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Cracks in the temple of global finance: governance, regulation, technology and the future of demutualized exchanges

Samer Iskandar

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Samer Iskandar. Cracks in the temple of global finance: governance, regulation, technology and the future of demutualized exchanges. Business administration. Université Panthéon-Sorbonne - Paris I, 2014. English. NNT: 2014PA010047 . tel-01436253

HAL Id: tel-01436253

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ESCP Europe

Ecole Doctorale de Management Panthéon-Sorbonne
ED 559

**Cracks in the Temple of Global Finance:
governance, regulation, technology and the future of demutualized exchanges**

**Le déclin des bourses démutualisées :
gouvernance défaillante, déréglementation et progrès technologique
affaiblissent les marchés organisés**

THESE

Présentée et soutenue publiquement le 4 décembre 2014

En vue de l'obtention du
DOCTORAT EN SCIENCES DE GESTION

Par

Samer ISKANDAR

JURY

Directeur de Recherche :	Christopher KOBRAK	Professeur de Finance ESCP Europe
Rapporteurs :	Leslie HANNAH	Professor of Economic History The London School of Economics and Political Science
	Janette RUTTERFORD	Professor of Financial Management The Open University Business School
Suffragants :	Ismail ERTÜRK	Senior Lecturer in Banking Manchester Business School
	Jean-Paul LAURENT	Professeur des Universités (Sciences de Gestion) Université Paris 1 Panthéon-Sorbonne
	Michael TROEGE	Professeur de Finance ESCP Europe

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A Violette

Remerciements

Ma première pensée va à Christopher Kobrak, mon directeur de thèse à ESCP Europe. De mes premières hésitations, jusqu'à mes derniers atermoiements, il a été bien plus qu'un simple professeur. Déjà en 1996, lorsqu'il m'a initié à la gouvernance d'entreprise, Chris a suscité chez moi une passion pour cette discipline à la croisée du management et de la finance d'entreprise. Pendant mes recherches, il m'a aidé à comprendre qu'aucun phénomène ne peut être appréhendé sans une connaissance préalable de son contexte historique. Enfin, tout au long de ce parcours de thèse, il a consacré des heures, voire des soirées entières, à écouter et répondre à mes interrogations tant académiques que personnelles. Sans Chris, cette thèse n'existerait tout simplement pas. Surtout, en dépit de mes doutes et de mes états d'âme, il ne s'est jamais départi de son inébranlable sens de l'humour : du premier jour (« tu te rends bien compte qu'en faisant cette thèse, tu te condamnes à voyager en classe éco le reste de ta vie ? »), jusqu'à la fin (« il va falloir penser à ta soutenance, car on approche du moment fatidique ou j'aurai dépensé pour te nourrir plus que ce que l'école m'a payé pour diriger ta thèse »).

Ce travail n'aurait pas été possible non plus sans la présence, la patience, l'écoute et la contribution des doctorants d'ESCP Europe et de l'Université Paris 1 Panthéon-Sorbonne, ainsi que des professeurs et vacataires qui ont partagé mon quotidien plusieurs années durant. Les doctorants (et alumni) : Magali Ayache, Emilie Bérard, Violette Bouveret, Alexandre Garel, Marie Holm, Xavier Léon, Mar Perezts, Sébastien Picard, Arthur Petit-Romec, Véronique Steyer, Elsa Tuffa, Arnaud Zeboulon, Andrew Zylstra, ont tous été disponibles et à l'écoute. Mes voisins de bureau : Thierry Amslem, Xiaoying Huang, Federica Salvade et les autres pensionnaires des cinquième et sixième étages de l'immeuble des Bluets, qui m'ont remonté le moral dans les moments de doute et de fatigue.

Je suis reconnaissant aux professeurs vacataires qui ont partagé avec moi le trac qui précédait les premiers cours de finance que j'ai animés à ESCP Europe : Catherine Bros et David Le Bris. Merci aussi à tous les étudiants qui ont assisté à mes cours (Finance d'entreprise et International Finance) pour leur patience durant les premières séances.

Une pensée particulière pour Fahmi Ben Abdelkader, qui a donné son temps sans compter pour m'initier aux arcanes des bases de données académiques et des logiciels de traitement statistique. Les journées entières qu'il m'a consacrées m'auront économisé, sans exagération, des mois entiers de tâtonnements. Et Charles-Henri Reuter, dont les conseils m'ont, tour à tour, conforté dans mes avancées ou remis en cause mes premières conclusions parfois hâtives.

Je remercie également ma famille pour son soutien affectif et moral : ma femme Isabelle pour sa patience, et notre bébé Violette, née en fin de thèse, et qui est trop petite pour se rendre compte de l'énergie, du bonheur et de la bonne humeur qu'elle dégage autour d'elle. Ainsi que mes parents, pour leurs encouragements ainsi que leur soutien moral.

Je tiens aussi à remercier les nombreux professeurs d'ESCP Europe, et plus particulièrement ceux du département finance, qui m'ont tellement souvent assisté ou éclairé sur d'innombrables sujets : Franck Bancel, Pramuan Bunkanwanicha, Stéphanie Collet, Alberta Di Giuli, Anne Gazengel, Cécile Kharoubi, Christophe Moussu, Steve Ohana, Philippe Spieser, Christophe Thibierge, Philippe Thomas et Michael Troege.

Remerciements

Sans oublier les professeurs des autres départements, dont le contact a été si enrichissant : Jean-Philippe Bouilloud, Sylvain Bureau, Maria Koutsovoulou, Jérémy Morales, Vanessa Stauss-Kahn, Véronique Tran, et tant d'autres.

Un grand merci aussi aux membres non-enseignants de la communauté ESCP Europe : Christine Rocque, du programme doctoral ; Michèle Criton et Annie Mouquet du département finance.

J'ai été très agréablement surpris par la disponibilité des professeurs visitants qui, malgré leurs emplois du temps surchargés, ont toujours pris la peine de m'écouter et me conseiller. Je pense surtout, mais pas seulement, à Donald Brean, Clifford Holderness et Mark Roe.

Je suis extrêmement reconnaissant aux professeurs qui ont accepté de participer à mon jury : les rapporteurs, d'abord, qui auront pris la peine de se déplacer deux fois pour venir à Paris, et dont les précieux conseils ont permis à ce document d'être aussi abouti. Les suffragants, aussi, pour la confiance qu'ils m'accordent en acceptant cette responsabilité.

Last but not least, mille mercis à Hervé Laroche, directeur du programme doctoral d'ESCP Europe, dont j'aurai testé la patience et la bienveillance jusqu'au dernier jour.

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Synthèse générale

Objectifs.

Le principal objectif de cette thèse de doctorat est de contribuer à la littérature existante dans le domaine de la théorie de l'agence, en dépassant l'approche traditionnelle, basée sur la dualité principal/agent. La méthode employée consiste à creuser plus en détail les motivations des divers principaux, afin de tester la validité de la théorie généralement admise, selon laquelle les principaux rationnels se comportent de manière à maximiser la création de valeur dans l'entreprise dont ils sont propriétaires.

Malgré ses innombrables contributions, l'approche principal/agent connaît des limites, qui sont explorées en détail dans cette thèse, et que je propose de dépasser.

Cette thèse examine la période qui suit les démutualisations des entreprises opératrices de marchés financiers organisés, et se concentre sur les années durant lesquelles ces entreprises étaient cotées en bourse. Cette période englobe par ailleurs la mise en place en 2007 (aux États-Unis et dans l'Union européenne) de deux textes réglementaires majeurs, qui ont effacé les barrières qui auparavant protégeaient le monopole des bourses historiques. Ces deux événements – démutualisation et déréglementation – et leurs conséquences sont déterminants pour l'analyse qui suit.

L'approche utilisée ici est basée sur la constatation que nombre de principaux ne sont pas préoccupés en priorité par la création de valeur, contrairement aux hypothèses qui sous-tendent l'analyse principal/agent traditionnelle. Plus précisément, je me penche sur des situations où certains principaux obtiennent plus d'avantages financiers de par leur position de client ou de partenaire de l'entreprise de marché, que par leur état d'actionnaire de cette même entreprise. Afin de jauger ces motivations contradictoires, il a fallu analyser l'identité-même de ces actionnaires et déterminer comment celle-ci influe sur leur comportement. Ces facteurs sont analysés quantitativement dans la Partie III, puis plus en détail dans les études de cas de la Partie IV. Dans la Partie V, je m'attache à identifier puis analyser d'autres facteurs explicatifs du déclin relatif des bourses par rapport à leurs concurrents, notamment les évolutions technologiques et réglementaires.

Le premier objectif (comprendre les motivations des principaux) est facilité par l'histoire récente des entreprises en question. En raison de leur démutualisation récente, il est facile de suivre de près les évolutions de leur actionnariat. Dans la période précédente, en tant que mutuelles (ou coopératives) toutes les bourses avaient une structure actionnariale homogène, composée d'acteurs (les courtiers en bourse ou agents de change) aux motivations similaires. Par conséquent, les problèmes d'agence étaient quasi-inexistants, même si d'autres formes d'expropriation, tels que les abus de position dominante ou les pratiques monopolistiques, pouvaient avoir lieu. Il est intéressant d'observer l'impact qu'a eue sur ces opérateurs de bourses leur propre introduction en bourse, accompagnée de l'arrivée de nouveaux actionnaires (dont certains purement financiers). Ce changement fait notamment émerger de nouveaux problèmes d'agence, accompagnés de nouvelles manières d'exproprier les nouvelles parties prenantes (par exemple les actionnaires, au lieu des clients auparavant).

Les structures actionnariales des différentes entreprises étudiées ici ont évolué dans des directions divergentes : les courtiers ont très rapidement disparu de l'actionnariat de Deutsche Boerse, pour être remplacés par des investisseurs institutionnels ; le Nasdaq, quant à lui, est resté de nombreuses années sous l'emprise de la très influente National Association of Securities Dealers, le lobby des courtiers américains et premier client de la plateforme d'échanges ; le London Stock Exchange vit sous le joug de Borse Dubai (et de Nasdaq OMX auparavant), des concurrents directs qui détiennent (ou ont détenu) plus d'un tiers de ses actions. Les performances et les stratégies de ces bourses sont tout aussi divergentes que la structure de leur actionnariat.

Le second objectif de cette thèse (identifier les autres facteurs explicatifs du déclin des bourses) découle naturellement du premier, quand il devient évident que le pouvoir des actionnaires ne peut suffire à expliquer toute l'étendue des changements subis par les bourses : il devait y avoir d'autres facteurs. C'est suite à cette constatation que j'ai identifié deux facteurs, la technologie et la réglementation, qui en interagissant acquièrent le pouvoir de révolutionner le contexte opérationnel et concurrentiel dans lequel évoluent les marchés financiers organisés.

L'approche choisie pour ce travail est innovante de deux manières. Premièrement, par le choix d'étudier la structure actionnariale plus en détail que dans les travaux précédents. Au lieu de classer l'actionnariat selon sa concentration ou sa

fragmentation (à l'instar de Holderness (2009), Jensen et Meckling (1976) ou Fama et Jensen (1983)), je classe les actionnaires dans trois catégories distinctes, selon le nombre et l'étendue des conflits d'intérêts qu'ils ont vis-à-vis de l'entreprise.

La seconde innovation consiste à analyser l'effet combiné que peuvent avoir les avancées technologiques et les évolutions réglementaires quand elles coïncident dans le temps. L'effet déstabilisant des changements réglementaires a déjà été bien exploré dans la littérature financière. De même pour l'importance des changements technologiques. La nouveauté ici consiste à analyser l'effet combiné de ces deux facteurs extrinsèques à l'entreprise.

Structure.

Cette thèse se présente sous la forme de trois articles. Ils sont précédés par une introduction générale (Partie I) contenant le contexte historique et une revue de la littérature, et un chapitre (Partie II) avec des informations essentielles sur la réglementation et le contexte concurrentiel. Les trois articles (Parties III, IV, et V) sont ensuite suivis d'une conclusion générale (Partie VI).

- Article 1 (Partie III) : dans cette partie j'utilise une approche empirique quantitative sur un échantillon de six entreprises de marché, dans le but d'identifier les traits comportementaux typiques de chaque catégorie d'actionnaires, et comment ces comportements influencent la performance de l'entreprise. En testant diverses hypothèses basées sur la nature des actionnaires et leurs motivations, une corrélation positive est établie entre la concentration d'actionnaires financiers et la performance de l'entreprise. A l'inverse, la fragmentation du capital est négativement corrélée avec les indicateurs de performance. Une troisième catégorie, les investisseurs stratégiques, a des effets globalement négatifs sur la performance. Mais ces effets étant contrastés, une analyse plus approfondie de chaque type d'actionnaire stratégique s'impose. Ces analyses, plus poussées, sont effectuées dans le chapitre suivant sous la forme d'études de cas individuels.
- Article 2 (Partie IV) : ce chapitre contient six études de cas d'entreprises individuelles (deux opérateurs spécialisés en marchés actions (London Stock

Exchange et Nasdaq OMX), deux conglomérats diversifiés (NYSE Euronext et Deutsche Boerse) et deux marchés spécialisés en produits dérivés (Intercontinental Exchange et CME Group)). Les actionnaires sont classés en trois catégories, selon le nombre et la nature des conflits d'intérêts qu'ils ont vis-à-vis de l'entreprise (ces catégories sont les mêmes que dans la Partie III). Les résultats montrent que la multiplication des conflits d'intérêt chez certains actionnaires est destructrice de valeur pour les autres actionnaires. Les études de cas mettent en lumière plusieurs exemples d'expropriation des actionnaires minoritaires par les actionnaires sujets aux conflits d'intérêt. Les hypothèses générales dérivées de la littérature antérieure sont encore une fois vérifiées : la fragmentation du capital est destructrice de valeur ; et la concentration d'actionnaires financiers est propice à la création de valeur. Les investisseurs stratégiques peuvent avoir divers effets sur la performance. Quand il s'agit d'actionnaires salariés, leur présence est destructrice de valeur. Lorsqu'ils sont fondateurs de l'entreprise, leur concentration a un effet bénéfique sur la performance. Enfin, lorsque l'actionnaire stratégique est un prédateur frustré (concurrent qui tente une prise de contrôle) sa présence accroît la volatilité des résultats financiers de sa proie.

- Article 3 (Partie V) : l'environnement concurrentiel des bourses organisées est constamment remodelé par deux forces puissantes – les changements réglementaires et l'évolution technologique. L'utilisation de nouvelles technologies est un facteur concurrentiel décisif, mais l'adoption de ces techniques est soumise à des restrictions d'ordre réglementaire. A un moment donné, il existe souvent des technologies permettant de nouvelles pratiques de marché, mais leur utilisation est freinée par des règles qui ont été écrites avant l'apparition de la technologie. Ainsi, la concurrence entre bourses se nourrit des avancées technologiques mineures, ce qui induit des évolutions graduelles du paysage opérationnel. Ces évolutions peuvent favoriser l'apparition de nouveaux acteurs, ou la domination relative d'un type d'acteur de marché existant au détriment d'un autre. Les avancées réglementaires, de leur côté, se font par paliers, notamment lors de passage de nouveaux paquets législatifs. Ainsi, toutes les quelques années, le paysage réglementaire change radicalement. Ces changements réglementaires sont souvent l'occasion d'adopter en masse les

technologies disponibles mais non-autorisées auparavant. L'évolution du contexte concurrentiel lors de ces passages de paliers réglementaires est autrement plus brutale que celle induite par l'adoption graduelle de nouvelles technologies en temps normal. Pour cette raison, j'utilise le terme « effet adjuvant » de la réglementation sur la technologie. En pharmacologie, un adjuvant est une molécule qui n'a pas d'effet médicinal en soi mais qui, ajoutée à une molécule active, multiplie les effets de cette dernière. Dans la Partie V, j'explique que la réglementation a un effet adjuvant, ou multiplicateur, sur les forces induites par les avancées technologiques.

Méthodologie.

L'approche est multi-méthode. Pour le premier article, l'échantillon de six entreprises, avec un historique (selon les entreprises) de 8 à 10 ans, permet une approche quantitative par régressions simples (moindres carrés). Une question, sur les quatre principales qui sont posées, est abordée de manière inductive (voir la section Résultats ci-dessous).

Dans le deuxième article je teste les mêmes trois hypothèses de manière hypothético-déductive, et j'aborde également la quatrième de manière inductive. Pour certaines variables, dont les échantillons sont trop petits pour donner des résultats significatifs, je présente des graphiques dans lesquels on peut déceler des tendances. Cette approche ne permet pas de corroborer des hypothèses émises, mais plutôt de vérifier visuellement que les résultats démontrés quantitativement auparavant s'appliquent également aux cas individuels.

Le troisième article s'appuie sur la même base de données, mais l'approche est différente. Le but ici étant de vérifier si un événement particulier (un changement de réglementation) affecte la performance des bourses, je procède par comparaison de moyennes, dans un premier temps, puis par différence de différences, dans un second. Cette approche requiert un panel de données adapté, avec des périodes de même longueur pour l'échantillon témoin (avant) et l'échantillon de test (après). Comme la période « après » est fixée à quatre ans (2008-2011), j'ai éliminé toutes les données antérieures à 2004, afin que l'échantillon « avant » contienne également

quatre années de données (2004-2007). J'ai également dû créer une variable muette (« dummy variable ») : After_Mifid, qui est égale à 1 pour 2008-2011, et 0 pour 2004-2007. Par ailleurs, comme la réglementation en question s'applique aux bourses d'actions, mais pas de dérivés, l'échantillon exclut également les deux bourses spécialisées en produits dérivés – ICE et CME Group. L'échantillon restant ne contient donc que quatre bourses : LSE et Nasdaq OMX (bourses d'actions pures) ; et NYSE Euronext et Deutsche Boerse (bourses diversifiées, actions et dérivés).

Résultats.

Partie III (Article 1).

J'ai utilisé quatre variables indépendantes, chacune représentant un type d'actionnariat.

1 – Freefloat. Il s'agit de la proportion des actions en circulation qui peuvent être considérées comme flottantes (détenues par des investisseurs individuels ou en blocs trop petits pour conférer un réel pouvoir à leur détenteur). Selon la littérature préexistante, un taux élevé de freefloat conduit à une sous-performance de l'entreprise. Ceci s'explique par le fait que les dirigeants de l'entreprise sont soumis à moins de pression de la part des investisseurs, ces derniers n'étant pas organisés.

2 – Investment Managers (IM). Il s'agit de la proportion des actions en circulation détenues par des investisseurs institutionnels. Selon la littérature, ces investisseurs sont en priorité à la recherche de performance financière. Par conséquent, leur présence devrait être associée avec une amélioration de la performance financière et opérationnelle de l'entreprise.

3 – Brokers. Il s'agit d'institutions financières dont la principale activité consiste à exécuter des ordres en bourse pour le compte de leurs clients. Ces institutions font face à de sérieux conflits d'intérêts vis-à-vis de la bourse dont ils sont actionnaires. D'une part, ils sont actionnaires, donc attendent un retour financier de la part de la bourse, sous forme de dividendes et de plus-values. D'autre part, ils sont utilisateurs (donc clients) de cette bourse, et paient des frais pour l'utilisation de ses services. Par conséquent, ils ont intérêt à exercer des pressions sur cette bourse afin d'obtenir des rabais, ce qui affecte négativement les résultats de la bourse. Si les brokers sont

des acteurs rationnels, leur comportement logique devrait être le suivant : ils exigeront des rabais (au détriment de leur retour sur investissement) tant que les frais qu'ils paient pour l'utilisation de la bourse sont supérieurs au retour qu'ils attendent de leur investissement dans les actions de la bourse ; et vice versa.

4 – Investisseurs stratégiques. Cette catégorie consiste en un groupe très hétérogène, aux intérêts divergents, souvent contradictoires. Les principaux acteurs pouvant appartenir à cette catégorie sont les suivants : fondateurs de l'entreprise ; dirigeants salariés bénéficiant de stock-options ; partenaires ou clients détenant des participations croisées ; prédateurs frustrés, ayant accumulé une participation lors d'une tentative d'acquisition manquée, sans réussir à prendre le contrôle.

Ces quatre types d'actionnaires me permettent de tester les quatre hypothèses suivantes :

- A) La variable freefloat est négativement corrélée aux indicateurs de performance de l'entreprise. C'est à dire que plus l'actionnariat est fragmenté, moins l'entreprise est performante.
- B) La variable IM est positivement corrélée aux indicateurs de performance : plus la proportion d'actionnaires financiers est élevée, plus l'entreprise est performante.
- C) La variable brokers est négativement corrélée aux indicateurs de performance : une grande proportion d'actions détenues par des clients de l'entreprise induit une sous-performance de celle-ci.
- D) Une forte proportion d'actionnaires stratégiques doit avoir des effets sur la performance, positifs ou négatifs.

Les hypothèses A), B) et C) peuvent être testées de manière hypothético-déductive. Répondre à la question D) nécessite une approche inductive.

J'ai dressé une liste de 19 variables dépendantes : 11 variables qui mesurent la performance financière de l'entreprise et 8 variables mesurant la performance opérationnelle. La liste, la description et le mode de calcul de toutes les variables sont détaillés dans les Annexes à la fin du document.

J'applique la méthode des régressions simples à toutes les variables. Les résultats de toutes les régressions sont reproduits dans les Annexes. Les résultats significatifs sont reproduits et analysés dans la Partie III. Les hypothèses A) et B) sont vérifiées pour un grand nombre de variables. L'hypothèse C) est vérifiée pour un petit nombre de

variables, de manière insuffisante pour être concluante. Les régressions visant à répondre à la question D) donnent des résultats contrastés : en moyenne, les régressions montrent une corrélation plutôt négative entre la proportion d'actionnaires stratégiques et les mesures de performance. Mais ces résultats demandent à être affinés au cas par cas, ce qui conduit à la Partie IV – les études de cas.

Partie IV (Article 2).

Dans cette partie j'utilise la même base de données, mais les régressions sont appliquées à chaque entreprise individuellement. Si les résultats statistiques sont moins robustes, cette approche offre néanmoins deux avantages. Le premier est de confirmer que les résultats auxquels je parviens dans la Partie III sur un panel d'entreprises sont vérifiés au niveau de chaque bourse individuellement. Le second avantage est que cette approche permet d'affiner la compréhension des divers effets que peuvent avoir les actionnaires stratégiques, étant donné que cette catégorie est hétérogène. La plupart des résultats obtenus dans la Partie III en testant les hypothèses A), B) et C) sont confirmées.

La question D) donne les résultats suivants, même si ces derniers ne sont pas robustes : quand les actionnaires stratégiques sont des concurrents directs (comme c'est le cas du London Stock Exchange avec Nasdaq comme actionnaire dominant), la conséquence est une plus grande volatilité des mesures de performances. Ceci est compatible avec les hypothèses émises auparavant dans la littérature, selon lesquelles une prise de contrôle rampante est source de distraction pour les dirigeants de l'entreprise cible. Le cas du LSE est également intéressant car il permet de détecter une situation d'expropriation des actionnaires minoritaires par des actionnaires dominants. Ce cas précis est traité séparément dans un encadré. Lorsque les actionnaires stratégiques sont des fondateurs (comme c'est le cas du marché de produits dérivés ICE), leur présence est associée à de meilleures performances. Ceci tend à confirmer que des dirigeants ayant un lien personnel avec l'entreprise se comportent plus comme des principaux (maximisateurs de valeur actionnariale) que comme des agents qui sont tentés de détourner les richesses de l'entreprise pour leur propre avantage. Enfin, lorsque l'actionnariat stratégique est composé de dirigeants salariés, je décèle des signes qui semblent indiquer que ces dirigeants cherchent à maximiser leur gain individuel, plutôt que la valeur actionnariale pour tous les actionnaires.

Dans cet article, j'aborde également des questions supplémentaires par rapport au premier, par exemple l'augmentation de la volatilité, que je teste par comparaisons des écarts types de certaines variables. Trois encadrés séparés permettent de mettre les études de cas en perspective. Ces encadrés (dont celui concernant le LSE qui est décrit ci-dessus) font le point sur des comportements d'actionnaires dans des situations ponctuelles qui ont eu des effets sur les entreprises étudiées.

Partie V (Article 3).

Le troisième article vise à tester trois hypothèses majeures, et une hypothèse mineure. Les trois hypothèses principales sont :

- 1) Mifid (et la législation équivalente et concomitante aux Etats-Unis – Reg NMS) nuisent aux résultats opérationnels et financiers des opérateurs de bourses d'actions. Par conséquent, les mesures moyennes de performance avant 2008 devraient être supérieures à ces mêmes mesures après 2008.
- 2) Mifid et Reg NMS nuisent aux résultats opérationnels et financiers des opérateurs de bourses diversifiées. Par conséquent, les mesures moyennes de performance avant 2008 devraient être supérieures à ces mêmes mesures après 2008.
- 3) Les bourses spécialisées en actions souffrent plus que les bourses diversifiées, car ces dernières bénéficient d'une activité (les dérivés) qui n'est pas affectée par la déréglementation, ce qui les protège partiellement.
- 4) L'hypothèse secondaire que je teste est la suivante : les actionnaires avertis (professionnels de la finance) anticipent la détérioration de la performance qui sera induite par Mifid et Reg NMS et vendent des actions des bourses. Donc les variables IM et Brokers à partir de 2008 devraient être inférieures à leur niveau moyen durant les années jusqu'à 2007.

Je teste les mêmes variables que dans les deux articles précédents (11 mesures de performance financière et 9 mesures de performance opérationnelle). Tous les calculs (comparaisons de moyennes et différences de différences) sont détaillés dans les annexes de la thèse. Les résultats significatifs sont reproduits et analysés dans la Partie V. Les hypothèses 1) et 2) sont vérifiées pour 9 variables dans l'échantillon des bourses diversifiées, et 6 variables dans celui des bourses spécialisées. L'approche par différence de différences est applicable uniquement pour les variables dont les résultats sont significatifs dans les deux échantillons, ce qui est le cas pour six variables. Le calcul de différence de différences corrobore l'hypothèse

3) : dans tous les cas, la détérioration de performance est plus prononcée pour les bourses spécialisées que pour les bourses diversifiées. Enfin, l'hypothèse 4) est vérifiée pour la variable Brokers, mais pas pour la variable IM. Les brokers, donc, réduisent significativement leurs détentions d'actions des bourses après le changement de réglementation qui élimine le monopole de ces bourses organisées sur les échanges des actions cotées.

Contributions.

Cette thèse apporte deux contributions notables aux littératures existantes sur la gouvernance d'entreprise et sur les bourses organisées.

- 1) Le « principal quasi-agent » : la littérature existante dans le domaine de la gouvernance d'entreprise divise les deux principales parties prenantes d'une entreprise en deux catégories : le principal, propriétaire à qui revient de droit la richesse générée par l'entreprise ; et l'agent, un gestionnaire mandaté et rémunéré par le principal afin de gérer l'entreprise pour le compte des propriétaires (actionnaires). A travers l'observation détaillée des différents types d'actionnaires, j'ai identifié plusieurs cas où des principaux, faisant face à de nombreux conflits d'intérêts, ont une influence contraire à celle qui serait attendue de leur part : au lieu de favoriser la création de valeur, ils la détruisent. Je nomme ces acteurs des principaux quasi-agents, car tout en étant des principaux (détenteurs de droits résiduels), ils se comportent souvent comme des agents (mandataires qui sont tentés d'exproprier les principaux).
- 2) L'« effet adjuvant » de la réglementation dans un contexte d'évolution technologique. Au-delà de la simple vérification que les changements réglementaires (Mifid et Reg NMS) ont eu un effet sur la performance des bourses, j'avance l'argument que ces changements réglementaires ont des conséquences particulièrement prononcées durant les périodes d'évolution technologique rapide. Dans le but de renforcer cet argument, je compare cette période d'ajustement réglementaire à deux époques similaires : le développement du marché de l'eurodollar à Londres durant les années 1960-

1970, sous l'impulsion conjuguée de la réglementation américaine et du déploiement des télécommunications à bas coût; les Big Bangs réglementaires du milieu des années 1980, coïncidant avec l'introduction des transactions électroniques.

Par ailleurs, cette thèse permet également de corroborer certaines théories existantes de la gouvernance. Notamment, que la fragmentation du capital d'une entreprise est nuisible à sa performance opérationnelle et financière; que la concentration d'actionnaires financiers est favorable à la création de valeur actionnariale; que les actionnaires dominants (avec une participation de 20% ou plus au capital) ont les moyens d'exproprier (en toute légalité) des actionnaires minoritaires impuissants; que la présence d'un actionnaire hostile (par exemple suite à une tentative de prise de contrôle) déstabilise l'entreprise, augmentant la volatilité de ses résultats. Par ailleurs, en ce qui concerne plus particulièrement le secteur des bourses, il est intéressant de constater que certaines bourses créées après la vague de démutualisations recourent à des techniques de gouvernance inspirées des mutuelles. C'est le cas, notamment, de ICE, qui a mis en place un système de partage de ses bénéfices avec ses clients les plus actifs.

Conclusion et discussion.

Le principal objectif de cette thèse – démontrer que l'approche principal/agent qui sous-tend une grande partie de la recherche en gouvernance d'entreprise est susceptible d'être affinée – est atteint. La théorie de l'agence, malgré ses raffinements successifs, reste tributaire d'une approche binaire à l'origine : le conflit entre les intérêts des principaux (détenteurs de droits résiduels dont l'objectif est de protéger et maximiser ces droits) et les agents (mandatés par les principaux pour gérer l'entreprise, et qui ont les moyens d'en détourner une partie des richesses en profitant de leur plus grande proximité avec les instruments de création de richesse). Les résultats de ce travail de recherche soulignent l'importance d'analyser la nature des principaux, car les intérêts des différents principaux ne sont pas nécessairement alignés. Ainsi, les conflits d'intérêts au sein d'une catégorie de principaux peuvent conduire ceux-ci à se

comporter comme des agents. C'est le cas, par exemple, quand un actionnaire/client peut obtenir des avantages commerciaux (au détriment des autres actionnaires) supérieurs au retour financier qu'il attend de l'entreprise.

L'analyse de la nature et des motivations des principaux devrait s'ajouter à la liste des instruments existants de la théorie de l'agence, au même titre que la fragmentation/concentration de l'actionnariat (Holderness), la théorie des contrats implicites (Williamson), ou les approches politique (Roe) et légale (La Porta, Lopez, Shleifer et Vishny).

Ma recherche, tout en répondant à des questions essentielles, en a également soulevé d'autres, notamment en ce qui concerne la réglementation. Dans la Partie V, j'analyse les effets des changements réglementaires sur les bourses. Mais les changements de gouvernance des bourses ont de leur côté soulevé des interrogations sur la réglementation. Le changement de mode de gouvernance des opérateurs de marché, en faveur de structures de sociétés à but lucratif, pose la question de leur capacité à s'autoréguler. Peut-on confier des responsabilités réglementaires à des entreprises qui cherchent à maximiser la création de valeur financière ? Une telle entreprise sera-t-elle capable d'appliquer des règles strictes à ses clients les plus rentables, au risque de les perdre ? Ne sera-t-elle pas tentée de relâcher ses règles quand cela peut lui permettre d'augmenter son activité ? Toutes ces questions, et d'autres, sont abordées dans la Partie VI, ainsi que dans différentes sections, notamment les revues de littérature de la Partie I et de la Partie III. Quoi qu'il en soit, de nombreux événements liés à la concurrence entre bourses (exposés dans cette thèse) ont récemment ravivé le débat entre les partisans de l'autorégulation et ceux qui prônent une régulation centralisée par les autorités publiques.

Par ailleurs, certaines de mes conclusions invitent de nouvelles recherches. Par exemple, mon échantillon étant composé d'entreprises en transition (leurs changements de gouvernance ont eu lieu dans les dix à vingt dernières années), les mêmes comportements existent-ils dans des entreprises démutualisées depuis plus longtemps (les compagnies d'assurances américaines démutualisées aux début du vingtième siècle) ? Les principaux quasi-agents existent-ils dans d'autres types d'entreprises (qui n'ont jamais été des mutuelles ou des coopératives) ? L'existence de conflits d'intérêts au sein de l'actionnariat des bourses devrait-elle pousser les régulateurs à s'immiscer dans la structure de cet actionnariat ?

Ou encore, et c'est sans doute une des questions les plus pressantes : si ces contextes concurrentiel, technologique et de gouvernance perdurent, combien de temps encore ces bourses affaiblies pourront-elles survivre ?

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Part I

General introduction

I.1. Aims and approach

My broadest aim in this dissertation is to make a contribution to agency theory by going beyond the principal/agent conundrum, and delving into the motivations of various principals. In spite of its invaluable contributions to financial and management theory, the principal/agent approach has many shortcomings that have been widely studied (I shall revisit this issue in the literature review below).

This dissertation examines the period following the demutualization of exchanges and the listing of their own shares. This timeframe also covers the introduction in 2007 of the two main pieces of legislation (in the US and EU) that previously shielded exchanges from competition. Both events (demutualization and deregulation) are central to the following analysis.

My approach is based on the assumption that not all principals are primarily motivated by value maximization. To be more specific, I have identified instances where principals derive more value through other means (as customers or users of a service) than from their position as part owners of the enterprise. In order to understand these ulterior motives, I had to analyze to what extent the identity of shareholders influences their behavior. I do this in Part III and Part IV. In Part V, I identify other important factors that explain the relative decline of exchanges as a financial infrastructure.

The first quest is facilitated by the nature and recent history of exchanges. Because the institutions included in this sample are all recently demutualized, it is possible to track changes in their ownership quite closely. Pre-demutualization, all the owners were similar in nature (brokers) and thus their objectives closely aligned. As a result, agency problems were not an issue, although other types of expropriation, such as abuse of their dominant position and predatory pricing, were numerous. Post-IPO, it is interesting to see what types of shareholders come to dominate and how their objectives shape the corporation going forward. Agency problems are rife and new ways have emerged to expropriate different constituencies (such as minority shareholders, instead of customers).

The shareholding structures of firms in the sample have evolved along diverging paths: brokers disappeared from Deutsche Boerse's shareholder register almost

immediately after the group's listing, and the exchange is now almost entirely owned by investment funds; for a long time Nasdaq remained dominated by brokers, represented by the influential National Association of Securities Dealers, who make up the biggest group of the exchange's customers; the London Stock Exchange (LSE) has a direct competitor, Borse Dubai, as the cumbersome owner of a third of its shares. And just as their shareholding structures diverged, exchanges' fortunes have also differed widely.

The second objective of this research becomes self-evident while pursuing the first, when it transpires that the changes affecting exchanges extend far beyond the influence that shareholders alone can exert. No matter how neglectful or conflicted shareholders are, no rational investor would deliberately allow his investment to dwindle towards irrelevance. So there had to be other forces at play. This is where I identified regulation and technology as two mutually reinforcing factors with the power to reshape the industry, outside the remit of the traditional principals and agents.

My approach is innovative in two ways: the first innovation is to examine corporate ownership not only in terms of fragmentation/concentration as in Holderness (2009), or principals and agents as in Jensen and Meckling (1976), Fama and Jensen (1983), etc., but to delve further into the nature and motivations of shareholders. I have segmented them into three categories depending on the degree of conflict of interest they display vis-à-vis the firm. These conflicts are summarized in Table 1.2 in the Methodology section of this chapter.

In a second innovation, I have looked at how regulation and technological change combine, during key periods, into a game-changing tectonic shift in the competitive landscape. The fact that regulation plays an important part in the functioning of exchanges is well known. Equally well documented is the importance of technology in such a highly competitive sector. The novelty in my approach is to look at what happens when these two factors are combined. The restraining effect of regulation on the uptake of new technologies has been described by Jim Eckenrode, executive director of the Deloitte Center for Financial Services.¹ In a 2013 research note, he described technology as an "irresistible force" meeting regulation's "immovable object". This led him to ask the question: "Which will have more influence in the coming years: innovation (the spear) or regulation (the shield)?" In Part V, I start answering this question by

examining several cases in which such a clash occurs between these two main forces that shape the financial industry.

The resulting dissertation comes in the form of three articles, preceded by a general introduction, historical background and a review of the literature, and followed by a conclusion and thoughts on avenues for future research.

- Article 1 (Part III) is an empirical analysis of financial data from six exchanges. In this section, I seek to identify general behavioral traits associated with each type of shareholder, and how they affect the corporation. Testing various hypotheses pertaining to shareholders' nature and motivations, I find evidence that the concentration of value-maximizing shareholders (financial investors) improves several measures of the exchanges' performance, and that high fragmentation of shares is associated with lower performance. Strategic investors are on balance value destroying.
- Article 2 (Part IV) consists of six case studies, each focusing on one of the major listed exchange operators. Two of them are pure equity exchanges (LSE and Nasdaq OMX); two diversified conglomerates (NYSE Euronext and Deutsche Boerse); and two are pure derivatives exchanges (Intercontinental Exchange and CME Group). Shareholders are divided into three groups, depending on the degree to which their interests conflict with those of the exchange's other shareholders (see Table I.2). I find evidence that the concentration of conflicted shareholders results in significant destruction of value for other shareholders, and detect instances of expropriation of minorities by the conflicted shareholders. Detailed examination of strategic shareholders also shows that the effects of their presence can vary widely: in some cases they foster value creation (when they consist of entrepreneurs), in others they destroy it (entrenched manager/shareholders).
- Article 3 (Part V). Two major forces are constantly modifying the competitive landscape in which financial exchanges operate: regulatory changes and technological advances. Technology is a key driver of competition, but its effects are kept in check by regulatory barriers: sometimes, it takes years before it becomes clear whether certain uses of new techniques are legal or not. Competitive pressure alone, fueled by technological innovation, fosters constant evolution, resulting in the emergence of new players and the weakening of others. But, sometimes, regulatory changes and technological pressure combine, resulting in a massive shake-up of the industrial landscape. Regulatory

overhauls multiply the effects of competition and technology (a phenomenon I call the adjuvant effect), resulting in a revolution – which can lead to the emergence or disappearance of a key player. With the combination of cheap electronic trading and the legal end of national monopolies, we are witnessing one of these adjuvant-boosted revolutions. Previous adjuvant moments have seen the disappearance of entire professions (such as stock-jobbing in London after the Big Bang of 1986) or markets (US dollars held by non-residents in New York migrating to London in order to avoid stringent US controls). This one could end up wiping out the most symbolic institution of all: the stock exchange.

I.2. Contributions and findings

My two contributions to the literature are what I call the “Quasi-Agent Principal” and the “adjuvant effect” of regulation.

I.2.1 The Quasi-agent principal (QAP).

My examination of shareholders shines the spotlight on several categories of principals who face so many conflicts of interest that they end up destroying the value of their investment, either deliberately or unwittingly as part of the pursuit of other agendas. Most prominent among these principals who behave like agents are two categories of shareholders: brokers and strategic investors.

The QAP is a shareholder (principal) whose conflicts of interest lead him to adopt behaviors that decrease the value of his investment in the firm, as he diverts this value into other advantages that he can receive from the same firm.

Agency theory has been constructed around the principal/agent dilemma, with principals being defined as the rightful owners of residual rights and agents as those to whom principals delegate power in order to produce value (Berle and Means (1932), Fama and Jensen (1983), etc.) Agency theory stipulates that, assuming principals and agents behave rationally, each group will seek above all to serve its own interests. Under this assumption, agents will seek to extract as much value as possible from the company, or at least as much value as they believe they can get away with before principals decide to replace them with less costly agents. Conversely, principals will try to delegate as little power as possible for their chosen agents to be able to manage the firm and create value. They will also seek to have in place as many checks on the agents as possible, until the cost of these safety nets (agency costs) becomes too great relative to the value created by the firm.

Brokers are conflicted vis-à-vis the exchanges because they play two simultaneous roles, as co-owners and customers. On the one hand, as shareholders, they expect their investment in the exchange to generate value in the form of dividends and capital gains. On the other hand, as customers, it is in their interest to pay as little as possible in fees to the exchange. It is this conflict that weighs on the profitability of

exchanges, as brokers stand to gain much more from lower trading fees than from higher dividends and capital gains.

One occurrence of behavior that is not consistent with value maximization is when nine of the LSE's biggest customers (and shareholders) created a rival equity-trading platform: Turquoise. These brokers then shifted a portion of their equity trading from LSE to Turquoise, exacerbating the exchange's loss of market share. A few years later LSE bought Turquoise, while the brokers again shifted their trading to other platforms, including one controlled by them. The episode is reminiscent of the practices described by Johnson, Porta, Lopez-de-Silanes and Shleifer (2000), where dominant shareholders transfer value from the company in which they are co-investors with others to another, related, company in which they are the sole beneficiary. This analogy between exchanges and the companies described in Johnson et al (2000) is the subject of a sub-section (Focus: "Tunneling" at the LSE) in Part IV.

The other value-destroying QAPs are strategic investors. Although the term applies to a ragbag of entities with various motivations, strategic investors come with a number of defects: entrenchment, hostility to the firm, ambiguous intentions, etc.

Strategic investors in this dissertation consist of founders who still have power, predators who built up a stake but failed to take full control, or trade bodies defending the interests of one type of stakeholder. In the most obvious case, the LSE has lived for over half a decade with a hostile shareholder (Nasdaq) who tried to take control but failed. Nasdaq kept its stake of more than 30% of LSE for several years, without disclosing its intentions. What can these intentions be? Drive LSE's share price down in the hope of taking control at a cheaper price eventually? Weaken its competitor from inside? Maximize the share price in order to sell out?

Whatever Nasdaq's motivations, LSE has underperformed under its rival's tutelage. The effects of creeping control (management wasting energy and money, demotivation of the staff, lack of strategic direction, denial of a takeover premium to other shareholders) have been studied extensively (including by Croft and Donker (2006), and many others). All of these symptoms appear to have afflicted the LSE since the irruption of Nasdaq among its shareholders.

I.2.2. The adjuvant effect of regulation.

There are documented instances in financial history (such as the Big Bangs of the mid-1980s in European financial markets, the emergence of the Eurodollar market in London in the second half of the 20th century, etc.) when a combination of regulatory change and technological advances turns into an explosive mix that changes the industrial landscape permanently, to an extent not foreseen by either the regulators or the adopters of the technology. We seem to be witnessing such a moment in history. The combination of very cheap, incredibly fast, trading technology, with the removal of legal protection for organized exchanges (through the implementation of the SEC's Regulation National Market System [Reg NMS]ⁱⁱ in the US and the Investment Services Directive – Markets in Financial Instruments Directive [Mifid]ⁱⁱⁱ in the EU) threatens the very existence of such exchanges.

In immunology, an adjuvant is a chemical additive that multiplies the therapeutic effects of a vaccine. The adjuvant does not have any medicinal properties in itself (it often consists of small quantities of aluminum) but makes the other components of the vaccine more powerful. In the context of financial markets, the main driver of change is competition, which feeds on technological advances and deregulation. I find that the effects of technological change are multiplied when it coincides with a favorable regulatory change. In other words, some competitive changes that are made possible by technology alone are vastly accelerated and their effects multiplied when a change in regulation (most often deregulation) unleashes their potential. This is what I call the adjuvant effect of regulation.

Technology-driven changes are well documented, and often lead to changes in the competitive landscape (for example, with a new entrant taking market share from an incumbent) or with the balance of power shifting between two existing competitors. Many technologies have played a role in financial innovation: the telephone, telex and telegraph, air travel, the internet, computers in general, etc. Among the regulations that have caused changes in the financial markets, we find taxation, exchange controls, limits on foreign ownership, competition law, the degree of tolerance of monopolistic positions, etc. However, when the adjuvant effect operates, the competitive shift is greater, often leading to the disappearance of a major institution or the emergence of a new one.

The most striking “adjuvant moment” before the current turmoil was the Big Bang of 1986 in London, which consisted of a regulatory overhaul and the introduction of then-revolutionary screen-based trading technology. Prior to Big Bang, roles were clearly defined in the City of London, as described in detail below. Big Bang resulted in the disappearance of an entire industry, jobbers, who were either bought by brokers or closed shop.

Similarly, the current adjuvant effect moment, fed by computerized trading and deregulation, threatens to cause the disappearance of exchanges themselves. Although equity trading globally is growing exponentially, revenues from equity trading on the organized exchanges have declined across the board. In the twelve years under study, comprising most of the post-IPO history for a majority of the exchanges, there are two clear periods: pre-2007 and post-2007.

Before 2007 was a period of steady growth, improving profitability and steadily rising prices of exchange shares. Exchanges dominated their sector (listing and trading of financial securities); they were efficient, liquid and reliable. The companies that operated them were very profitable. After 2007 most performance measures deteriorate. Exchanges look increasingly vulnerable, with market share being taken away from them by new entrants. Every exchange’s share price peaked in 2007 (with the exception of NYSE’s, which peaked a year earlier, due to the transatlantic merger with Euronext). In the following years productivity fell, sales stagnated or fell, and operating and net income declined. Exchanges strived to maintain their cash dividend, so dividend yields rose as a result of the fall in share prices. But this had a cost: in order to pay a constant level of dividend per share, exchanges had to dedicate an increasing proportion of their (declining) revenues to it. Dividend payout ratios rose, from an average of less than 20% in 2004 to more than 50% in 2010, with some extreme cases where more than 80% of earnings is distributed as dividends.

2007 was also a high point in M&A activity (NYSE merged with Euronext, LSE acquired Borsa Italiana, etc.), and witnessed the launch of new trading platforms, such as Chi-X and Turquoise, in Europe.

Among the other findings, this research confirms many predictions one could extrapolate from the literature.

- Financial and operating performances are highly correlated with the presence of institutional investors among the company's shareholders.
- Dominant shareholders, especially ones with different channels for exerting their influence – such as being large customers – can expropriate smaller shareholders. This is a typical case of “Tunneling”, as described by Johnson, Porta, Lopez-de-Silanes and Shleifer (2000), and as illustrated in the LSE case study in Part IV.
- Living with a hostile large shareholder disrupts both strategy and performance (also shown in detail in Part IV).
- Exchanges created post-demutualization use some of the attributes of mutuals to build up their business.

This last finding is particularly interesting, as it allows me to make a link between agency theory and stakeholder theory. I have observed this behavior at ICE, which was created from scratch as an online trading platform by profit-seeking entrepreneurs rather than owner-users. ICE adopted some aspects of the mutual/cooperative model in order to build up its business. Although its governance is shareholder-oriented, it has pioneered a profit-sharing scheme with potential users, similar to the former cooperative system of distributing profits to stakeholders in the form of fee rebates when still a mutual.

In sum, a combination of dysfunctional governance (due to conflicts of interest that make principals sometimes behave like agents), technological advances and regulatory changes fostered an entirely new operating landscape for exchanges, an environment that they seem to find it difficult to adapt to.

A charitable explanation would be that exchanges faced with adverse regulatory winds and behind the curve technologically, are fighting a rearguard battle to safeguard what remains of their previously comfortable monopolistic rents. A more critical analysis would suggest that exchanges' new (post-IPO) owners are panicking after discovering that the erstwhile shareholders (brokers) have bailed out after extracting as much value as they could through any means available, leaving them on a rudderless ship.

It is also interesting to note that the two exchanges in my sample in which brokers are not a dominant group of shareholders (ICE and Deutsche Boerse) very strongly

outperform the demutualized exchanges on both the operational and financial levels. This finding helps to dispel the claim that exchanges demutualize in order to expose themselves to the discipline of the market (as many claimed to justify their demutualization and IPO). Instead, it reinforces the view that demutualization was either an opportunity for other users to get rid of the most disruptive stakeholders (the brokers, locals or floor traders), or an opportunity created by those same brokers in order to cash out.

Finally, a close look at the effects of demutualization inevitably raises questions about exchanges' role as enforcers of regulation. The arguments for and against self-regulation are examined in the literature review in Part III and discussed in more detail in Part VI.

I.3. Marginalization of organized exchanges: causes and consequences

For most of their 200-year history, organized exchanges were the engine room of the global financial market. But drastic changes in the financial landscape in the past few years have led many professionals to feel they can make do without exchanges altogether. The loss of exchanges' main prerogatives has been gradual, but accelerated sharply in the early 2000s and climaxed in the past couple of years with the disappearance of their last preserved domain: the primary listing of companies.

The original idea of organized exchanges was to bring under one roof as many buyers and sellers as possible, in order to obtain the most efficient prices and the highest liquidity possible. In order to improve the safety and reliability of trades, exchanges took on the role of gatekeepers for both listed companies and market participants. They guaranteed the integrity and professionalism of intermediaries by way of their membership structure, which ensured that anyone wishing to trade on the exchange had to be vetted by other market participants (Michie 1986). Through the listing process, they also ensured that by the time a company was allowed to list its shares, it had been thoroughly scrutinized, was profitable, and its governance and management passed muster.

In seeking to gain the public's trust, exchanges also set rules that ensure a level playing field for all participants (for example by banning front-running and regulating insider trading). Many exchanges went further and also set up clearing houses to limit counterparty risk. In many cases, exchanges also set maximum (and/or minimum) trading fees to reassure investors that they could not be overcharged by unscrupulous brokers and that brokers could not be tempted to provide sub-par service in order to post cheaper fees to attract business. As the major meeting place for demand and supply, exchanges also published official transaction prices, notably the "closing price", that act as a benchmark for the pricing of derivatives and other contracts. Changes in the governance of exchanges inevitably raise questions over their role as gatekeepers (with a responsibility to prevent market abuse and protect final investors). These questions are reviewed in detail in the introduction to Part III.

Most of these prerogatives were eroded over time or deliberately jettisoned by the exchanges themselves. In the wake of major scandals, regulators nibbled at

exchanges' self-regulatory powers. Nowadays, in most countries an independent regulator sets the rules and enforces them. Other activities (such as clearing and settlement) were dropped because the exchanges themselves considered them unprofitable or non-strategic.

Many changes were induced by deregulation, as legislators, with prodding from lobbyists for the financial services industry^{iv}, removed barriers to entry that previously gave organized exchanges monopolistic powers.

Two main pieces of legislation introduced in 2007 (in the US and EU) are a case in point. According to the SEC, Reg NMS is "a series of initiatives designed to modernize and strengthen the national market system for equity securities [... in order to foster] competition among individual markets and competition among individual orders." The EU's Mifid was also aimed at liberalizing secondary trading in equities by breaking up the monopoly of national stock exchanges and allowing new entrants to offer competing services. The effects of both regulations were immediate and far-reaching. Their content is detailed in Part II and their effects are analyzed in Part V.

Interestingly, liberal market economies (the US, UK) underwent the changes faster than coordinated market economies (France, Germany). The incumbent's market share in the trading of blue chips had fallen to just under 70% in France and Germany three years after the introduction of Mifid, compared with just over 50% in the UK (see Table I.1 below). This is in line with what previous research predicts: LMEs are more favorable to competition than CMEs (Hall and Soskice 2001). Or, in the words of Mark Roe: "Who has political power? and do they like capital markets?" plays a big role in shaping a country's capital markets (Roe 2006).

In the early 2000s, most exchanges still had a monopoly on the listing and trading of shares, as well as on the choice of firms allowed to trade on their markets. By 2012, however, there remained no transaction whatsoever that necessitated the services of an exchange and could not be executed elsewhere. Companies can list newly issued shares on a variety of venues, and secondary trading in securities can be executed almost anywhere.

Trades on the LSE before the Big Bang of 1986 involved many intermediaries but the procedure was always the same. Investors called their broker to place a buy (or sell) order. The broker called a jobbing firm (a member with exclusive rights to have a

presence on the exchange floor). The jobbers, who centralized all buy and sell orders, traded face to face in the trading pits, matching supply and demand for every share on its dedicated pit. The process involved up to six parties (the buyer and seller, their respective brokers and the jobbers who acted on behalf of the brokers), in addition to the exchange itself.

As recently as five years ago, in developed markets such as France and Germany, when a client called a broker to buy or sell a security, the broker would still automatically execute the transaction at the best price posted on the central exchange's platform, although one layer of intermediation had been removed – the jobbers, most of which were bought by brokerage firms in the wake of Big Bang (and similar modernization moves in other financial centers).

Today, with the proliferation of choices made possible by deregulation, such a trade could be executed in any of the following manners.

- First, the cheapest and quickest route is internalization: the broker checks in the internal system whether another client of the firm is seeking to execute the other end of the trade. If this is the case, the trade is internalized: executed between the two clients through the brokerage firm's own computer system, incurring no marginal costs whatsoever. The cost savings are split with the customer.^v
- If no obvious match is available, the broker can turn to an Electronic Crossing Network (ECN) – an electronic system that links the trading books of several institutions. Because ECNs were set up in the electronic age and under less stringent regulatory oversight (they are exempted from publicly posting pre-trade prices), trading fees are a fraction of those levied by organized exchanges.
- If the order is not urgent, the broker can also group it with other orders for the same security and post the block on a dark pool. Dark pools are another type of private electronic platform, on which member firms post large orders anonymously. The system matches buy and sell orders, and the final client does not incur the costs associated with bid-offer spreads. Dark pools, like ECNs, charge minimal fees for access and execution.
- Finally, and often as a last resort if none of these avenues allows swift execution, the broker will turn to the organized exchange on which the securities are listed. Here, liquidity is usually guaranteed: either through the order book (the list of all available

bids and offers) or through the market-maker system (brokers who are committed to buying and selling a security at a pre-agreed cost, for pre-agreed amounts). In a March 2014 interview, Duncan Neiderauer, NYSE's chief executive, acknowledged that "NYSE is more often the last stop for a stock order, rather than the first stop".^{vi}

In addition, large institutional investors can gain direct access to ECNs and dark pools, shunting the broker (and associated costs) altogether. In Europe, 10% of equity trading was taking place on dark pools in 2010, up from almost none in 2001 (see Graph V.1). In 2007 a trader seeking to buy or sell US-listed shares faced a choice between no fewer than 35 possible venues, including exchanges, ECNs and dark pools, according to an independent study.^{vii} And the number of dark pools and ECNs continued to grow exponentially: from 2 in Europe and 18 in the US in 2005, to 35 and 50, respectively, in 2010.^{viii} Nasdaq's market share in US equity trading was 22% in 2012, down by a third since 2000.^{ix}

In Europe, the loss of market share has been less dramatic, but nonetheless substantial. Just 33 months after the implementation of Mifid, incumbent exchanges had lost anywhere between 10% and 50% of trading volumes in their national blue chips, according to a 2010 report for the City of London Corporation by London Economics, summarized in Table I.1 below.

Table I.1
Share of trading in stocks comprising national indices (August 2010)

Index	Incumbent Venue	Share of Incumbent Venue
AEX	Euronext-NYSE Amsterdam	62.9%
BEL 20	Euronext-NYSE Brussels	69.4%
CAC 40	Euronext-NYSE Paris	68.5%
DAX	Deutsche Börse Xetra	67.6%
FTSE 100	London Stock Exchange	51.2%
FTSE 250	London Stock Exchange	62.2%
IBEX 35	Bolsa de Madrid	84.2%
FTSE MIB	Borsa Italiana	78.7%
PSI 20	Euronext-NYSE Lisbon	91.5%
OMX C20	Nasdaq-OMX Copenhagen	80.5%
OMX H25	Nasdaq-OMX Helsinki	68.7%
OMX S30	Nasdaq-OMX Stockholm	57.2%

Source: City of London Corporation/London Economics. ^x

In terms of transaction costs, (Domowitz and Steil 1999) calculated that total trading costs for US equities halved between 1996 and 1998 (when off-exchange trading was already prevalent), and that this resulted in an 8% decline in the cost of equity capital of S&P 500 companies. They also projected that if mandatory broker intermediation were eliminated at the European exchanges, this would result in at least a 7.8% savings to European blue-chip companies. (Mandatory broker intermediation in Europe has since been abolished by Mifid, whose effects on exchanges are the subject of Part V.) In the 2010 City of London Corporation report, London Economics estimated that Mifid had “raised the long-run level of EU GDP (at constant prices) by about 0.7 % to 0.8%” (p.2), mainly as a result of increased cross-border share trading.^{xi}

In spite of their dramatic loss of market share, the importance of exchanges should not be understated. Of every dollar of funding available to the economy (excluding privately held firms) in 2010, more than 80 cents are listed on an exchange – the remainder consists mostly of bank loans. Stock market capitalization is by far the world’s biggest source of capital. According to the McKinsey Global Institute^{xiii}, the

world's total market capitalization stood at \$54 trillion at the end of 2010. In comparison, total funds under management by private equity firms were estimated by TheCityUK^{xiii} at \$2 trillion in mid-2012 (but this figure does not include other privately-controlled companies, such as family-owned businesses, whose value is difficult to measure globally). The total market value of public debt outstanding stood at \$41 trillion and non-securitized loans at \$49 trillion. Before the financial crisis, equities' preeminence was even greater, at \$65 trillion (in 2007, at 2010 constant exchange rates), public debt at \$30 trillion and loans at \$43 trillion. And with the current credit drought (since 2008), the overwhelming preponderance of equity financing could grow larger still. In 2010 equities outstanding accounted for more than 25% of the world's financial stock (which the McKinsey report defines as market value of equity; the face value of all bonds issued by governments, corporates and financial institutions; securitized debt instruments; and the book value of loans held on the balance sheets of banks and other lenders).

Although only a tiny proportion of debt securities is actually traded on NYSE (0.5% to 1% according to SEC estimates) (Schultz 2001), most government, corporate and securitized debt instruments are nonetheless listed on exchanges. This allows derivatives based on these instruments to be priced, by using the exchange price as a reference.

Just like a flag carrier airline or a local automobile industry, a stock market is also a source of national pride for developing countries. The existence of a stock exchange is widely considered to favor economic growth and development, Levine (1996)^{xiv} points out. "Countries that had more liquid stock markets in 1976 enjoyed both faster rates of capital accumulation and greater productivity gains over the next 18 years."

It is also believed that exchanges reduce the risk of bubbles forming. Gravereau and Trauman (2013) say the Netherlands' 17th century tulip-mania was made possible by "the absence of an organized market". They claim that had tulip bulbs been traded on an exchange, where "trades are standardized, prices are transparent, profits are known [and] intermediaries must pay a margin deposit", the bubble would not have been allowed to form, because these procedures would have "made the system safe". And therefore the formation of such a bubble would not have been possible. This view is reinforced by recent events such as the bankruptcy of Lehman Brothers in September

2008, and the liquidity crisis at AIG in that same month. Both were exposed to highly illiquid and opaque financial instruments (bonds backed by subprime mortgages at Lehman and credit default swaps in the case of AIG).

As mentioned above, exchanges are also gatekeepers between the corporation and the general public. They vet companies in terms of governance, transparency, liquidity, etc. In other words, by the time a firm's shares are allowed to be traded by the public, the firm has been checked and certified as relatively safe, transparent and viable. Kuan (2006) argue that this function is threatened by demutualization. Others disagree and believe that value-maximizing investors will seek to protect and improve corporate reputation as they would with the corporation's other assets. The debate is ongoing and the various arguments are laid out in Part III and further discussed in Part VI.

Separately, a stock market listing is still seen as the crowning of a successful entrepreneurial career (think Google, Amazon, eBay). Especially in view of the fact that fewer than 6 in a million enterprises that reach the venture capital stage go on to reach the IPO stage (Nesheim 2000). How do you gauge corporate success when almost any company of any size can be listed on some type of "exchange" somewhere?

In today's financial environment, stock exchanges are no longer the first port of call for raising equity from the public. The market price (on which derivatives and other contracts are based) is still considered to be the one published by the exchange, even though it is no longer the price formed by the meeting of an overwhelming majority of supply and demand. The gatekeepers on whom the public rely to be an objective arbiter of firms' suitability for investment are often recently set up companies fighting a fierce battle for market share of new listings.

The multiplicity of new trading venues has also resulted in a fragmentation of trading volumes. While it is undeniable that traders today have the ability to trade on the platform that charges the lowest fees, there is no guarantee that the price at which such trades are executed is the lowest. It is also not clear whether brokers share with the final customer the benefits of lower transaction fees. At least one study by London Economics, quoted above,^{xv} claims that the lower trading costs brought about by Mifid have not trickled through to the final investor. At the time of writing this dissertation in spring 2014, a scandal was brewing following the publication of a book by Michael Lewis.^{xvi} In this controversial book, Lewis claims that high-frequency traders have been

defrauding final investors by billions of dollars by front-running their orders. In effect, Lewis argues that because brokers are now forced by law to compare prices across different platforms before executing a trade, high-frequency traders have enough time to detect the order before it is executed, and barge in on the trade before the price comparison process is complete. Although Lewis's claims have yet to be verified, law enforcers have expressed alarm: one day after the publication of Lewis's book the US Federal Bureau of Investigation urged high-frequency traders to blow the whistle on any possible front-running, as described in the book.^{xvii}

New hidden costs could also have emerged. It is very difficult to gauge whether a given trade would have been executed at better conditions if it had taken place on a platform where higher volumes are concentrated. A platform displaying a higher total number of units exchanged in a given share could very well be fragmenting those into a large number of small trades at different prices. Lower charged trading fees could also have been outweighed by wider bid-offer spreads. The best price available on one platform can sometimes apply to a very small number of shares, with the next best price very far off. If anything, the fact that brokers have sold out as owners of the exchanges in order to operate and use newly created platforms indicates that executing trades on these platforms is more profitable for them. Conversely, the sharp rise in trading volumes in recent years, in large part attributable to new trading techniques, such as high frequency trading, indicates that transaction costs must have fallen.

This situation arises from the latest developments in the stock market environment – from deregulation, to competition and the shift to for-profit status. In sum, the marginalization of organized exchanges raises questions not only about liquidity, trading costs and fragmentation of volumes, but also about the safety of the wider financial system, including defaults and systemic risk.

It can be safely argued that the era of dominance by organized exchanges is over. National exchanges have already disappeared or been marginalized in many European countries. In others, alternative platforms have overtaken the exchanges in terms of trading volumes and/or revenues. When ICE, then a recently created exchange specializing in derivatives, initiated its takeover of NYSE Group, its market capitalization was larger than those of NYSE and Nasdaq combined. (NYSE shares were later driven up by ICE's bid).

National stock exchanges are nowadays allowed to be gobbled-up by rivals without even a frown from finance ministers. It is also possible that some national exchanges will be allowed to shut down in the near future. What is still the world's largest exchange, NYSE, is in the process of being merged into ICE, a relative start up. The London Stock Exchange carries out only a fraction of the total trading in LSE-listed shares. In March 2014 Duncan Neiderauer, NYSE Euronext's chief executive, said it was only a matter of time before the new owners close the exchange's historical trading floor.^{xviii} NYSE's European arm Euronext was floated in summer 2014 at a fraction of the price of the post-demutualization IPO in 2001. Euronext in 2014 (consisting of the Paris, Amsterdam, Brussels and Lisbon exchanges) had a market capitalization of €1.4 billion when it was spun off from ICE. In 2001 (when it comprised only Paris, Amsterdam and Brussels, without Lisbon) the market capitalization at the IPO was €2.4 billion.

The benefits brought about by the introduction of competition to the sleepy world of exchanges should not be underestimated, either. Trading costs have been driven down by the new entrants and total trading volumes in shares have grown exponentially in developed markets. A whole new industry has been made possible thanks to cheaper and faster trading: high frequency trading. The world of arbitrage has also grown, creating jobs and new ways to make money for the large players as well as new boutique outfits.

Also, exchanges have not all stood by idly while new entrants snatched chunks of their core business from under their noses. Many have adapted to the new environment by diversifying their activities or entering new fields. Between 2007 and 2011 the LSE was a real chameleon. Its business profile has changed so much that, by some measures, it is no longer an organized exchange in the traditional meaning of the term. As if to prove the point, in September 2009 the LSE walked out of the Federation of European Stock Exchanges (FESE), the industry's European trade association. The FESE had accused the LSE of undermining the industry by favoring off-exchange trading.

In 2008 LSE launched Baikal, its own dark pool, to compete head-on with privately operated alternative venues that were taking business away from its central trading platform. A year later it took control of Turquoise, another electronic platform, and merged it with Baikal to boost its non-exchange trading business. The LSE continued diversifying its activities, launching a derivatives market through

Turquoise/Baikal in 2011. Other moves include the 2010 decision to take a majority stake (60%) in LCH Clearnet, a large transatlantic clearing house, and the 2011 acquisition of FTSE International, the financial-index publisher that was originally a joint venture with the Financial Times media group. During the late stages of writing this dissertation, in the summer of 2014, LSE was in the process of acquiring Russell Investments, a US asset manager and compiler of financial indices, for \$2.7 billion.^{xix}

Overall, the LSE has managed to maintain revenue growth in spite of its dwindling cash equities trading. Tellingly, the LSE changed its reporting format in its 2010 annual report. It stopped disclosing revenues from on-exchange equity and bond trading, and started publishing instead gross revenues from “capital markets”, which bundles together all trading of equities and bonds, on the official exchange as well as on Turquoise, derivatives trading, membership fees and primary listing fees.

LSE was not alone in expanding into new activities. In July 2013 NYSE won a tender to become the official publisher of Libor, the benchmark for short-term interest rates, beating bids from financial information companies (such as Thomson Reuters) and the LSE. Most exchanges have large information technology operations and also make money from selling software and services to customers and competitors. In a similar diversification move Nasdaq OMX acquired Thomson Reuters’ investor relations and multimedia activities in June 2013.

Clearing offers another avenue of growth, especially in the aftermath of the 2008 financial crisis and the ensuing Dodd-Frank reforms to make financial markets more secure. Citigroup estimates that 60% of the over-the-counter derivatives market by volume will end up being centrally cleared.^{xx} This opportunity was a driving force in LSE’s acquisition of LCH Clearnet, the latter being by far the leading clearer of interest rate swaps – the largest portion of the OTC market – through its SwapClear division.^{xxi}

So the future is not all bleak for exchanges, but the entities that survive are likely to bear very little resemblance to the gatherings-under-a-buttonwood-tree of yore. Salvation of the remaining cash trading business cannot be ruled out altogether, either. There are indications the EU feels Mifid has gone too far, and a revised version of the law (under discussion while I was writing this dissertation) shows signs of back-pedaling. ICE, known for its shrewd deal making, is paying top dollar for NYSE. It is unlikely to sacrifice goodwill representing 200 years of brand recognition.

Exchanges are reinventing themselves, with various degrees of success, and some might yet get a respite from protective legislation, but the trend is nonetheless foreboding. It is probably too soon to tell whether the world of finance will be better or worse off without the dominance of centralized securities trading monoliths. But it is important to understand how and why exchanges have been marginalized.

This introductory section seeks to set out the backdrop for the following dissertation. Before moving on to analyze in detail the ownership of exchanges and how it affects their strategic and operating behavior, a brief summary of the situation: regulatory and technological changes have introduced competition into the previously club-like operating environment of stock and derivatives exchanges. This competition is two-fold: exchanges started competing with each other (offering trading in companies listed on other exchanges or offering access to their systems to members of foreign exchanges); and new entrants started challenging established exchanges on their own turf (start-ups with lower fixed costs were set up when legislation allowed, to offer cheap and anonymous trading in the shares listed on national exchanges).

A majority of exchanges in industrialized countries have demutualized since the early 1990s. Many of them have also listed their shares on their own exchange or, more rarely, on a rival exchange (NSX of Australia comes to mind, listing its shares on its main competitor, ASX). Using their newly found financial freedom (or, more rarely, before acquiring it), exchanges have engaged in frantic strategic moves: mergers, acquisitions, horizontal and vertical integration, business diversification, large investments in electronic trading, etc. Post-IPO exchanges also sought to increase profits, started paying dividends, changed their voting system to one-share one-vote, and appointed outside directors. Some of them maintain voting or ownership restrictions (no single shareholder can own more than 5% of ASX, as decreed by the demutualization law). Strategic moves, be they M&A or integration/diversification, have had mixed results. New entrants (dark pools, ECNs, internalized trading, etc.) have snatched significant market share in cash trading from the stock exchanges, threatening their profits and their legitimacy. Some of the demutualized exchanges have retorted by launching their own alternative trading venues and even acquiring newly created platforms. More rarely, they have seen these new players as potential customers and started creating products for them. This is the case with the LSE, which has seen significant growth in its

sales of information technology, notably to dark pools and ECNs, as will be discussed in more detail later in this dissertation.

In sum, the exchange universe has undergone a major mutation and looks likely to continue evolving in a fast-changing environment in coming years. That the corporate governance of exchanges has evolved as a result of demutualization and listing is undeniable. What is less clear is to what extent the grip of the former members has been loosened, what types of new shareholders have joined them, and whether the exchanges' strategy and performance have been affected. Measuring and understanding this is the purpose of this dissertation.

I.4. Literature review

I.4.1. Corporate governance in academic literature.

Although this dissertation draws on many fields of financial and management literature, it is above all concerned with the corporate governance of a specific financial sector – companies that operate stock and derivatives exchanges.

Defining corporate governance is no easy task, as the term tends to draw on a wide range of concepts and touches on almost all the managerial functions of an organization, while being influenced by a plethora of external factors, including economic policy, the legal system, social and cultural issues and all sorts of regulations and traditions.

The term itself is ambiguous, as highlighted by Charreaux (2004), because it is easily (but misleadingly) associated with “government”. He points out that governance is not about how managers govern the company – which is one of the definitions of management – but rather about how the managers themselves are governed. He draws the analogy with the term “governess” (as in “nanny”). “[Her] roles are notably to supervise and define the rules of the game for the children and their leeway. In so doing, she fulfills two functions: a constraining disciplinary function and an educational function.”(p.1). Another definition is provided by Shleifer and Vishny (1997): “Corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment. How do the suppliers of finance get managers to return some of the profits to them? How do they make sure that managers do not steal the capital they supply or invest it in bad projects? How do suppliers of finance control managers?” (p.737).

Both definitions, as well as others, highlight the fact that corporate governance remains a subjective theme, involving – in addition to legally-defined obligations and privately-contracted ones – moral issues touching on personal responsibility, integrity, reputation and ambition. A few definitions (some of them non-academic) are worthy of note, if only owing to their conciseness and clarity. A brief selection follows in the box below.^{xxii, xxiii, xxiv, xxv}

Organization for Economic Cooperation and Development (OECD)

“Corporate governance is the system by which business corporations are directed and controlled.”

World Bank

“Corporate governance refers to the framework of laws, regulatory institutions, and reporting requirements that condition the way the corporate sector is governed.”

Adrian Cadbury

“Corporate Governance is the system by which companies are directed and controlled.”

“The governance framework is there to encourage the efficient use of resources and equally to acquire accountability for the stewardship of those resources. The aim is to align as nearly as possible the interests of individuals, corporations, and society.”

Professor Ira Millstein

“Corporate governance is that blend of law, regulation, and appropriate voluntary private-sector practices, which enable the corporation to attract financial and human capital, perform efficiently, and thereby perpetuate itself by generating long-term economic value for its shareholders, while respecting the interest of stakeholders and society as a whole.”

Bank for International Settlement (BIS)

“Corporate governance is the manner in which the affairs of individual banks are governed by their boards of directors and senior managers, which affects how banks set corporate objectives; run the day-to-day operations; meet the obligation of accountability to shareholders, taking into account the interest of other stakeholders; operate in compliance with applicable laws and regulations; and protect the interests of depositors.”

Professor Robert Tricker

“Whilst management processes have been widely explored, relatively little attention has been paid to the processes by which companies are governed. If management is about running businesses, governance is about seeing that it is run properly. All companies need governing as well as managing.” (Tricker 1984)

While “comply or explain” systems such as the UK and US raise governance to an ethical, almost abstract, level, more recent converts rely primarily on legislation. France started off with a comply or explain system, with the Viénot (1995^{xxvi}, 1999^{xxvii}) reports, but ended up legislating (loi NRE, “nouvelles réglementations économiques”)^{xxviii} in 2001, in response to the employers’ federation’s (Medef) refusal to comply voluntarily with some provisions, most notably on compensation disclosure.^{xxix}

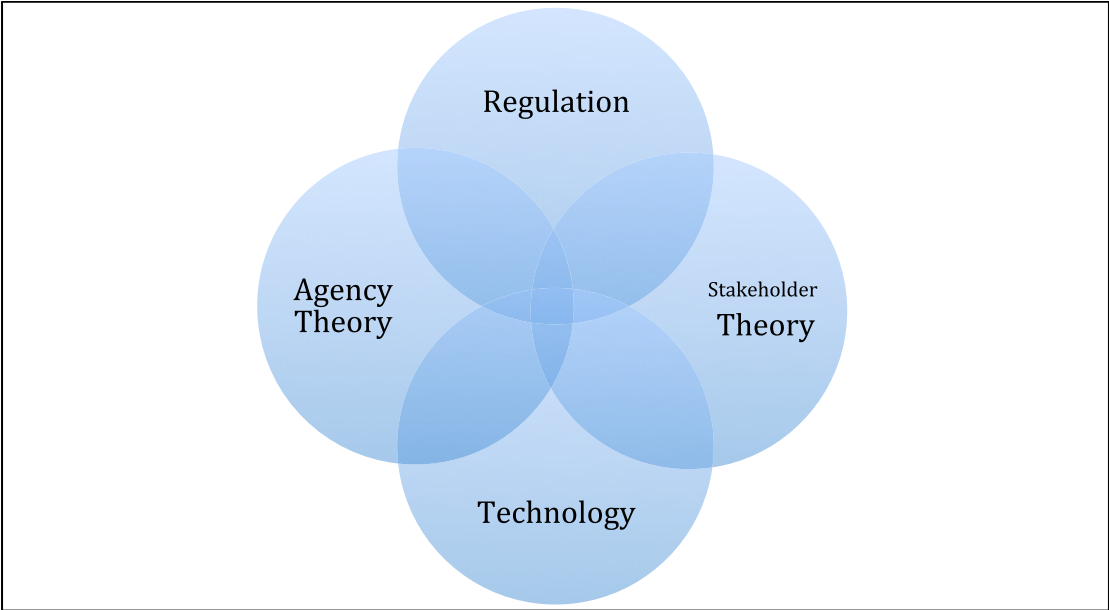
The tendency to legislate is increasingly being embraced by governments in both the industrialized and emerging economies, in response to governance crises, which tend to highlight the failings of voluntary codes. The best-known examples are the Loi NRE (2001), a direct response to the quasi-defaults of France Telecom and Vivendi Universal; and the Sarbanes-Oxley Act (2002), dictated by financial scandals at Enron and WorldCom, among others. More recently, in 2010 President Barack Obama signed the so-called Dodd-Frank Act^{xxx} into law, in response to the financial crisis of 2008. The Wall Street Reform and Consumer Protection Act (to give Dodd-Frank its full official name) increases the burdens of accountability and transparency for bankers, with the stated aim of preventing a repeat of the excessive risk-taking and unchecked speculative behavior displayed by Wall Street institutions in the run-up to the Lehman Brothers collapse.

One way to define the field of governance is by looking at the various academic fields on which it draws. The graph below sums up the way I shall be looking at exchanges in this dissertation. As I pointed out above, the exchange universe in the past decade or so has been shaped by competition, itself the result of two major forces: technological advances and deregulation. This environment is not confined to the past few years; it has been so ever since exchanges were formalized in the 18th and 19th centuries. But the pace of technological advances has accelerated sharply since the generalization of the internet and electronic communications in the 1990s, and two pieces of legislation in 2007 (Mifid and Reg NMS) had more impact on exchanges than the entire body of pre-existing regulation (with the possible exception of the Glass-Steagall Act of 1933).

Other fields will also be relevant to this study, including corporate finance, market finance, law, politics, culture, and to some extent psychology and game theory, insofar as they relate to the firm, its shareholders and regulators, as well as other

stakeholders, and the relationships between them. At the risk of oversimplifying, this dissertation focuses on the area at the intersection of the four disciplines represented by circles in the graph below, while drawing occasionally on other related disciplines.

Graph I.1
Focus area of this research



Microeconomics is also relevant to some extent because it determines the firm’s objectives, its competitive environment and strategy. Macroeconomics will determine the regulatory backdrop, as well as the fiscal and monetary policies that will inevitably affect its decision-making and its operations. Corporate finance will play a role, if only because the equity-debt mix plays an important part in the relative power of shareholders vis-à-vis managers. Finally, for obvious reasons, financial markets will also constitute a major factor: partly because the share price has a direct effect on how safe managers feel in their jobs; but also, perhaps most significantly, because of the constant threat of unsolicited takeovers of companies with fragmented ownership.

I shall start by discerning between governance at the micro level, which comprises agency theory and the legal/financial approach; and the macro level, which encompasses the political approach, the socio-economic angle and the varieties of

capitalism school. Stakeholder theory is addressed in the review of exchange-specific literature in Part III.

- Agency Theory

The idea that the separation of ownership and management of corporations creates conflicts that need to be managed was popularized in the 1930s by Berle and Means (1932). It is still to this day one of the main preoccupations of corporate governance. Agency theory remains one of the most active research fields in corporate governance, even as several other schools of thought were being developed throughout the 20th century. While Berle and Means remains a defining text, the theory has been refined as its limitations became apparent. It is important to read Berle and Means in the light of the following:

1) The environment in which they observed the phenomenon of separation was heavily influenced by J.P. Morgan's work with the large US corporations of the time, for which he devised ways to raise funds for future development while limiting the dilution of the founding shareholders.

2) Their seminal work, *The Modern Corporation and Private Property*, was published in 1932, in the midst of the most violent financial and economic crisis of the 20th century. The implications they draw are far-reaching, as Berle and Means claim that the disproportionate power hoarded by managers, if it remains unchecked, could end up undermining democracy itself.

Although the agency dilemma is considered to have been formalized by Berle and Means, it had been identified much earlier, for example by Smith (1776). The following paragraph from *The Wealth of Nations* (1776) was quoted two centuries later by Jensen and Meckling in the introduction to Jensen and Meckling (1976): "The directors of such [joint-stock] companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own." (Smith 1776), in Jensen and Meckling (p.305).

Historians have even unearthed occurrences of conflicts of interest resulting from the agency problem that were documented as far back as the Middle Ages. In his article on the economic development of the city-state of Genoa in the 12th and 13th centuries, Greif (1994) analyses the compensation schemes of Genoan consuls, who had control of the state's military but were also remunerated by the merchant families, based on commercial targets. According to Greif, "a consul was officially compensated by a fixed pecuniary payment and a share in the commune's revenue during his year in office" (p.273).

Because trade agreements initiated by the consuls yielded future revenues, while the consuls' compensation was linked to the current year's trade, the consuls often used public assets over which they had control (the military) to boost the city's current revenues (and thus their own remuneration for the current year). "The consuls' short-term reward scheme motivated them to devote resources to implementing economic policy yielding revenues during their term. In particular, the consuls initiated military raids against the ships and ports of other political units, thereby generating, at times, immense spoil." (p.274) (Greif 1994).

Most of the literature on agency theory focuses on two main issues:

- Aligning the goals of agents with those of principals.
- Minimizing the cost to principals of overseeing and controlling agents.

Influential recent works in the field include Jensen and Meckling (1976), Fama (1980) and Eisenhardt (1989). Numerous attempts were made to invalidate agency theory or play down its importance, including by (Ertürk, Froud, Johal and Williams 2004; Perrow 1986). Perrow, notably, criticized its "one-sidedness", claiming that it completely overlooks labor's interests. Ertürk et al believe Anglo-American efforts to improve governance in the 1990s and early 2000s were based on "naïve assumptions about social actors, identities and motivations" (p.704). Both these criticisms, among others, add fuel to the stakeholder debate, which is still ongoing. The stakeholder debate continues to occupy scholars, in large part because of the economic success of several forms of social democratic government, such as the Japanese, German and Scandinavian models of wealth creation, all of which eschew the principle of shareholder value maximization and involve other stakeholders (state representatives, employees and the

trade unions) in the decision-making and strategy-setting processes. Jensen, however, reaffirms the primacy of shareholder value maximization on several occasions (Jensen 2001; Jensen and Meckling 2000), following several decades during which scholars attempted to widen the debate to take account of other stakeholders.

Agency theory will be a core area of study for my research. Agency issues, most notably conflicts of interest, are particularly acute in the sector under observation, where shareholders can wear many hats simultaneously: owner, customer, director and competitor.

- Legal approach

Whatever the economic system, all countries have extensive laws and regulations to determine how business is done, disclosure obligations, shareholder rights, directors' and managers' obligations, etc. Corporate governance requirements are enshrined in law, to various degrees, even in countries that had originally opted for comply-or-explain governance codes. In France, this includes the NRE law of 2001, which complements the Viénot reports' recommendations, and in the US the Sarbanes-Oxley Act of 2002.

The mainstream legal approach is epitomized by one article (La Porta, Lopez-De-Silanes, Shleifer and Vishny 1997). In this article, the authors argue that civil law offers a less favorable environment for corporate performance, because financial backers (shareholders and creditors) enjoy weaker protection than under common law. In their conclusions, however, they warn that the relationship is influenced by the effectiveness of the legal system – or how easy it is for investors to have their rights enforced. Thus a civil law country could end up being more investor-friendly than a similarly prosperous common law country that has a slower court system. The LLSV approach has been abundantly criticized, notably by Beck, Demirgüç-Kunt and Levine (2003), who find no evidence that common law systems are superior to civil law systems in terms of financial markets' development.

The wider question – does the nature of the legal system really influence the development of financial markets? – remains unanswered, according to Coffee Jr (1999). Based on the US system before the 1929 crisis, which offered less protection for

investors than the current environment (and possibly even less than some emerging markets today), Coffee argues that the markets themselves, which are more innovative and faster moving than legislators, have been the main providers of advances in corporate governance; either through private contractual arrangements or through financial innovation.

Financial law, corporate law and even property rights may influence the way governance is perceived. While English common law clearly states the reason why shareholders, as the takers of ultimate residual risk, are the rightful owners of the corporation and its assets (those that are not pledged to creditors), this state of affairs is not as clear under, say, French law.

An interesting example is provided by Pollin (2004). He highlights the importance of the legal argument by using the following example: why, he asks, is it taken for granted that the productive environment consists of owners (shareholders) renting expertise from agents (managers and employees)? Isn't it just as plausible that the corporate world could be seen as workers renting the means of production from the owners of capital? In his view, the respective roles of principal (owner) and agent (management and labor) were principally dictated by the definition of ownership in (originally English) common law. This view turns the principal/agent relationship on its head, transforming management into principals and owners into agents.

In this dissertation, I shall be looking at governance through the legal lens for many reasons. Firstly, because the sample of companies in my panel includes entities operating under various legal systems (both common law and civil law): US and UK law, French and German law. This offers an interesting opportunity to compare economies that are at similar stages of development but apply different legal systems. Secondly, with finance being one of the most tightly regulated sectors, the legal set-up and changes in legislation have a huge impact on the operations and performance of the companies involved. And, as we shall see later in this dissertation, the competitive, operational and performance changes brought about by legal evolution have affected the behavior of shareholders.

- Political approach

Although Mark Roe is primarily a legal scholar, his most lasting contributions pertain to the political school of corporate governance. In the preface to “Political Determinants”, Roe (2003) puts politics at the macro (one could say “hyper”) level, encompassing all other factors (product markets, capital markets, employees, managers, directors and investors). In his own words, the book focuses on “the political determinant, under-examined but tugging on the firm as strongly as the moon determines the tides”.

Roe does not play down the importance of legal, social, financial or other organizational and institutional issues, but rather emphasizes the fact that all of these are shaped by politics. His political approach builds on agency theory, but looks at governance issues through the political lens. Capital diffusion, the relative strengths of labor and management, as well as the rights of shareholders, are all determined by the political system in which the firm evolves. Using the political approach to explain variations in governance models across the industrialized world, Roe exposes the reasons why some countries deliberately choose to put up with higher agency costs, compensated by higher productivity. In a more recent article Roe (2006) argues that two questions ([1] Who has political power? and [2] Do they like capital markets?) matter much more in shaping a country’s capital markets than what type of law (civil or common) prevails.

Roe’s political theory has been criticized, notably by Coffee (2001). If Roe’s political explanation was valid, then why do British financial investors behave just like their American counterparts in spite of operating in a totally different political landscape? he asks. Another point of contention between the two revolves around the structure of shareholdings in Europe’s social democracies. Roe argues that concentrated ownership in Europe is a result of investors’ fear of expropriation by the state. This logic is incomplete, according to Coffee, because the same factors should militate in favor of greater transparency (which is not the case), as governments (which have the power to impose it) would use this tool to undermine dominant investors.

Gourevitch and Hawes (2002) refine the political approach, by highlighting some special situations. They argue that unlikely alliances are sometimes formed in response

to particular shocks, for example when investors and employees jointly demand trade barriers. They also warn against assuming that certain political situations result in predictable outcomes (for example, that free market-oriented governments will improve shareholders' rights). Political influence on governance is exercised through political institutions, which have their own inertia. Existing institutions, they argue, might well be operating in a mindset that was determined by a previous political ideology. They also point out that the pace of change in the relative powers of shareholders, managers and employees might vary substantially, depending on whether the political system is consensual or majority-dominated.

Cioffi and Höpner (2006), meanwhile, examine the dynamics of reform in various political environments. Looking at Europe in particular, they come to some counter-intuitive conclusions. For example, they state that "center-left political parties were the driving force behind corporate governance reform and the institutional adjustment to finance capitalism, while right of center parties resisted reform to protect established forms of managerialism and organized capitalism." (p.464). The explanation for this, they argue, is that workers often found it was in their interest to form alliances with shareholders (the lesser of two evils), against managers. In turn, left-leaning governments played on their affiliation with labor organizations. "Corporate governance reform also provided the center-left a way to attack the opaque and strategically important relationships between conservative politicians and corporate managers" (p.488), according to Cioffi and Hopner.

At first sight, it might appear that the political approach could be particularly relevant to the industry under study. Until recently many countries considered their national stock market a strategic industry. As a result, it was supervised and protected in a manner reminiscent of the defense and aerospace industries, or in a similar fashion to utilities.

However, this attitude was undermined when EU member states agreed on Mifid, a package of laws destined to foster competition between financial infrastructures. The sheer act of agreeing to implement Mifid seemed to suggest that national governments were willing to see their stock market shrink into irrelevance. And this impression was confirmed when France's Socialist government agreed in 2000 to allow the Paris Bourse

to merge with those of Amsterdam and Brussels into a holding company incorporated in the Netherlands (Euronext, later acquired by NYSE).

Several findings (notably Roe's work on countries' development after war and/or occupation) will be useful. Agency theory under a political lens (also as performed by Roe) should be a useful tool in an environment where politics and business are inextricably linked (France comes to mind).

- Varieties of Capitalism (VoC)

In the second half of the twentieth century abundant literature was published, analyzing the way cultures, legal systems, organizational preferences and even religious values combined to influence economic activity, with the aim of explaining divergences in national economic performances among countries at similar stages of development.

The various ways that wealth is created in different socio-economic-political environments were outlined by Hampden-Turner and Trompenaars (1993) in their seminal book. However, 2001 was a watershed for the field, with the publication of the groundbreaking book by Hall and Soskice (2001). Coming after more than a decade of free-market hubris that followed the 1989 fall of the Berlin Wall, the book demolishes the argument that liberal market economies are superior to coordinated market economies. Hall and Soskice use empirical evidence to show that, over a period spanning half a century, France and the US (and a surprisingly large sample of industrialized nations) had almost identical economic growth and productivity gains.

The VoC approach divides economic systems in two broad categories: liberal market economies (LMEs, such as the US, Australia, UK) and coordinated market economies (CMEs, including Japan and Germany); with France somewhere in the middle (but slightly closer to a CME). Companies in LMEs have to rely on shorter-term capital market funding and, as a result, must be extremely adaptable. Because funding can dry up quickly, these firms must have movable assets and adaptable skills. Thus the MBA becomes the favored qualification and the services and consumer goods sectors are the most developed. LMEs are most competitive in producing high-volume, low-cost goods. Their capital markets are liquid and the banking system relatively less developed. Conversely, CMEs rely on greater coordination between the various stakeholders. Banks

establish long-term relationships with borrowers. The state invests in an education system geared towards specialized skills, in exchange for implicit guarantees of job stability from employers. Long-term finance is available to fund long-term projects. This shields companies from short-term financial pressures, allowing them to focus on high-value long-term projects. As a result, these firms value technical skills (engineering degrees). They end up specializing in heavy industries, around which there is less competition from LME-based companies. Although Hall and Soskice find similar economic performance in CMEs and LMEs over the long term, they highlight some differences: LMEs tend to outperform in periods of high growth, and CMEs suffer less during downturns. This allows them to conclude that there is no market pressure on any system to converge towards the other.

This view, however, is strongly disputed, notably by Aoki (1994) who develops a Darwinian hypothesis of convergence of national governance systems, around four possible scenarios:

- 1) Systems converge by adopting the most efficient features of other governance regimes.
- 2) National governance systems become unstable as a result of protectionist policies.
- 3) Inefficient systems are superseded by more efficient ones.
- 4) A hybrid system emerges, as a result of the integration of several governance models in an interlocking economic area (the European Union being the best example of such a work-in-progress).

The convergence theory itself is disputed by Brean and Kobrak (2013), who are “skeptical of the likelihood and the advisability of international convergence in corporate governance” (p.56).

Another widely debated idea is Hall and Soskice’s contention that hybrid systems, which lie somewhere between CMEs and LMEs, are systematically less efficient. Kenworthy (2006), notably, points out that in order to back their assertion about the coherence of systems, Hall and Soskice (2001) and Hall and Gingerich (2001) use their empirical data selectively. Kenworthy asks the question: since the VoC definition of CME vs. LME is based on five criteria, why are only three of these criteria used to compare “pure” governance regimes with hybrid systems?

Hall and Thelen (2009) later refine the VoC school by examining changes in national governance systems that result in a country moving from one dominant system towards another, or somewhere towards a hybrid system.

They identify three main ways in which governance regimes evolve:

- 1) Defection: when actors following the prescriptions of a particular model stop doing so.
- 2) Reinterpretation: the actors associated with an institution leave its formal attributes intact but gradually change the content of the practices associated with it.
- 3) Reform: institutional change mandated or endorsed by governments.

While all these schools of governance are useful for this dissertation, separate research focusing specifically on stock exchanges has yielded its own body of literature, on which I have drawn extensively. This literature is reviewed in Part III.

I.4.2. Financial exchanges in academic literature.

The main focus of this dissertation being the corporate governance of financial exchanges, it is only normal that I review the literature pertaining specifically to exchanges, in addition to the governance literature reviewed above.

Scholarly research on exchange demutualization started almost immediately after the process itself was kicked off in the early 1990s. Books and articles have been written on the subject, from the governance angle but also from viewpoints spanning all aspects of the business: the financial performance of exchange operators; the effects on various stakeholders or on regulation; implications for market efficiency; financial and operating risks, etc. Also, because exchanges operated under their mutual structure for two centuries and in the for-profit format for only two decades, a lot of relevant literature can be found in the financial history field. I provide a comprehensive review of all literature pertaining to exchanges in Part III. However at this stage I would like to highlight some of the gaps in the literature, which incited me to undertake this research.

While the existing literature has examined in detail the financial performance of exchanges before and after demutualization, and several aspects of shareholder behavior have been studied, I have found no trace of in-depth analysis of the attitudes of

the various types of shareholders. The closest subject I found in the literature consisted of articles comparing the performances of companies with concentrated ownership to those of widely held corporations. This approach is epitomized by Holderness (2009) and La Porta, Lopez-de-Silanes and Shleifer (1999). Conflicts of interest faced by managers who own shares in the company are analyzed by Morck, Shleifer and Vishny (1988).

Interestingly, there is little or no research on how shareholders who are commercially conflicted (customers) or strategically conflicted (competitors) behave, and the consequences of this conflicted behavior. This aspect of governance is particularly relevant in the exchange universe, because the concentration of conflicted actors is exceptionally high due to the relatively short timeframe since exchanges changed their governance regime. Old stakeholders (such as brokers) can still be found among exchanges' shareholders. There is scope to add to the literature by looking closely at the different groups of shareholders and the evolution of their ownership. This approach could help to explain, for example, why some exchanges have not reaped the expected benefits of the change in their shareholding structure, and shed some light on why the shareholders of exchanges sometimes appear to behave irrationally: by not applying pressure on management to maximize value, or by approving value-destroying acquisitions.

1.4.3. Other relevant material.

Owing to the tormented period under study, this dissertation covers events that fall outside the scope of pure corporate governance. These events include IPOs, attempted and successful mergers, attempted hostile takeovers, changes of legal structure (demutualizations) and large-scale evolutions in shareholding structure (rise of strategic shareholders, fragmentation of ownership, etc.).

In order to take account of these events, I have drawn on large swathes of the literature, including published material on M&A, such as (Jensen and Ruback 1983), and fragmentation vs. concentration of ownership. A number of major events affecting stock exchanges are also explained by the historical context. Historical analysis helps explain why exchanges started out as mutuals or cooperatives, and why this structure eventually became untenable. Separately, the operating landscape of financial markets

was repeatedly shaken by changes in regulation. The competitive backdrop, for example, can only be understood by looking at Mifid, the EU directive allowing new entrants to challenge the incumbents, and SEC Regulation ATS (in 1998) and Regulation NMS (2007). Competition between national exchanges for each other's products was introduced by the Investment Services Directive of 1996 (ISD) in the EU. This was followed by Mifid, which allowed other companies to compete for exchanges' business. In the US, Reg NMS had a similar effect although the exchanges were not previously shielded from competition as they were in Europe. All these legislative moves have had a dramatic effect on the former incumbents, which is why the legislative/regulatory texts are so relevant to this dissertation.

When looking at recent years, there is little academic literature on market shares in the trading of European equities. However, non-academic material is widely available. It includes official reports and working papers by regulators, governments and the European Commission. Sometimes governments commissioned reports from independent consultants. Trade associations, such as the Federation of European Stock Exchanges and the World Federation of Exchanges, also publish in-depth analysis of market developments. I rely extensively on such non-academic studies.

In fact, most data on off-exchange transactions come from non-academic sources, and their interpretation is often found in reports written by specialized consulting outfits. TABB Group, McKinsey Global Institute, Accenture, Aite Group, Investment Technology Group (ITG) and the City of London Corporation are also among the many observers who have examined developments in the exchange industry and commented on them. I shall be quoting them extensively on issues that are not always covered by academics.

In view of the quick pace of evolution in the industry, information is often first made available by the media. In order to keep abreast of all developments, I have had to rely extensively on the printed and online press. I have strived to restrict such references only to the most reliable media. These are mainly the newspapers of record (such as the Financial Times, The Economist, The Wall Street Journal or Le Monde) but I sometimes also refer to specialized sources of financial information, such as Bloomberg, BusinessWeek and Thomson Reuters.

Finally, I have found precious insight in the annual reports of exchanges, as well as those of their shareholders and users.

I.5. Methodology

I.5.1. Aims and approach.

I rely on a mix of quantitative and qualitative methodologies. As will become clear from the data description below, the sector under study is too small to allow for a purely quantitative approach. Because the universe is limited and the time period relatively short, results from quantitative methods fail most robustness tests. I have nonetheless used quantitative methods (difference-in-differences, mean comparisons, and ordinary least squares (OLS) regressions) because in many instances they show very clear and interesting trends. However, whenever possible I have sought to corroborate the quantitative results through other – qualitative or mixed – methods, including case studies.

The resulting approach is a mix of methodologies or multimethodology, not to be confused with the mixed method formalized by Johnson, Onwuegbuzie and Turner (2007), where the respective importance of predetermined quantitative and qualitative methods is fixed at the outset. Instead, I have adopted a pragmatic attitude, consisting of switching from one method to another as and when needed, with the aim of gathering any available evidence to corroborate a finding. I have also regularly shifted between postures, in turn hypothetico-deductive and inductive, the result being close to abduction, as defined by Peirce, Hartshorne, Weiss and Burks (1960).

My first aim is to validate the general hypothesis that shareholders' behavior is influenced by their other relationships with the company in which they own shares, because these relationships are often conflicting, and that this behavior in turn influences the results of the company. Very few industries present such a concentration of conflicts within a group of shareholders. It would be unimaginable for Samsung to own a blocking minority of shares in Apple, its fiercest competitor in the smartphone business. Yet this is exactly the situation the LSE has been living in since 2006, with Nasdaq (and later Borse Dubai) holding more than 35% of its outstanding shares. Equally far-fetched would be if Toyota, the world's biggest purchaser of steel sheets, were the largest shareholder in steelmaker ArcelorMittal, as well as being its biggest customer.

These outlandish scenarios are exactly what most exchanges have been experiencing ever since their IPOs: a significant proportion of their shareholders are either clients (who pay fees to use the services of the exchange) or competitors (who make money by executing clients' orders on rival exchanges that they own), and sometimes both.

I have summarized the conflicts faced by the different types of shareholders in the Table I.2 below.

Table I.2
Potential conflicts between shareholders' stated and hidden objectives

	Main objective*	Other objectives	Degree of conflict
Brokers	Capital gains (?); dividends (?)	Protecting economic rents; obtaining discounts; building rival platforms	High
IM	Capital Gains; dividends	-	Nil
Strategic	?	Entrenchment; lower competition; gaining control cheaply	High
Freefloat	Capital gains; dividends	-	Nil

*assuming rational, value-maximizing behavior.

In order to analyze shareholders' behavior I assume that they are rational and that their main objective is to maximize the value of their investment in the firm. This is in line with a wide body of literature on corporate governance, and in particular agency theory [(Fama 1980; Grossman and Stiglitz 1977); (Fama and Jensen 1983); (Shleifer and Vishny 1997); and many others]. The desired value creation is attained in two ways: through capital gains or dividends. [Other means, such as share buybacks, are assimilated to one of the above, as explained by Modigliani and Miller (1958) and again Modigliani and Miller (1963)]. Consequently, I assume that any unconflicted shareholder in an exchange will naturally seek to maximize capital gains and dividends. But, as we

have seen above, many owners of exchanges are conflicted, and it is these conflicts that this dissertation addresses.

Following is the list of conflicts faced by the four types of shareholders I have identified:

- Brokers: many of them were stakeholders in the organization before its demutualization and are used to receiving their share of the firm's performance in the form of fee rebates. Since their business model has not changed with the change of governance of the exchange, and their main source of income is the difference between the fees they charge final investors and those they pay to use the services of the exchange, it remains in their interest to apply pressure on the exchange to keep its fees low. However, now that they are also shareholders in an exchange that seeks to make and distribute profits, they also have an interest in maximizing the exchange's revenues and earnings. This is reminiscent of the situation described by Andreasen (1995), who analyzed the conflicts that arise when non-profit organizations have to cooperate with for-profit companies on a given project. Since I assume that all the protagonists in the exchange universe are rational [see (Muth 1961)], the upshot should be that brokers will act as value-maximizing investors when their expected dividends and capital gains from the exchange exceed the fee rebates they can hope to achieve by pressuring the exchange, and vice versa [see (Smith and Jensen 2000)].
- Investment managers: these are large institutional investors who manage investments on behalf of their clients, and their remuneration is based on the financial performance they achieve on these investments. Given that investment managers do not directly operate exchanges, there are few situations in which they could face a conflict of interest as regards their shareholding in an exchange. The only situation I can think of is if an investment manager also happens to be a shareholder of a company that would benefit from an exchange's counterperformance. This could only be the result of two things: the manager is irrational (which I have ruled out under my main assumption) or the second investment is a hedge for the investment in the exchange (in which case there is no incentive to deliberately seek value-destruction at the exchange). Therefore, I assume that investment managers are pure value-maximizing investors as

described by Jensen (2000), among others. It is possible, even likely, that investment managers hold stakes in several competing exchanges. In such situations, a rational investor would seek to maximize value in each exchange separately, without deliberately undermining another exchange in which it is also a shareholder.

- Strategic investors: this category of owners is the most difficult to define as it consists of wide array of investors with diverse agendas. According to Hellmann (2002), they are a force for good, willing to pay more for their stakes and wait for the firm's strategy to pay off. They also devote managerial time and play a counselling role. But Noe (2002) describes them as highly active and activist, sometimes colluding with similar minded shareholders, with potentially disruptive effects. In the present case, strategic investors come under various guises: unsuccessful acquirers who end up holding a sizeable stake; former allies in a project that is no longer relevant, but who retained cross shareholdings; current and former managers; employee saving schemes, etc. Opportunities for conflicts of interest are rife: managers might use their stakes for entrenchment; competitors could use theirs to undermine their rival; rejected suitors might be tempted to enfeeble the target in order to acquire it more cheaply (Barclay and Holderness 1989).
- Widely held shares or freefloat: the remainder of the shares consists of holdings that are too fragmented to be attributable to any specific owner or group of owners. A significant proportion is held either by individual investors or by professionals who trade them frequently. In both cases, the influence of these owners is minimal. Many do not vote at shareholder assemblies and rely instead on large blockholders [see (Holderness 2003)] to maximize value for them – in other words, they “free-ride” [see (Grossman and Hart 1980) and (Kerr and Bruun 1983)]. Wide dispersion of shares (especially in the absence of any block holders) is often associated with financial underperformance, sometimes due to management entrenchment [(Berle and Means 1932) and (Jensen and Meckling 1976)].

To illustrate the potential for conflicts of interest, the following Table I.3 shows the diversity of financial institutions' shareholdings in exchanges and trading platforms in the US in 2007.

Table I.3
Exchanges and AVs in which banks and brokers own stakes

Firms	PHLX	BSE	ISE	CHX	CBOE	NSX	BATS	Direct Edge	BIDS	Level
Bank of America				█					█	
Bear Stearns			█	█		█			█	
Bloomberg						█				
Citadel	█		█					█		
Credit Suisse	█	█				█	█		█	█
CSFB	█	█				█	█		█	█
Deutsche Bank			█						█	
E*Trade		█		█						
Fidelity		█								█
Getco							█			
Goldman Sachs			█	█	█				█	
Interactive Brokers			█		█				█	
JPMorgan			█						█	
Knight Capital			█			█		█	█	
Lime Brokerage							█			
LaBranche					█					
Lehman Brothers	█	█					█		█	█
Merrill Lynch	█						█		█	█
Morgan Stanley	█						█		█	
SIG					█					
Sun Trading			█							
UBS	█								█	
VDM					█					
Wedbush							█			

Source: Aite Group (2007)

In sum throughout this dissertation, and particularly in Part III and Part IV, I shall be using various methods to test whether: brokers behave more as rational investors or discount-seeking clients; investment managers' presence leads to better corporate performance; strategic shareholders work in the interest of the firm or against it; share dispersion gives managers a free rein resulting in poor financial results.

I.5.2. Database description.

The main source of data is Thomson One Banker, where most historical data on exchanges are available from several databases. I have used three databases from

Thomson One Banker, namely Datastream, Worldscope and Thomson Financial, with Compustat as a secondary source in some cases.

Thomson One Banker offers many classification criteria to define the industry that each company belongs to. The most relevant for my purposes is the SIC code (Standard Industry Classification). All financial exchanges belong to SIC code 6231 (Security and Commodity Exchange Industry), although many of them are part of holding companies that have other activities and therefore several SIC codes. SIC code 6231 contains 87 companies. Many exchanges belong to groups that have SIC code 6231 as one of their activities. Reducing the list to only those companies whose primary SIC code is 6231 reduces the sample to 42 companies. Companies whose dominant activity belongs to another SIC code are thus excluded.

Among these 42 companies, I have selected only those whose list of shareholders is public. This leaves me with the 24 exchanges: ASX (Australia), BM&F Bovespa (Brazil), CBOE (US), CME (US), Bolsa de Valores de Colombia, Deutsche Boerse, Dubai Financial Market, Hellenic Exchanges, Hong Kong Exchanges and Clearing, Intercontinental Exchange (US), Bolsa de Valores de Lima, London Stock Exchange, Bursa Malaysia Berhad, Bolsa Mexicana de Valores, Nasdaq (US), NZX (New Zealand), NSX (Australia), NYSE Euronext (US-EU), Osaka Securities Exchange (Japan), Oslo Bors (Norway), Singapore Exchange, Bolsas y Mercados Espanoles (Spain), TMX Group (Canada) and Gielda Papierow Wartosciowych w Warszawie (Poland). Accounting, financial, performance and historical data are available for all of these companies, annually or quarterly (for some).

Table I.4 below shows the availability of data on Thomson One Banker for shareholder types for each exchange (B for brokers, IM for investment managers and S for strategic shareholders). The shaded areas represent the final dataset, which was determined after applying the selection criteria described in the following pages (company size, relevance, data availability, liquidity, etc.)

Table I.4
Data availability

Exchange	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
ASX	IM	IM	IM	IM	IM	IM	IM	IM	IM	IM	IM	IM
Brazil								IM	IM	IM	IM	IM, S
CBOE											B, IM, S	B, IM, S
CME			B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Colombia								B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Deutsche Boerse		IM, S	IM, S	IM, S	IM, S	IM, S	IM, S	IM, S	IM, S	IM, S	IM, S	IM, S
Dubai							IM, S	IM, S	IM, S	IM, S	IM, S	IM, S
Hellenic	IM	IM	IM	IM	IM	IM	IM	IM	IM	IM	IM	IM
Hong Kong	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
ICE						B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Lima										S	S	S
LSE	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Malaysia						B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Mexico												
Nasdaq			B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
New Zealand												
NSX						IM, S	IM, S	IM, S	IM, S	IM, S	IM, S	IM, S
NYSE Euronext												
Osaka						B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Oslo		IM	IM	IM	IM	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Singapore	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Spain												
TMX			B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S	B, IM, S
Warsaw										IM, S	IM, S	IM, S

The main problems arising from a preliminary examination of the database come from inconsistencies in the available data. Even in the restricted list of 24 exchanges, some have shareholder statistics for only a handful of years. In other cases, one type of shareholder accounts for a negligible percentage of total shareholding. In other cases one strategic shareholder is extremely dominant: the ruler of Dubai, for instance, owns 80 per cent of its exchange, which means it is no use analyzing the remainder of the shareholding. In the years 2010-2011, shareholding data are available for all 24 exchanges. Conversely, in 2002 only 10 exchanges have shareholding data. Inconsistency also arises in other forms, such as the total percentage of shareholdings that is made public. For LSE, for example, between 65% and 95% of shareholders are identified for most of the period under study. For the Toronto exchange (TMX), only 12% to 40% of shareholdings are attributed, depending on the period.

After several successive layers of selection and elimination, the list is finally reduced to six exchanges: London Stock Exchange and Nasdaq (specialized in cash equities trading); NYSE Euronext and Deutsche Boerse (large diversified conglomerates operating in both cash and derivatives markets); CME Group and Intercontinental Exchange, both pure derivatives markets (until the ICE acquisition of NYSE in 2012, which falls outside the period selected). This sample is the largest I could find that fulfilled the necessary requirements for this study: all the needed data are available, including detailed shareholding structure, for at least 5-6 years; they are all publicly listed, their shares are actively traded and they publish comprehensive financial information.

This dissertation is thus based on two datasets. Part III relies on a panel of six exchanges (LSE, Nasdaq OMX, NYSE Euronext, CME Group and ICE), with data from 2002 to 2011. Part IV uses the same dataset, but statistical tools are applied to variables from each exchange individually. Part V examines only the first four exchanges. The two derivatives markets, CME Group and ICE (before the 2012 acquisition of NYSE) are not affected by the event under study, namely the introduction of laws liberalizing cash equity trading. Also, because the event study compares two identical timeframes (before and after the legislation), I have not used any data prior to 2004. This is because the “after Mifid” period is limited to four years (2008-2011), and therefore the “before Mifid” period had to have an equal duration. Both datasets are laid out in Appendix IV.

I am aware that a sample of only six exchanges is rather small, which will inevitably raise questions about the robustness of results from a quantitative analysis. I have tried, as much as possible, to use different – qualitative or mixed – approaches to corroborate clear but non-robust findings.

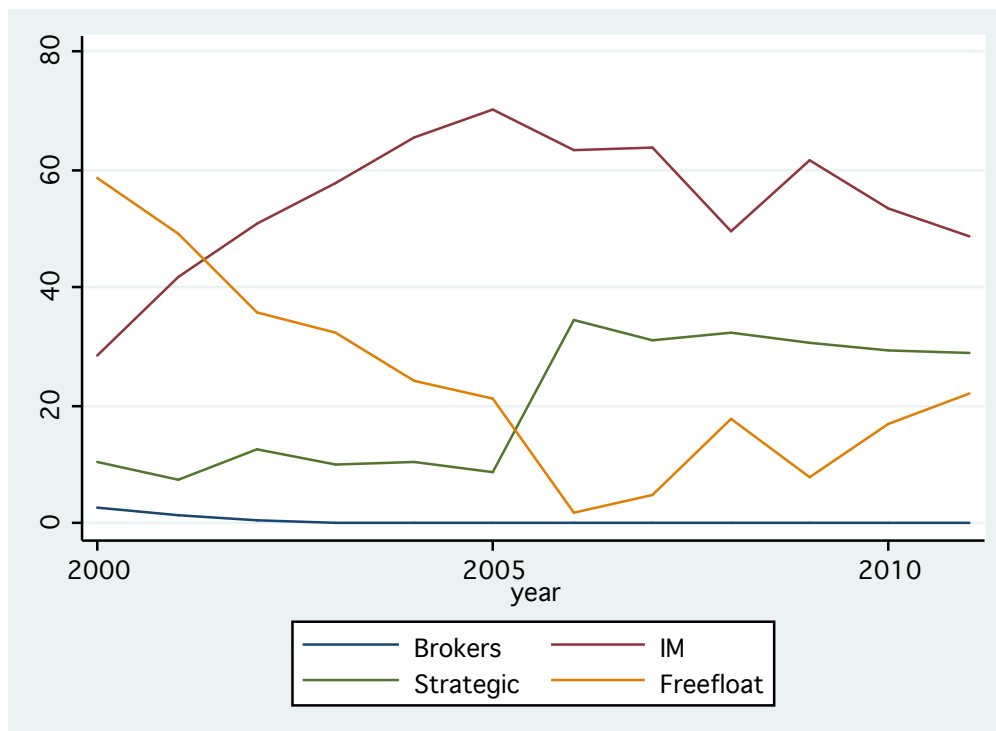
I.5.3. Shareholder types and evolution.

I have downloaded quarterly shareholding lists for each exchange since its IPO date, but in most cases only annual statistics were available for many variables (dividend, operating margin, sales, etc.). Thomson One Banker divides shareholders into three types: Investment Managers, Brokers and Strategic Entities. After checking that the identity of shareholders fit the three categories used by Thomson One Banker, I have added a fourth– Freefloat – to account for the remaining shares. In effect, my Freefloat variable is equal to 100% minus the sum of holdings by brokers, investment managers and strategic shareholders ($F=100-[S\ IM\ B]$). This fourth group consists of widely held shares, which I have assumed to be too dispersed to have any significant influence on the running of the company. This assumption is in line with existing literature, such as (Faccio and Lang 2002).

Graph I.2 below, showing the shareholding structure of the LSE from 2000 to 2011, illustrates the relative shifts in influence by various shareholders. Before 2002 ownership was very dispersed, with freefloat accounting for almost 60% of outstanding shares. From 2002 to 2006 investment managers were the dominant group of owners. After 2006, strategic investors (Nasdaq followed by Borse Dubai) came to dominate. Although aggregate IM holdings remained larger than the 30%-35% held by strategic investors, the latter are in effect held by a single entity. This is a larger block than any single investment manager has ever held.

Graph I.2

LSE shareholder evolution from 2000 to 2011 (% outstanding shares)



Source: Thomson One Banker

In Part IV I look at the breakdown of each exchange's shareholding structure, its evolution and the implications.

I.5.4. Detailed methodology.

Following is a description of the methods used in each chapter.

Part III is an empirical study of the group of six exchanges to determine the effects that various types of shareholders have on corporate performance. In this section I test the following three hypotheses: that freefloat is negatively correlated to corporate performance; that investment managers are positively correlated; and that brokers are negatively correlated. I conduct simple OLS regressions. In each case, the independent variable is the percentage of shares held by one particular type of shareholder (IMs, brokers or freefloat); the dependent variables are nineteen indicators of corporate

performance, divided into 10 financial indicators and nine indicators of operating performance (a detailed list is provided in Appendix I). The approach to the fourth group (strategic investors) is inductive: the aim is to determine if strategic investors have an effect on corporate performance, and whether this effect is beneficial (or otherwise) to other shareholders.

In Part IV (case studies), I look at exchanges individually, first to test the same three hypotheses as in Part III, then to gauge the influence of strategic investors inductively. I use simple OLS regressions, as in Part III but on smaller samples (data for individual exchanges). In some cases, OLS results are purely illustrative because the samples are very small when firms are taken one at a time. Further corroboration for the results comes from illustrating the expected outcomes with examples taken from the literature, or by putting the results in a context that helps to explain causes and consequences.

My initial approach aimed to determine whether there is a correlation between the proportion of conflicted shareholders and the company's performance. But the early results raised as many questions as they answered, prompting me to search for alternative methods. In some instances, detailed analysis of specific events was necessary, including searching for the identities of individual shareholders at some point in time, either to find the effect that an independent variable can have or, conversely, to identify the independent variable that caused a particular outcome.

In Part V, I demonstrate that major regulatory overhauls are needed to allow market participants to take full advantage of the means offered by technology. Although technology is constantly evolving, its benefits are not immediately available, often because the tools it offers may not be used legally for some time. This is the case of cheap electronic trading: although it has been technically possible since the 1960s, it was illegal until 2007 to execute trades off an organized exchange in most of Europe. To show the effects that Mifid (the regulation that allowed private electronic platforms to compete with exchanges) had, I start with an event study, using mean comparisons to show that there is indeed a significant difference between exchange performances before and after the change. I follow this up with a difference-in-differences approach. This shows that exchanges whose main activities were subjected to Mifid were more affected than diversified exchanges whose activities included businesses that were not

deregulated. Finally, because the size of the sample does not allow for very robust results, I draw parallels with two earlier periods that witnessed similar regulatory, legal or political events. This helps to show that similar circumstances have led to similarly significant events in previous instances.

Part II

Essential Background

This chapter contains information that is necessary to understand the actors, institutions and companies that are the subject of this dissertation, and sets the stage for the following analysis. In Part III and Part IV I have chosen an approach that relies heavily on agency theory, in order to understand the effects that various types of shareholders can have on the company. These shareholders are described in detail in Part I and again in the introductory sections (Methodology and Hypotheses) of the next two chapters. The remainder of this section contains background on the other actors (exchanges and their competitors) and factors (regulation) involved. The regulation angle is particularly relevant to Part V.

II.1. Overview of organized exchanges

The origins and early history of stock exchanges are detailed in earlier sections of this dissertation, as well as in the literature review of Part III. However, it is important for the understanding of the remainder of this work to highlight recent events that are relevant to the period under study. In addition to the changes in exchanges' governance regime and the emergence of new platforms competing with them, the post-demutualization period also witnessed several mergers between organized exchanges, which are summarized in Table II.1 below.

Table II.1
Consolidation in the stock exchange industry

<u>Year</u>	<u>Acquirer</u>	<u>Target</u>
<u>2012</u>	Tokyo Stock Exchange Hong Kong Exchanges and Clearing	Osaka Securities Exchange London Metal Exchange
<u>2011</u>	London Stock Exchange	TMX Group
<u>2008</u>	Nasdaq CME Group	OMX Nymex Holdings
<u>2007</u>	NYSE Nasdaq TSX Group	Euronext Boston Stock Exchange, Philadelphia Stock Exchange Montreal Stock Exchange
<u>2006</u>	Australian Stock Exchange	SFE Corporation
<u>2005</u>	NYSE Nasdaq	Archipelago Instinet
<u>2004</u>	TSX (Toronto) OMX Nasdaq	Natural Gas Exchange Copenhagen Exchange BRUT ECN
<u>2003</u>	OMX	Helsinki Exchange
<u>2002</u>	Euronext Euronext	LIFFE Portuguese Exchange
<u>2001</u>	TSX (Toronto) BME Spanish Exchanges	CDNX (Canadian Venture Exchange) Madrid Stock Exchange Valencia Stock Exchange Barcelona Stock Exchange
<u>2000</u>	CDNX (Canadian Venture Exchange) Euronext Hellenic Stock Exchange Hong Kong Exchanges & Clearing	Winnipeg Stock Exchange Paris Stock Exchange Amsterdam Stock Exchange Brussels Stock Exchange Athens Stock Exchange Thessaloniki Stock Exchange Athens Derivative Exchange Stock Exchange of Hong Kong Hong Kong Futures Exchange Hong Kong Securities Clearing Company
<u>1999</u>	Singapore Exchange CDNX (Canadian Venture Exchange) Nasdaq	Stock Exchange of Singapore Singapore Intl Monetary Exchange (SIMEX) Vancouver Stock Exchange Alberta Stock Exchange American Stock Exchange

Source: OECD (2014)

II.1.1. London Stock Exchange.

The two hundred year history of the London Stock Exchange is explored in detail in several parts of this dissertation. The following analysis focuses on the exchange after it was demutualized and started facing international competition. LSE shareholders voted to demutualize the exchange and list its shares in 2000. Almost immediately after its IPO, LSE went through a roller-coaster ride of strategic events, hostile attacks, setbacks and successful moves.

In May 2000 the exchange announced plans to merge with Deutsche Boerse, in order to form a European rival to Euronext (comprising the Paris, Amsterdam and Brussels exchanges). In August, Sweden's OM Exchange made a hostile £808 million bid for LSE. Although LSE shareholders rejected the OM offer, the move nonetheless derailed the merger plan with Deutsche Boerse.

In November 2001 LSE failed to acquire the London International Financial Futures and Options Exchange (Liffe), which was bought instead by Euronext for £550 million at the end of a fierce bidding process also involving Deutsche Boerse. LSE management was widely criticized for missing this opportunity to diversify into derivatives.^{xxxii} In 2003 it joined forces with OM, the Nordic exchange group that will later merge with Nasdaq, and the two groups set up a joint equity derivatives exchange called EDX London.

In December 2004 Deutsche Boerse made a new offer for LSE, valuing the London exchange at £1.35 billion. A few weeks later LSE rejected the bid. In December 2005 LSE rejected another £1.6 billion offer from Australia's Macquarie Bank, describing it as "derisory". At the same time, rumors circulated in the market that Euronext would make an offer for LSE. No such bid materialized, but the speculation, combined with shareholder resistance at the LSE, led Macquarie to withdraw its bid.

In March 2006 US exchange Nasdaq made a £2.4 billion offer for the LSE. The offer was rejected and in March Nasdaq withdrew it. Two months later, in May, Nasdaq disclosed that it had built up an equity stake of 25.1% of LSE shares. After fruitless talks over the summer Nasdaq raised its LSE stake to 28.75% and made a final £2.7 billion offer, which the LSE turned down. In June 2007 LSE agreed to buy Borsa Italiana for

more than £1.1 billion. In August Nasdaq announced it would sell its stake in LSE and focus on trying to buy OM, the Scandinavian exchange, instead. In September 2007 Nasdaq agreed to sell most of its LSE shares to Borse Dubai, as part of a wider strategic move that saw the US exchange become the operator of DIFX, an offshore equity exchange based in Dubai. Borse Dubai thus became LSE's largest shareholder. The battle for control of the LSE was over, but left the London exchange wounded. Its effects are still weighing on the LSE's performance and strategy years later, as we shall see in Part IV.

In December 2009 LSE acquired a majority stake in Turquoise, a rival fast-growing trading platform set up by nine financial institutions that are among the LSE's biggest shareholders, as well being large customers.

In February 2011 LSE and TMX, the Canadian stock exchange, revealed they were in merger talks to create world's seventh largest exchange. The plan was ditched in June, in spite of obtaining all necessary regulatory approvals, in the face of opposition from TMX shareholders. In September 2011 LSE initiated talks with LCH.Clearnet in a deal that could value the clearing house at up to £900 million and would bring the London group closer to Deutsche Boerse's "silo structure" (a vertically integrated business model that aims to capture all facets of its clients' orders, from trading to clearing, settlement and custody, in addition to offering trading software and selling market information).

II.1.2 Nasdaq OMX Group.

Strictly speaking the National Association of Securities Dealers Automated Quotation (Nasdaq) is not an organized exchange but (for most of its existence) one of the world's oldest (and by far the biggest) MTFs. When it was founded in February 1971 by the National Association of Securities Dealers (NASD), Nasdaq was an over-the-counter electronic platform for price quotations. Trades were actually executed over the telephone, after obtaining the price information online. It was only in 2006 that Nasdaq became a licensed national securities exchange.^{xxxii}

Nasdaq grew organically, in large part thanks to the listings of fast growing technology-related companies, before moving on to building a transatlantic empire

through acquisitions. Its most ambitious move was the 2005 hostile attempt to take over the LSE, which led to a protracted battle that only ended in 2007 when its stake of more than 30% was finally sold to Borse Dubai. Locking horns with LSE did not preclude Nasdaq from buying the Boston Stock Exchange in October 2007 and almost immediately gobbling up the Philadelphia Stock exchange a month later. Meanwhile, in the midst of the LSE takeover attempt it negotiated the \$3.7 billion friendly takeover of OMX, a Swedish-Finnish group that operates seven Baltic and Nordic stock exchanges.^{xxxiii}

II.1.3. NYSE Euronext.

The NYSE's genesis after the signing of the Buttonwood Agreement in 1792 and its subsequent growth to become the world's largest stock exchange in the second half of the 20th century are detailed elsewhere in this dissertation (notably in the literature review of Part III). The group under study in following sections is the result of NYSE's merger with Euronext in 2007, up until its absorption by the hugely ambitious derivatives-trading platform ICE in 2012.^{xxxiv} Euronext itself is the result of a three-way merger between the national stock exchanges of France, the Netherlands and Belgium in 2000, followed by the 2001 acquisition of Liffe for £550 million and the friendly merger with the Lisbon and Oporto exchanges in 2002. The timing of the creation of NYSE Euronext exposed the venerable US institution to the effects of Mifid, the EU directive following which the national monopolies just acquired by NYSE vanished literally overnight (on November 1, 2007). By 2010 most trades in shares listed on NYSE Euronext's European markets were taking place off the group's platforms. And by early 2014 the NYSE itself had become just a division of ICE, and its European arm (with the exception of Liffe) was earmarked for a spin-off, which eventually took place through an IPO in summer 2014, at the bottom of the indicative pricing range and with the shares falling on the first day of trading.^{xxxv}

II.1.4. Deutsche Boerse.

Continental Europe's biggest stock market, and a serious contender for the title of world's biggest derivatives exchange (depending on how trading volumes are

calculated) has had the least tormented history of the lot. No complex demutualization or legacy of insiders fighting to keep their privileges here. Deutsche Boerse was incorporated in 1993 and has been owned almost exclusively by financial investors for as long as its shares have been listed (the IPO took place in February 2001). It remains mostly a German-based company (with the small exception of having acquired a Swiss-held stake in its derivatives arm, Eurex), although it has not shied away from ambitious cross-border ventures. In 2000 Deutsche Boerse and the LSE dropped a plan to merge, after Euronext barged in on the cozy relationship and the LSE was distracted by a hostile bid from OMX, the Nordic group that eventually agreed to be taken over by Nasdaq.^{xxxvi} In 2005 Deutsche Boerse tried again to acquire LSE, but dropped its bid a few weeks later as a result of strong opposition from LSE's management and shareholders. Almost immediately Deutsche Boerse set its sight on Euronext, but was trumped by NYSE, which had been in secret talks with the Paris-run cross-border exchange. NYSE Euronext and Deutsche Boerse agreed to merge in 2011, but this project was scuppered by EU competition regulators.^{xxxvii} This setback weakened NYSE Euronext, an opportunity that ICE seized to pounce on the US-European exchange.

These foiled strategic plans did not prevent Deutsche Boerse from building over time Europe's most integrated equity and derivatives market: first by acquiring Cedel, Europe's biggest custodian, in 2011 and integrating it into Clearstream, its post-trade unit. This was followed in 2011 by the acquisition of all of Eurex, which was previously a joint venture with SIX Swiss Exchange. Deutsche Boerse's vertically integrated "silo" structure has long been criticized by rivals, who claim it gives the German exchange an unfair dominant position.^{xxxviii}

II.1.5 CME Group.

It is somewhat ironic that the creation of the world's largest derivatives exchange is the result of a Freudian act: the offspring devouring its genitor. With this event, reminiscent of the myth of Oedipus in Greek mythology, the US derivatives industry came full circle.

The story began in 1848, when the Chicago Board of Trade (CBOT) was established as the world's first organized derivatives exchange. US farmers in the Midwest had long been selling their harvest for delivery at a future date, in the form of

forward agreements. But by standardizing contract sizes and delivery dates, and making buyers and sellers meet under a single roof, the CBOT claims to have pioneered the “first standardized listed futures contracts” in 1864.^{xxxix} In 1898 a group of specialized CBOT traders set up the Chicago Butter and Egg Board, a non-profit cooperative, which operated under the aegis of the CBOT until 1919, when these traders reorganized themselves into a separate entity that they called the Chicago Mercantile Exchange (CME). The CBOT and CME prospered side by side throughout the postwar period until late 2006. Meanwhile, in November 2000 the CME demutualized and listed its shares in December 2002, and the CBOT had its own IPO in October 2005. When the two merged in 2007 the combined entity was by far the most valuable exchange, with a market capitalization just shy of \$50 billion. It continued to grow by acquisitions, gobbling up NYMEX Holdings in August 2008, which owns the New York Mercantile Exchange (Nymex) and Commodities Exchange (Comex).

Since October 2012 CME Group has been offering almost round the clock trading (with two hours downtime for clearing and netting outstanding trades) through the CBOT’s electronic platforms.

II.1.6. Intercontinental Exchange.

ICE’s history since its creation in the late 1990s is a phenomenal success story. Since going public in 2005, its revenues and earnings have grown almost tenfold. ICE epitomizes the streamlined, super-efficient, focused company, with just two activities originally: trading and clearing commodity derivatives. The short but eventful history of what is now ICE started in 1997 when Jeff Sprecher, a veteran power generation industry executive, acquired Continental Power Exchange, a small electronic electricity-trading platform to turn it into a sort of derivatives dark pool. He enlisted six of the US’s leading electricity and natural gas traders (American Electric Power, Aquila Energy, Duke Energy, El Paso Energy, Reliant Energy and Southern Company Energy Marketing) as partners and users, building up trading volumes on the exchange.

ICE itself was formed in 2000, when the founders brought in a new group of partners, including pure financial players (SG Investment Banking, Deutsche Bank, Morgan Stanley), as well as some additional energy specialists (BP Royal Dutch/Shell, and Total).^{xl} The new venture was propelled to prominence in mid-2001 when Enron

started wobbling, and benefited from its integrated trading and clearing operation, which reassured buyers and sellers of energy contracts.^{xli}

Emboldened by its early success, ICE grew aggressively through acquisitions: the London-based International Petroleum Exchange (IPE) in 2001, the New York Board of Trade in 2005 and the Winnipeg Commodity Exchange in 2007. Also in 2007 ICE made an unsuccessful \$10 billion bid for the CBOT.^{xlii}

But by far ICE's biggest and boldest move was the December 2012 acquisition of NYSE Euronext for \$8.5 billion. ICE first teamed up with Nasdaq in April 2011 to make a joint bid valuing NYSE Euronext at \$11.3 billion. The bid was immediately rejected by the NYSE's board while the US Justice Department hinted it was concerned by the deal on competition grounds.^{xliii} Nasdaq and ICE withdrew their offer. In December 2012 ICE made a new, successful \$8.2 billion bid for NYSE Euronext. The upshot is the world's largest stock and derivatives market, with a market capitalization of \$25 billion at the end of 2013.

Nothing illustrates the turmoil that has engulfed historical stock exchanges more than ICE's rise from humble beginnings to owning the biggest trophy in equity markets – NYSE – in less than two decades.

II.2. Overview of European Multilateral Trading Facilities

Some of the venues where financial instruments can be traded outside exchanges can never be identified, such as the huge over-the-counter market in derivatives, where any two or more institutions can trade with each other on a contractual basis. This is also the case with internalization, which consists of matching supply and demand within an institution, by comparing buy and sell orders from all the institution's clients, its proprietary trading books, market makers' books and investment funds managed by it.

However, the more formalized (and lightly regulated) off-exchange venues are identified, and volumes traded on them are reported by regulators, trade bodies and some specialized consultancy firms. In Europe FESE provides a list of venues. At its height, in 2012, the European MTF market comprised six active facilities executing more than 20 million trades a month on average. In 2013 only four were left, the remainder having either registered as recognized exchanges (BATS Europe), folded into their parent company (Burgundy) or been acquired (Chi-X).

II.2.1. Chi-X.

Chi-X was the first tangible result of Mifid, launched in 2007 as soon as the law permitted, by Instinet (the US pioneer of electronic trading). By January 2008 it had invited some of the biggest European equity traders to become shareholders (including BNP Paribas, Citigroup, Credit Suisse, Goldman Sachs, Merrill Lynch, Morgan Stanley, Société Générale and UBS). Chi-X had the European off-exchange market to itself for almost a year, until it was joined by BATS Europe (the European offshoot of a US pioneer) and Turquoise (a platform operated by the LSE) in October 2008.^{xliv} By February 2009 Chi-X had captured more than 9% of volumes in Europe's 10 largest markets, including almost 15% of trades in UK equities, with LSE's market share falling below 75% for the first time.^{xlv} In April 2009 Chi-X launched a dark pool, which helped it to accelerate its market share grab.^{xlvi} In mid-2010 Chi-X had captured 20% of all equity trading in Europe, when it accepted a merger offer from BATS (according to a company press release).

II.2.2. BATS Europe.

BATS Europe was launched in September 2008 by BATS Global Markets, an ambitious Kansas City-based electronic trading network founded in 2005. By the end of 2010 BATS Europe was trading 9 million contracts a month, roughly half the volumes of Chi-X, the market leader, and more than double the number of contracts exchanged on Turquoise.^{xlvi} In February 2011 BATS Global Markets agreed to acquire Chi-X Europe for more than \$300 million.^{xlviii} By the end of 2011 the combined BATS Chi-X Europe was executing 25% of all equity trades in Europe.^{xliv} In December 2012 the merged group applied to UK regulators for an authorization to become a fully regulated exchange. The authorization was granted in May 2013.^l At the end of 2013 BATS Chi-X Europe was by far Europe's largest exchange, processing double the transaction volumes of its nearest rival, the LSE. In December 2013 BATS Chi-X Europe executed 26.6 million trades, the LSE 13.8 million, NYSE Euronext 11.7 million and Deutsche Boerse 7.2 million.^{li}

II.2.3. Turquoise.

Turquoise, paradoxically, was in turn a nail in the coffin of LSE as a traditional exchange and a cornerstone of its future survival strategy: the acquisition of Turquoise in 2009 prompted the tensions that led to the LSE's walking out on FESE^{lii}, but after its integration into Baikal, the LSE's dark pool, in 2011 Turquoise was faster growing than the parent exchange itself and on the verge of overtaking the main board in terms of transactions. Turquoise is also a case in point of conflict of interest for shareholders and, quite possibly as I shall discuss in Part IV, an illustration of "Tunneling" (Johnson, Porta, Lopez-de-Silanes and Shleifer 2000). Turquoise was launched in 2008 by nine institutions (BNP Paribas, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, Merrill Lynch, Morgan Stanley, Société Générale and UBS). All nine are members (users) and shareholders of the LSE, and most of them were also among the founding owners of Chi-X. Its aim at the outset was to offer trading fees on pan-European equities 50% below those of organized exchanges.^{liii} In 2009 it processed 3.5 million-5 million trades on average every month, more than a quarter of the LSE's volumes.^{liiv} In December 2009 LSE acquired 60% of Turquoise and in April 2011 the exchange started consolidating Turquoise's trading volumes as part of its capital markets division.^{liv} In December 2013 Turquoise processed 11.6 million trades. This compares with the LSE electronic order

book's (the main market) 13.8 million, 7.2 million on Deutsche Boerse and 11.7 million on all of NYSE Euronext's European platforms combined (France, Belgium, the Netherlands and Portugal).^{lvi}

II.2.4. Baikal.

Baikal was launched in June 2008 by the LSE as dark pool offering trading in 6,500 shares and exchange-traded funds.^{lvii} Volumes never really took off, in large part because of the LSE's decision to resort to one market maker – Lehman Brothers – who happened to be the former employer of Xavier Rollet, LSE's chief executive. Potential users of Baikal stayed away and in any case the system collapsed when Lehman filed for bankruptcy in September 2008.^{lviii} Baikal was briefly relaunched in June 2009 before being folded into the LSE's recently purchased Turquoise.

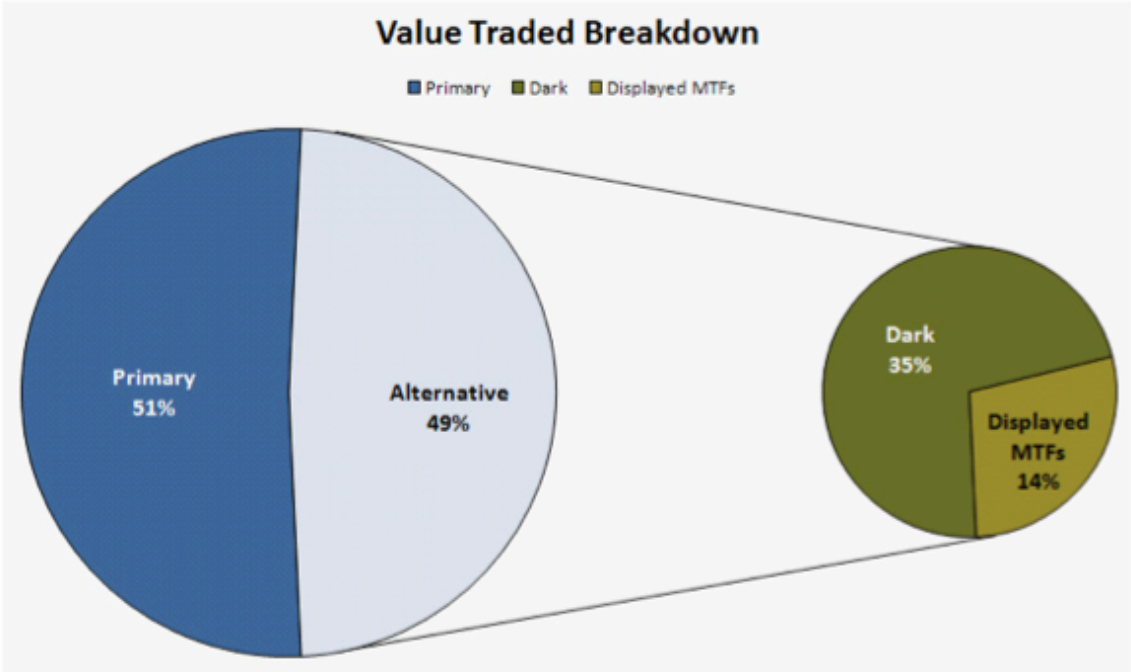
II.2.5. Others.

Other off-exchange venues include smaller, often short-lived ventures, such as Burgundy. Launched in June 2009 by some of the leading North European banks and investment houses, this was a platform offering cheap and fast trading in Swedish, Finnish and Danish financial instruments. Daily volumes never exceeded a few thousand transactions, and in 2012 the venture was folded into the Oslo Bors. As part of their attempts to keep a foothold in the growing off-exchange business, the two US giants also launched European dark pools or ECNs, in the form of NYSE Arca Europe, an offshoot of the NYSE's American electronic marketplace, and Nasdaq OMX Europe, a platform that sought to extend Nasdaq's expertise in automated trading into European equity markets.

By definition dark pools, which provide anonymous trading between institutional investors, are opaque. Although very little data are publicly available a report privately commissioned by industry participants shows interesting results.^{lix} In this report, consulting firm ITG finds that in the months following the launch of alternative venues in 2008-2009, trading costs on European organized exchanges were 71% higher than those on dark pools and 20% higher than on MTFs. The competition prompted exchanges to make massive efforts, with the result that in 2010 MTFs had higher costs than the exchanges by about 5%, and the relative cost advantage of dark pools had

shrunk to 13%. This situation is partly responsible for the ensuing mergers between MTFs, such as BATS’s acquisition of Chi-X, described above. ITG also provides the most recent estimate of market shares between regulated markets, “lit” MTFs and dark pools (Graph II.1 below). It is the first documented indication that by 2010 a majority of equity trading in value terms was taking place outside the regulated exchanges.

Graph II.1
Market shares of European equity trading venues (January-October 2010)



(Source: ITG)

In this dissertation I shall refer to all off-exchange trading venues as Alternative Venues (AVs). This term will apply equally to ECNs, dark pools, ATFs and MTFs. It is not important, for the purpose of this study, to get into the detail of what the new platforms do and how they do it. I shall call AV any physical venue or technological network that competes with a national stock exchange and allows financial operators to buy or sell securities.

II.3. Regulatory backdrop

The past century or so was a golden age for financial regulators. To start with, that period saw the creation of most modern financial regulatory agencies in the developed world. The SEC, for example, was established by the Securities and Exchange Act of 1934^{lx}. Most other stock-market watchdogs followed, although some market regulation pre-dating the SEC had been undertaken by central banks. France's Commission des Opérations de Bourse was established in 1967, notably to authorize IPOs. It was folded into the Autorité des Marchés Financiers, a regulator with widened powers such as punishing insider trading, in 2003. The UK's Securities and Investment Board, precursor to the Financial Services Authority and later the Financial Conduct Authority, was incorporated in 1985. The period 1930-2010 was also when the overwhelming majority of existing financial rules were written. But two relatively recent pieces of legislation, passed during a time of rapid technological evolution that was already destabilizing financial market practices, are threatening to have more damaging and longer lasting effects than any previous regulatory change: Reg NMS and Mifid. However, these two regulatory overhauls are refinements of – and additions to – two earlier sets of financial laws: Reg ATS in the US and the ISD in Europe. I shall outline and describe all four in this section.

II.3.1. ISD.

The Investment Services Directive (ISD) was implemented in January 1996. It did not deal with new off-exchange trading venues, but created the European passport: an obligation for each country to allow financial institutions approved by one national regulator to operate unimpeded in all national markets. Under ISD, financial firms no longer needed to establish a branch or subsidiary in other countries where they wished to offer their services. The ISD also breaks down regulatory prerogatives between the home country (whose regulator remains responsible for prudential supervision) and the host country (which applies the rules of conduct and monitors compliance with them). One important provision in the ISD was that it allowed member states “in certain circumstances [to] require that the transactions connected with investment services be carried out on an organized market. However, investment firms, irrespective of whether

they are banks, may become members of such an organized market”.^{lxi} Summing up, the one important impediment that the ISD did not remove was the power of EU member states to protect the monopoly of their national stock market. The UK was a notable exception in that it opted not to maintain the monopoly of the London Stock Exchange. Most other large exchanges kept their monopolies. Until the Mifid, that is.

II.3.2. Reg ATS. ^{lxii}

Off-exchange transactions were initiated in the US by Instinet in 1969^{lxiii}, but only took off during the 1970s as Nasdaq gradually became an official over-the-counter electronic trading venue [see (Terrell 2010)]. Faced with the rising importance of electronic off-exchange trading, the SEC drafted the Regulation of Exchanges and Alternative Trading Systems of 1998 (Reg ATS). Reg ATS acknowledged the right of non-exchanges to offer share trading services. It implicitly acknowledges the role and importance of ATSS by offering them a choice between becoming recognized exchanges and registering as broker-dealers. By defining the roles of the various trading venues, the SEC thus created the National Market System (NMS). This helped to clarify the regulatory burden imposed on ATSS and therefore also aimed to give exchanges a chance to compete on a level playing field (which was not the case when exchanges were regulated and ATSS were not).

II.3.3. Mifid.

With hindsight, it becomes clear why exchanges went to such unprecedented lengths to lobby against the Mifid. Although it deals with numerous issues pertaining to investor protection and giving final customers the best possible service while bringing down the costs of financial transactions, the Mifid is most vividly remembered for having broken down the national monopolies of stock exchanges. New entrants were well prepared for this and within a few years more than 30 alternatives to the stock exchanges were established.

On the handling of customers’ orders, the Mifid details the information that needs to be captured when accepting client orders. It also seeks to ensure that firms act in the client’s best interests and sets rules about how orders from different clients may be

aggregated. In order to ensure maximum pre-trade transparency, the Mifid stipulates all trading platforms make public a large amount of data on pending prices and available orders. Other compliance requirements pertain to post-trade transparency. The aim is to make public all data required to constitute a comprehensive audit trail: ultimately, investors or regulators must be able to rebuild a minute by minute account of every trade, its timing, size and execution price.

Also, to protect customers, the Mifid introduces a best-execution rule. This means “firms [must] take all reasonable steps to obtain the best possible result in the execution of an order for a client. The best possible result is not limited to execution price but also includes cost, speed, likelihood of execution and likelihood of settlement and any other factors deemed relevant”.^{lxiv}

II.3.4. Reg NMS.

According to the SEC, Reg NMS redefines the National Market System. In addition to modernizing listing and trading practices, “Regulation NMS includes new substantive rules that are designed to modernize and strengthen the regulatory structure of the U.S. equity markets”.^{lxv}

In essence, the main difference between Reg NMS and the Mifid is that the first did not need to open securities trading to competition, because Reg ATS had already done that. The remainder of Reg NMS deals broadly with the same issues as Mifid. Reg NMS is made up of four main sections. The first, “Order Protection Rule”, aims to ensure that orders are not automatically executed on a platform until sufficient steps have been taken to verify that no other venue offered a better price. The second section (“Access Rule”) seeks to make the market more transparent. Effectively, it sets limits on the fees that a trading venue can charge for participants to access its market prices. It also forces trading venues to forbid their members from posting prices that are deliberately set to interfere with the order books of other markets. The third rule (called the “Sub-Penny Rule”) sets a minimum quotation price (or “tick size”), so that a market participant may not undercut a posted price by a fraction of a US cent just to undermine that pre-existing price. The last rule (“Market Data”) is very similar to the audit trail provisions introduced by the Mifid. However, the SEC’s market data rule goes further and sets out a

formula for exchanges and trading platforms to share the revenues from selling market data, based on their market share of equity trading.

Part III

Shareholder types, their concentration and its effects on exchanges' operating and financial results – an empirical study

Abstract

Scholars are divided over whether listing the shares of stock exchanges improves their financial performance. Applying simple OLS regressions, I test the hypothesis that exchanges' post-IPO owners are value maximizers. However, recently demutualized exchanges have a high proportion of shareholders with conflicts of interest. Therefore, I also test whether different types of shareholders have different effects on performance. I find that investment managers behave like true value maximizers. The results also show that a higher fragmentation of share ownership is associated with lower performance. The proportion of brokers, who are the most conflicted shareholders in exchanges (since they are large customers as well as owners), is too small to have a measurable effect on performance. Most interestingly I find, by way of an inductive approach to shareholding structure, that strategic shareholders, a wide array of investors with various agendas, are on balance detrimental to shareholder value. This chapter is the first in a trilogy of articles that make up my Ph.D. dissertation. It is followed by an in-depth study of the shareholding structure of individual stock exchanges, notably in order to understand more clearly who these strategic investors are and what effects they have on exchanges.

Résumé

Le fait de savoir si la cotation en bourse améliore les résultats financiers des entreprises de marché continue à diviser les observateurs. Utilisant une approche empirique par régressions simples (moindres carrés), je teste les théories existantes de la gouvernance selon lesquelles les détenteurs d'actions cotées cherchent en priorité à maximiser la valeur financière de leur investissement. Les entreprises de marché ont la particularité d'avoir une grande concentration d'actionnaires avec des conflits d'intérêt (clients ou concurrents). Par conséquent, je cherche également à déterminer si la nature des actionnaires influence la performance de l'entreprise. Conformément à la littérature antérieure, je trouve que la présence d'investisseurs institutionnels est corrélée à une amélioration de la performance financière. Les résultats montrent également qu'une grande fragmentation du capital est associée à une performance plus faible. Les courtiers (actionnaires les plus ambigus car ils sont clients en même temps que propriétaires) ne sont pas suffisamment nombreux au capital pour affecter la performance. Enfin, par une approche inductive, je trouve que la présence d'investisseurs stratégiques (une catégorie englobant divers profils avec des motivations variées) est associée avec une détérioration de la performance. Ce chapitre est le premier de trois articles constituant ma thèse de doctorat. Le chapitre suivant examine en détail l'actionnariat de chaque bourse et permet notamment de différencier les divers actionnaires stratégiques et leurs influences.

III.1. Introduction

Since the mid-1990s financial exchanges have witnessed major changes in their operating environment. The most important of these include fast-paced technological advances; significant modifications of their legal and regulatory environments; massive entry of new competitors; major shifts in trading patterns in parallel with exponential growth in trading volumes; and strong pressure from customers to reduce trading costs. These developments have induced equally massive changes in the way exchanges are organized and managed, as well as major shifts in their ownership structure, requiring significant modifications in corporate governance.

Over the last 20 years in developed countries most exchanges, which had been structured as cooperatives or user-owned entities since their creation decades – or centuries – earlier, demutualized and adopted corporate structures more in line with those of financial institutions such as commercial or investment banks. One share-one vote replaced one member-one vote and distribution of dividends replaced the previous, non-profit, norm. Among the exchanges that demutualized, a majority also listed their own shares on their exchange and, in the process, were forced to implement (with various degrees of success) the standards of transparency and governance that they imposed on their listed customers.

III.2. Literature review

III.2.1. Types of exchange ownership and control.

Before getting into the details of the various types of ownership, I should clarify that in this dissertation I shall not differentiate between a mutual and a cooperative when discussing exchanges prior to their demutualization. Both mutuals and cooperatives are owned by their users and run for their benefit, and do not aim to make profits. The main difference between the two structures is that in order to become a member of a cooperative, one must purchase a share. This is not the case for a mutual, which imposes no such entry fee. Mutualist owners become members by the sheer fact of opening an account or paying a fee to use the organization's services. The US

exchanges, for example, were cooperatives: after being approved to join, members had to buy a “seat” at the exchange. Each seat gave its holder the right to trade on the exchange floor and the right to a vote under the one-seat one-vote quota system. Since the existence (or absence) of this entry fee is not relevant to the rights and behavior of the member, I shall use the terms “mutual” and “cooperative” interchangeably when referring to pre-demutualization exchanges in the rest of this dissertation.

Three major factors determine the governance of an exchange: (i) whether it is owned exclusively by its users (mutually owned or cooperative) or by outside investors (demutualized); (ii) whether it seeks to make profits (for-profit) or not (not-for-profit); and (iii) whether its shares are listed on an exchange (public) or not (private).

There are eight theoretical combinations of these factors. However, only four actually exist: (a) mutual/not-for-profit/private; (b) mutual/for-profit/private; (c) demutualized/for-profit/private; and (d) demutualized/for-profit/public.

It is easy to see why the other theoretical combinations are not encountered in real life. There is no interest for mutuals, whether profit-seeking or not, to be listed. This is because stakes could only be sold to other user-owners who, by definition, are already partial owners. There is no incentive for a part owner to increase their stake because mutuals are usually structured with identical voting rights for each owner, regardless of their size (“one-member one-vote” as opposed to “one-share one-vote” for corporations). In any case, the mutual structure cannot, for legal reasons, be listed, because such an entity does not have shares to list. The mutual/for-profit organization, legally structured as an association or cooperative, is usually a transitory stage in the evolution from mutual/not-for-profit/private entity to demutualized/for-profit/public corporation.

Similarly, it would be pointless to list the shares of a demutualized/non-profit entity, because no outside shareholder would be interested in buying the shares of a company that does not seek to make profits or pay dividends. Therefore, there are no demutualized/not-for-profit/public companies. Henceforth I will refer to mutual/not-for-profit/private exchanges as mutuals, and to demutualized/for-profit/public exchanges as public or listed. When referring to intermediate structures, I will specify, for example mutual/for-profit or demutualized/for-profit/private.

All the major exchanges (with the exception of recently-created electronic

exchanges, as we will see later in this dissertation) started as user-owned mutuals and maintained this structure until the great wave of demutualizations of the 1990s and early 2000s. In a 1999 report on demutualization^{lxvi}, the UK parliament's Treasury Select Committee defined mutual organizations as "those whose owners and customers are, generally speaking, the same people. They are distinguished from proprietary organizations, owned by a body of shareholders distinct, or largely distinct, from those who have financial dealings with the organization."

In 2012, in an effort to bring more clarity to the subject, an independent commission set up by the UK Cabinet Office refined its definition as follows^{lxvii}: "[mutuals are,] broadly speaking, societies registered under the Building Societies, Friendly Societies and Industrial & Provident Societies Acts. They are:

- owned/controlled by their members;
- run democratically on the basis of one member one vote;
- set up to meet the mutual needs of their members;
- not set up to make profits for external shareholders or primarily provide a return on capital;
- share any surplus or profits (the dividend) with their members. "

In a report published in June 2011^{lxviii} Unison, the UK's largest public sector employees' union, discusses in detail the definition and implications of mutuals and cooperatives. The report states that there is no single definition of a mutual. Instead, they share some common features:

- mutuals are established to serve a specific community or interest group;
- mutuals are all 'owned' by their members. This ownership is vested in the membership community of each mutual, and is expressed commonly. In other words, no individual can take away their share of the assets. Each generation is a custodian of the organization for the next. There are no equity shareholders, and mutuals do not belong to the government;

- mutuals all operate democratic voting systems, with all members having equal power – one member, one vote;
- mutuals have governance structures that formally incorporate stakeholder interests, and seek to ensure that these different stakeholders have an appropriate role in running the organization proportional to their relative stake.

According to Co-operatives UK^{lix}, the trade body for the sector, one of the key elements is that they are owned by the members, not external shareholders, and:

- they exist to serve their members, whether they are the customers, the employees or the local community;
- members have an equal say in what the co-operative does. So, as well as getting the products and services they need, members help shape the decisions their co-operative makes;
- co-operatives share their profits among members, rather than rewarding external investors.

Coop FR, the French trade association representing the country's 23,000 cooperatives, lists seven "values" and seven "principles" that define cooperatives.^{lxx} The values are: democracy (managers, who must be members, are elected through a one-member-one-vote system, by all members); solidarity (all members are responsible and liable); responsibility; going concern (cooperatives are here to serve current and future generations); transparency; proximity; and service (a cooperative exists in order to fulfill the social and economic needs of members).

The principles are: membership is voluntary and open to all; democracy is a right granted to all members; members must participate economically (purchase a share to become a member); autonomy and independence; education and training are a part of a cooperative's missions; cooperation with other cooperatives; duty-bound to the community.

III.2.2. Determinants of exchange ownership.

Bradley (2001) traces the origins of mutuals to medieval guilds in northern Europe, which were member associations. Each guild represented a profession and they were originally linked to the boroughs in which they were established. As such, they were part of a public authority. Later, when they separated from the boroughs they came to be seen as private-sector entities.

She draws a parallel with insurance companies in the US, which began originally as stock companies and converted into mutuals at the beginning of the 20th century after scandals at many life insurers. In sum, Bradley concludes, the “mutual business form was a vehicle that could promote the trust of those who might deal with the firm” (p.662).

The New York Stock Exchange, for example, was created on May 17, 1792, when 24 brokers signed the Buttonwood Agreement under a buttonwood tree outside 68 Wall Street^{lxxi}. The agreement had two main provisions: the first was a commitment by the brokers to trade exclusively with each other, thus eliminating outside competition; the second set a minimum commission of 0.25% on every trade. By agreeing to trade exclusively with each other the brokers were automatically committing themselves to meeting regularly under the same roof to conduct their business. This required that the brokers share the cost of the required premises – in this case the Tontine Coffee House on the corner of Wall Street and Water Street, according to Sobel (2000). This situation automatically turned the brokers into joint owners as well as joint users of what later became the NYSE.

According to Stringham (2002) the London Stock Exchange had similar beginnings. After meeting informally in various locations (mainly coffee houses) to trade financial instruments in the 16th and 17th centuries, and after being banned from the Royal Exchange (a formal market for tradespeople from different trades, including grocers and cloth merchants), a group of 150 brokers formed a club and opened a new and more formal "Stock Exchange" in Sweeting's Alley in the City of London in 1773. They charged an entrance fee for traders who wished to enter and trade securities.

The Amsterdam Stock Exchange, which claims to be the world's oldest organized exchange and is now part of NYSE Euronext Group, also had a very similar early history. "The Amsterdam Stock Exchange Association (Vereniging voor de Effectenhandel) was

founded in 1851 to organize and regulate share trading in the Netherlands. Only members of this association were allowed to trade directly on the stock exchange.”^{lxxii}

There are two main motivations, and several lesser ones, why the user-owned structure made sense. The main ones are: (i) the ability to apply monopoly pricing and extract economic rents as a result; and (ii) self-regulation and fraud prevention.

(i) Monopoly pricing and extracting economic rents. Exchange members’ efforts to secure economic rents through cartel behavior are well documented. In line with other monopolistic activities, including many utilities, concessions, or licenses to exploit natural resources, there are two straightforward tools to maximize revenues: (a) by fixing prices; and (b) by restricting access to their club. Both (a) and (b) are accurately described by (Krueger 1974; Von Mises 1998), and Kahana and Katz (1990), among many others, and are well illustrated by the Buttonwood Agreement of 1792, which created what later became the NYSE. In effect, the agreement contained two clauses: the first was a minimum commission of 0.25% on all trades (a perfect example of point (a)). Point (b) is enshrined in the second clause of the agreement, in which the original 24 signatories pledge to trade exclusively with each other.

These attributes of mutuals have long been viewed with suspicion by outsiders, and became a focal point of the criticism that ultimately led to the demise of this type of organizational structure.

“Floor trading enables increases in the value of franchise for the exchange members. Due to lack of transparency and absence of competition from remote liquidity providers, members can extract bigger rents from their clients,” (p.3), say (Jain and Jain 2009). The opacity resulting from the closed circle of floor traders has also made it possible for members to resort to front running – executing trades for their own account before executing a large client order that they know to be large enough to move the market price. The authors refer to several occasions when the NYSE penalized specialists for such unethical practices. In sum, these monopolistic powers enhance the value of existing assets for exchange members in the floor-trading environment.

Pirrong (1999) also highlights the nefarious effects of closed membership: because existing members can restrict the number of new members allowed to join an exchange, they deliberately reduce competition. This generates economic rents for them. “Under plausible conditions, exchanges have enough members to make it unprofitable for

competing exchanges to form, but fewer members than is socially optimal,” (p.330), he says.

(ii) Self-regulation and fraud prevention. One of the most valuable assets of an exchange is reputation, as final investors are reluctant to trade on a marketplace where they are exposed to the risk of fraud or bad execution. Jackson (2004) describes reputational capital as “the most valuable asset, the most powerful force behind your business”.

Bradley (2001) explains how this applies to exchanges through self-regulation. She says the regulation of financial exchanges is based on the idea that investors will only trade financial instruments in markets that work properly, are not rife with fraud, have accurate and readily available price information, and in which trading, clearing, and settlement are efficient. “Because exchanges are an important element in the capital formation process, they must be seen to be clean,” (p.658), she says. Hannah (2011) also emphasizes this point. Agreeing with Sylla and Smith (1995), he says Britain’s more stringent disclosure requirements in the early 20th century help explain why its stock exchange was at least 50% larger than the US’s, a country whose economy was twice as big. Michie (1998) makes a similar point: “in addition to providing a location for buyers and sellers to meet, the main function of an exchange was to lay out rules to prevent fraud, misconduct or dangerous risk-taking.” This notion is self-evident, because as an exchange’s reputation improves more investors are attracted, bolstering revenues for the exchange’s owners and thus increasing its value.

The realization that reputation was a valuable asset dates back to the very early days of exchanges, as do members’ efforts to maintain control of the regulatory function. Stringham (2002) reports that attempts by the British government to regulate financial trading were among the main reasons that led financial brokers to leave the Royal Exchange in 1698 and start trading in coffee-houses, Jonathan’s Coffee-house in Exchange Alley being the most notorious. It was also during this period that the brokers started actively rooting out unreliable or dishonest intermediaries. Stringham (2002) says that initially, the only punishment for fraud or defaulting on a trade was banishment from the coffee house. But when the British law courts ruled that coffee houses were public places and owners were not allowed to restrict entry, the traders resorted to writing the names of disreputable or defaulting traders on the wall so that newcomers could avoid them.

There is an ongoing debate as to whether self-regulation leads to stricter rules and

enforcement (as members seek to enhance the exchange's reputation), or looser oversight (as members seek to maximize the number of transactions, even if this means turning a blind eye to dodgy trades). This debate was revived by the SEC in the run-up to the finalization of Reg NMS. In March 2005 the SEC issued a concept release and request for comments on proposals to revamp self-regulation.^{lxxiii} In this document the SEC listed a number of conflicts of interest that self-regulatory organizations face, including inherent conflicts with members, market operations, issuers and shareholders. The concept release also looked at new problems arising from the rise of AVs. The ensuing consultation led to the merger of NYSE's and the NASD's self-regulatory arms into the Financial Industry Regulatory Authority (Finra), a revamped self-regulatory organization structured to be less exposed to conflicts of interest (for example by giving industry members only a minority of seats on the board). Other comments raised by the consultation were integrated into Reg NMS. The episode reignited the debate on self-regulation – a debate that remains lively to this day. This issue is discussed further in Part VI.

Section (i) above explains how the mutual structure was aimed at maximizing revenues for the community that created it, while section (ii) describes how keeping an eye on one's neighbors ensured that he could not behave in a manner that jeopardized this source of revenues. The next three points explain how, in view of the (limited) technology available at the time, brokers sought to minimize costs and boost efficiency, just as they do today by computerizing processes and streamlining operations. Thus mutually owned exchanges go hand in hand with floor trading, owing to the technological environment of the period (16th-18th centuries), which favored face-to-face trading among people who knew each other. In order to exclude outsiders and decide who could participate, members had to own the premises. And in order to generate the cash necessary for the building and maintenance of the facilities, owners had to generate generous economic rents. The most propitious structure to achieve these interlinked objectives was thus the mutual (or cooperative) structure. The other advantages induced by this choice of governance include:

- (iii) **Network effect.** The term “network effect” was officially coined in the early 20th century by Theodore Vail, president of Bell Telephone, to justify the creation of a monopoly for telecommunications, but the effect itself was known well before that. It refers to the fact

that the value of some activities is directly (or exponentially) related to the number of participants in that activity. One telephone, for example, is useless. But when two people are equipped with telephones, value is created because the two units can communicate. The network effect was further formalized in the 1980s and 1990s as Metcalfe's Law (named after Robert Metcalfe, a senior information technology executive), which states that the value of a network is proportional to the square of the number of connected users. The same logic applies to financial trading: one trader by himself cannot conduct business. Two traders in contact with each other can trade if their needs coincide: that is, if the security that one trader wants to sell is the same that the other wants to buy. Adding traders under the same roof increases the chances of finding a matching need among the crowd, and having access to this pool of traders had value. "Non-members naturally wished to benefit from the network externalities of concentrated trading activity (commonly referred to as "liquidity") and therefore paid members to represent their buy and sell orders on the exchange floor." (p.2). (Steil 2002).

Hart and Moore (1996) call it the agglomeration effect: "Perhaps above all, the key asset of an exchange is market depth: the fact that traders know that they can deal with many other traders at the exchange (i.e. there is an agglomeration effect)." (p.55).

(iv) Communication. Price formation requires that traders have access to as much information as possible about the product they are trading. In the absence of telecommunications the best way to ensure the dissemination of such information was physical proximity. According to Michie (1988), arbitrage was taking place in the 1860s between the NYSE and rival exchanges set up in nearby hotel rooms, with non-NYSE members trying to gain market insight by listening at the doors of the official exchange before running to an informal exchange to execute their trades. The value of communication is highlighted by all the early attempts by outsiders to create parallel markets: the curb outside the NYSE in New York, or the Coullisse in Paris.

(v) Transaction costs and economies of scale. Economies of scale are well documented, especially in microeconomic literature. From Smith (1776) to Chandler (1977), the notion that the average cost of a product falls if total costs are divided by a larger number of units produced is well known. Applied to exchanges, it is obvious that as the number of transactions executed in a single location increases, transaction costs (both average costs and marginal costs) decrease. In the case of trades on an exchange, Pirrong (1999) believes that reducing transaction costs was the main motivation for the

formation of exchanges. “Spatial and temporal concentration of trade on an exchange reduces search costs incurred to find counterparties,” (p.333), he explains.

(vi) Regional or cultural motivations. Governance regimes also seem to be driven by regional or cultural preferences. Ramos (2006) finds that exchanges in South America are mostly organized as associations, while governmental and member stock exchanges are found primarily in the Middle East. Most demutualized and publicly listed exchanges are found in western Europe and north America. The structure and governance of exchanges, she says, is heavily influenced by the level of economic freedom and the degree of liberalization of capital market controls. She also finds that democracy is an important catalyst of demutualization and going public. “This is consistent with (Rajan and Zingales 2003) view that in democracy incumbents are less able to protect their monopolies and to impose restrictions on competition” (p.5).

It is important to distinguish between factors (i) and (ii), and the others. The pros and cons of monopolies, cartels and economic activities with asymmetric rights (or information) are still being debated, academically and among professionals, legislators and politicians. These debates tackle issues of fairness, efficiency and productivity that are still very relevant today, with many questions remaining unanswered.

Reason (vi) belongs to the field of politics and falls outside the scope of financial research, at least under the approach adopted for this dissertation. (Because I focus on corporate governance with a particular emphasis on shareholder behavior, my main sample consists of companies operating in an economic environment that allows free trading of shares unimpeded by political interference). Meanwhile, factors (iii) to (v) were mainly the result of the state of technological advancement of the period, and were thus destined to be gradually eroded.

The demise of open outcry trading on derivatives exchanges is a case in point. Between 1990 and 1997, London-based Liffe was the only exchange to dominate trading in a foreign benchmark futures contract. Futures on 10-year Bunds (German government bonds) were then simultaneously traded on Liffe’s open outcry floor and on the all-electronic Frankfurt exchange, DTB (the derivatives arm of Deutsche Boerse).

Since domestic exchanges have a natural advantage over foreign competitors in the trading of their national financial products, Liffe’s dominance in Bund-futures trading

was widely interpreted as proof of the superiority of open outcry over electronic trading. Locals (the equivalent of “specialists” on the NYSE) were an influential group of Liffe members who trade for their own account and provide market depth. They were actively lobbying against the introduction of electronic trading on the exchange, arguing that the technology available at the time could not offer the same liquidity as human interaction. Their main argument was that multi-tasking (the ability to analyze several factors at once) was more important than pure processing power or speed of execution in the matching of buy and sell orders. Humans, they insisted, were capable of multi-tasking while computers, no matter how fast or powerful, were not. Locals were influential enough, and their arguments sufficiently convincing, to freeze Liffe’s management into inaction. Floor trading was maintained at Liffe in spite of rising evidence that electronic trading was gaining ground on exchanges around the world. Liffe even had plans to expand its trading floors. (Luce and Iskandar, 1997)^{lxxiv}

The City of London was stunned in the second half of 1997, when DTB’s 10-year Bund futures overtook Liffe’s rival contract in terms of trading volumes (measured in number of contracts). This incident led to a major overhaul of Liffe’s management, culminating in the resignation of the chairman and the CEO in early 1998. The incoming managerial team immediately announced the jettisoning of the new trading floor project and pledged to make major investments in a new electronic platform. (Luce and Iskandar, 1998)^{lxxv}

Competition, organizational changes and technological advances are all interlinked, and play a defining role in the decision to demutualize, as we shall see in the following section.

III.2.3. Drivers of demutualization.

The mutual structure served exchanges well for almost two centuries. It was an obvious choice as long as market participants were not too numerous, and were of roughly equal size (in terms of their inputs and benefits derived from the exchange).

However, as Jensen and Meckling (1976) point out, agency costs exist in “any situation involving cooperative effort between two or more people even though there is no clear-cut principal-agent relationship... It exists in all organizations and in all

cooperative efforts ... in universities, in mutual companies, in cooperatives, in governmental authorities and bureaus, in unions..." (p.311).

In a mutual or cooperative, agency costs become noticeable when the institution reaches a certain size, requiring the hiring of professional managers. Clearly, agency costs were not an issue for the signatories of the Buttonwood Agreement, but equally clearly the principal-agent issue had become a problem by the time Richard Grasso retired as CEO from the NYSE in 2003 (as will become clear in the following pages).

Demutualization was at least in part attributable to rising agency costs, as well as to other governance, strategic, competitive and technology-related issues. The recent wave of demutualizations was kicked off in 1993 by the Stockholm Stock Exchange. Several others soon followed, including the Helsinki Stock Exchange in 1995, the Copenhagen Exchange in 1996, the Amsterdam Exchange in 1997, the Australian Exchange and Borsa Italiana in 1998, and the Toronto, Hong Kong and London Stock Exchange in 2000. In 2005, about 60% of the World Federation of Exchanges' (WFE) members were either demutualized or listed.^{lxxvi}

Table III.1 below sums up the demutualization process and gives IPO dates for the major exchanges. (Several Nordic exchanges, including Stockholm and Helsinki, are regrouped under OMX; the date given is the earliest – that of Stockholm's demutualization.)

Table III.1
Milestones of major stock exchange demutualizations

	Year of Demutualisation	IPO/Listing Date	First Day Return (Offer to Close)
<u>Major European Exchanges</u>			
London Stock Exchange	2000	20-Jul-01	-5.20%
Euronext	2000	10-Jul-01	-8.40%
Deutsche Borse	2000	5-Feb-01	11.40%
BME Spanish Exchanges	2001	14-July-06	-4.03%
Swiss Exchange	2002	N/A	N/A
OMX Group	1993	1-Jan-93	N/A
Borsa Italiana	1997	N/A	N/A
Oslo Exchange	2001	28-May-01	25.26%
Hellenic Stock Exchange	1999	28-Jul-00	-6.40%
<u>Major North American Exchanges</u>			
NYSE	2006	7-Mar-2006	19.4%
Nasdaq (including AMEX)	2001	1-Jul-02	0.00%
Toronto Stock Exchange	2000	12-Nov-02	13.10%
Chicago Mercantile Exchange	2002	6-Dec-02	22.57%
CBOT	2005	19-Oct-05	48.70%
CBOE	2010	15-June-10	12.03%
International Securities Exchange	2002	8-Mar-05	68.89%
<u>Major Asian/Oceania Exchanges</u>			
Tokyo Stock Exchange	2001	2013	N/A
Osaka Stock Exchange	2001	2-Apr-04	154.12%
Hong Kong Stock Exchange	2000	27-Jun-00	17.90%
Australia Stock Exchange	1998	14-Oct-98	3.70%
Taiwan SE Corp.	N/A	N/A	N/A
Korea Exchange	2005	N/A	N/A
Singapore Stock Exchange	1999	16-Nov-00	21.80%
Bursa Malaysia	2004	18-Mar-05	23.33%
Philippines Stock Exchange	2001	15-Dec-03	120.18%
New Zealand Stock Exchange	2003	4-Jun-03	16.67%
Sydney Futures Exchange	2000	16-Apr-02	-3.02%

Source: OECD (2014)

It is still an open question whether exchanges, which are considered strategic industries in many countries, undergo a mutation in their governance structure for the same reasons that other activities do, or if this latest wave of exchange demutualizations and IPOs was prompted by developments affecting their sector specifically.

Bradley (2001) draws a parallel between exchange demutualizations and those of other industries (notably insurance). “Exchanges demutualize for reasons similar to those identified by other types of mutual firms.” (p.668). She singles out three main arguments for demutualization: subjecting the firm to the discipline of the marketplace; facilitating the raising of capital; and allowing diversification into areas for which the mutual structure is not adapted. This view is corroborated by the exchanges themselves,

in their regulatory filings and declarations by senior executives when announcing their demutualization plans. The CME, which demutualized in 2000 and listed on NYSE in 2002, identified five major objectives for its demutualization: adopting a governance and managerial structure that could respond quickly to competition; a business model aimed at creating shareholder value; the ability to expand into new business activities; allowing members to cash in on the value embedded in their membership; and facilitating mergers and acquisitions.^{lxxvii} The Toronto Stock Exchange said that becoming a for-profit business would make it more competitive, more entrepreneurial, and more customer-focused. These stated motivations are summed up in a survey of exchanges conducted by BTA Consulting and quoted by Scullion (2001) and Serifsoy (2008): according to the survey, the main drivers of (and expected benefits from) demutualization are: (1) to raise capital to modernize their trading systems; (2) to reduce the constraints imposed by vested interests; (3) to control costs; and (4) to increase flexibility, efficiency and competitiveness.

Ramos (2006) and Morsy (2010) conducted in-depth analyses of the process of exchange demutualization, using different methodologies. Ramos tested six hypotheses derived from various parts of financial and management literature, while Morsy adopted a theoretical approach to test whether the different aspects of the Theory of the Firm (Transaction Costs; Property Rights; Behavioral Theory; Agency Theory; Resource-Based and Dynamic Capabilities) could explain demutualization decisions. Ramos validates the hypothesis that demutualization and going public are responses to rising competition between exchanges. She also finds evidence that gaining the ability to merge or make acquisitions is a motivation for demutualizing and going public. “As mergers are an important instrument in enhancing liquidity, we interpret this as an additional signal of stock exchange competition” (p.5), she explains. Ramos also validates her hypothesis that exchanges restructure internally prior to going public.

Interestingly, some of Ramos’s findings contradict the parallel that Bradley draws between exchanges and other institutions. “Stock exchanges seem to have different reasons from the ones that have been theoretically argued and empirically found for ‘common’ firms” (p.5), she writes (Ramos 2006). Fixed costs, adverse selection costs and liquidity costs are among the factors regularly identified in the literature as drivers of demutualization. But Ramos does not find evidence that they played a role in exchanges’

decision to list their shares. She also fails to find evidence that stock exchanges go public to enhance their reputation.

In her theoretical approach relying on the Theory of the Firm, Morsy (2010) also reaches contrasting conclusions. The Transaction Costs Theory, she claims, provides a good explanation for demutualization. The move to electronic trading, Morsy says, has undermined two of the main arguments used by advocates of mutuals: price determination and the risk of market manipulation. "The new changes in today's competitive environment, that resulted from the introduction of new electronic systems have led to lower costs of trading for investors, allowed for better price determination, and lowered the chance for market manipulation – that existed under the mutual structure of stock exchanges." (p.141). Recent advances in technology have also facilitated cross-border trading and over time the development of inter-market trading systems (Claessens, Djankov and Nenova 2000). Therefore the shift towards demutualization of stock exchanges became a natural response to technological progress, when the mutual structure became less appealing and more costly for investors.

Similarly, Morsy finds that the Property Rights theory provides a good explanation for demutualization. Because user-owners benefiting from quasi-monopolistic rents are reluctant to jeopardize their privileges, they are inclined to resist any modernization that threatens to loosen their control over the exchange. Eventually, this situation reduces the value of the exchange, as it loses competitiveness and market share. Ultimately, this opportunity cost becomes too burdensome, and pressure to demutualize (in order to increase the value of the exchange for its owners) builds up.

The filter of Behavioral Theory leads to similar results. Morsy explains that as the competitive environment changes, the mutual or cooperative structure of the stock exchange loses its appeal. "The investor-stock exchange relationship has changed to seek better liquidity and services. Members' interests become increasingly divergent and the benefits of the cooperative structure become greatly reduced" (p.143).

Agency Theory is arguably the most relevant filter in this particular situation. This is because demutualization entails a wholesale shake-up of the entire principal/agent relation. Demutualization brings in profit-seeking outside owners, as well as new professional managers who are separate from the previous owners-cum-

customers (mutual owners or members). Therefore, referring to Jensen and Meckling (1976), (Fama and Jensen 1983; Fama 1980), and Elliott (2002), Morsy finds that demutualization is widely beneficial to all stakeholders, because it promises higher profits, more transparency, better management and, overall, increased value for owners and a better proposition for most users (with the exception of the floor brokers who end up losing their economic rents).

One motivation that is harder to document but cannot be discounted is that breaking the hold of the insiders was seen as a desirable end in itself (Steil 2002). There is ample evidence that many outsiders (regulators, banks, asset managers, foreign institutions, final investors, and even the managers of exchanges) found the situation counter-productive. As Richard Grasso, the former chairman and CEO of the NYSE, put it: “[Members] realize economic value from their right to trade on the NYSE floor.” The diversity of interests of members “is a continual source of tension and conflict. At times it leads to careful deliberations and consensual judgment. All too often it can lead to cumbersome decision-making and strategic gridlock.”^{lxxviii} Lee (2010) makes a similar argument. He points out that the direct users of an exchange benefit from inefficiencies in its operation, while the costs of these inefficiencies are borne by end-users. A key example, he says, is how traders on the floors of exchanges frequently seek to protect their position by resisting automation, because they feel that the lower trading costs brought about by automation will take place at the expense of their own profits (Lee 1996). Domowitz and Steil (1999) also find that under the mutual ownership structure, members may resist innovations that enhance the value of the exchange in case this innovation threatens the demand on their intermediation services. Revisiting the subject later, Steil (2002) reiterates his earlier findings. Because members are the entrance point to the exchange, they derive their profits from their role as intermediaries. “They can therefore be expected to resist both technological and institutional innovations which serve to reduce demand for their intermediation services, even where such innovations would increase the economic value of the exchange itself. If the members are actually owners of the exchange, they will logically exercise their powers to block disintermediation” (p.3) (Steil, 2002). Michie (1998) also emphasizes members’ role as self-regulators, which becomes a source of conflict of interest: “This role as writer and enforcer of the rules led the members of exchanges to use these same rules to safeguard their monopoly.”

Concerning competition as a source of pressure for demutualization, it is important to distinguish between exogenous and endogenous competition. Endogenous competition, which I have analyzed in detail above, is defined as competition between existing exchanges, while exogenous competition is due to new entrants. Ramos introduces a different type of competition: exchanges first compete for listings, but also now compete for traders. Pirrong (1999) gets into more detailed analysis of competition. He says the attitude of the large international financial institutions, which can be members or end-users putting their trades through members, depends on how internationally active they are. Institutions that can trade on several rival exchanges are less inclined to maintain the status quo if an exchange becomes less competitive than another exchange to which they have access.

In addition to competition between exchanges (endogenous) legislation enabling new entrants to launch trading venues has introduced exogenous competition (that is, other institutions providing services that compete with the main functions provided by exchanges).

There are three main reasons for the rise of exogenous competition in western economies. In the US, the 1998 SEC Regulation of Exchanges and Alternative Trading Systems Act^{lxxxix} (Reg ATS) officially recognized the role of electronic trading networks that had already started competing with exchanges. It was followed in 2007 by Reg NMS, which aimed to establish a level playing field for competition between exchanges and the newcomers. In the EU, two major pieces of legislation led to an overhaul of the competitive environment: the Investment Services Directive of 1993 (ISD)^{lxxx} and the Market in Financial Instruments Directive of 2007 (Mifid). The first created the European passport, allowing financial institutions approved by regulators in one EU country to operate in all EU member states. Mifid broke the monopoly of national exchanges and allowed the creation of alternative trading venues, including ECNs, dark pools and internalized trading, among others.

Aggarwal (2002) says the situation boils down to two main forces driving stock exchanges to demutualize – increased global competition and advances in technology – and finds that these two factors are mutually reinforcing.

In sum:

- Derivatives exchanges were under more intense competitive pressure than cash

exchanges, because they never had a monopoly on the products they listed. Liffe and DTB were in direct competition on European interest rate futures and options. When electronic trading gave DTB a decisive competitive advantage, Liffe was forced into shifting to electronic trading. This required substantial investments, which in turn led to the sale of the entire exchange to Euronext.

- Stock exchanges were challenged by lower-cost new entrants when legislation ended their monopoly on trading in domestic shares. The legislative and regulatory changes also allowed them to start competing with each other. This led to mergers between the national exchanges (sometimes preceded by demutualization and/or IPO).

III.2.4. Effects of demutualization.

By 2010 an overwhelming majority of exchanges in the developed world had demutualized, and a substantial proportion of them had listed their own shares. Not all of these exchanges, however, followed the logical route: change of legal structure (from mutual to corporation or limited company), followed by allowing non-members to own shares, followed by an IPO. Notorious examples include the Paris, Amsterdam and Brussels exchanges, which merged into Euronext before listing (the Paris Bourse was thus temporarily a demutualized exchange in the 1990s, but with no outside shareholders before the three-way merger). NYSE also never really went through the process of demutualizing. After several attempts (starting in 1999) were blocked by members [see (Fleckner 2006)], the exchange finally acquired publicly-listed Archipelago (an electronic exchange created in the 1990s) in a reverse merger in 2006, and the merged entity (NYSE Group) became listed as a result of the deal.^{lxxxix} NYSE Group then merged with Euronext a year later to form NYSE Euronext. Borsa Italiana also never conducted an IPO. After going through the legal process of demutualization in 1998, but still owned and operated by a consortium of banks that were its previous user-members, it was acquired by the London Stock Exchange in October 2007 in an all-share takeover.^{lxxxii}

The effects of the unprecedented wave of demutualizations that has taken place since the early 1990s have been observed in many areas, both intrinsic and extrinsic to the companies that operate the exchanges. The extrinsic areas include: regulation, market liquidity, and the cost of capital of listed companies. The intrinsic areas, on

which this dissertation will focus more specifically, include: corporate strategy, financial and operating performance, ownership and governance.

- Strategy

Among the stated objectives of demutualizing exchanges, two aims figure prominently: the ability to acquire or merge with other exchanges and the ability to venture into new activities.

Morsy and Rwegasira (2010) find that demutualized/for-profit stock exchanges that are owned by profit-seeking investors are more likely than mutuals to seek innovative ideas and processes in order to grow their business, and are also more careful in seeking cheap, efficient sources of financing. Demutualized exchanges have extensively used these newly found abilities. A number of mergers have been successfully completed, and many attempts were blocked or failed. OMX/Nasdaq, LSE/Borsa Italiana and NYSE/Euronext belong to the first group; Nasdaq/LSE, LSE/TMX (Toronto), NYSE Euronext/Deutsche Boerse and Singapore/Australia (as well as many other attempted combinations) to the second. However, there is little evidence that such mergers have created value, and many academic studies raise concerns that acquisitions were overpriced.

Examples of successful diversification by listed exchanges include NYSE Group: the reverse merger with Archipelago introduced electronic trading to the venerable Wall Street institution, and the subsequent merger with Euronext made it the second largest derivatives exchange operator in Europe. In 2012 the NYSE Euronext group also unveiled plans to create a major clearing operation for derivatives in London. Similarly Deutsche Boerse has in the past decade and a half created the most fully integrated financial exchange operator in the world, with activities ranging from cash and derivatives trading to information technology to clearing and settlement through its Clearstream subsidiary.

However, it can be argued that demutualization is not a prerequisite for strategic moves, such as mergers. There are many examples of exchanges merging before demutualizing or going public. In Australia the leading exchange, ASX, is a result of the merger of six regional exchanges (Sydney, Melbourne, Brisbane, Adelaide, Perth and

Launceston) in 1987, followed by demutualization in 1996 and an IPO in 1998. The Paris Bourse, before its demutualization and three-way merger to create Euronext in 2000, was itself the result of the gradual absorption of small exchanges in Lille, Lyon and Marseille by Paris (the largest exchange among them). Euronext then had an IPO in 2001. The successive operations are outlined by Raulot (2007). In Japan in July 2012, the Tokyo Stock Exchange (the country’s main cash market for equities) and the Osaka Securities Exchange (the dominant derivatives exchange), announced plans to merge. The resulting entity was due to become operational in January 2013, under the name Japan Exchange Group. Again, although the OSE is demutualized and listed, the Tokyo Stock Exchange was never demutualized.^{lxxxiii}

But once listed, and with easier access to additional capital through secondary offerings if needed, exchanges have paid handsome prices for acquisitions. Table III.2 below shows the multiples paid for exchanges in M&A deals up to 2007.

Table III.2
Multiples paid for exchange acquisitions in 2002-2007
(multiple of earnings before interest, tax, depreciations and amortizations)

<i>All deals</i>		<i>European markets</i>		<i>Us markets</i>		<i>Derivative markets</i>	
Mean	Median	Mean	Median	Mean	Median	Mean	Median
27	23.9	25.3	20	28.5	29.1	27.6	28.6

Source: Polato and Floreani (2009)

The multiples paid are high for the period, as average market valuations for listed European exchanges were in the region of 10 to 11 times earnings in the years 2002-2007, according to Polato and Floreani.

Euronext was widely criticized in 2001 when it paid £550million to acquire Liffe (it increased its bid unilaterally at the last minute after submitting a first closed-envelope offer at £500m. The two other bidders, LSE and Deutsche Boerse, had made offers in the region of £350million-£400 million, so in effect Euronext ended up outbidding itself.^{lxxxiv} Polato and Floreani (2009) analyzed the NYSE bid for Euronext and the LSE’s acquisition of Borsa Italiana, and came to the conclusion that both acquisition prices were hefty. Based on multiples of other exchanges, they estimated a standalone value for Euronext

ranging from €59.5 to €61.2 per share, and €55 to €67 for Borsa Italiana. Euronext shares were trading at around €60 a share immediately prior to the announcement (Borsa Italiana was not listed). NYSE's offer valued Euronext at €93.06 per share and LSE paid €100 per share for Borsa Italiana. The authors offer two explanations for this. First, they point out that a large number of exchange mergers and acquisitions took place between 2002 and 2007, a strong bull market during which share trading was rising exceptionally fast; and this could have led exchange executives to overestimate future growth prospects. Second, the exchanges were facing intense competitive pressures, which might have resulted in what could be deemed rash behavior with hindsight. The bullish argument was confirmed by an executive director of NYSE Euronext. The executive said the NYSE board was surprised by the deterioration in the group's European performance between 2006 (when the merger was agreed) and 2012 (when ICE approached NYSE about a potential acquisition). The board realized that in NYSE's future growth projections, it had assumed that growth rates from 2000-2006 would continue at the same rate for years to come. "Although Mifid was being written in Brussels, no-one thought it was relevant to anticipate that Euronext's monopoly was going to disappear and that future trading volumes would be shared with newcomers in the industry."^{lxxxv}

It is important to remember that Mifid, the EU directive breaking up national exchanges' monopoly, was implemented in November 2007. Chi-X, the first pan-European alternative trading platform for equities, was launched in 2007 as soon as Mifid made it possible, and just weeks after the October 2007 LSE/Borsa Italiana deal. As Polato and Floreani (2009) point out, "the value of trading on Borsa Italiana was €74.6 billion in July 2008 whereas that on Chi-X was €73,5 billion. In March 2009 those figures were €45.9 billion and €57.1 billion respectively". (p.9).

Thus, in the months following Mifid, not only did absolute trading volumes decline on Borsa Italiana, but it was overtaken in terms of activity by a new-starter less than 18 months old. The authors believe that "at the time of LSE-Borsa Italiana merger the magnitude of competitive pressure was, probably, not fully understood, leading to valuations overestimating exchange values." This view corroborates the opinion expressed by the NYSE Euronext executive director in 2013. "Projections of future revenue growth were extrapolated on a straight-line basis from previous years," the

executive said.^{lxxxvi} The importance of Mifid and other market-liberalizing measures has been mentioned and will be revisited in more detail in Part V of this dissertation.

The other main strategic consideration put forward by exchanges to justify their demutualizations and listings was the ability to expand into new business areas, or diversify. Here again, there are two ways to diversify: horizontally (expanding into new business or geographical areas) or vertically (developing upstream or downstream from one's main activity). The NYSE/Euronext combination illustrates horizontal expansion: it added European cash equity trading and derivatives trading to NYSE's activities. Nasdaq/OMX/Dubai is also a good illustration of horizontal expansion through geographical diversification. Deutsche Boerse is the best example of vertical integration: to complement its cash and derivatives exchanges, it owns clearing and settlement operations to handle post-trading, and earns revenues from selling trading technology and market information.

The pros and cons of vertical vs. horizontal integration, as well as those of focus vs. diversification, are still being debated and deserve closer study. However, a consensus is emerging over the "horses for courses" theory, where some strategic set-ups outperform others in different market environments, and vice versa. It is generally agreed, for example, that since derivatives and cash trading are countercyclical to each other, companies that operate both types of exchanges tend to suffer less during bear markets, when the inevitable decline in equity trading is compensated by a rise in demand for derivatives. Meanwhile, more focused stock exchanges would be expected to outperform in a bull market, and conversely pure derivatives exchanges would outperform in bear markets as investors resort to futures and options for hedging purposes.

These expectations are partly corroborated by Serifsoy (2008), who finds that "horizontally integrated exchanges possess a lower productivity value than cash markets-only operators" (p.328). However, he also finds "evidence that fully integrated exchanges have a better performance than cash markets-only venues," although this latter finding could be biased by the importance of Deutsche Boerse, the most fully integrated market which also happens to be one of the most profitable. Serifsoy (2008) concludes by taking "a rather cautious stance regarding conclusions on the comparative performance of business models". (p.328).

- Financial and operating performance.

Several scholars have examined the financial performance of demutualized exchanges. While most of the literature concurs that there has been an improvement in the operating and financial performance of the demutualized entities, there is no general consensus on whether the improvement can be attributed to the change in legal structure, the admittance of outside shareholders, the listing of the shares on an exchange, or a combination of these factors.

Comparing financial data before and after exchanges listed their own shares on the market, Mendiola and O'Hara (2003) found evidence that financial performance improved after the IPO. "We found that listed stock exchanges generally outperformed both the stocks on their markets and the IPOs listed on these exchanges." (p.23). Furthermore, the authors present evidence that the performance of stock exchanges with public offerings was positively correlated with the proportion of the equity sold to outsiders. The results, however, were not entirely clear-cut, as the authors themselves acknowledge. "While not every converting exchange exhibited enhanced performance, we interpret our overall results as providing strong evidence that shifting corporate governance from a cooperative to a corporate structure is value-enhancing for exchanges." (p.13).

With more data available by the time they researched the subject, and using a broader range of financial indicators, Morsy and Rwegasira (2010) came to the very different conclusion that there is no strong evidence that demutualization leads to improved financial performance. The authors say they find "persuasive evidence that suggests that the demutualization programs do not improve the financial performance of demutualized stock exchanges" (p.38). Instead, their empirical study shows an improvement in only a minority of the financial performance indicators they use. They find that "demutualization results in significant improvement in only four out of the eleven financial measures used to test for change in performance [...] The research hypothesis that demutualization improves stock exchange financial performance is not however supported in the remaining financial measures: current ratio, debt equity ratio, debt ratio, fixed assets turnover, total assets turnover, return on equity (ROE) and return on capital employed (ROCE)." (p.38).

Serifsoy (2008) also finds no benefits from listing and exchange's shares. Instead, he concludes that just moving from a mutual structure to a corporate one confers most of the benefits to be had in terms of financial performance, even if no outside shareholders are allowed to invest in the firm. In any case, he says, the additional costs incurred by listed companies in terms of compliance and transparency obligations are too high compared with the added benefit of an exchange listing for a company that is already demutualized. "Therefore, the case for an IPO, a measure that involves considerable costs, cannot be advocated from an operative performance perspective. However, a demutualization process that retains the exchange's customers as its main owners seems promising." (p.329). Serifsoy's findings also contradict the widely held view that listed exchanges gain competitive advantage by having better access to capital, which in turn should allow them to invest in performance-enhancing technology. "The assumption that a demutualization process is necessary to install modern trading systems cannot be confirmed empirically," (p.329), he says. Intriguingly, the mutual exchanges in his sample have a persistently higher portion of electronic order book trading than the demutualized and listed exchanges. His conclusion is that, unburdened by the need to remunerate shareholders, some mutual exchanges are able to invest in technology in order to adopt new trading technologies without changing their governance structure.

Finally, Lee (2002) disputes the argument that exchanges with outside shareholders are necessarily under more pressure than mutuals to deliver higher financial results. He believes that mutually owned exchanges can generate as much profit as listed ones, but that the cash-flows are just distributed in a different manner. "The main difference between a demutualized, profit-seeking exchange and a non-profit, mutually-owned cooperative exchange, is that the first type of institution can distribute profits in the form of dividends, whereas the second can not," he says. "This does not mean that the second type of institution does not seek to maximize profits, it just distributes them to its users as fee rebates." (p.5).

- Ownership and governance

As discussed above, it is widely agreed that breaking the stranglehold of members on exchanges was a desirable objective, and that opening ownership to

outsiders was a necessary means to that end. The change in ownership of listed exchanges is widely documented.

Aggarwal (2002) examined the ownership of Deutsche Boerse after its February 2001 IPO. The IPO brought in 300 shareholders, but strategic investors such as banks, brokers and regional stock exchanges maintained a controlling 51% stake; other German institutions owned 15%; US institutions 13%; UK institutions 12%; other institutions 7%; and retail investors bought 2%. The five largest shareholders as of May 2002 were Deutsche Bank (10.1%), German regional exchanges (7.2%), Hypobank (4.7%), Commerzbank (4.6%) and BHF Bank (2.6%).

A similar exercise for the LSE, which listed on July 20, 2001 with a market capitalization of £1 billion, shows the following shareholding structure: institutional investors controlled roughly 25% of the shares, up from the original 15-20% (post-demutualization but pre-IPO); and ownership by members had fallen. As of March 2002 the major shareholders included Fidelity (9.2%), Warburg Dillon Read (4.2%), Cazenove Fund Managers (4.1%), Credit Suisse Asset Management (2.9%) and Legal & General Investment Management (2.8%). By the end of 2007, according to Polato and Floreani (2009), Deutsche Boerse had a “100% floating capital and a shareholding structure dominated by foreign institutional investors, particularly from the Anglo-Saxon financial markets”. German investors owned only 18% of Deutsche Boerse’s shares (compared with 35% in 2004), while UK investors held 29% and US investors 42%. Similarly for Euronext, which until 2000 was owned by members of its three founding exchanges (Amsterdam, Brussels and Paris); by 2007 Dutch, Belgian and French shareholders controlled only 22% of the shares, with the remainder controlled by international investors.

However, there remain many impediments to open competition and full dedication to shareholder value in the industry.

Many countries still consider the former monopoly exchange to be a strategic industry that needs to be protected. Australia, for example, has a law that puts a 5% cap on the shareholding that any institution can hold in its exchanges. In France, Jean-François Théodore, the CEO of Euronext, was widely criticized for agreeing to a transatlantic merger with NYSE [see (Raulot 2007)]. Many were disappointed that the French government did not intervene to block the deal. After all, the French authorities

had intervened to protect Danone, a yoghurt maker, from being taken over by Pepsi Cola! Callaghan and Lagneau-Ymonet (2012) explain that NYSE benefited from a conjunction of factors, including the lack of credibility of some of the merger's critics, namely the French banks, which Euronext accused of having abandoned it.

Even among demutualized and listed exchanges, many are still majority controlled by former members. In many cases, exchanges are also dominant shareholders in other exchanges (after its 2006 failed attempt to take over the LSE, Nasdaq held almost 30% of the shares of its UK rival, a situation that will be examined in detail later in this dissertation). Also, many exchanges have launched, or invested in, alternative trading systems, when these systems were originally seen as a major source of competition that would help transform the exchanges. Many shareholders are also part owners of new platforms that compete with the exchange, or even run their own internalizing system where they execute customers' trades that would otherwise be executed on the exchange.

Such situations put exchange managers in the awkward position of serving several masters. A position that is untenable, according to Jensen (2010), who believes the best way to serve the interests of multiple constituencies (stakeholders with diverging agendas) is to focus on a single objective, preferably shareholder-value maximization. "Without the clarity of mission provided by a single-valued objective function, companies embracing stakeholder theory will experience managerial confusion, conflict, inefficiency, and perhaps even competitive failure," (p.33), he writes. Jensen does not believe it is possible to maximize more than one factor at the same time. "Telling a manager to maximize current profits, market share, future growth in profits, and anything else one pleases will leave that manager with no way to make a reasoned decision. In effect, it leaves the manager with no objective." (p.34).

According to Ruben Lee^{lxxxvii}, "Different ownership groups may attempt to promote their own competing interests. They may, for example, seek to minimize the particular fees that they are required to pay. Some of an exchange's members may also be its competitors, and these participants are likely to pursue different goals than those followed by non-competitors. Many financial intermediaries in the cash equity markets, for example, operate their own internal order matching systems in competition with the exchanges of which they are a member." (p.39).

In short, a significant proportion of an exchange's shareholders are simultaneously its customers and shareholders of its main competitors. The main shareholders will also be represented on the board, as well as on the boards of competing exchanges. Opportunities for conflicts of interest are rife. Listed companies, for example, will logically seek to obtain the lowest possible listing fees, whereas fund managers will no doubt pressure the exchange to maximize income from all sources. Proprietary traders benefit from the lowest possible trading fees. Stockbrokers might have conflicting demands: for higher revenues (as shareholders) and lower fees (as users). Morsy (2010) sums up the potential for conflicts of interest, pre-demutualization: "The mutual governance structure and the heterogeneity of members of the stock exchanges (local market makers, broker dealers, international banks, etc.) made it difficult for them to ignore their private cost-benefit evaluations and vote for policy change." (p.143).

There are signs that the shift from user-owned to shareholder-owned entities, and the ensuing quest for value creation through improved efficiency, have led to a shift in the business strategy of exchanges. Hart and Moore (1996) detect a change in the product mix of exchanges post-demutualization, which they interpret as the result of the shift to for-profit status. Traditional functions performed by exchanges, such as providing a trading mechanism, disseminating information, acting as a clearing house, settling trades, etc., are gradually abandoned, starting with the least profitable. "Exchanges no longer need to be vertically integrated in this way. Many of these functions are offered by specialist service providers and, in many cases, exchanges have hived off particular functions." (p.53).

The governance of exchanges is also influenced, in some cases, by the exchanges' additional role as self-regulator. This situation puts the exchange in the uncomfortable position of having to enforce rules that can antagonize its customers and, consequently, impede its business activity.

The exchange industry, which has operated for centuries as a non-profit sector with public utility connotations, is also fertile ground for the study of stakeholder theory. Two main areas of concern arise: first, the fact that most users are tied to an exchange gives the latter a natural monopoly. This leads many researchers to call for compensatory measures to prevent the "monopolist" from using its advantage to the

detriment of users. Second, the dominance of exchanges as the economy's main source of capital means that mismanagement leading to a failure raises the specter of systemic risk.

Most of the literature in this area addresses the questions of whether demutualization was really necessary, or if the shareholder-controlled structure threatens exchanges' ability to respond to their responsibilities (regulatory, systemic, level playing field) other than creating value for shareholders.

Lauzun and Lee (2006) argue that users are very often tied to the exchange, which enjoys a dominant position in its domestic market. Therefore, these users cannot "vote with their feet" (p.3). Aware of this power, the operators of the "infrastructures can be tempted to enjoy a rent by applying non-competitive prices". Such practices weigh on transaction costs for final investors, and more widely, on the global efficiency of markets. At the very least, extremely strict rules of governance must be imposed, giving priority to the users, Lauzun and Lee add. One way to constrain such possible anti-competitive behavior, the authors believe, is to give users of exchanges voting rights. "We must address the question of users' participation in the capital of listed exchanges. It is undoubtedly very highly desirable." (p.3).

Reiffen (2008) looks at whether profit seeking could tempt exchanges to relax the enforcement of rules (listing requirements as well as trading restrictions) in order to please their customers (listed companies and stockbrokers) to whom the rules apply. Reiterating the view that exchanges have been given substantial responsibilities with respect to enforcing regulations and protecting investors, he looks specifically at the period during which an exchange converts from mutual to for-profit status. "In contrast to oft-stated concerns, we find that, in many circumstances, an exchange that maximizes shareholder (rather than member) income has a greater incentive to aggressively enforce these types of regulations," (p.3), he concludes.

This view is contradicted by Kuan (2006). In this contrarian article, and referring to Akerlof (1970), the authors claim that the member-owned structure, and the monopolistic powers associated with it, allow an exchange to treat its customers as "hostages". They believe this is the most effective way to force listed firms to be fully transparent, therefore eliminating "lemons" (or sub-par companies that a profit-seeking exchange might accept to list in spite of their defects).

III.3. Aims and approach

In their new corporate shape as listed entities, stock exchanges should perform in line with the findings of previous corporate governance research: the owners of listed and easily tradable shares are expected to apply pressure for financial performance, a purpose for which they have to check the temptations of the managers to whom they have devolved wide powers to run the company on a day-to-day basis.

However, due to their recent past as non-profit organizations, exchanges still have a wide array of shareholders, not all of them pure value maximizers. In addition to investment managers, exchanges also count brokers among their owners, as well as strategic shareholders with non-financial objectives.

According to agency theory literature, financial investors are expected to be mostly value maximizers: their concentration in a firm's capital should be positively correlated with higher sales, productivity and profits, and negatively correlated with costs. Conversely, higher dispersion of shares (i.e. a large freefloat) should be positively correlated with higher costs and negatively correlated with productivity and profitability.

In this section, I use a panel consisting of six exchanges. My objectives are twofold. The first objective is to test earlier findings about the effects of stock exchange demutualizations. For example, the assertion by Lee (2002) that being owned by shareholders does not necessarily imply more pressure on management to achieve higher profits, since mutually-owned exchanges also distribute profits in another form: fee rebates.

The second objective is to make a contribution to agency theory by going beyond the principal/agent conundrum, and delving deeper into the motivations of various types of principals. The approach here is based on the assumption that not all principals are primarily motivated by value maximization. There are situations where principals derive more value through other means (as customers or users of a service) than from their position as shareholders of the company. In order to understand these conflicting motives, I had to analyze to what extent the identity of shareholders influences their behavior.

This approach is innovative in two ways because it leads me to examine corporate ownership not only in terms of fragmentation/concentration as has been done previously by Holderness (2009), Jensen and Meckling (1976), Fama and Jensen (1983) etc., but to delve further into the nature and motivations of shareholders. The second innovation consists of moving beyond the black and white approach of agency theory, where principals are thought to have one straightforward aim (maximizing financial value) and agents to have the opposite aim (expropriating principals by as much as they can get away with).

I have segmented shareholders into three categories depending on the degree of conflict of interest they display vis-à-vis the firm. A fourth category (shares not held by any of the three) also has its attributes, as we shall see below.

In this world, dominated by shades of grey between principal-white and agent-black, some shareholders (notably those that have commercial ties to the exchange in addition to being part-owners) can alternatively wear their principal's white hat or their agent's black hat depending on the situation.

III.4. Methodology

I use a database covering six exchanges over the period 2002-2011. The choices that led to this specific sample of six companies are explained in Part I. The resulting database is laid out in Appendix I. All the exchanges are listed and their shares very liquid. They all publish audited annual reports and the list and description of their shareholders is available from Thomson One Banker. The full list of performance variables that I test is available in Appendix I.

In the following pages I test three hypotheses (linked to shareholder types) empirically through OLS regressions. I approach hypothesis (4) inductively.

- Hypothesis (1). Wide dispersion of shares (or high freefloat) is value destroying and detrimental to financial and operating performance.

- Hypothesis (2). A high proportion of investment managers (IM) shareholders leads to greater value creation and improved corporate performance.
- Hypothesis (3). A high concentration of brokers in the shareholding is detrimental to corporate performance.
- Hypothesis (4). Strategic investors' motivations are unclear, as is the effect of their presence on the exchanges' performance. These effects, if there are any, can be value-enhancing or value-destroying. I therefore approach this part inductively, regressing the performance variables against the proportion of strategic shareholders. The aim is to find out if strategic investors on balance have a significant effect on corporate performance, and determine whether this effect is value-enhancing or value-destroying for other shareholders.

III.5. Empirical results

Following are the results of OLS regressions involving 17 dependent variables. Each is regressed against four independent variables, representing the proportion of the capital held by: freefloat, IM, brokers and strategic investors. In this section I have compiled tables showing only regressions that had significant results. All the regressions, including those with inconclusive results, are laid out in Appendix III.

III.5.1. Testing hypothesis (1).

The first set of regressions shows significant results for 7 of the 17 variables. The results validate the expectation that high dispersion of shares is negatively correlated to productivity (sales per employee) and profitability (return on assets and return on invested capital). High freefloat is also positively correlated to operating expenses, as there is no dominant power to act as a counterweight to management's propensity to use company resources as it pleases.

Table III.3
Effects of freefloat on performance

Independent variable: freefloat.

Number of observations: 54.

Variable	R-squared	T-stat	P
DividendPayout	0.078	2.04	*
DividendYield	0.068	2.18	*
ReturnOnInvestCap	0.159	-3.17	**
DebtToEquityRatio	0.089	2.28	*
SalesPerEmployee	0.351	-5.25	***
ReturnOnAssets	0.148	-3.03	**
SellGenAdmExpToSales	0.110	2.39	*

There is no obvious causality that would explain the positive correlation to leverage (debt-to-equity ratio); the positive correlation with dividend payout could be explained by signaling theory, whereby management will maintain the level of dividends when profits fall in order to reassure shareholders that future prospects are positive.

III.5.2. Testing hypothesis (2).

Regressing the 17 dependent variables against IM holdings yields 9 significant results. The positive correlations of share price, operating profit margin, sales per employee, return on assets, pretax margin, net margin and return on invested capital are all consistent with earlier literature stating that IMs are value maximizers. The very strong (and robust) negative correlation with leverage is inconsistent with hypothesis (2), unless professional investors consider that exchanges are already too indebted, or there are no tax benefits to be enjoyed, as described by Modigliani and Miller (1958).

Table III.4
Effects of investment managers on performance

Independent variable: IM.

Number of observations: 54.

Variable	R-squared	T-stat	P
SharePrice	0.193	3.56	***
BookValuePerShare	0.225	3.89	***
ReturnOnInvestCap	0.117	2.65	*
DebtToEquityRatio	0.315	-4.94	***
OperatProfMargin	0.138	2.91	**
SalesPerEmployee	0.424	6.13	***
ReturnOnAssets	0.112	2.58	*
PreTaxMargin	0.12	2.68	**
NetMargin	0.136	2.88	**

Book value per share is inversely related to goodwill. One explanation for the positive correlation is that IM shareholders demand higher capital spending. This is a rational expectation in a sector where success is determined by investment in information technology. It is perfectly plausible that value-maximizing shareholders insist on constant investment.

III.5.3. Testing hypothesis (3).

Only two variables are correlated to brokers' shareholdings: the quick ratio, which calculates the firm's ability to cover short term liabilities with liquid assets (i.e. the company's short term financial strength); and the ratio of cash flow to sales, a measure of productivity.

Table III.5
Effects of brokers on performance

Independent variable: brokers.

Number of observations: 44.

Variable	R-squared	T-stat	P
QuickRatio	0.125	2.48	*
CashFlowToSales	0.126	-2.49	*

Neither result is very robust, which is in large part attributable to the generally low level of brokers' shareholding (and the fact that they are completely absent from two exchanges: LSE and Deutsche Boerse). The negative correlation with cash flow to sales is consistent with the hypothesis that brokers are value destructive.

III.5.4. Hypothesis (4).

A quick reminder here that hypothesis (4) is not clear-cut. The data show that strategic shareholders are not a homogeneous group. The only thing they have in common is that their motivations for holding the shares are not purely financial. At NYSE Euronext, they consist mainly of employees and managers. According to agency theory literature, this group is expected to display signs of entrenchment, with a negative influence on corporate performance. In the case of the London Stock Exchange, the main strategic investors are competitors, a situation that is likely to be destabilizing for the company's management. At Intercontinental Exchange, the main strategic investor is the founder and CEO of the group. This puts him in a position of immense influence, giving him the power to create value for all shareholders (including himself) or to expropriate other investors. The following analysis provides the first opportunity to measure the aggregate effect of such a diverse range of influences.

Nine of the 17 variables show correlations with the shareholdings of strategic investors, and the outcome is clearly that strategic investors are value destroying. Five key performance indicators are clearly negatively correlated to strategic holdings: the share price, operating profit margins, pre tax margins, net income and net margins.

The positive correlation of leverage is consistent with the expectation that other shareholders will seek to impose higher levels of debt as a tool to discipline the managers and employees who account for the bulk of strategic shareholdings.

Table III.6
Effects of strategic investors on performance

Independent variable: strategic investors.

Number of observations: 55.

Variable	R-squared	T-stat	P
SharePrice	0.149	-3.05	**
PERatio	0.113	2.55	*
BookValuePerShare	0.102	-2.43	*
NetIncome	0.125	-2.75	**
DebtToEquityRatio	0.148	3.03	**
OperatProfMargin	0.085	-2.21	*
PreTaxMargin	0.163	-3.21	**
NetMargin	0.122	-2.72	**
SellGenAdmExpToSales	0.101	-2.28	*

The one puzzling result is that a high level of strategic ownership is associated with a high stock market valuation. This is apparent in the positive correlation of the price/earnings ratio and the negative correlation of book value per share (i.e. strategic shareholding is associated with high goodwill). After looking at the results of the individual case studies in Part III, it will become apparent that this result is consistent with situations such as that of ICE, where the bulk of strategic shareholdings is accounted for by the founder and CEO, who is gradually winding down his stake as he increases the total value of the firm. It is also consistent with situations described by Rappaport and Sirower (1998), where companies growing through acquisitions maximize the valuation of their shares in order to use them as acquisition currency. However, the same result contradicts the situation at NYSE Euronext, where strategic shareholdings are associated with management entrenchment, which is not conducive to higher share valuations. It is also inconsistent with the situation at LSE, where ownership by strategic investors has shattered expectations of a bid for the company.

III.6. Conclusion

This empirical study of exchanges' shareholders and their influence on corporate performance allows me to verify some of the findings from earlier work on stock exchanges, as well as to corroborate expectations dictated by the general literature on

corporate governance. Two widely held hypotheses are corroborated: that financial investors seek to maximize the value of their investment; and that a high fragmentation of shares leads to lower performance.

I had assumed that brokers are conflicted because they play two simultaneous and conflicting roles, as co-owners and customers. On the one hand, as shareholders, they expect their investment in the exchange to generate value in the form of dividends and capital gains. On the other hand, as customers, it is in their interest to pay as little as possible in fees to the exchange. Tests to determine which of these conflicting attitudes (seeking discounts or demanding financial reward) dominates are not conclusive. This is mainly due to the small presence of brokers relative to the other blocks of shareholders.

My most interesting finding relates to the behavior of strategic investors, who turn out to be value destroying on balance. The term strategic encompasses a wide array of investors with various motivations. In this sample they consist of founders who still have power (at ICE), predators who built up a stake but failed to take full control (Nasdaq in LSE), or entrenched managers (NYSE Euronext).

My results clearly show that strategic shareholders are correlated with bad performance on balance: i.e. that these principals have an overall influence over the exchange that is closer to that of an agent. This leads me to call them Quasi-Agent Principals (QAPs), as in owners whose ambiguous relationship to the asset they have invested in ends up eroding the value of this asset.

Two factors lead me to conclude that more detailed analysis of individual exchanges' shareholdings is called for. First, in view of the diversity of investors who fall under the "strategic" label, it is necessary to study how each type (managers, rivals, founders) behaves. Second, the lack of meaningful results from the analysis of brokers' holdings is due their absence from some exchanges (most notably Deutsche Boerse and the LSE). However, in other exchanges (such as Nasdaq) they are highly concentrated and influential. The next chapter is therefore dedicated to an in-depth examination of each exchange's shareholders. Because the fragmentation of the database precludes a purely quantitative approach, that article will be in the form of six individual case studies, approached through a mixed methodology.

Part IV

Owners' motivations and their impact on exchanges' strategy and performance – six case studies

Abstract

This self contained article lies at the intersection of two disciplines belonging to the field of corporate governance: agency theory and the study of shareholder concentration/fragmentation. In this series of case studies, I test whether outcomes predicted by the literature in these two fields (and confirmed at the aggregate level in Part III) are observed at the level of each firm. Using multiple methods (OLS regressions, mean comparisons and graphical extrapolations), it emerges that a strong presence of investment managers among the shareholders is positively correlated with value creation and, conversely, that high shareholder fragmentation is associated with lower performance. Brokers' behavior confirms their status as QAPs (as defined in Iskandar 2014), destroying value. Finally, through an inductive approach, I find that strategic investors fall into three categories: founding shareholders, who are value-enhancing; employee shareholders, who are value-destroying; and competitors, whose presence increases the volatility of the firm's performance.

Résumé

Ce chapitre sous forme d'article explore deux sous-disciplines de la gouvernance d'entreprise : la théorie de l'agence et l'étude de la concentration/fragmentation de l'actionnariat. En examinant à la loupe l'évolution de la structure actionnariale de six opérateurs de marchés organisés, il transparaît que deux hypothèses largement évoquées dans la littérature (et testées dans le chapitre précédent) sont validées au niveau de chaque entreprise individuelle : le lien positif entre présence d'actionnaires institutionnels et maximisation de la valeur financière ; et la corrélation négative entre fragmentation du capital et performance financière. Enfin, par le biais d'une approche inductive, je divise les actionnaires stratégiques en trois catégories : les fondateurs, créateurs de valeur ; les salariés actionnaires, destructeurs de valeur ; et les concurrents (ou prédateurs), qui accroissent la volatilité de la performance de l'entreprise. Enfin, je confirme l'existence des « principaux quasi-agents », cette catégorie d'actionnaires faisant face à de nombreux conflits d'intérêts, et dont le comportement est destructeur de valeur (voir Iskandar 2014, ou la Partie III de cette thèse).

IV.1. Introduction

In this chapter I analyze the shareholding structure of each exchange, and its evolution over time. In the previous chapter, Part III (Iskandar 2014), I found that institutional investors were beneficial to corporate performance and, conversely, high shareholder fragmentation was detrimental. I also found that strategic shareholders on balance were associated with lower performance.

The aim in this chapter is to analyze in more detail the effects that various types of investor have on the performance of the firm. The shareholders are again divided into four types: brokers, investment managers (IMs), strategic shareholders and widely held shares (freefloat). It is the same categorization as in Part III, but by breaking up the data to look at individual firms I expect to detect behavioral traits associated with specific types of shareholders, which are not obvious at the aggregate level.

Strategic shareholders, for example, are a very diverse group that cannot be studied like a homogeneous entity. At ICE, it consists in large part of the shares held by Jeffrey Sprecher, the company's entrepreneurial, empire-building, founder and CEO. At NYSE Euronext, the strategic owners are mostly a group of former civil servants led by CEO Jean-François Théodore, who calls the management team a "cabinet" and his closest adviser a "chief of staff". Surely the motivations of these two diametrically opposed groups (entrepreneurs vs. former civil servants) cannot be identical. The LSE has had several successive strategic shareholders: Nasdaq, its US competitor, which tried unsuccessfully to take it over and ended up holding roughly 35% of its shares; it was followed by Borse Dubai, also a competitor albeit a less threatening one; then the sovereign wealth fund of Qatar, presumably a passive owner with no hostile intentions. Again, it cannot be assumed that these successive shareholders had identical influences on the LSE just because they all describe themselves as strategic.

In most exchanges, brokers were the sole owners (as well as the main customers) of the structure before its demutualization and move to a for-profit governance. They remain large customers even after they relinquish full ownership, paying substantial fees to use the services of the exchange. Brokers face conflicts of interest, as they simultaneously pay fees to the exchange (as customers) and receive a share of its profits (as shareholders). They can also be avid users, as well as shareholders, in other venues

that compete directly with the exchange – another source of conflict of interest. Brokers are still dominant shareholders in some exchanges, so their effects on performance must be looked at in detail, even if their influence in aggregate was not visible in Part III because of their total absence from some exchanges.

Investment managers (IMs) consist of investment funds. Academic literature has shown repeatedly that they invest with a view to maximize the value of their investment, through capital gains (share price appreciation) and dividends.

The final category of investors is described as freefloat. This part of the shareholding consists mainly of small stakes whose owners are not identified, either because they are too small to declare their stake or because they trade their shares frequently. In both cases, they cannot be considered a homogeneous group. As a result, even if their combined stakes can be substantial, freefloat shareholders do not have a commensurate influence, as their agendas might diverge widely (they might even not have an agenda at all). Many smaller shareholders, who belong to the freefloat group, do not vote at shareholder meetings; they are not represented on the board; and, more generally, are not considered to have much influence on management or strategy.

The relevant literature for this article is reviewed in Part III.

IV.2. Methodology

I use the same data as in Part III, but I have broken down the figures for each exchange individually. This fragmentation precludes a hypothetico-deductive approach, as the small number of observations in each sample makes it impossible to obtain robust quantitative results. I nonetheless run the same regressions as in Part III, for each performance variable against each category of shareholder.

The regression results are then used to deduce relationships between corporate performance and the concentration of each shareholder type. When regression results are not significant, I look at the graphical representation, which sometimes shows interesting trends, which then need to be explained through non-quantitative means.

This is why this section is described as a series of case studies, and not a quantitative study.

In each case, I regress the same performance variables (the full list is detailed in Appendix 2) against the four independent variables used in Part III: freefloat, investment managers (IM), brokers and strategic shareholders. In some instances I look at individual events, such as large share trades or M&A activity, and try to explain outcomes in the context of shareholders' motivations (or interests) at that specific moment.

IV.3. Case studies

IV.3.1. London Stock Exchange Group.

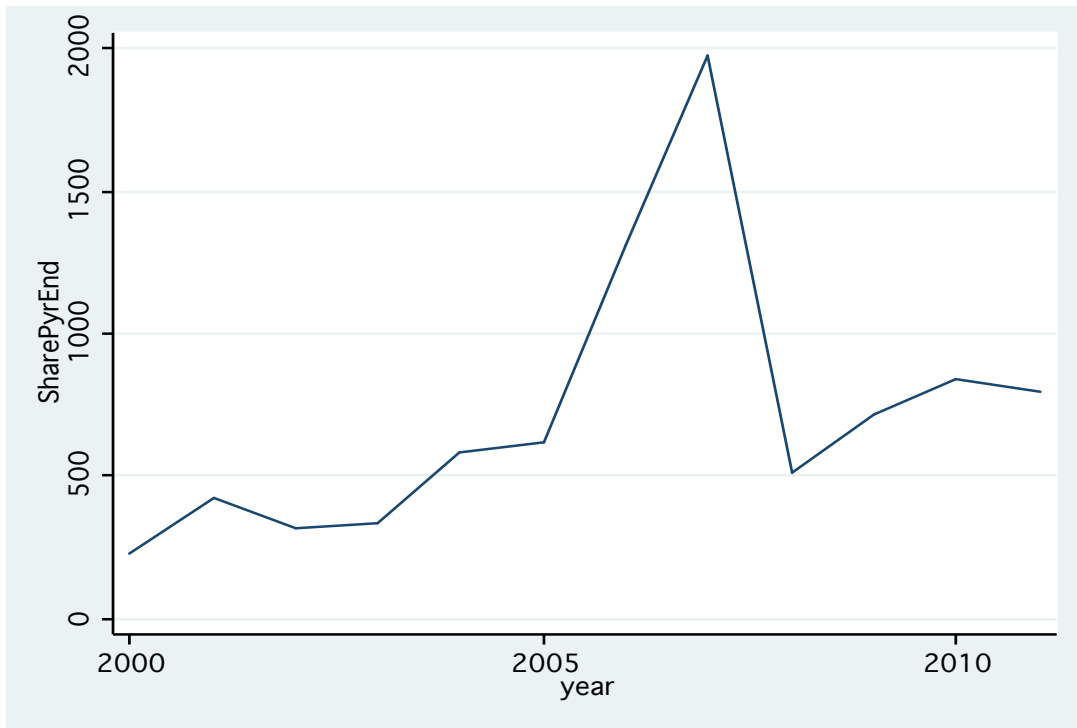
Introduction.

The London Stock Exchange (LSE) has undergone a very eventful period since its demutualization in 2000. It has made successful and unsuccessful takeover attempts of rival (or complementary) exchanges, negotiated successful and unsuccessful friendly mergers, and has been the target of numerous hostile bids, all of which it has fended off so far. This makes the LSE a particularly interesting subject to study, since this flurry of deals has resulted in significant upheavals in the exchange's shareholding structure, with various effects on its operating and financial performance.

Share Price.

The LSE's share price rises gradually, in line with sales and profits growth, for most of the period under observation (see Graph IV.1 below). However, it peaks in 2007, in the midst of Nasdaq's build up of a large stake as part of an attempted hostile takeover. The takeover attempt seems to be the main explanation for the share price performance in that period. This explanation is corroborated in two separate ways: first, because the peak in the share price coincides with that in Nasdaq's holding of LSE shares; second, because it does not coincide with rises in performance measures, such as annual sales, operating profit, net income or dividend payout. Sales peaked in 2008, a year later than the share price. Dividend payout peaked in 2006 and 2010, a year before and three years after the share price peaked.

Graph IV.1
LSE share price

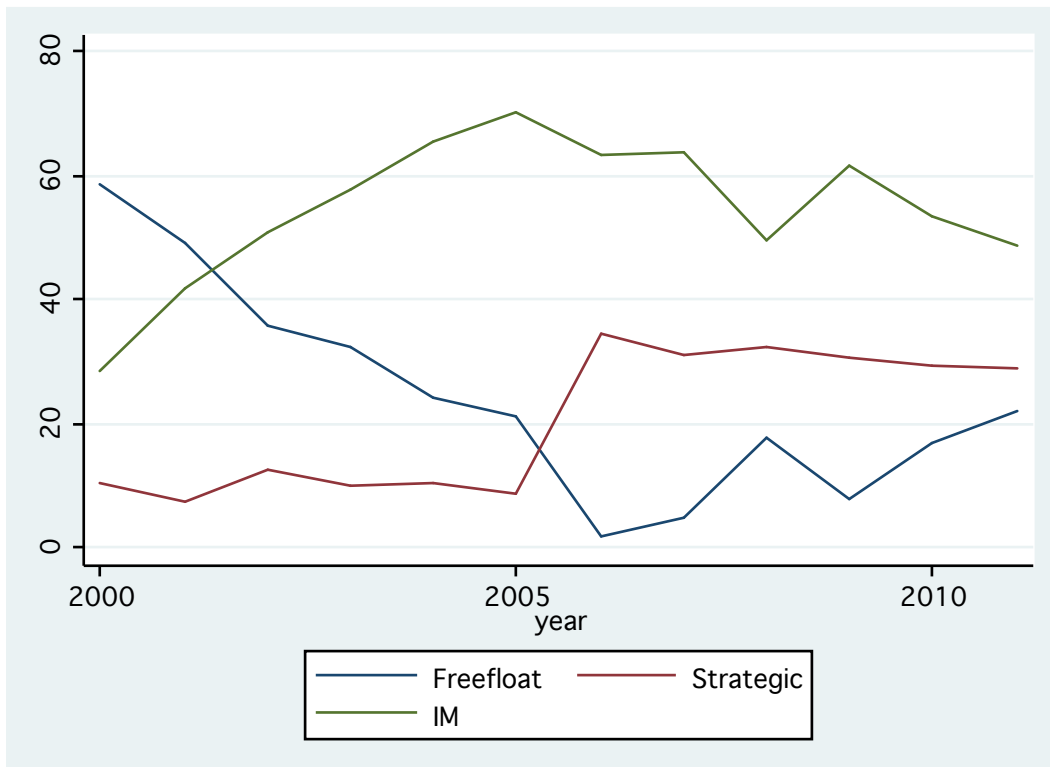


It is interesting to note, as we shall see later in this case study, that the share price becomes increasingly disconnected from corporate performance indicators after Nasdaq's failed takeover attempt. While sales, operating profits and net income are closely correlated from 2001 to 2005, they cease to be so from 2006 onwards.

Shareholding evolution.

Several interesting points are worth noting. As can be seen in Graph IV.2 below, in 2002 widely held shares (freefloat) ceased to be a majority of LSE's equity. Instead, in that same year IMs became the dominant shareholding group and have continued to own more than 50% ever since. In 2006 strategic investors quadrupled their combined stake, from 8.67% to 34.56%. Although this was mostly the result of Nasdaq's build-up in anticipation of a hostile takeover bid, strategic investors remained very influential well after Nasdaq sold out, accounting for roughly 30% until 2011.

Graph IV.2
LSE shareholder base evolution
 (% outstanding shares)



Thus the year 2006 was a watershed for the LSE. This clear preponderance of certain types of investor at given periods will prove very useful in order to test various hypotheses. Brokers, who held a majority before demutualization, have gradually reduced their combined stake: from 2.8% in 2000 to 0.03 % in 2009, and insignificant amounts thereafter. These figures mean that brokers are not significant enough to influence the LSE as shareholders. However, being the most important source of revenues for the exchange, they can apply pressure through other means, such as threatening to take their business elsewhere. Therefore, I have not tested the influence brokers' shareholdings quantitatively, but chose instead to focus on their behavior in a specific case study at the end of this section.

Methodology.

Due to the absence of brokers from LSE's shareholding, I look at only three independent variables in this section, using two different methods. I use simple OLS

regressions on two variables, IMs and freefloat, to check whether their concentration affects performance. In order to gauge the influence of strategic shareholders, I use a different approach. I expect that when a competitor becomes a controlling shareholder of the LSE, this must have some influence the LSE's performance. In order to find out what these effects can be, I compare performance variables before and after a strategic shareholder takes control. In this case, 2006 is the watershed. Before that, no strategic shareholder holds more than 12%. Starting in 2006, Nasdaq holds more than 35% of LSE's shares. Even after Nasdaq sells its stake to Borse Dubai, this strategic stake remains above 29% up to and including 2011.

I chose a 20% threshold to define a controlling shareholder based on one of the most influential articles in the field. La Porta, Lopez-de-Silanes and Shleifer (1999) look at corporate ownership in wealthy economies, and divide firms into those that are widely held and those that have an ultimate owner. They define an ultimate owner as an entity that controls more than 20% of the shares or votes of a company. This 20% threshold, they establish, allows the said owner to have a very strong influence on the company. In their conclusion, they state that having such control offers this owner the possibility to expropriate other owners, if their stakes are smaller and dispersed, but also allows him to exert his influence to create additional value that can benefit all shareholders.

I therefore create a new dummy variable, *StratDom*, which is equal to 1 in the presence of a strategic dominant investor with more than 20%, and 0 when there is none. I then apply a *ttest* (on Stata 10.0) to determine whether each performance variable is significantly different in situations 1 compared to 0.

Freefloat.

I tested seven variables measuring operating performance and 10 measures of financial performance. The list of variables is detailed in Appendix II. Three of the eight showed statistically significant results when regressed against the proportion of widely held shares, as shown in Table IV.1 below. The remaining regressions, including those with inconclusive results, are shown in Appendix IV.

Table IV.1
Effects of freefloat on LSE performance

Independent variable: freefloat.
Number of observations: 10

Variable	R-squared	T-stat	P
SharePriceYrEnd	0.617	-3.59	**
OperatingProfitMargin	0.414	-2.38	*
SalesPerEmployee	0.506	-2.86	*

The share price is clearly negatively correlated with freefloat – i.e. the more dispersed the shareholding, the lower the share price. This is in line with what the literature would lead us to expect, as dispersed ownership results in less pressure on management to perform. Also negatively correlated to the proportion of widely held shares are sales per employee, a key measure of productivity, and operating profit margin.

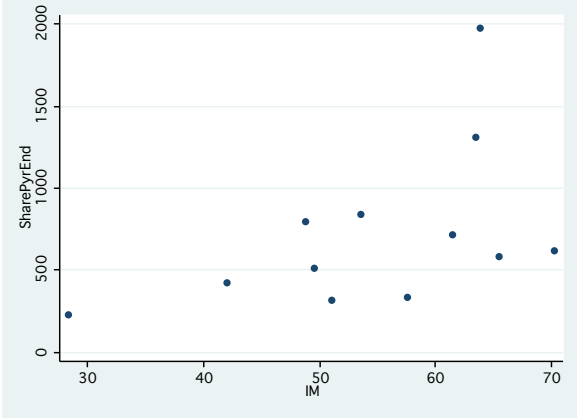
Investment managers.

In this section, I regress the same variables against the proportion of investment managers in the exchange’s capital. I find no significant results. Summing up, I do not find that a higher concentration of investment managers leads to better operating or financial results.

However, although the results are not statistically significant, a graphical representation shows a clear link between IMs and performance in some variables. I have shown Graph IV.3 and Graph IV.4 below for illustrative purposes. In the cases of sales per employee and the share price, the lack of significance of the data is due to one outlier. The remaining data clearly rise when the level of IM holdings rises, and in both cases the lowest point in the performance variable is associated with lowest level of IM holdings.

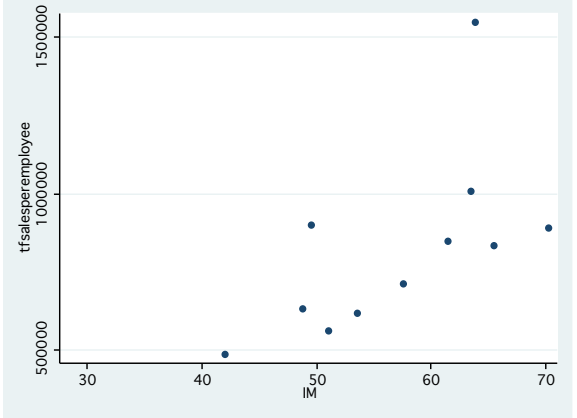
Graph IV.3

Effects of IMs on LSE share price



Graph IV.4

Effects of IMs on sales per employee



Strategic investors.

Strategic investors, by definition, have an interest in the operations and strategy of the company in which they hold shares. They also have enough clout to affect its performance. However, unlike IMs who are above all expected to be interested in maximizing the value of their investment, strategic investors might have a different agenda. In the case of Nasdaq, this agenda was initially clear: to take full control of the LSE. The LSE’s board and management considered Nasdaq’s approach hostile, and vowed to defend the exchange’s independence. They were ultimately successful although, as we shall see later, the battle had long-lasting effects on the LSE’s performance.

In Table IV.2 below I have applied a mean comparison to the data with (1) and without (0) a controlling strategic shareholder holding a stake of more than 20%.

Table IV.2
Effects of dominance by strategic investors

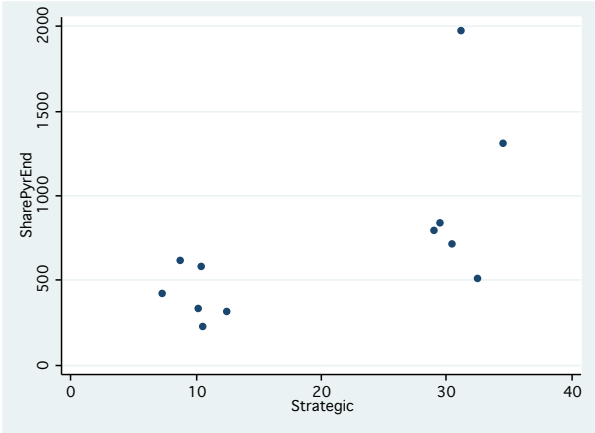
Dummy variable: StratDom

Variable	Mean 1	Mean 0	Diff.	t-stat	P
SharePrYrEnd	18.238	8.208	10.03	1.599	*
DividendPayout	41.012	20.250	20.762	1.874	**
DividendYield	2.588	1.320	1.268	1.943	**
QuickRatio	0.628	3.070	-2.442	3.487	***
OperatProfMargin	42.888	34.348	8.541	2.283	***

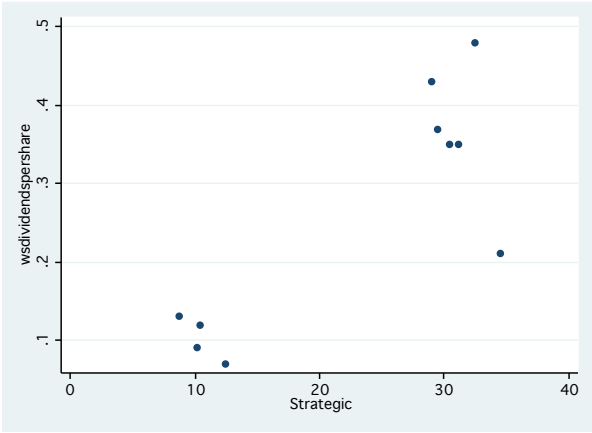
Five variables are clearly and significantly affected by the presence of a strategic shareholder (see table above). The difference in the share price can safely be attributed at least partly to a squeeze on the shares, as building a stake of 35% in a company clearly distorts the balance between supply and demand. The fact that dividend payout roughly doubles after the arrival of the strategic shareholder can be the result of either of two possibilities: the dominant shareholder applies pressure for a high return on their investment or the LSE maintains a high dividend in order to please other shareholders. The same logic applies to the improvement in the operating profit margin. Most interesting, though, is the sharp fall in the quick ratio. It shows that the financial strength of the target company deteriorated sharply after the arrival of the dominant strategic shareholder.

More noticeably, for the variables that do not show statistically significant changes with the arrival of the dominant shareholder, a graphical representation yields interesting results.

Graph IV.5
Effects of strategic holdings
On LSE share price

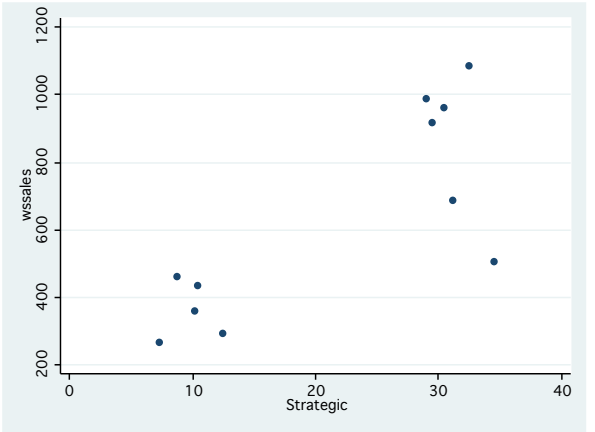


Graph IV.6
Effects of strategic holdings
on LSE dividend per share

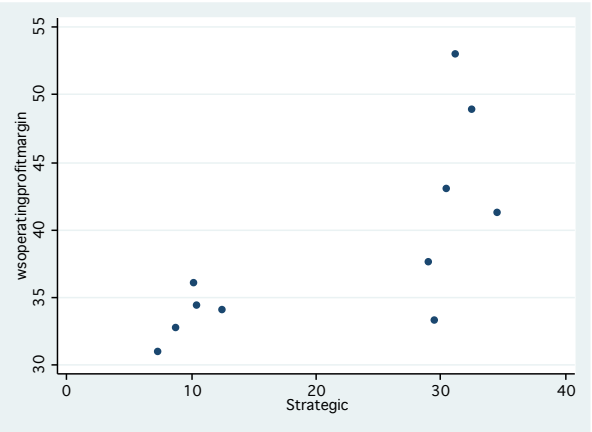


As can be seen in Graphs IV.5 to IV.8 on this page, for each variable, with the exception of net income (which I discuss separately below), the presence of a dominant strategic shareholder is associated with a higher dispersion of results. In other words, the performance of the LSE is much more haphazard and unpredictable under the dominance of Nasdaq, from 2006 onwards.

Graph IV.7
Effects of strategic holdings
on LSE sales

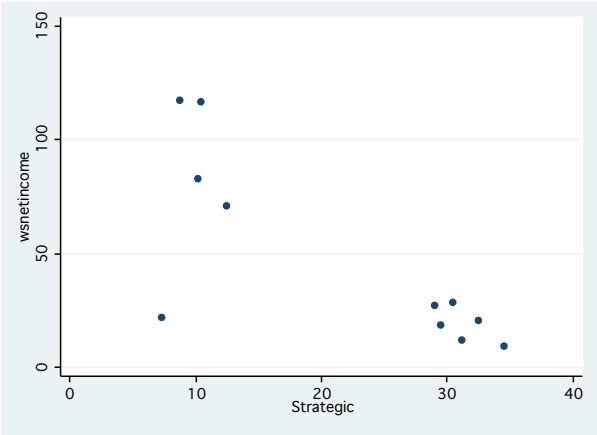


Graph IV.8
Effects of strategic holdings
on LSE operating profit margin



Living with a dominant strategic shareholder is clearly linked to lower net income, as can be seen in Graph IV.9 below. However, this performance has to be looked at in conjunction with other performance measures. It is interesting to note that this lower net income coincides with higher sales (Graph IV.7 above) and operating profit margin (Graph IV.8). Therefore, the fall in net income can only be attributed to lower net financial income or higher extraordinary expenses. The latter explanation is compatible with a defence against a hostile bid or creeping control.

Graph IV.9
Effect of strategic holdings on LSE net income



The added dispersion apparent in Graphs IV.7 and IV.8 above is corroborated by a quantitative analysis of the data. Table IV.3 below confirms that several performance measures become more volatile in the presence of the dominant strategic investor. (Std.Dev1: standard deviation of the variable with a strategic investor holding a stake of more than 20%; Std.Dev0: standard deviation of the variable with no dominant strategic investor.)

Table IV.3
Volatility of LSE performance under strategic investors' dominance

Variable	Std.Dev. 1	Std.Dev. 0
SharePyrEnd	12.05	3.14
DivPayout	18.57	0.81
PERatio	13.94	4.50
DividendYield	1.25	0.34
BookValuePerShare	4.94	0.60
QuickRatio	1.23	0.78
TotalInvestReturn	61.25	40.62
OperProfMargin	7.25	1.39
ReturnOnAssets	15.77	0.63
PretaxMargin	31.09	0.93
NetMargin	31.52	1.55

Interpretation.

This analysis yields interesting results, in many cases corroborating widely held views that emerged from earlier literature, but also offers new insights into the effects that some types of shareholders can have on the firm, be they deliberate or otherwise.

Firstly, the regressions show in some cases a very clear negative correlation between freefloat and a number of performance measures, both operating and financial. In sum, a high proportion of widely held shares coincides with lower productivity (sales per employee) and a lower share price. This is in line with literature suggesting that the absence of a dominant group of influential shareholders leads to a lack of focus on performance, as management faces no substantial checks and balances [see Barclay and Holderness (1989) and Holderness (2003)].

Secondly, there are clear indications that the rising influence of strategic investors leads to deteriorating performance on many fronts. The fact that sales are positively correlated to strategic shareholdings must be tempered by the observations that these same sales are negatively correlated with net income and uncorrelated to productivity. Simply put, in this case rising sales are not an indication of improving

performance, but rather attributable to a general trend (rising markets and increasing stock market activity).

Instead, the strong negative correlation between strategic holdings and net income confirms the expectation that strategic investors' influence is value-destructive for at least two reasons. First, the LSE incurred huge costs in fending off Nasdaq's hostile bid in 2006 and 2007. This is corroborated by the fact that in these two years, operating profits continued to rise, but net income dropped sharply. Second, living under the influence of (even passive) strategic investors, as the LSE did post-2006, is less conducive to value creation. The costs incurred by targets of hostile bids are widely explored in the literature, including by Franks and Mayer (1996), and Easterbrook and Fischel (1982).

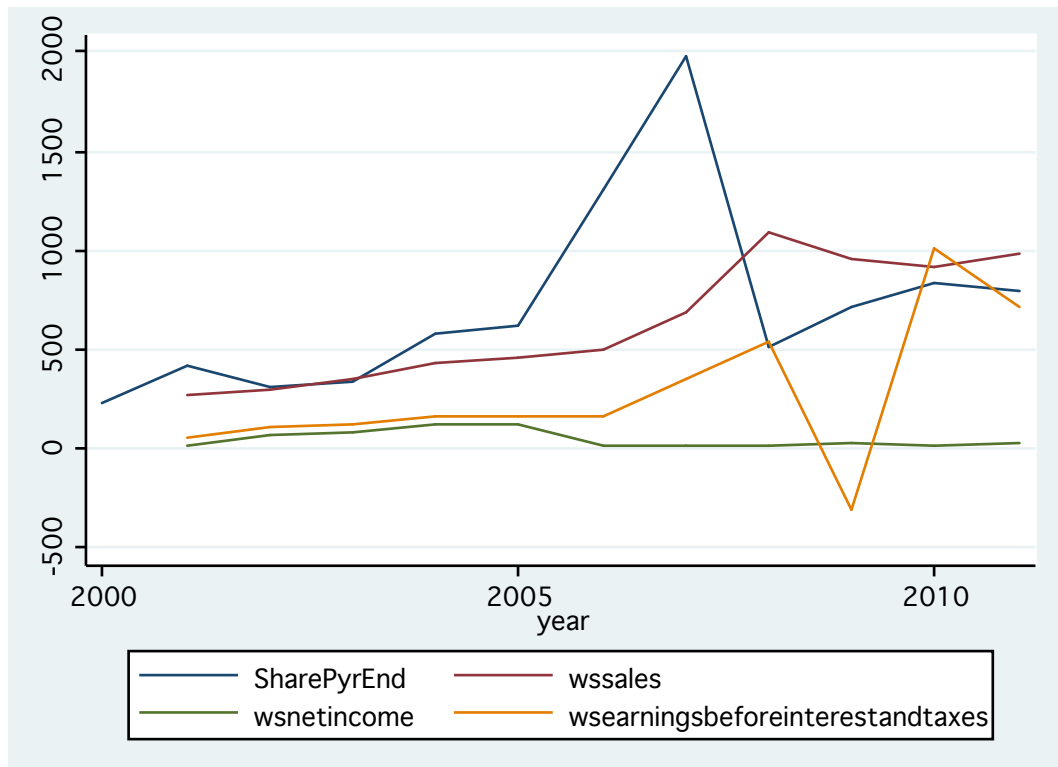
Conclusion.

In terms of operating and financial performance, there are clearly two LSEs: a Dr Jekyll (pre-Nasdaq bid) LSE; and a Mr Hyde (post-bid) LSE.^{lxxxviii} The watershed is the year 2005, as can be seen in Graph IV.10 below.

Graph IV.10

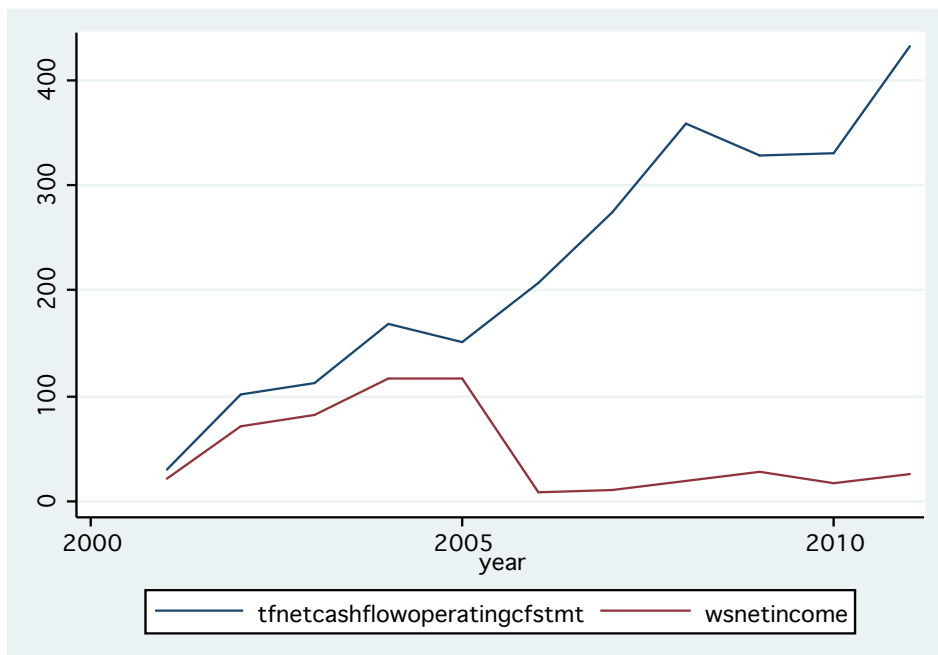
LSE performance indicators

(share price in cents; sales, ebit and net income in \$ million)



The Dr Jekyll LSE, from 2000 to 2005, has steadily rising sales, share price, operating profits, net income and Ebit. The performance of the Mr Hyde LSE, is more haphazard and unpredictable, and much less focused. While sales continue to rise steadily, net income becomes increasingly disconnected from operating profits (see Graph IV.11 below).

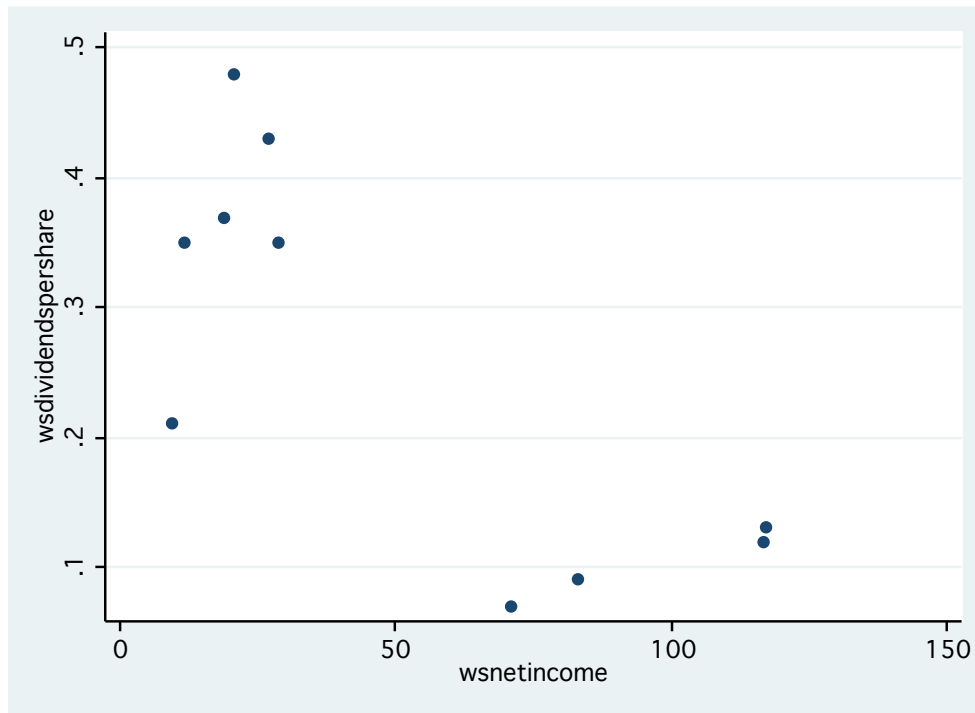
Graph IV.11
LSE's net income disconnects from operating cash flow
 (in \$ million)



Dividends no longer reflect net income, presumably as management strives to reassure freefloat holders and IM investors in spite of the costs of fending off Nasdaq's unsolicited advances. This is clear in Graph IV.12 below, where cash dividends are highest when net income is low.

Graph IV.12

LSE dividend disconnected from net income



This disconnection, post-2006, between financial performance and the share price helps to establish that the peak in the share price in 2007 is mostly the result of Nasdaq's takeover attempt (either because the supply of shares available for trading is squeezed or on expectations of a large-premium bid). The shares' relative stagnation from 2009 onwards, coinciding with the dominance of strategic investors, points to a situation where market sentiment is that the LSE has its hands tied, which could impede value creation and strategic moves. The presence of a long-term investor (Borse Dubai, which bought Nasdaq's stake in 2007) also lowers the odds of a hostile bid from a third party.

In sum, the LSE since 2007 can no longer be considered in play: two passive investors hold a controlling stake [according to the definition given by Porta, Lopez-de-Silanes and Shleifer (1999)] and expectations of a bidding war for Europe's largest capitalization stock market have waned.

The influence of value-maximizing IM shareholders has shrunk drastically, as their combined stake fell from over 70% in 2005 to under 50% in 2011. Meanwhile, the presence of non-value maximizing investors (freefloat and strategic) has risen from less

than 30% in 2005 to more than 51% in 2011. This new equilibrium in the balance of power between value-maximizing and non-value maximizing shareholders, combined with receding prospects of a bidding war, point to a protracted situation of low strategic activity, less than optimal value creation and little chance of positive surprises on the financial performance front.

“Tunneling” at the London Stock Exchange?

In “Tunneling”, Johnson, Porta, Lopez-de-Silanes and Shleifer (2000) describe through several case studies events where a dominant shareholder clearly expropriates, in a legal fashion, powerless minority shareholders. The methods vary in each case: in one occurrence, the firm rents equipment from another company owned by the dominant shareholder at a price that the minority investors have no say on. In another case, the dominant shareholder gets the firm to guarantee the liabilities of another company controlled by him without consulting the minority shareholders. By “Tunnel”, the authors mean a channel through which the dominant shareholder transfers value from the firm (which he shares with the minorities) to another entity in which he is the main – or only – beneficiary. Their article shines the spotlight on the conflicts of interest faced by many dominant shareholders, who have opportunities to expropriate those with less power over the firm.

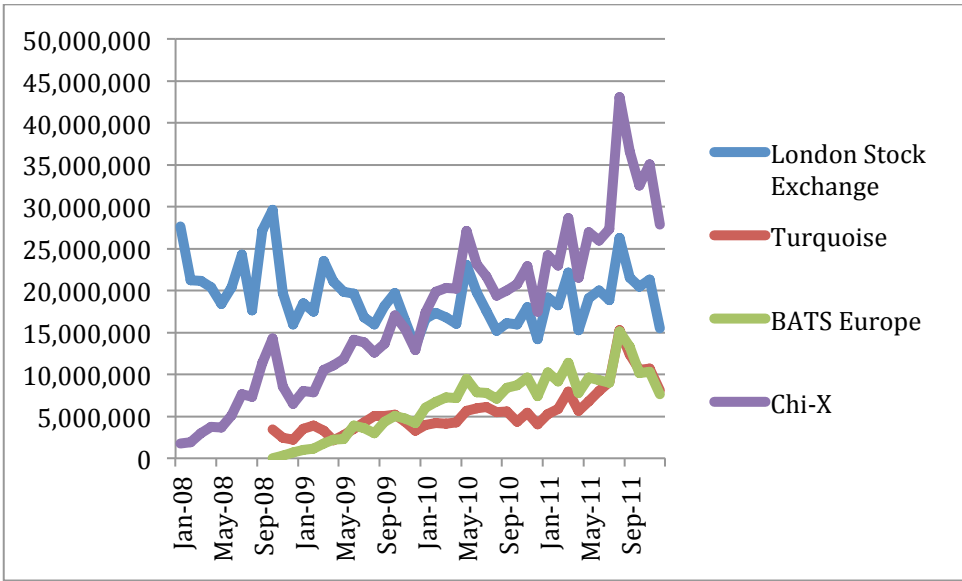
I have identified a similar opportunity within the LSE, where some of the exchange’s shareholders, wielding significant power both as investors and customers, faced an acute conflict of interest. Although the protagonists in this case are not significant shareholders of the LSE, the events leading to LSE’s acquisition of Turquoise involve a significant number of conflicted parties: the exchange buying a large asset from some of its biggest customers, the deal being approved by a board with links to the sellers, the sellers being in a position to transfer their custom from the asset being sold to another rival, etc.

The events relate to the sale by a group of LSE shareholders and customers of a controlling stake in Turquoise, an AV they had founded to compete with the LSE. During

and after the sale, trading volumes were being shifted away from both LSE and Turquoise, in favor of other AVs, including one (Chi-X) also controlled by the same group of conflicted shareholders/users.

Chi-X was the first platform to launch in Europe when Mifid allowed, in late 2007, followed by Turquoise and BATS Europe in October 2008.^{lxxxix}

Graph IV.13
Monthly trading on LSE and major AVs
 (in number of transactions)



Sources: FESE, LSE

Turquoise was launched by nine LSE-members: BNP Paribas, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, Merrill Lynch, Morgan Stanley, Société Générale and UBS. Chi-X Europe was founded by Nomura in 2007, which sold stakes to a group of institutions: BNP Paribas, Citadel, Citigroup, Credit Suisse, Fortis, Getco, Goldman Sachs, Merrill Lynch, Morgan Stanley, Société Générale and UBS.

With the exception of Citigroup, Citadel and Getco, all these institutions (which are among the world’s biggest equity traders) were shareholders in the LSE before 2008; UBS and Morgan Stanley still held small stakes at the end of 2009 (when the Turquoise acquisition was announced); only Morgan Stanley still held a small stake at

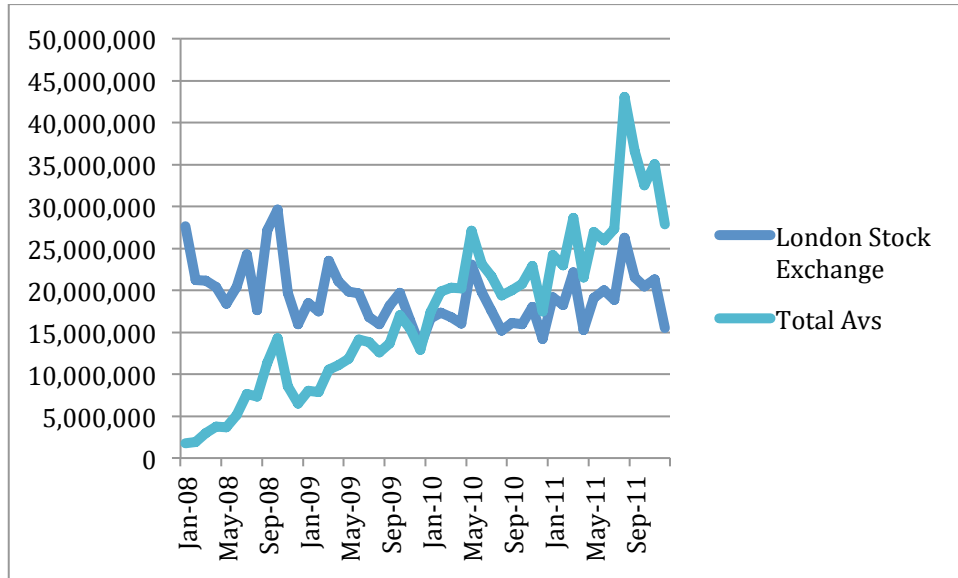
the end of 2010 after the deal was finalized; and none remained by 2011. All of them without exception were, and still are, big users of the LSE and the aforementioned AVs.

Although the combined stake of this group of conflicted shareholders is not large enough to allow them to impose strategic moves on LSE's management, their other means of pressure are significantly more substantial: they are among the exchange's biggest customers and many of them have links to its board of directors.

Clara Furse, LSE chief executive until May 2009, was a senior executive at Phillips & Drew, a UBS subsidiary, from 1983 to 1998. Xavier Rolet, her successor as chief executive, held senior positions at Credit Suisse (1994-1996) and Goldman Sachs (1984-1994). Raffaele Jerusalmi, an executive director of LSE since June 2010, was a senior executive of Credit Suisse (1993-1998). Sergio Ermotti, non-executive director since October 2007, was co-head of equity trading at Merrill Lynch (1987-2004). Gay Huey Evans, non-executive director since June 2010, was at Citi (2007-2008). Andrea Munari, non-executive director since October 2007, was at Morgan Stanley (2003-2005). Massimo Tononi, non-executive director since September 2010, was at Goldman Sachs until July 2010.^{xc xci xcii}

In December 2009 LSE announced it was acquiring 60% of Turquoise from its nine founding shareholders, and said it would sell 9% to other "interested parties" but would retain a majority. The deal was finalized in March 2010, when LSE owned 60% of Turquoise, then sold 9% to an undisclosed group of investors (described in LSE's 2010 annual report as "investment bank clients"). The period surrounding the deal (September 2009-March 2010) is rich in events, fortuitous or otherwise. It was during this period (in January 2010) that the main European AVs combined (Turquoise, Chi-X and BATS) executed more trades than the LSE, for the first time. This watershed, clearly visible in Graph IV.14 below, took place halfway between the announcement of the Turquoise deal and its finalization.

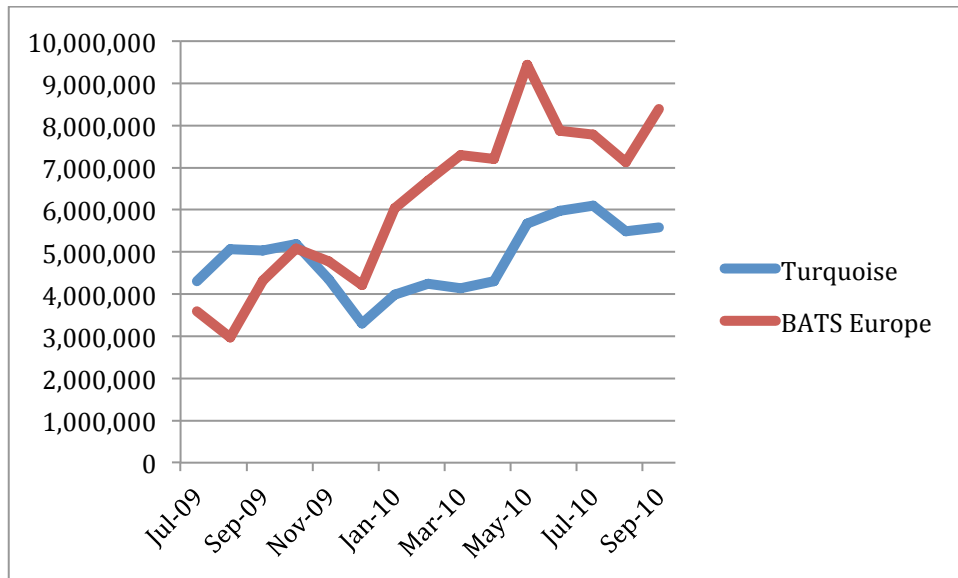
Graph IV.14
Aggregate trading on major AVs overtakes LSE
(in number of transactions)



Sources: FESE, LSE

It was also during this period, in November 2009, that BATS overtook Turquoise in terms of transaction volumes for the first time, and has stayed ahead ever since (see Graph IV.15 below).

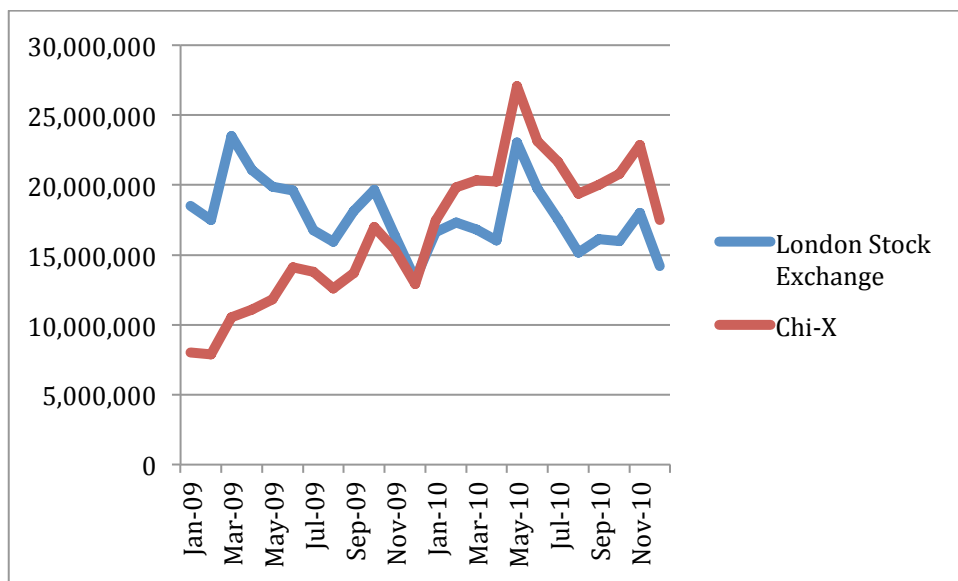
Graph IV.15
BATS overtakes Turquoise
 (in number of transactions)



Source: FESE

Almost simultaneously, in January 2010, Chi-X overtook the LSE and has stayed ahead ever since (see Graph IV.16 below).

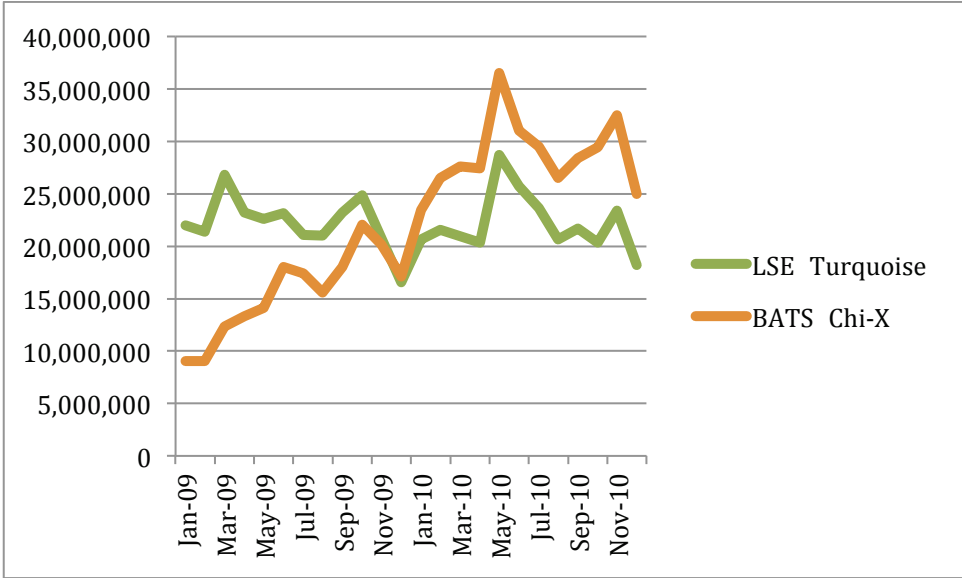
Graph IV.16
Monthly trading on LSE and Chi-X
 (in number of transactions)



Sources: FESE, LSE

In September 2009, before the deal, Chi-X had volumes roughly three times those of Turquoise (13.7 million trades to 5 million). By March 2010, when the change of control of Turquoise effectively took place, the gap had grown to five times (20.3 million vs. 4.1 million). Putting it bluntly, while the group of customers/shareholders was in talks with the LSE, trading volumes shifted massively from the platform controlled 40% by them to the one in which they controlled 100%.

Graph IV.17
Shifting market shares between AVs
 (in number of transactions)



Sources: FESE, LSE

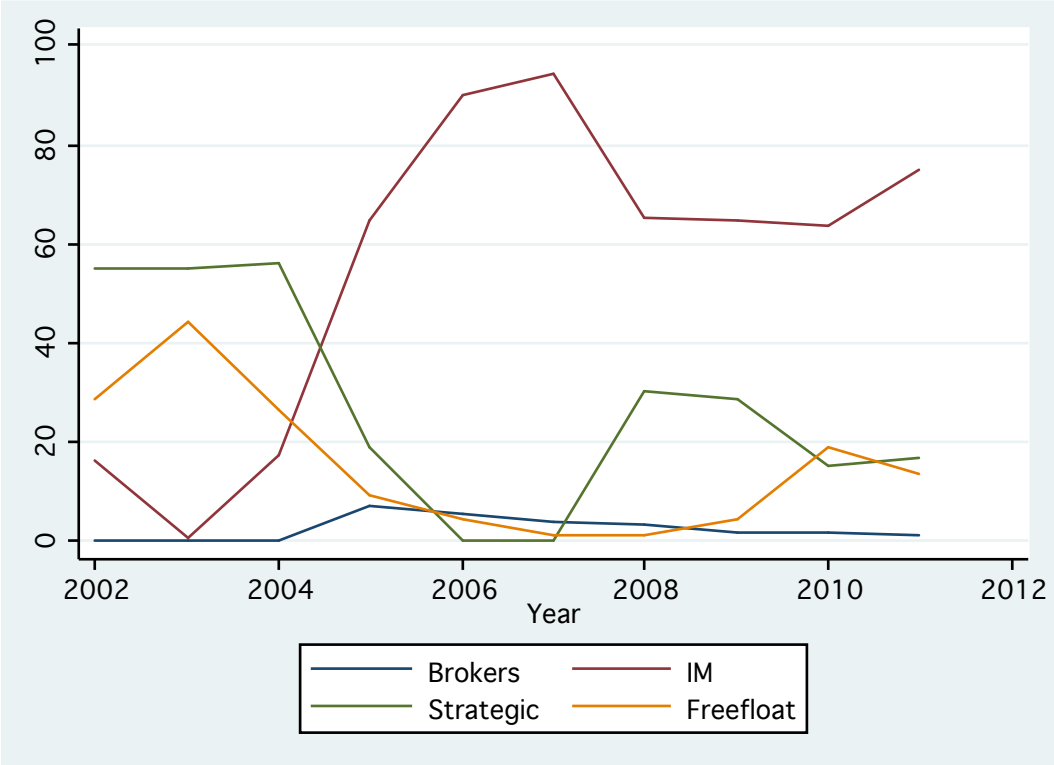
The Guardian newspaper described the sale of Turquoise as the “LSE bailing out some of its largest customers by taking a stake in a trading platform set up as its rival”.^{xciii} In calendar year 2008 Turquoise had made a £16 million loss. LSE took a £12.4 million integration charge in 2010, and in 2011 it took a £1.3 million charge to write down goodwill related to the acquisition of Turquoise. The Financial Times wrote: “It is a remarkable turn of events for a venture that was propelled into existence by the banks’ frustration at the LSE’s reluctance to cut fees or improve services for its biggest customers – those same banks.”^{xciv}

Perhaps the best explanation for the deal is provided by consultant Christopher Morris, director of Aequitas Associates, interviewed by the FT: “It is rebuilding goodwill with the banking community that will be the most valuable asset [for the LSE].”^{xcv}

IV.3.2. Nasdaq OMX Group.

Two distinct periods are significant in the evolution of Nasdaq’s shareholding structure. The first is pre-2005, when the National Association of Securities Dealers (NASD, accounted for in the graph below as a strategic investor) is the dominant shareholder, with roughly 55% of the shares. The second is post-2007, when Borse Dubai is the single largest shareholder, with a stake of 15%-30%. Borse Dubai (80% owned by the ruler of the emirate) became a significant shareholder in Nasdaq as part of a deal that also included buying Nasdaq’s roughly 30% of LSE. These changes are visible in Graph IV.18 below (where Borse Dubai is responsible for the bulge in the “strategic” line from 2008 onwards).

Graph IV.18
Nasdaq shareholder base evolution
 (% outstanding shares)



At the same time, Nasdaq became the operator of DIFX, an offshore exchange

based in Dubai. NASD is the main brokers' lobby, and I expect that its attitude to Nasdaq, a market it has created and dominated for three decades before admitting outside shareholders, is more reminiscent of a mutualist owner than a value maximizing investor. Thus I have created three dummy variables in order to gauge whether one type of strategic shareholder behaves differently from another.

Dummy variable NASDom is equal to 1 when the NASD is the controlling shareholder, and 0 otherwise. Dummy variable DubaiDom is 1 when Borse Dubai is the dominant shareholder, and 0 otherwise. Dummy variable IMDom is 1 when IMs hold more than 50% and 0 the rest of the time.

Freefloat.

The data in Table IV.4 below clearly show that dispersion of ownership is detrimental to shareholder value. Nine of the 17 dependent variables show a negative correlation to the proportion of freefloat in Nasdaq's capital. I have no explanation for the negative correlation of book value per share (an inverse of goodwill). The positive correlation of leverage (debt-to-equity ratio) is interesting to note, as it contradicts earlier literature, which usually associates high freefloat with less disciplining of managers (and therefore less debt, which is a widely used disciplining tool when there are shareholders powerful enough to impose it on managers).

Table IV.4
Effects of freefloat on Nasdaq performance

Independent variable: freefloat.
Number of observations: 10.

Variable	R-squared	T-stat	P
SharePrice	0.573	-3.28	*
NetIncome	0.444	-2.53	*
ReturnOnInvestCapital	0.624	-3.65	**
DebtToEquityRatio	0.502	2.84	*
OperatingProfMargin	0.484	-2.74	*
SalesPerEmployee	0.582	-3.34	*
ReturnOnAssets	0.586	-3.36	**
PreTaxMargin	0.661	-3.95	**
NetMargin	0.647	-3.83	**

Investment managers.

Most operating and financial performance measures (10 out of 17) are positively correlated to the presence of IMs, as can be seen in Table IV.5 below. This provides a strong indication that these investors are above all value maximizers, as often shown in prior literature.

Table IV.5
Effects of IMs on Nasdaq performance

Independent variable: IM.

Variable	R-squared	T-stat	P
SharePrice	0.745	4.83	*
BookValuePerShare	0.428	2.45	*
NetIncome	0.593	3.41	**
ReturnOnInvestCapital	0.561	3.19	*
DebtToEquityRatio	0.578	-3.31	*
OperatingProfMargin	0.600	3.47	**
SalesPerEmployee	0.745	4.83	**
ReturnOnAssets	0.551	3.14	*
PreTaxMargin	0.731	4.67	**
NetMargin	0.660	3.94	**

The fact that leverage is negatively correlated to IM shareholdings indicates that in this case, IMs see debt more as a risk than as a useful disciplining tool for managers.

Brokers.

Analyzing the effect of brokers as shareholders on the performance of the exchange is not relevant in the case of Nasdaq. As explained in the introduction to this section, brokers in this case are grouped under the banner of the NASD, which presents itself as a strategic shareholder. Therefore, in order to understand the effect that brokers have on the performance of the exchange, I have to compare their influence to that of other strategic shareholders, notably Borse Dubai.

Strategic shareholders.

The approach by OLS regression shows that strategic shareholders are on balance detrimental to performance. This is the case for 9 of the 17 variables tested, as shown in Table IV.6 below.

Table IV.6
Effects of strategic shareholders on Nasdaq performance

Independent variable: strategic.

Variable	R-squared	T-stat	P
SharePrice	0.782	-5.36	***
NetIncome	0.503	-2.84	*
ReturnOnInvestCap	0.433	-2.47	*
DebtToEquityRatio	0.455	2.58	*
OperatingProfMargin	0.472	-2.67	*
SalesPerEmployee	0.711	-4.44	**
ReturnOnAssets	0.458	-2.60	*
PreTaxMargin	0.621	-3.62	**
NetMargin	0.522	-2.96	*

However, given the variety of shareholders identified as strategic in this case, it is important to verify if passive strategic investors like Borse Dubai affect the company in a manner that is different to active strategic investors, such as the members of NASD.

For this purpose, I apply a multiple regression approach with two independent variables – the dummy variables NASDom and DubaiDom, described above in the Methodology section of this chapter. The results of these regressions are shown in Table IV.7 below.

Table IV.7
Effects of dominant strategic investors on Nasdaq

Dummy variables: NASDom, DubaiDom

Variable	R-square	P	t-stat (NasDom)	t-stat (DubaiDom)
SharePrice	0.856	***	-6.44	-3.68
OperProfMargin	0.846	***	-3.35	2.63
SalesPerEmployee	0.584	*	-3.07	-1.13

The results show that ownership by the NASD is the main factor affecting shareholder value, in line with the expectation that brokers in numbers large enough to wield influence will seek value through means that are not in the interest of all shareholders. For a given rise in the proportion of strategic investors, the share price falls almost twice as much when these investors are NASD members. In terms of productivity, NASD members have almost three times more negative influence than Borse Dubai. In the case of operating profit margin, the passive strategic investor (Borse Dubai) is actually beneficial when it has a sizeable stake, while the NASD is detrimental.

Conclusion.

The case of Nasdaq shows very significant results on all fronts. A large number of variables corroborate the expectation that share dispersion is detrimental to shareholder value creation, that IMs increase value for all shareholders, and that strategic investors on balance have a nefarious influence, in particular those with interests that conflict with those of pure financial investors. If one considers that the NASD as a shareholder behaves more like a group of brokers than a strategic investor, then the results of this section can be considered as corroborating my hypothesis (discussed in the introduction of this chapter) that brokers as shareholders destroy value for other investors.

IV.3.3. NYSE Euronext.

Introduction.

After failing to persuade its mutualist owners in 1999 to move to a for-profit corporate organization, the NYSE's management had to wait until 2005, when the chance of back-door demutualization surfaced in the form of a merger with Archipelago, a listed, fast-growing electronic venue operating out of Chicago and rapidly stealing market share from the NYSE (this episode is described in more detail in Part II). The entity that was listed between 2005 and 2007 was NYSE Group, formed of NYSE and Archipelago. This reverse listing (NYSE merging with a company that was already listed) means that brokers were never dominant shareholders, as they would have been if NYSE had gone through an IPO, with members receiving new shares in exchange for their previous seats (the right to access the floor and trade on it). The breakdown of shareholdings in NYSE can be seen in Graph IV.19 below.

The second significant change in the group's structure was the merger with Euronext, operator of the Paris, Amsterdam, Brussels and Lisbon stock markets, and the Liffe derivatives exchange in London. The following analysis focuses primarily on the enlarged NYSE Euronext Group, although I examine some significant aspects of the merger itself and events immediately surrounding it.

Share price and market capitalization.

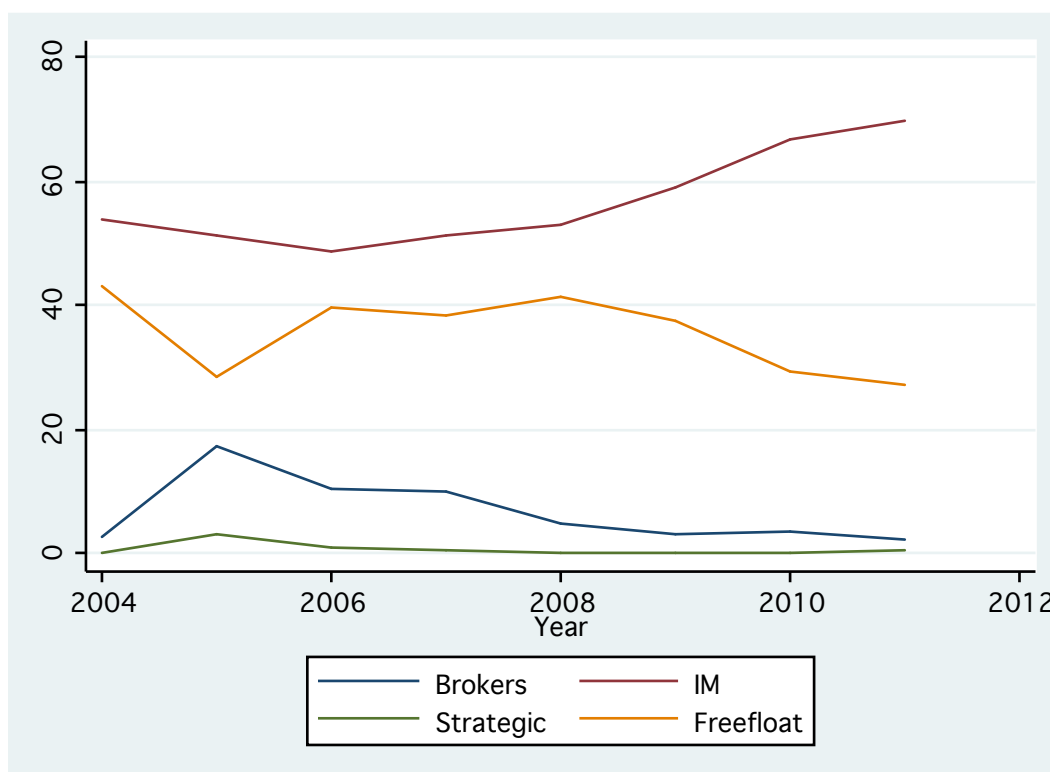
It is interesting to note that NYSE Group's share price peaked in 2006, after the announcement of the merger with Euronext but before the merger became effective. The market capitalization peaked a year later, in 2007, mainly because of the new shares created to pay for the merger (Euronext shareholders who accepted the offer received a mix of cash and NYSE shares). Although sales of the combined NYSE Euronext continued to grow in 2008, the share price reacted negatively. Unfortunately 2008, the first full year with Mifid in operation, coincided with the global financial crisis. The upshot is that it is difficult to distinguish whether bad performance in that year was due to one factor or the other.

Although annual sales stagnated or fell from 2008 onwards, productivity rose sharply after a major restructuring in 2009, which involved laying off more than 50% of employees in Paris, the group's European headquarters. Net income also rose in 2009, but the share price fell. Sales, productivity, net income and the share price all stagnated in 2010 and 2011. The sharp rise in annual Sales in 2007 was mainly the result of the new, larger, consolidation perimeter of NYSE Euronext.

Pre-merger shareholder maneuvers

A dramatic shift in NYSE's shareholding structure in 2005 is worth explaining, even though it will not be included in the following analysis (which relies on year-end data). Briefly in 2005 IM investors' combined stake rose from just under 50% to more than 80%. The bulk of this spike is accounted for by three investors: Gandhara Capital Management, which held a 5% stake; Atticus Capital, with 12%; and Horizon Kinetics with 16.75%. Gandhara, now extinct, was a hedge fund set up by a former high flyer of Goldman Sachs's arbitrage desk. Horizon Kinetics, a stock-picking specialist, describes itself as "contrarian". Atticus, the investment vehicle of Nathaniel Rothschild, was at the time an activist manager in the exchange sector. Atticus was then simultaneously a 2% shareholder in Deutsche Boerse, and helped scupper the German exchange's hostile bid for the LSE (this role is explored in more detail below). Atticus also owned around 3% of Euronext and later played an active part in getting the NYSE/Euronext merger to succeed. Atticus's accumulation of stock (from 3% to 12%) in 2005 coincided with rumors that Euronext was preparing a counterbid amidst Deutsche Boerse's and Macquarie's competing offers for LSE (see Part II, "Overview of Exchanges".)

Graph IV.19
NYSE shareholder base evolution
 (% outstanding shares)



Freefloat.

Although NYSE (and later NYSE Euronext) shares are widely dispersed throughout the period under study (freefloat of between 30% and 40%), there are no indications that any performance variables are correlated (positively or negatively), with the proportion of widely held shares.

Investment managers.

Two variables measuring productivity are correlated with IM shareholdings. As expected under the assumption that IMs are rational value maximizers, their concentration is positively correlated with sales per employee, and operating expenses are negatively correlated (see Table IV.8 below).

Table IV.8
Effects of IM investors on NYSE

Independent variable: IM.

Variable	R-squared	T-stat	P
SalesPerEmployee	0.722	3.60	*
SellingGenExpensesToSales	0.619	-3.13	*

Brokers.

One variable (sales per employee) clearly corroborates the expectation that brokers are associated with lower productivity (see Table IV.9 below). The negative correlation with the dividend yield can be explained by the fact that cash dividend levels were maintained as the share price fell.

Table IV.9
Effects of brokers on NYSE

Independent variable: brokers.

Variable	R-squared	T-stat	P
DividendYield	0.931	-7.32	**
SalesPerEmployee	0.658	-3.10	*

Strategic shareholders.

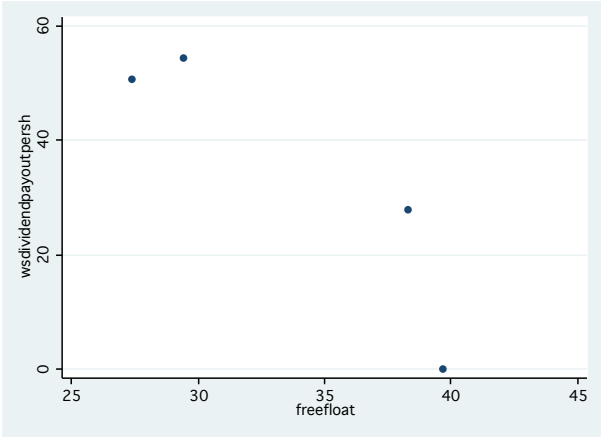
No variables are significantly correlated with the level of strategic shareholding.

A slightly different picture emerges when looking at data from 2006 to 2011. Although reducing the sample size affects the (already low) robustness of the results, this cropped picture nonetheless deserves attention. Excluding pre-2006 data offers two benefits: it removes the specific situation described in the box above (“Pre-merger shareholder maneuvers”) and the distortions associated with this pre-merger

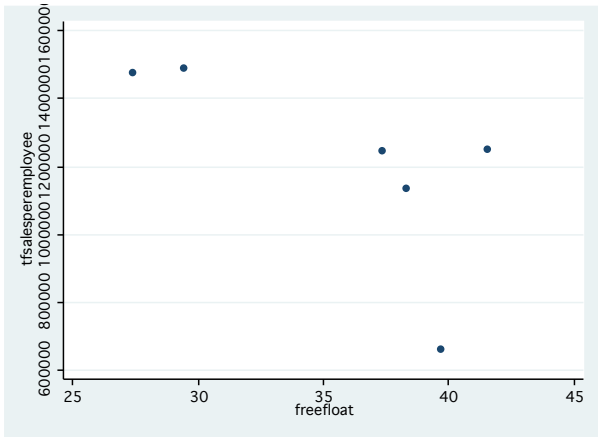
speculation; and also focuses the study on a homogeneous group, the merged entity consolidating Euronext into the perimeter of NYSE. I have not conducted any regressions, as this would be meaningless with only six observations in each sample. The graphs below speak for themselves.

The two lowest levels of freefloat are associated with the highest dividend payout. High freefloat is also associated with lower productivity, as sales per employee are also highest when freefloat is lowest (see Graphs IV.20 and IV.21 below).

Graph IV.20
Effect of freefloat on dividend payout

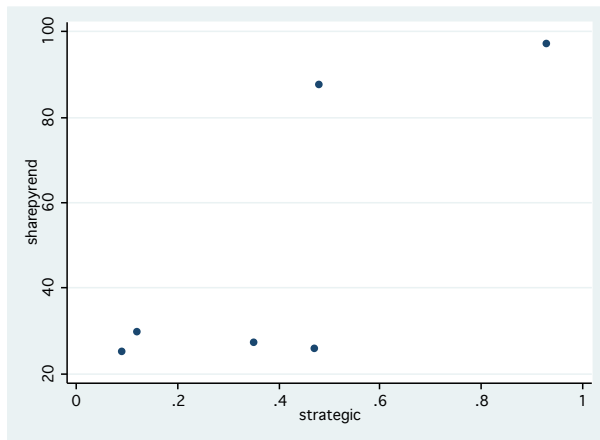


Graph IV.21
Effect on sales per employee

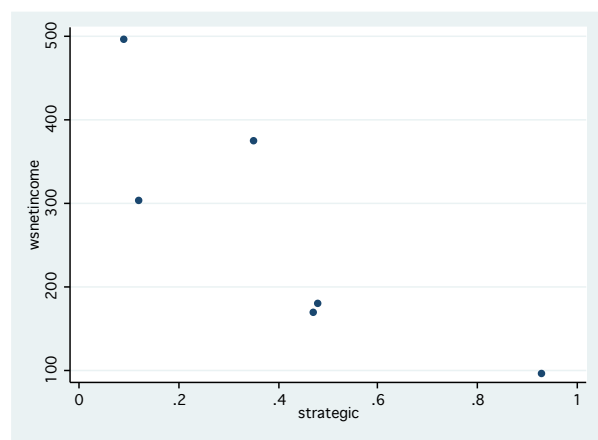


In the case of NYSE Euronext, strategic shareholders consist mainly of managers and employees, a situation that could increase the risk of entrenchment. Again, there are insufficient data to conduct serious quantitative analysis, but indications can be seen in the graphs below. Looking at Graphs IV.22, IV.23 and IV.24 together, the share price is positively linked to strategic holdings, in contrast with net income and dividend per share. It is worthy of note that, as managers and directors increase their holdings of shares, the company’s financial results decline, but the share price, paradoxically, seems to hold up. A possible explanation for this anomaly is that employee shareholders and managers (the vast majority of strategic shareholders at NYSE Euronext) have the ability to influence the share price in the short term, for example around the vesting periods of their share options or the end of lock-up periods for performance-related shares.

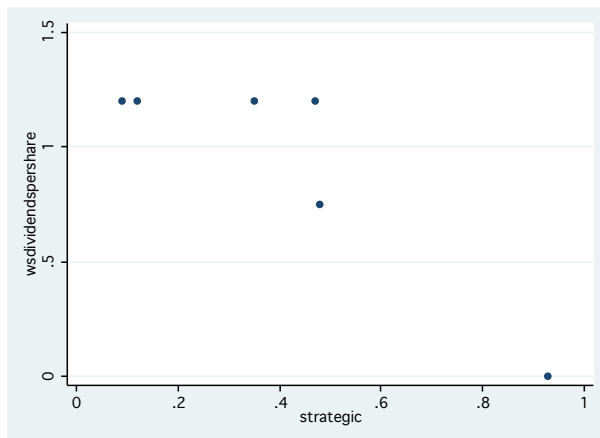
Graph IV.22
Effect of strategic investors
on the share price



Graph IV.23
Effect of strategic investors
on net income

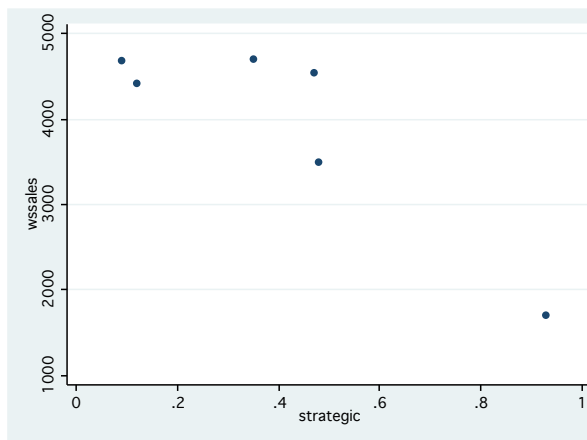


Graph IV.24
Effect of strategic investors
on dividend

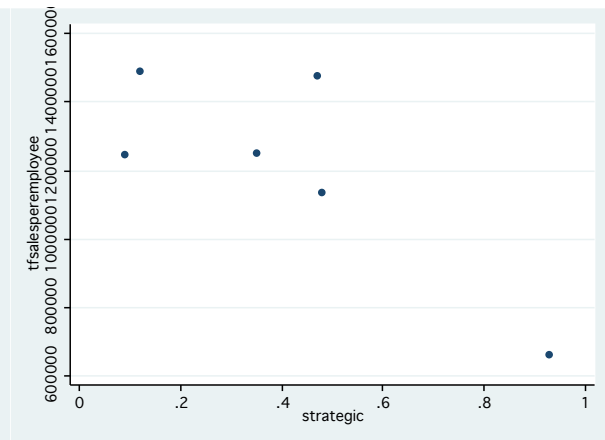


A look at operating performance indicators also shows trends that can be associated with entrenched managers, relatively immune to shareholder pressure. Graphs IV.25 and IV.26 below show that both total sales and sales per employee are lowest when strategic shareholdings are highest.

Graph IV.25
Effect of strategic shareholders
on sales



Graph IV.26
Effect of strategic shareholders
on sales per employee



Interpretation.

In spite of its shortcomings in terms of data robustness, this case study corroborates some hypotheses derived from agency theory, especially with regard to (potentially) entrenched manager/shareholders, and the struggle between value-maximizing IMs and other stakeholders with conflicting agendas. Outcomes predicted by other theories, such as the study of ownership fragmentation or concentration, are also confirmed.

A look at the evolution of shareholdings shows that brokers, who were well placed to anticipate (or precipitate) the migration of business away from the exchange, gradually sold out of NYSE Euronext as competition was introduced to the sector post-Mifid and they gained the ability to execute their business on other platforms, which they often also owned. But while they remained shareholders, the higher their combined stake the lower the exchange’s performance on almost all measures: sales, productivity, net income and dividends per share were all lower when brokers’ shareholdings were higher.

Financial literature, notably (Holderness 2003), predicts that high fragmentation of ownership is detrimental to corporate performance. Again, this is verified here. High freefloat is associated with lower sales, productivity, net cash flow from operations and operating profit margin. The theory that pure financial investors, such as hedge funds and pension funds, push the company to maximize value for its owners is also

corroborated. Almost every measure of operating and financial performance is higher when IM investors are predominant.

Finally, the data hint at signs of management entrenchment, as value to other owners is minimized when the stakes of strategic shareholders are high. This indicates that strategic shareholders seem to have ways to extract value without sharing it with other investors (for example through dividends). One surprising finding is the negative correlation between the share price and other financial performance measures, when strategic shareholdings are at their highest level. In short, when managers have their biggest exposure to the company's stock, the share price manages to remain high even when other financial data point to deterioration. These indicators are indicative of entrenched management. Many measures of financial performance tend to corroborate the view that strategic investors, in this case managers, are acting to maximize their own gains rather than create value for all shareholders. Unfortunately, these results are most visible in a small sample, and therefore impossible to generalize. They nonetheless provide food for thought.

IV.3.4. Deutsche Boerse.

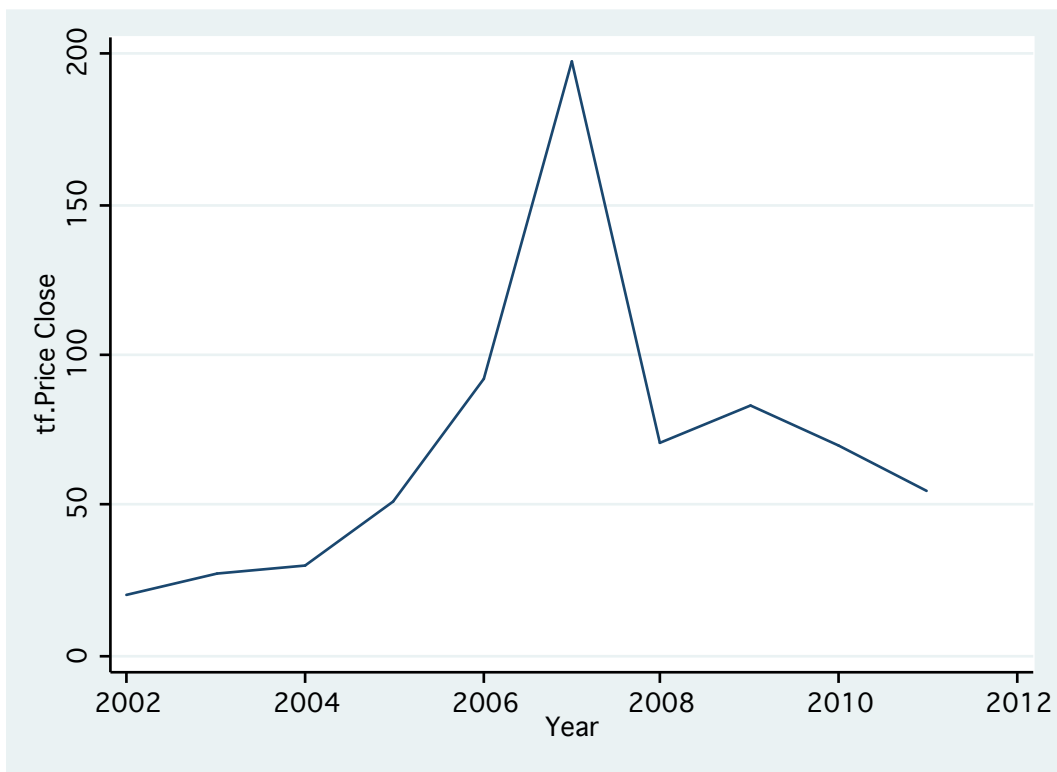
Introduction.

Deutsche Boerse is a particularly interesting case in this sample of exchanges, for at least two reasons. Firstly, it was set up early on (in 1992) as a corporation, owning its derivatives exchange and central securities depository. This means brokers were not dominant players in its shareholding structure. Secondly, in spite of being a conglomerate (with the most diversified portfolio of activities of any exchange operator), Deutsche Boerse is consistently the most profitable company in its sector. However, this has not shielded it from the general decline in market share brought on by Mifid in late 2007 and the ensuing challenge from new nimble competitors in the form of AVs.

Share price movements.

Deutsche Boerse's share price is barely affected by strategic events. None of its large-scale operations (attempted takeover of LSE, gaining full control of Clearstream or the acquisition of ISE, a US equity options exchange) has a significant impact on the share price. However, like many other exchanges, it suffers from the financial crisis in 2008 (see Graph IV.27 below). The spike in the share price in 2006-2007 also coincides with hedge fund activism, which is analyzed in a separate box below.

Graph IV.27
Deutsche Boerse share price



Types of shareholders.

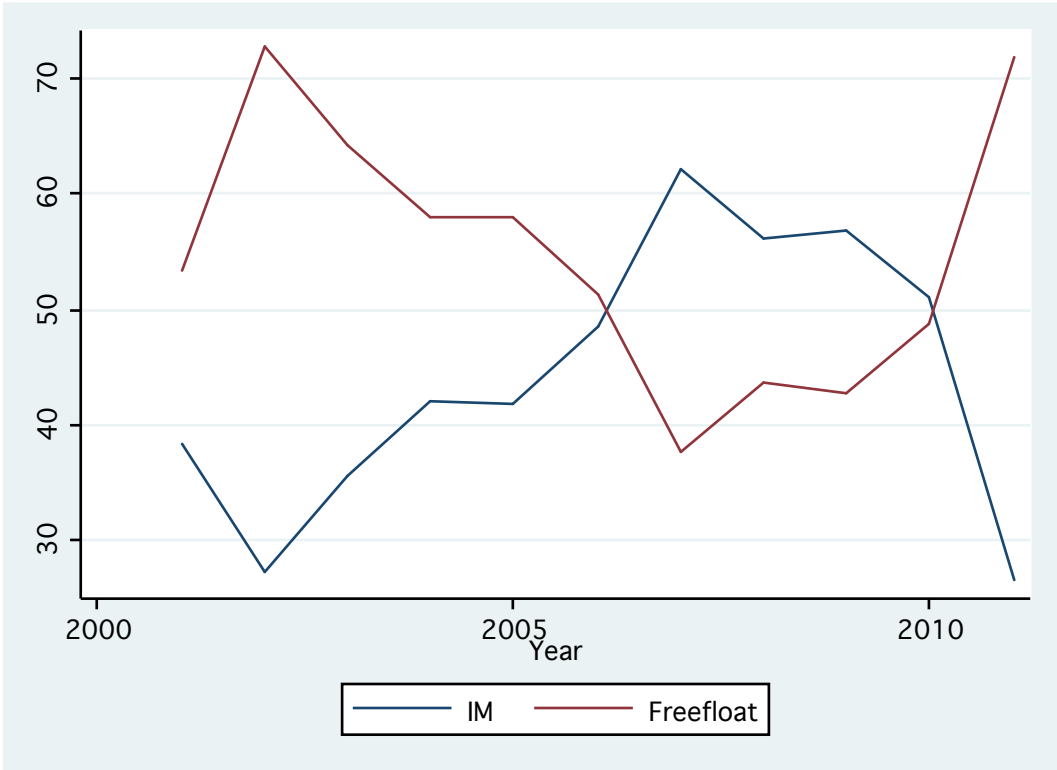
Deutsche Boerse only has two types of shareholders during the period under study: investment managers and freefloat (widely held shares). In line with prior literature and the hypotheses tested above in this section, I assume that institutional investors (investment managers, or IMs) are rational value maximizers. This means they tend to push for lower costs, and higher sales, margins and profits.

Wide dispersion of shares, as many scholars have shown before, is associated with underperformance: when the shares are predominantly held by a large number of small owners, costs tend to be less under control. No outsider is powerful enough to apply pressure on management to increase operating performance, so financial results end up suffering.

Shareholding evolution.

There are three distinct periods in terms of shareholding distribution at Deutsche Boerse. From 2001 to 2006 the shares are widely dispersed and IMs account for less than 50% of shares outstanding. From 2006 onwards, IMs increase their holdings up to a peak of more than 60% in 2007, then start reducing their holdings gradually until 2010, when the shares are again equally distributed between small holdings and financial investors (roughly 50% each). Hedge funds account for a significant part of the rise in IM holdings, as is explained in the separate box on activism below). In 2011 IMs drastically reduce their holdings to below 30%. The net sellers do not belong to any particular category of investors: they range from 158 eurozone funds and banks (BNP Paribas, ING or Deutsche Bank) to US mutual funds (Fidelity, Vanguard). Activist hedge funds, led by The Children’s Investment Fund (TCI), start trimming their holdings earlier, after a peak in 2008.

Graph IV.28
Deutsche Boerse shareholding evolution



It is interesting to note than in 2011, the year when IM shareholding collapsed, Deutsche Boerse paid a one-off special dividend of €1 a share, in addition to increasing its regular dividend to €2.30. This means shareholders received €3.30 per share in 2011, up from €2.10 in each of the previous four years.

Freefloat.

Wide dispersion of shares (or high freefloat) is associated with a lower share price, lower operating profit margin and sales per employee. Operating costs are also higher, as can be seen in Table IV.10 below.

Table IV.10
Effect of freefloat on Deutsche Boerse performance

Dependent variable: freefloat.

Number of observations: 9.

Number of observations: 10			
Variable	R-squared	T-stat	P
SharePrice	0.558	-3.18	*
OperatingProfitMargin	0.414	-2.38	*
SalesPerEmployee	0.655	-3.90	**
SellingGenExpToSales	0.652	3.87	**

Investment managers.

Several measures of productivity and profitability are positively correlated to IM holdings (see Table IV.11 below). As expected, operating expenses are negatively correlated, with IMs more likely than other investors to apply pressure for cost control.

Table IV.11
Effect of IMs on Deutsche Boerse performance

Dependent variable: IM.

Variable	R-squared	T-stat	P
SharePrice	0.544	3.09	*
SalesPerEmployee	0.630	3.69	**
SellingGenExpToSales	0.636	-3.74	**

In sum, a high proportion of financial investors is linked to better operating performance and higher financial performance, in particular a high share price.

Mean comparisons.

In a separate approach, I apply a test to compare the mean of each variable when IMs own more than 50% (mean 1) to the mean when IMs hold less than 50% (mean 0). Table IV.12 below shows the results of this method.

Table IV.12
Deutsche Boerse performance under IM control

Dummy variable: IMDom.

Variable	Mean 1	Mean 0	Diff.	t-stat	P
DividendPayout	61.82	25.60	36.22	2.84	*
SalesPerEmployee	967927	666892	301035	2.77	*

Complementing the regressions shown above, this method yields some interesting additional results, notably on dividend payout, which is significantly higher (more than double) when IMs own an outright majority of the shares. This finding is a further indication that IMs seek to maximize financial value, for example by insisting on maintaining the nominal level of the dividend even when profits decline.

Interpretation.

Two different approaches in this section corroborate my hypotheses on the relationship between shareholding structure and corporate performance. Several performance measures are negatively affected by high freefloat, while the disciplinary effects of IMs on performance are confirmed. The role of activist investors deserves special attention, and is the subject of the separate focus below.

Germany stunned by “locust invasion”

The German business community was stunned in 2005-2006 when its tradition of consensus-based decision-making was shaken by shareholder activism at Deutsche Boerse (DB). The Children’s Investment Fund (TCI), a London-based activist hedge fund, acquired 5.5% of DB in the first quarter of 2005, just after it had launched a hostile bid for the London Stock Exchange (LSE) at the end of 2004. Chris Hohn, TCI’s manager, actively lobbied to replace a majority of DB’s supervisory board members, including the CEO Werner Seifert, and advocated breaking up DB into its three component companies. He argued that Eurex, DB’s derivatives arm, would be valued at 25 times earnings on a standalone basis, compared with 10 times earnings for the DB conglomerate.^{xcvi}

German business rallied to DB’s defense, as well as politicians. It was during this period that Franz Müntefering, chairman of the German Social Democratic Party, famously described alternative investors (hedge funds and private equity) as “locusts”, when he declared: “Some financial investors waste no thought for the people whose jobs they destroy. They stay anonymous, have no face, fall upon companies like locusts, devour them and move on.”^{xcvii}

Hohn ultimately rallied holders of between 55% and 60% of DB’s shares to his crusade against DB’s bid for LSE. The rebels around TCI comprised mainly US and UK funds. They included Atticus, managed by activist investor Nathaniel Rothschild; Merrill Lynch (where Hohn had worked before setting up TCI); and Fidelity Investments, one of the US’s largest institutional investors who had also emerged as Euronext’s largest investor soon after its IPO.^{xcviii} The Atticus fund that held 5% of DB was run by Timothy Barakett, Hohn’s classmate at Harvard in 1992-1993.^{xcix} Under pressure from the

activists, Seifert dropped the bid for LSE in March 2005, and resigned two months later. In March 2006 Seifert published a book about the fight with TCI, entitled “Invasion of the Locusts”.^c

After several more controversial proxy fights, including a high profile attack on Japan Tobacco and an assault on US railways operator CSX Corp that landed him in a New York court^{ci}, Hohn’s motivations and performance started to be questioned,^{cii} including by some of TCI’s historical investors. Yale University, a founding investor, pulled out its \$500 million investment in March 2006.^{ciii} Atticus’s role was also controversial, as it was simultaneously building up a stake in Euronext, amid rumors that the Paris-based exchange was contemplating a counter-bid on LSE (see box in the previous section on Euronext). The German financial regulator investigated the events surrounding the failure of the bid for LSE and the ouster of Seifert but did not find evidence of wrongdoing to justify prosecution.^{civ}

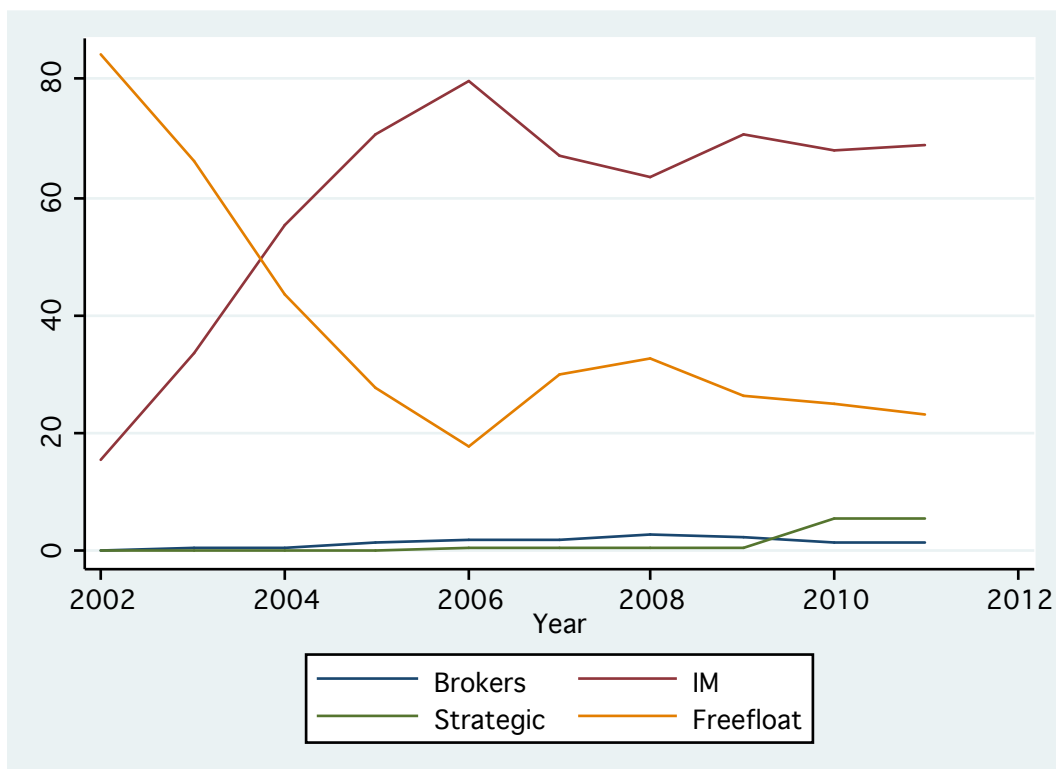
With up to 18.82% of DB’s equity in its hands (more than a third of the 55% of outstanding shares held by all IMs together at the end of 2008) TCI undoubtedly had an effect on the results of Table IV.11 and Table IV.12, showing the positive influence of IM shareholders on performance.

IV.3.5. CME Group.

Introduction.

The CME's shareholding structure since its IPO in 2002 is straightforward. Investment managers gradually took over from small investors, gaining outright majority (50%) in 2004 and controlling between 60% and 80% ever since (see Graph IV.29 below). The CME's strategic shareholders consist mainly of former members (brokers), but their combined stake is insignificant. Since 2010 the CME and BM&F Bovespa, the largest Brazilian exchange operator, have held strategic cross shareholdings of approximately 5%.

Graph IV.29
CME shareholding evolution



Since the shareholdings of brokers and strategic investors are negligible throughout the period under study, this section will focus on testing just hypotheses (1) and (2).

Freefloat.

A large number of performance indicators (listed in Table IV.13 below) corroborate the expectation that share dispersion has a negative influence on performance.

Table IV.13
Effects of freefloat on CME performance

Independent variable: freefloat..

Number of observations: 9.

Variable	R-squared	T-stat	P
SharePrice	0.496	-2.81	*
OperatProfitMargin	0.880	-7.64	***
SalesPerEmployee	0.474	-2.51	*
PreTaxMargin	0.879	-7.61	***
CashFlowToSales	0.754	-4.95	**
NetMargin	0.478	-2.70	*
SellingGenExpToSales	0.731	4.66	**

Productivity, gross and net margins, profits and the share price, are all negatively correlated to the proportion of freefloat. Selling, general and administrative expenses are positively correlated, validating the expression “when the cat’s away, the mice will play” (in other words, in the absence of a counter-power, management feels unaccountable and has little incentive to control costs).

Investment managers.

Conversely, a number of variables (shown in Table IV.14 below) indicate that the presence of value maximizing institutional investors leads to better performance and a higher share price. Similarly, a high concentration of IMs seems to help managers to focus on keeping operating costs under control.

Table IV.14
Effects of IMs on CME performance

Independent variable: IM.

Variable	R-squared	T-stat	P
SharePrice	0.533	3.02	*
OperatProfitMargin	0.845	6.61	***
PreTaxMargin	0.864	7.11	***
CashFlowToSales	0.758	5.01	**
NetMargin	0.424	2.42	*
SellGenExpenToSales	0.673	-4.06	**

Conclusion.

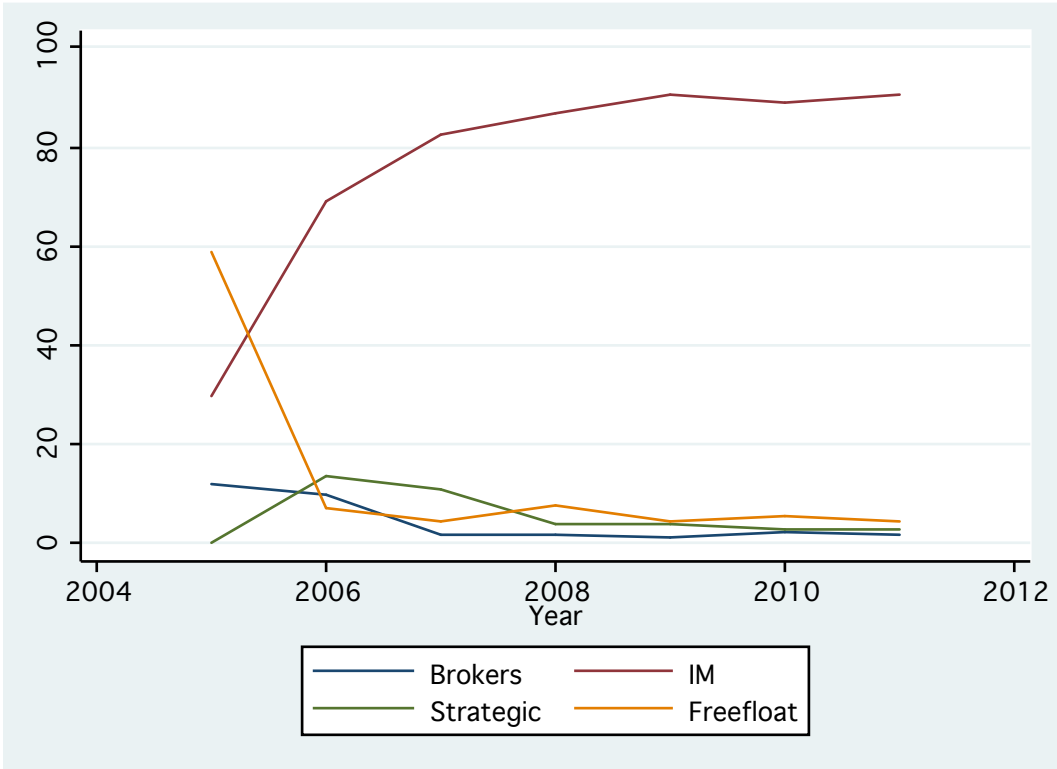
The case of CME, whose shareholding structure fluctuates between tight control by IMs and high dispersion of shares, further corroborates hypotheses that have been regularly tested before through the filter of agency theory: that when financial investors are in control, the company maximizes wealth creation; and when shares are widely dispersed, costs are less tightly checked and wealth creation is lower.

IV.3.6. Intercontinental Exchange.

Shareholder evolution.

The shareholder mix at ICE is typical of many recently floated companies. Shares are relatively widely dispersed immediately following the IPO. In the years that follow, IMs build stakes as the company becomes established and its strategy is better understood. By 2006, the year after the IPO, IMs become clearly the dominant group and their importance continues to grow. IMs have held more than 80% of the shares since 2007 (see Graph IV.30 below).

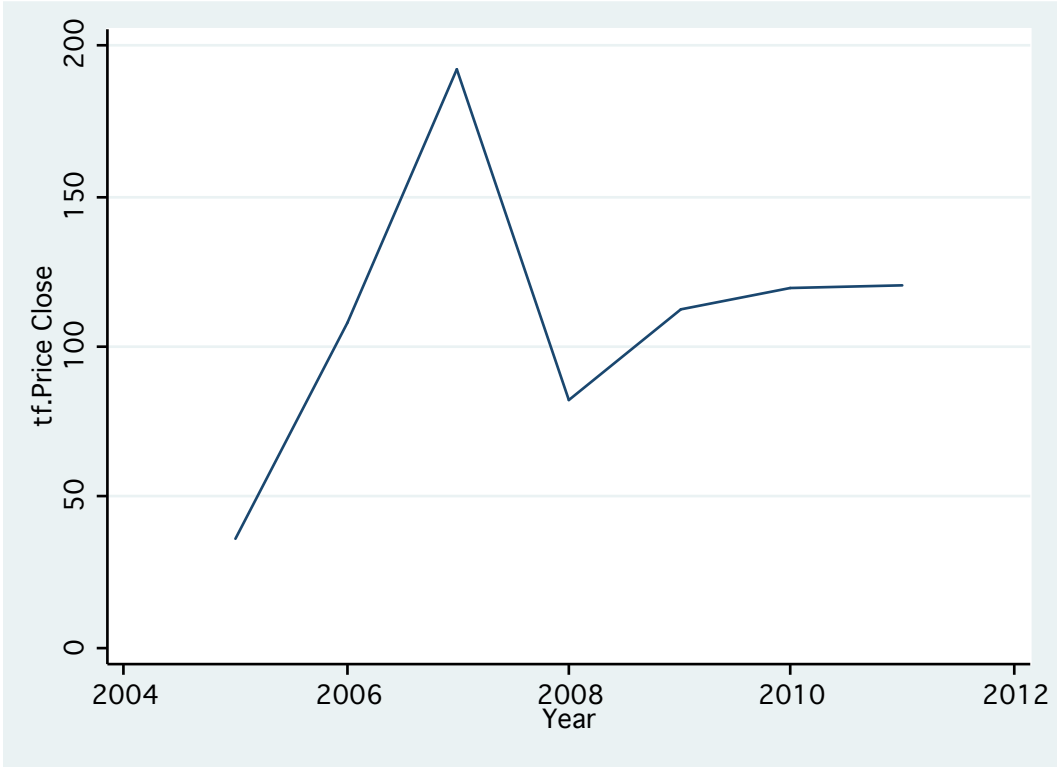
Graph IV.30
ICE shareholding evolution



Share price.

It is worth noting that although ICE’s share price falls in 2008 in line with most other exchanges, under the effects of the global financial crisis, in this case it rebounds more robustly and starts rising again from 2009 onwards. ICE’s shares outperform those of the other exchanges examined here, as can be seen from comparing Graph IV.31 below with the share price graphs reproduced earlier in this section.

Graph IV.31
ICE share price



Freefloat.

Under my assumptions, derived from earlier literature, the larger the freefloat, the less productive and profitable the company. This expectation is verified in the case of ICE. OLS analysis (reproduced in Table IV.15 below) shows that two financial indicators and three indicators of operating performance are negatively correlated with

the proportion of widely held shares. It should be kept in mind, however, that the number of observations is limited, due to the short existence of ICE.

Table IV.15
Effects of freefloat on ICE performance

Independent variable: freefloat.

Number of observations: 7.

Variable	R-squared	T-stat	P
PERatio	0.913	-7.23	***
NetIncome	0.579	-2.62	*
SalesPerEmployee	0.679	-3.25	*
PreTaxMargin	0.583	-2.64	*
NetMargin	0.936	-8.57	***

Investment managers.

The widely held idea that a high presence of IM investors should result in improved performance is verified on many variables, with one notable exception (see Table IV.16 below). The negative correlation between total investment return and IMs' stake is explained by the fact that IMs raised their combined stake in 2008, when ICE's share price was hit, along with those of other exchanges, by the financial crisis.

Table IV.16
Effects of IMs on ICE performance

Independent variable: IM.

Variable	R-squared	T-stat	P
PERatio	0.693	3.36	*
BookValuePerShare	0.688	3.32	*
TotalInvestReturn	0.784	-3.45	*
NetIncome	0.789	4.33	**
DebtToEquityRatio	0.600	2.74	*
NetMargin	0.723	3.61	*

The positive correlation between leverage (debt/equity ratio) and IM shareholdings corroborates the theory that IMs are value maximizers. High leverage is conducive to better corporate performance in two ways: either through the maximization of cash-flows, as explained by Modigliani and Miller (1963); or as a disciplining tool for managers. This latter use of leverage is also widely discussed in the literature, including by Dewatripont and Tirole (1994), Harris and Raviv (1990), and Grier and Zychowicz (1994). This view is particularly relevant in the case of ICE, where Jeffrey Sprecher, the founder and CEO of the company, is by far the largest investor throughout the period under study. He owned personally 4.22% after the IPO in 2005 and still controlled 2.24% in 2011, way more than any other person or institution. It would be logical for a group of rational value-maximizing IMs, controlling 80% or more of the equity, to use leverage as a tool to check a powerful founder who remains at the helm of the company while retaining a significant shareholding.

Brokers.

The effects of brokers' shareholding in ICE are mixed. Of all the types of shareholders, brokers are the only ones who are also fee-paying customers of the exchange. This puts them in an awkward position, where their objective to maximize value for their own shareholders conflicts with their other objective – maximizing the performance of their investment in the exchange. If successful, brokers' lobbying to pay lower fees to the exchange ends up reducing the profitability of ICE. However, as explained in Part II, ICE has sought to reduce brokers' conflicts of interest by creating mutual-like incentives, whereby active brokers who bring a lot of business to the exchange receive a share of its profits. The first three variables listed in Table IV.17 below seem to reflect the effects of these incentives, because brokers' holdings are positively correlated with financial performance variables. The negative correlations in the last two variables seem to indicate that brokers nonetheless continue to face some conflicts, and weigh negatively on some aspects of ICE's performance.

Table IV.17
Effects of brokers on ICE performance

Independent variable: brokers.

Variable	R-squared	T-stat	P
BookValuePerShare	0.76	-3.98	*
QuickRatio	0.869	5.77	**
TotalInvestReturn	0.723	3.23	*
NetIncome	0.708	-3.48	*
DebtToEquityRatio	0.738	-3.76	*

Strategic shareholders.

Once more, my approach towards understanding the influence of strategic shareholders is inductive. Assuming that their presence must be reflected in performance, in Table IV.18 I look for variables that showed a correlation with strategic shareholdings.

Table IV.18
Effects of strategic shareholders on ICE performance

Independent variable: strategic.

Variable	R-squared	T-stat	P
TotalInvestReturn	0.776	3.72	*
ReturnOnInvestCap	0.837	5.07	**
OperatProfitMargin	0.608	2.78	*
ReturnOnAssets	0.918	7.48	***
PreTaxMargin	0.734	3.72	*

The data show some very strong positive correlations between strategic holdings and corporate performance. This indicates that strategic shareholders in the case of ICE are value maximizers. This is consistent with the fact that Jeffrey Sprecher, the founder, is the largest strategic shareholder and that he is gradually reducing his stake. It is rational to show the best possible performance when a company is seeking to attract new outside shareholders. The correlation between total investment return and

strategic stakes is explained by the fact that Sprecher was reducing his stake as the share price fell in 2008.

IV.4. Conclusion

Detailed examination of six exchanges' shareholding structures yields some very interesting results. Two widely held (and often verified) views – that dispersed share ownership destroys shareholder value and that investment managers lead to greater value creation – are clearly shown in every case studied here. In cases where brokers are present in sufficiently large numbers, there are signs that their concentration affects corporate performance negatively. However, this latter finding is tempered in some cases by the effects of a profit-sharing scheme that ICE has put in place in order to entice brokers to bring business to the exchange (this rare example, of a listed company adopting the practices of a mutual, is discussed again in Part VI).

The most interesting results in this chapter emerge from examining strategic shareholdings. Reflecting the fact that strategic investors have various agendas, their presence can lead in turns to the adverse performance associated with management entrenchment, value destruction or just increased uncertainty for other investors. In one clear case where the dominant strategic investor is an empire-building founder, his presence is associated with significant value creation.

Three special cases, which I have highlighted in separate boxes, shine the spotlight on maneuverings by some groups of stakeholders, resulting in unpredictable outcomes for powerless minority shareholders. In two cases, Euronext and LSE, the plotting and scheming occur behind the scenes, increasing uncertainty for other shareholders. In one case, Deutsche Boerse, the public proxy fight clearly ends up creating value for all shareholders, at least in the short term.

Finally, although I have not explored this stochastically, it is interesting to note that the results are much clearer in the cases of US-listed exchanges (Nasdaq, ICE, CME). This observation could have implications for the debate on market efficiency, which is still ongoing but has been very widely debated, including by (Fama (1991), Malkiel and Fama (1970)), among many others, and neatly summed up in Dimson and Mussavian

(1998); it could also contribute to the ongoing debate about common vs. civil law (LLSV), and add fuel to the discussions shaping the varieties of capitalism school.

Part V

Rise and fall of the organized exchange:

the adjuvant effect of regulation in the context of technological change

Abstract

Mifid (and to a lesser extent Reg NMS) broke down the final barriers protecting stock exchanges' monopolies or market dominance in Europe and the US. The deleterious effect on exchange performance is noticeable. But the extent of the damage varies, depending on: the exchange's reliance on equities (highly impacted by the changes) relative to derivatives (untouched by these specific rule changes); its exposure to European markets (more deeply affected than US markets); and the nature of their shareholding structure. Mean comparisons clearly show that operating performance and financial performance of the exchanges is significantly lower in the four years following the rule changes compared with the four years before. The examination of shareholder data shows that holdings of exchange shares by informed investors (brokers) is dramatically lower after the changes. Conversely, holdings by less informed investors are higher in the post-change, lower-performance, period. Strategic shareholdings are not affected by the regulatory change. This implies that strategic investors are: either prevented from selling (directors, founders, managers, etc.); or have motivations to hold their shares that are unrelated to the performance of their investment (plans to take control, long term cooperation projects, etc.). Drawing a parallel with previous regulatory overhauls, I argue that the rule changes act as an adjuvant, allowing market participants to take full advantage of the possibilities offered by technology, thus multiplying its effects.

Résumé

Le chapitre qui suit, sous forme d'article, montre que le potentiel promis par les avancées technologiques est freiné par le rythme plus lent des avancées réglementaires. Les effets de l'utilisation des nouvelles technologies sont ressentis par saccades, au fur et à mesure des avancées (le plus souvent par paliers) de la réglementation. Quand un changement réglementaire coïncide avec une nouvelle technologie, les effets de cette dernière sur les acteurs de marché sont multipliés. C'est ce que j'appelle l'effet adjuvant – un terme utilisé dans le secteur pharmaceutique – où un adjuvant est un composant chimique sans effet intrinsèque, mais qui multiplie les effets d'un agent actif.

Utilisant une approche par comparaisons de moyennes, je démontre que les bourses d'actions auxquelles s'applique la directive européenne Mif sont profondément affectées par la mise en œuvre de cette directive. Les marchés diversifiés (actions et dérivés) sont un peu moins affectés. Les marchés de dérivés purs (qui ne sont pas soumis à la directive) ne sont pas affectés du tout. Ces constatations corroborent les événements constatés lors de situations similaires antérieures, tels que le développement de l'eurodollar ou les Big Bangs réglementaires des années 1980.

Adjuvant (noun): something (as a drug or method)
that enhances the effectiveness
of medical treatment.
(Merriam-Webster Dictionary)

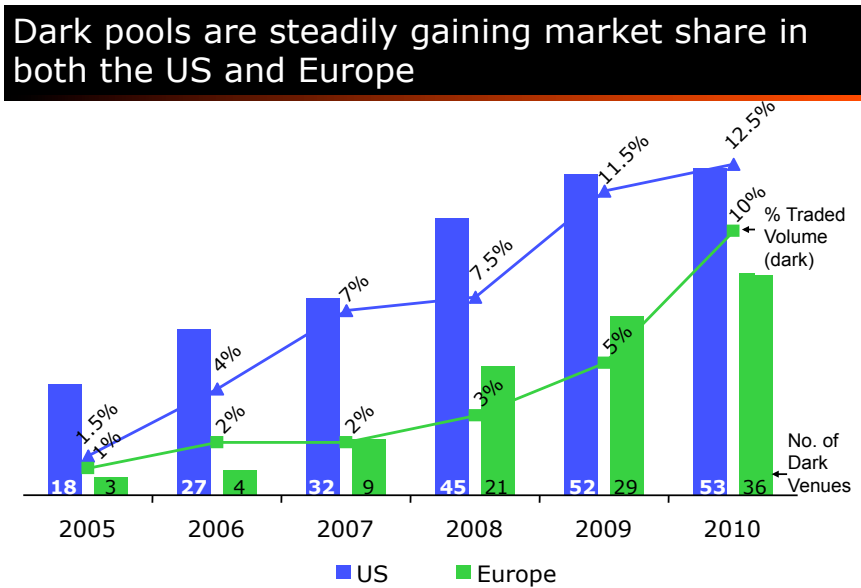
V.1. Introduction

The year 2007 was a watershed for the exchange industry, and more specifically equity markets. Both in the US and EU regulations promoting competition between exchanges and rival trading platforms were introduced almost simultaneously. In essence, the SEC's Regulation National Market System (Reg NMS) and the European Union's Markets in Financial Instruments Directive (Mifid) both state that participants in the financial markets (asset managers, brokers and final investors) must have equal access to all venues offering equity trading services, be they exchanges or some other type of set-up. The rules require that brokers compare prices on several platforms and ensure that each order is executed on the venue offering the best conditions. Best execution does not necessarily mean the best price available, but could consist of a combination of factors, such as ease or speed of execution, liquidity, market depth, etc. Finally, both regulations create a post-trade transparency obligation, in the form of a consolidated audit trail. In short, this means that the public must have access to a database recapitulating all trades executed during any given period, the time and location of their execution, size, price, etc. This requirement aims to give final customers the means to verify that their orders were indeed given best execution. The finer details of Mifid and Reg NMS contain provisions to ensure a level playing field, i.e. an environment where opportunities for unfair competition are reduced to a minimum or eliminated (this is described in more detail in Part II). In the US, where off-exchange trading was prevalent even before Reg NMS, the effects of the new rules were relatively milder than for European exchanges.

In Europe Mifid shattered the previously cosseted world of equity trading. According to statistics from the Federation of European Stock Exchanges (FESE) in January 2008, two months after Mifid allowed other platforms to compete with exchanges, only one such platform was active: Chi-X, executing €21.28 billion worth of share trades. This compares with €332.8 billion on NYSE Euronext's European systems, €298.8 billion on Deutsche Boerse and €451.4 billion on the LSE. Even Oslo outdid Chi-X, with €35.7 billion of trades that month. In December 2011, €115.5 billion worth of shares were exchanged on Chi-X, more than on any organized exchange: NYSE Euronext traded €82.3 billion, Deutsche Boerse €72.8 billion and the LSE €110.5 billion. In effect Chi-X could not have legally existed before 2007. Just three years later it had become the largest equity trading venue in Europe. Furthermore, although Chi-X was the first MTF to start operating in Europe, it is not the only one. The others include BATS, a fast growing US company, Turquoise, which took some market share from the LSE until the exchange ended up acquiring it, and a handful of smaller operators.

Even the smallest of the newcomers are already trading bigger volumes than any European exchange bar the three large ones (LSE, NYSE Euronext and Deutsche Boerse) and Nasdaq OMX Europe, which operates a cluster of Nordic exchanges (Stockholm, Helsinki, Copenhagen, Tallinn, Riga and Vilnius). In addition to the MTFs big enough to be tracked by FESE, there exist several dozen smaller trading venues, also made possible by Mifid. By definition these "dark" or "unlit" venues, where trades are anonymous, operate below the radars of regulators or data aggregators. According to TABB Group (see Graph V.1 below), their number grew from four in 2006 (the UK authorities tolerated some off-exchange trading before Mifid) with a 2% share of the equity market to 36 venues in 2010, with 10% of the total equity market.

Graph V.1
Dark pool market share (US and Europe)

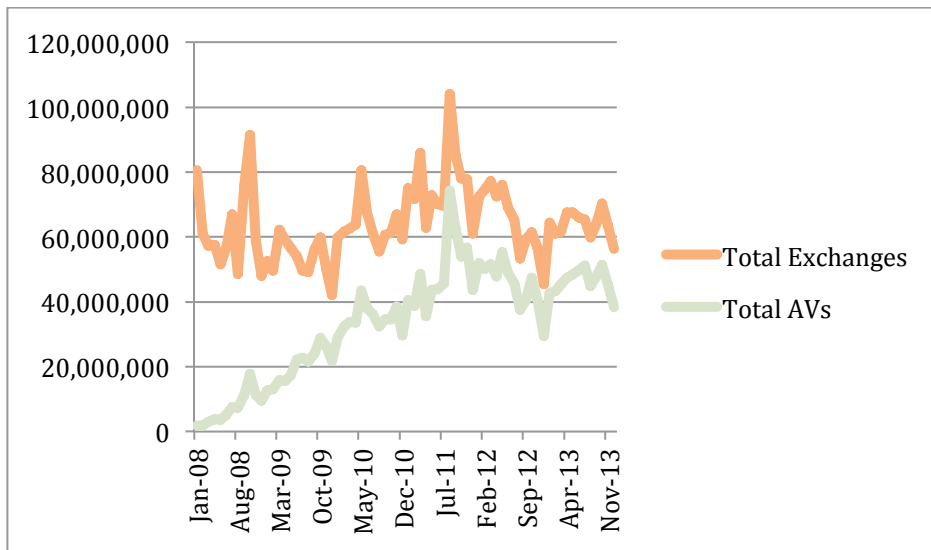


Source: TABB Group Estimate

At current growth rates, and unless the former monopolies react strongly, it is only a matter of a few years before a clear majority of all equity trading moves to venues that did not even exist five years ago. Although there is no official consolidated tally of off-exchange total trading (notably because of the anonymity of trades on dark pools), the authors of one study, with access to non-public data from industry participants, estimate that more than 50% of trading volumes was already taking place on AVs (alternative venues, including MTFs, dark pools and other privately-operated systems) in 2010 (see Graph II.1 in Part II, above).^{cv} The fast pace at which AVs caught up with incumbent exchanges after 2007 is illustrated in Graph V.2 below.

Graph V.2

Monthly trades on European exchanges and MTFs (excluding dark pools)



(Source: FESE)

V.1.1. The role of technology.

Disruptive technologies in finance are not a new phenomenon. From carrier pigeons (Bell 1979) to the internet [see Bakos, Lucas, Oh, Simon, Viswanathan and Weber (2000), among many others] money-men have always been particularly quick to embrace new technologies. New technology allows the emergence of new types of players in an existing market, because it lowers barriers to entry. The telegraph, for example, allowed banks to establish branches overseas in order to offer their customers at home access to foreign markets (Newburg 1978). The telephone again widened the pool of market participants by making it possible to trade on a foreign market from the home office, without even having to establish a foreign branch. Electronic trading went even further, allowing exchanges to offer foreign clients direct access to their market, on the same terms as local customers (Yang and Fang 2004).

However, as is the case in many tightly regulated industries, financial market players are rarely able to enjoy the full benefits offered by technology, because it takes legislators very long to decide whether it should be allowed. Many inefficient industries thus survive for decades against the economic odds, thanks to legal or political protection that insulates them from market forces that would normally lead to their

decline. Stock exchanges are a clear example, resisting electronic trading well into the twenty-first century, even though it had been proven for years that computerization made it possible to achieve similar results for a fraction of the cost (Massimb and Phelps 1994) and (Stoll 2006).

V.1.2. The role of regulation.

The role of regulation in the inception and subsequent evolution of markets has been widely explored. The creation of the Dojima Rice Exchange in Osaka in the late 1600s, which many believe to be the oldest organized derivatives exchange, is attributed to a political decision. According to Schaede (1989), traders were ordered by the Shogun to conduct their trades and hold their rice inventories at a location designated by the prefecture, in order to be able to assess and tax the trades. This view is shared by the authors of a Harvard Business School case study.^{cvi} Similarly, Michie (2001) attributes the institutionalization of the London Stock Exchange in Jonathan's coffee house to a legal ruling that barred traders from conducting business at the Royal Exchange (this event is examined in more detail in Part I). Sylla, Wright and Cowen (2009) also say the Buttonwood Agreement was a direct consequence of US legislation banning public trading of futures, which was passed in the wake of the financial crisis of 1792.

In the 1990s the EU's Investment Services Directive (ISD), liberalizing cross-border competition in financial services, also played its part in reshaping the exchange landscape. The ISD is described in more detail in Part II.

Deutsche Boerse's declaration of war on the London International Financial Futures and Options Exchange (Liffe), which ended with Frankfurt overtaking London as Europe's derivatives-trading capital, is one of these results of provisions in the ISD, which allowed the German exchange to offer direct access to its trading platforms to institutions based overseas. Also a direct result of the ISD was the Euronext project, with the stock exchanges of Paris, Brussels and Amsterdam deciding to merge in March 2000 in order to gain critical mass in what had become overnight a seamless market of 300 million potential investors.

V.1.3. When technology meets regulation: the “adjuvant effect”.

But the most spectacular changes in the financial industry’s make-up were fostered by a combination of technological advances and regulatory change (usually deregulation). When these two factors combine, the effects can be earth shattering for market participants. This is why I call such occurrences “adjuvant moments”. In the pharmaceutical industry, an adjuvant is a chemical component that has no effect on its own, but multiplies the effects of another component. The most common adjuvant is aluminum. When added to a virus, the aluminum multiplies the effect of the vaccine by up to 1000 times. The phenomenon is described in detail by Vogel (2000).

I have identified two adjuvant moments in recent financial history, which I will describe in this section. A third seems to be unfolding, under the combined influences of Mifid and Reg NMS, on the one hand; and new trading technology, on the other. The first adjuvant-fueled event I look at is the rise of the eurodollar market in the late 1960s and early 1970s. The role of regulation in the rise of offshore dollar deposits has been abundantly discussed. In Milton Friedman’s words (Friedman 1969): “The difference in regulation has played a key role in the development of the Euro-dollar market. No doubt there were minor precursors, but the initial substantial Euro-dollar deposits in the post-World War II period originated with the Russians [who] wanted dollar claims not subject to U.S. governmental control” (p.17). Friedman identifies two further regulatory stimulants to the offshore market in US dollars, in the form of Regulation Q, which capped the interest rates that US banks could pay on deposits, and exchange controls, which limited the freedom to transfer money across borders.

“Without Regulation Q and the exchange controls – all of which, in my opinion, are both unnecessary and undesirable – the Euro-dollar market, though it might still have existed, would not have reached anything like its present dimensions” (p.18).

This view is shared by Schenk (1998), who says the “major source of competitive advantage for London was the regulatory environment” (p.221).

The role of technology is also highlighted on several occasions, but rarely is a parallel drawn between these two factors. Battilossi (2009) states that the euro-currency market could not have existed without the “explosion of innovation in

communications technology in the 1970s” (p.2). This is how The Economist newspaper defined the eurodollar market in 1969: “In essence, the Eurodollar market is a telephone and telex network, through which many of the world’s major banks bid for and employ dollar balances.”^{cvii}

The importance of the euromarket is neatly summed up by Podolski (1986): “In the world of finance, the impact of the Eurocurrency system is comparable to that of coke smelting [...] the steam engine [...] and the computer” (p.113). Schenk (1998) also describes the Eurocurrency market as “arguably the most dramatic financial innovation in the post-war period” (p.221).

The other major adjuvant moment in the world of finance in the last 50 years was the Big Bang move to electronic trading. Pioneered by London in 1986, it was soon copied by France and later inspired other financial centers. London’s Big Bang was initiated by the Thatcher government, in response to fears that London was being overtaken by Tokyo and New York as a global financial capital. The reforms combined a modernization of the London Stock Exchange, a deregulation of the financial markets that ended the monopoly of “jobbers” (the only firms that were allowed to have traders on the floor of the exchange), and the wholesale move to electronic trading for all UK-listed equities.^{cviii} The upshot was the removal of a layer of costs and inefficiency, in the form of the disappearance of the jobbing firms (described in more detail in the Introduction). Again, the effects of this event, with regulatory change unleashing technology, cannot be understated. The Independent called it the day “the City entered the modern world”.^{cix}

There is a major difference in scale between the effects induced by regulation or technological advances alone, as described earlier in this chapter, and the earthquake that is equated with adjuvant moments, such as the rise of the euromarket or Big Bang. In a way, it is evolution vs. revolution.

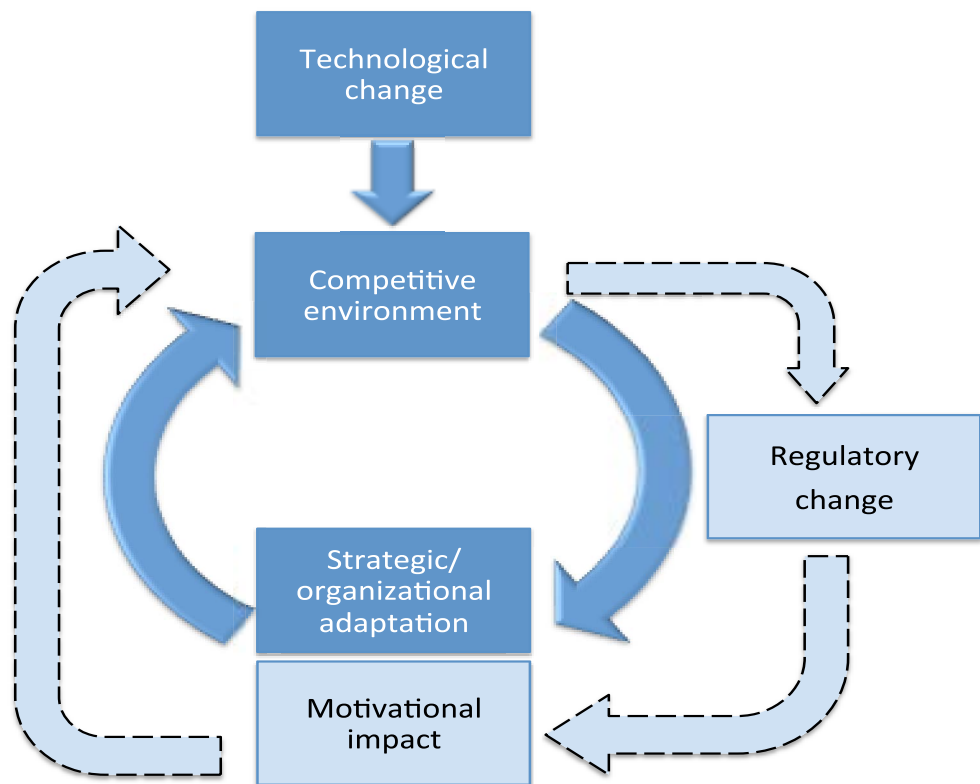
As in many industries, the exchange universe is constantly subjected to technological innovations. Each new technology offers opportunities to create new activities, or perform existing ones faster and more cheaply. Existing organizations or institutions usually adapt to the advent of a new technology by launching new products or boosting existing business by cutting its cost. So it can be argued that the exchange industry is constantly in a cycle of innovation and adaptation. Through a cycle of

innovation/adaptation, new entrants can emerge, old ones can grow their business, and new markets can be created. However, the institutions in presence usually remain the same, even if the balance of power between them can shift. The advent of electronic trading, for example, saw the decline of locals (or members) on exchanges, because direct access by firms to the exchange's computer system meant that orders no longer had to go through the floor-level stage of intermediation. Similarly, the generalization of internet access led to the emergence of online brokers, who could undercut traditional brokerages on cost by making do with smaller headcounts. Although online brokers took a big chunk of the market from the likes of Merrill Lynch, all the main categories of market participants remained in existence.

An adjuvant-boosted revolution is a super-cycle of evolution, usually resulting in the wiping out of entire professions or institutions. London's Big Bang in 1986 consisted not only of a shift to electronic trading of equities on the LSE, but also included the end of the monopoly of jobbers (floor brokers on the exchange), which ultimately led to the disappearance of the profession. In addition to questions of cost and efficiency, a revolution has a motivational impact. This is when the questions raised by competitive or technological changes go beyond adaptation, and market participants start asking themselves: do I still need this (service, infrastructure, etc.)? In the case of Big Bang, the question was: do we still need jobbers, when the rules allow others to do their job? The financial community's answer was clearly: no. The same happened in the case of the eurodollar market. The question was: do we still need to go through New York to borrow and deposit US dollars? And the answer, again, was: no.

I sum up the two cycles (evolution vs. revolution) in Graph V.3 below.

Graph V.3
Evolution cycle (dark shade) vs. revolution cycle (light shade)



If the current upheaval is indeed an adjuvant moment, the next question could well be: do we still need stock exchanges to buy and sell securities? At stake is nothing less than the existence of the form of trading that has dominated the financial world since the late 1700s – the stock exchange.

V.2. Objectives

It is becoming increasingly clear that we are witnessing a period of rare instability for exchanges – an accelerated cycle of upheaval – resulting from the conjunction of Mifid and Reg NMS, both acting as adjuvants to the underlying cycle of competitive shift that is still proceeding, fed by the ongoing computerization of trading.

As a result, a significant proportion of equity trades has deserted the organized exchanges in favor of new AVs. What are the effects of this situation on exchanges, and which of them are suffering the most? In the following pages I measure the impact of this troubled period on exchanges' performance.

V.3. Methodology

I have compiled a database of performance indicators for the main exchanges (which is laid out in detail in Appendix V). My aim is to compare the performances of different types of exchanges: those fully exposed to Mifid and Reg NMS (pure equity exchanges, whose entire range of products and services is opened up to competition), and those partly exposed (diversified exchanges, offering both cash equity trading and derivatives trading, the latter being unaffected by the new legislation). The first group (pure equity) consists of Nasdaq OMX and the London Stock Exchange; the second (diversified) comprises Deutsche Boerse and NYSE Euronext. The sample size is relatively small, consisting of four exchange operators. To start with, the companies had to be listed and to publish detailed financial accounts. Then, they also had to be active in the two regions that witnessed regulatory changes with strong effects on equity trading: the US and the EU. I also had to have equal numbers of pure players (cash equity markets) and diversified conglomerates (cash and derivatives), and if possible of equivalent sizes. Only four groups fulfill all these requirements: Deutsche Boerse, NYSE Euronext, London Stock Exchange and Nasdaq. The first two are conglomerates, whereas the latter two are pure equity exchanges. The detailed criteria of the data selection are exposed in Part I, and the description of the exchanges' activities in Part II.

I use two main statistical tools: mean comparisons and difference-in-differences. The t-test (mean comparisons) aims to detect whether there is a significant difference, for a given variable, between its average value before and after the event (regulatory change). In this case, I compare several performance variables, using the mean of the four years preceding the change (2004-2007) with the four years following it (2008-2011).

I use a difference-in-differences approach to compare one group of exchanges (pure equity players) with another (diversified exchanges). The aim is to demonstrate that the average performance indicators of the pure players fall more significantly than those of the diversified exchanges.

The timing of the regulatory changes (end of 2007) that are the subject of this event study raises the question of the potential impact of the financial crisis. It is legitimate to ask whether the results of the following tests might have been partly – or even largely – attributable to the crisis, which shook share prices worldwide. There is no way to eliminate the impact of the crisis entirely, but there are a number of reasons why this exercise is nonetheless meaningful. As can be seen in Graph IV.13 (in Part IV above), transaction volumes were relatively stable in the period 2008-2011 (at an average of 15 million to 25 million monthly trades on the LSE). The effects on revenues from trading are analyzed in detail in the Empirical Study section below. The trends are similar at Deutsche Boerse and NYSE Euronext. So any deterioration in the financial and operating performances of exchanges cannot be attributed to falls in share trading activity. This is corroborated by the mean comparisons in Table V.1 below, showing that average annual sales are significantly higher in the period 2008-2011 than in 2004-2007, for both diversified exchanges and pure equity exchanges. Thus, any deterioration in performance measures cannot be attributed to a fall in general activity, either. (Sales include all other services provided by exchanges in addition to share trading). Another question that can be legitimately asked is whether exchanges suffered from a contagion effect, since the financial crisis originated in the banking sector, a related industry. While I cannot rule out a spillover effect altogether, I can nonetheless point out some differences between the two sectors. First, exchanges (unlike banks) did not hold any financial instruments on their balance sheets, whose value could fall. Second, exchange shares are less volatile than bank shares. Following are the historical betas of exchanges (sourced from Thomson Reuters in August 2014) and those of a sample of banks in the same countries: LSE (1.41); Nasdaq OMX (1.18); Deutsche Boerse (1.02); ICE (0.87); CME (1.12). This compares with the following betas for banks: Bank of America (1.63); Goldman Sachs (1.60); Morgan Stanley (2.05); Citigroup (1.76); Société Générale (2.27); BNP Paribas (2.05); Deutsche Bank (1.80); Credit Suisse (1.51). Therefore, if exchange shares can suffer from market jitters, they do so to a lesser extent than the other main actors involved in the crisis. In any case, although exchanges' share prices are on

average lower in 2008-2011 than in 2004-2007, the fall is not statistically significant, as can be seen in the tables in Appendix V. Therefore the share price is not one of the variables I use to verify my hypotheses about performance deterioration following the implementation of Mifid and Reg NMS.

V.4. Hypotheses

Pure equity markets are most affected. This group consists of exchanges whose main activity consists of cash equity listing and trading. This is the specific sector that Mifid targeted. The performance of pure equity exchanges post-Mifid is significantly inferior to performance pre-Mifid. Both Nasdaq and LSE are primarily equity exchanges, whose main business takes place in the EU and US. Nasdaq operates stock exchanges in the US and Nordic EU countries. LSE is the main stock exchange in the UK. The second group is also affected, but less so than the pure equity players. It is made up of exchange conglomerates offering cash and derivatives trading. NYSE Euronext operates cash equity markets in the US, France, the Netherlands, Belgium and Portugal, as well as Liffe, a derivatives exchange present in all these countries except the US. Deutsche Boerse operates the main German equity market, and Eurex, by some measures the world's largest organized derivatives market.

Since Mifid does not change the competitive environment of derivatives trading, only some parts of the activities of diversified companies are affected (Liffe and Eurex are not concerned by Mifid). These companies are likely to see their cash equities business take a hit from the regulatory changes, but the performance of their derivatives arm is equivalent or superior to what it was before the legal changes.

In sum, I test three main hypotheses: (1) diversified exchanges are adversely hit by the implementation of Mifid and Reg NMS; (2) pure equity markets are adversely hit by the implementation of Mifid and Reg NMS; (3) pure equity players suffer more than diversified exchanges from the implementation of Mifid and Reg NMS.

I also test a secondary hypothesis: (4) that informed shareholders react to the expected adverse effects of regulation and reduce their holdings in the exchanges that are affected. Formalizing these propositions, I have:

- Hypothesis 1: mean performance indicators in the years 2004-2007 are higher than mean performance indicators in 2008-2011 for pure equity exchanges.
- Hypothesis 2: mean performance indicators in the years 2004-2007 are higher than mean performance indicators in 2008-2011 for diversified exchanges.
- Hypothesis 3: the difference in mean indicators before and after the rule changes is larger for equity markets than for diversified exchanges.
- Hypothesis 4: mean IM and broker shareholdings in 2004-2007 are higher than mean IM and broker shareholdings in 2008-2011.

V.5. Empirical study

Tables V.1 and V.2 below provide a summary of the statistical analysis of the two samples, and their comparison. As expected in hypothesis (1), several performance measures of the diversified exchanges are negatively affected (mean performance in the four years after the regulatory change is inferior to the mean performance in the four years prior to the change, in a statistically significant manner). This is verified for nine out of 20 performance variables that were tested (see Table V.1). Also as expected, hypothesis (2) is verified: the mean performance measures for the pure players are lower in the four years post-deregulation than in the four years preceding it. This is apparent for six different performance measures (shown in Table V.1). Hypothesis (3) is also validated, with the pure players showing a more pronounced fall in performance than the diversified exchanges. This is verified, using the difference-in-differences approach, for the five variables that were significantly affected in both groups of exchanges (see Table V.2). Hypothesis (4) is partly validated, for brokers but not for IMs, and is discussed separately.

The evolution of each variable is studied individually in the pages that follow.

Table V.1
Comparing pre-Mifid and post-Mifid performances

Sample	Variable	Mean 0	Mean 1	M1-M0	t-stat	P
Pure Players	BookValuePerShare	3.998	15.423	11.425	2.63	*
	QuickRatio	2.574	0.448	-2.126	-4.08	**
	TotalInvestmentReturn	64.491	-4.609	-69.1	-2.12	*
	Price to Book	10.193	1.564	-8.629	-2.31	*
	ReturnonAssets	14.814	2.084	-12.73	-3.15	**
	Sales	950	2206	1256	2.38	*
Diversified	Dividend Payout	23.253	60.328	37.075	3.67	**
	PERatio	32.275	13.56	-18.715	-2.19	*
	Dividend Yield	1.475	4.358	2.883	7.33	***
	BookValuePerShare	13.539	23.413	9.874	2.60	*
	QuickRatio	1.258	0.828	-0.43	-2.20	*
	TotalInvestmentReturn	51.262	-14.543	-65.805	-2.84	*
	Price to Book	5.737	2.184	-3.553	-2.60	*
	SalesPerEmployee	849691	1134095	284404	2.24	*
	Sales	2283	3876	1593	3.77	**

Table V.2
Mifid and Reg NMS effects on types of exchanges

Group	Variable	Mean 0	Mean 1	M1-M0	DiD
Pure Players	BookValuePerShare	3.998	15.423	11.425	
	QuickRatio	2.574	0.448	-2.126	
	TotalInvestReturn	64.491	-4.609	-69.1	
	Price To Book	10.193	1.564	-8.629	
	Sales	950	2206	1256	
Diversified	BookValuePerShare	13.539	23.413	9.874	1.551
	QuickRatio	1.258	0.828	-0.43	-1.696
	TotalInvestReturn	51.262	-14.543	-65.805	-3.295
	Price To Book	5.737	2.184	-3.553	-5.076
	Sales	2283	3876	1593	-337

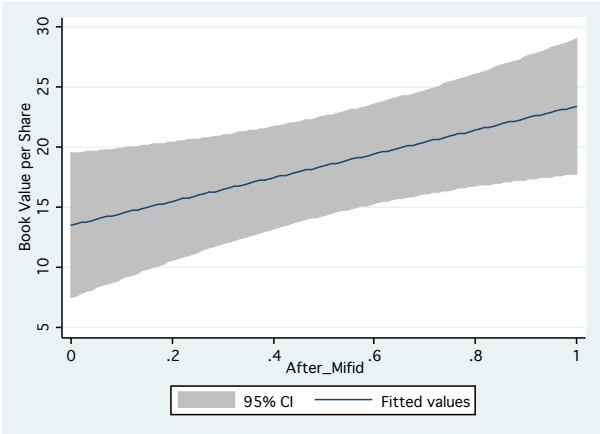
(DiD = [M1 – M0] Pure Players – [M1-M0] Diversified)

Book value per share.

Book value per share measures roughly the inverse of price to book (in the absence of any share buybacks or secondary offerings, or as long as the number of outstanding shares remains constant from one period to the next during the observation timespan). It reflects the “physical” value of assets attached to each share. A rise in the book value per share means that the accounting (book) value of the physical assets comes to account for a greater value of the total market price of the company. A low book value per share means that a large proportion of the value of a share is accounted for by goodwill (the value created by the management, and to which investors attach a monetary value because it is precisely this company with this management).

If book value per share, say, were equal to the share price, this would mean that investors believe the company is worth only the price it paid to acquire its physical assets, as valued in the annual accounts. Graphs V.4 and V.5 below, show that book value per share is significantly higher post-Mifid, meaning that the valuations of exchange shares are lower after the regulatory change.

Graph V.4
Book value per share
(Diversified exchanges)



Graph V.5
Book value per share
(Pure players)

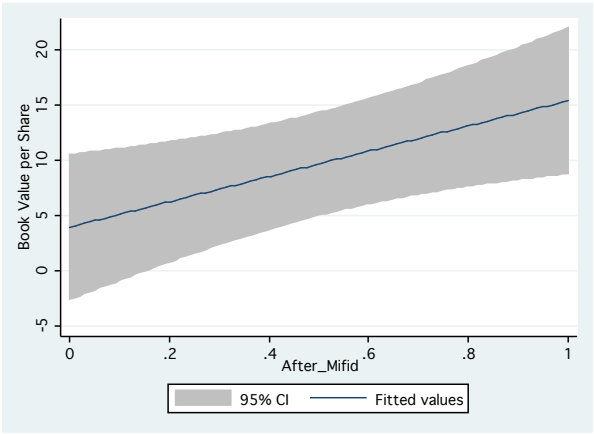
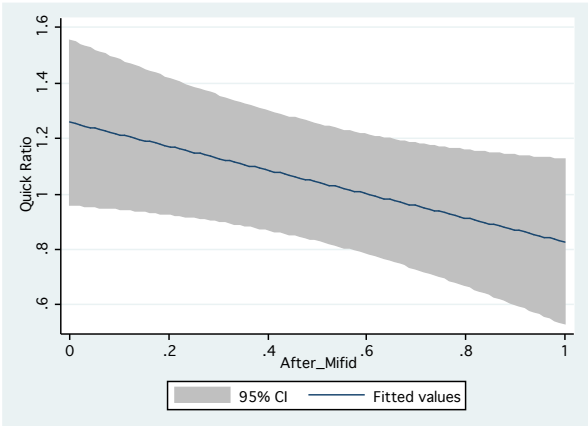


Table V.2 above also shows that diversified exchanges saw their book value per share rise less than pure players.

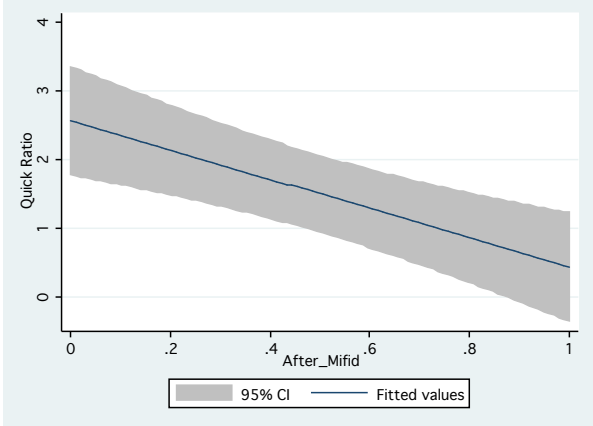
Liquidity ratio deterioration.

The quick ratio reflects the safety of a company’s short-term financial situation – its ability to pay short-term liabilities out of available liquid assets. A quick ratio of less than 1 means a company does not have enough cash and liquid assets to cover all short-term liabilities if these were to be called by the creditors. The mean quick ratio was above one for both groups of exchanges in the period 2004-2007 and fell to less than 1 in the period 2008-2011, as can be seen in Graphs V.6 and V.7 below. In short, both exchange types became less financially solid in the period post-Mifid and Reg NMS than they were in the previous four years.

Graph V.6
Quick ratio
(Diversified exchanges)



Graph V.7
Quick ratio
(Pure players)

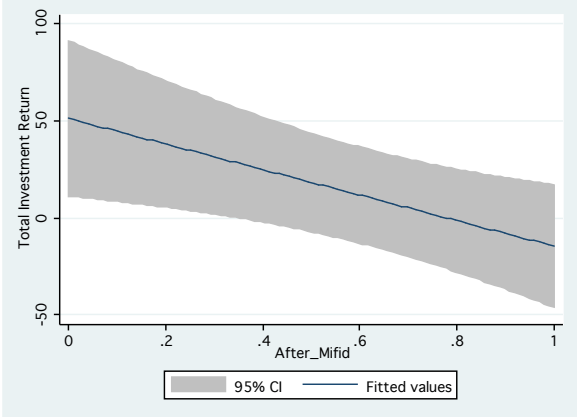


Also, the average liquidity ratio for pure players fell much more than the average liquidity ratio of diversified exchanges, as can be seen in the graphs, as well as in Table V.2 above. This means the liquidity position of pure players suffered much more than that of the diversified firms.

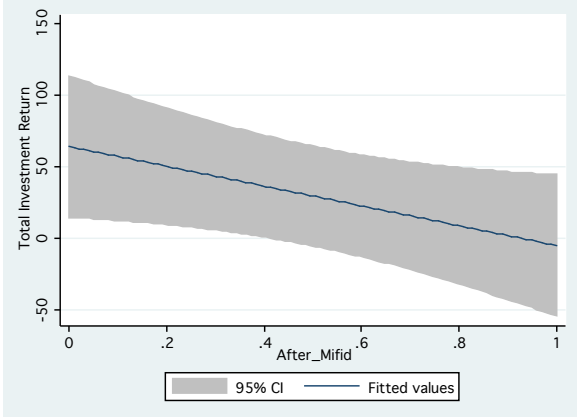
Total investment returns plunge.

Investment returns were negative in three of the four years to 2011 for NYSE Euronext and Deutsche Boerse, and in two of the four years for LSE and Nasdaq OMX. In contrast, LSE had four consecutive years of positive returns in 2004-2007, and Nasdaq had only one year of negative returns (2006). Similarly, Deutsche Boerse showed positive returns every year from 2004 to 2007. In sum, all the exchanges in the sample had largely positive returns in the years before the regulatory changes, and mixed (but largely negative) returns in the following four years, as Graphs V.8 and V.9 below clearly show.

Graph V.8
Total investment return
(Diversified exchanges)



Graph V.9
Total investment return
(Pure players)



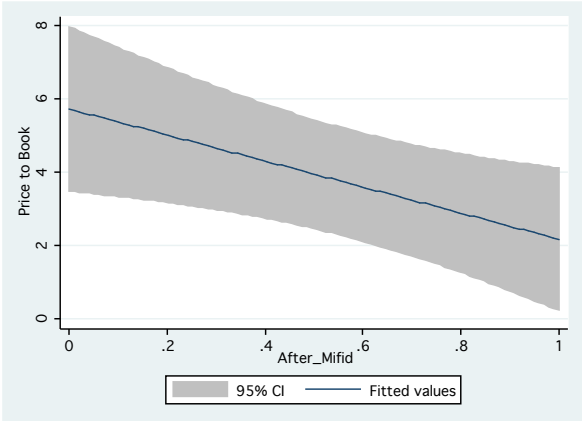
Again, the diversified exchanges seemed to temper the fall better than the pure players (see Table V.2 above).

Price to book.

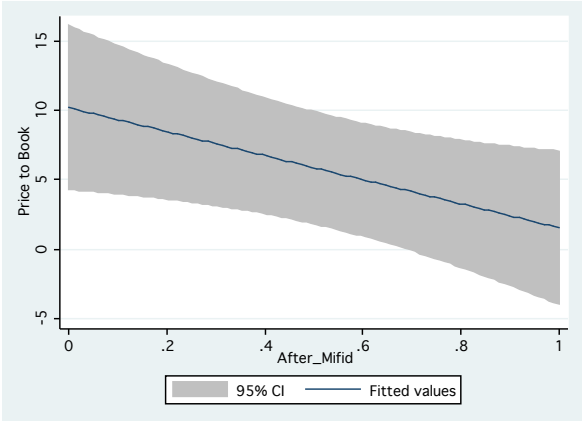
The price-to-book ratio is one of the most widely used tools to measure the value that investors attach to a company, relative to the accounting value of tradable assets. In other words, a high price-to-book means that the company is worth much more than the sum of its parts, mainly because shareholders expect that the company will generate cash flows whose present value is superior to the value that could be achieved by selling the firm's assets.

For pure equity exchanges, the mean price-to-book ratio plummets after the regulatory changes (see Graph V.11 below). While these exchanges were worth (at market prices) on average 10.2 times the accounting value of their assets before 2007, their market value falls to 1.56 times their book value in 2008-2011. Diversified exchanges also become worth less in the eyes of investors over the same period, but the ratio declines much less, from 5.74 to 2.18 (Graph V.10 below).

Graph V.10
Price to book.
(Diversified exchanges)



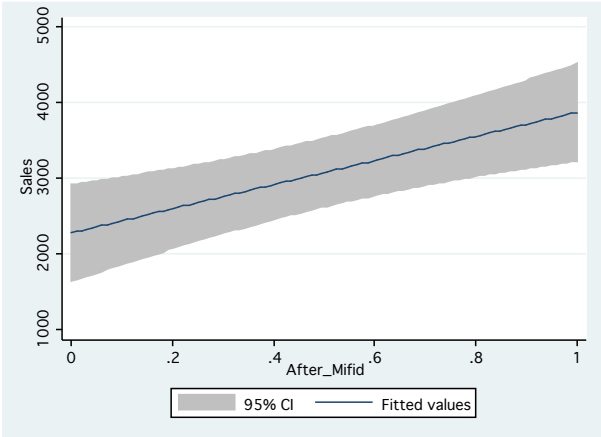
Graph V.11
Price to book.
(Pure players)



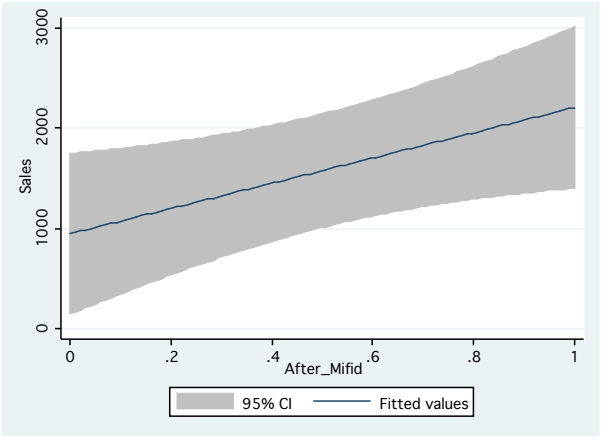
Sales.

All the exchanges in the sample have managed to maintain some revenue growth, as can be seen in Graphs V.12 and V.13 below.

Graph V.12
Sales (in \$ million)
(Diversified exchanges)



Graph V.13
Sales (in \$ million)
(Pure players)



However, a detailed look at the breakdown in their revenues confirms that equity trading, the activity most directly affected by the regulatory changes, took a bad hit. Cash trading at Deutsche Boerse fell from €435 million in 2007 to €275 million in 2011. Considering that transaction numbers did not fall, as explained in the Methodology section above, this indicates that exchanges are likely to have resorted to fee rebates in order to fend off the competition. Also, at group level, this fall was offset by an equivalent rise in revenues from derivatives trading, which reached €946 million in 2011, up from €714 million in 2007, and to a lesser extent sales of market data, €236 million, up from €168 million.^{cx cxi}

A similar picture emerges at LSE. Although cash trading revenues managed a modest rise, from £227 million in 2007 to £282 million in 2011, this includes the acquisition in 2009 of Turquoise. In effect, LSE compensated its loss of market share to AVs by acquiring one and consolidating its revenues with those of the main exchange. LSE also managed to boost its revenues from information services, to £185 million from £106 million, and added a new revenue stream in the form of sales of technology

services, which achieved sales of £49 million in 2011, and were nonexistent (or negligible) in 2007.^{cxii cxiii}

Future top-line growth at LSE is expected to come mainly from new businesses, as well as from its off-exchange equity trading. In 2012, for example, LSE reported substantial sales of information technology services to several exchanges, including the London Metals Exchange, and the acquisition of LCH Clearnet, the London-based clearing house.^{cxiv} LSE is also trying to expand into derivatives trading, albeit from a very low base. Such a strategy of diversification is vindicated by the earlier results in this article, with the diversified exchanges showing stronger average sales growth than the pure players.

Hypothesis 4.

I tested the hypothesis that informed shareholders would anticipate the effects of regulatory change and adapt their investment strategy accordingly: i.e. they would sell out of exchanges that are expected to suffer and invest instead in exchanges that are unaffected (or in other industries). Shareholder types are described in detail in earlier sections of this dissertation. By definition, the owners of widely held shares (or freefloat) cannot be considered informed, since they are either small investors or professional investors who trade in and out of their positions opportunistically. Similarly, I do not expect strategic investors to sell out ahead of an expected period of turbulence because their motivations for holding the shares are not based on financial performance alone. The remaining investors who can be considered informed are brokers and investment managers. The most significant result I find is that brokers massively sell out of diversified exchanges, as illustrated in Graph V.14 below.

Graph V.14

Brokers' shareholdings in organized exchanges.

[Before Mifid (0) vs. After Mifid (1)]

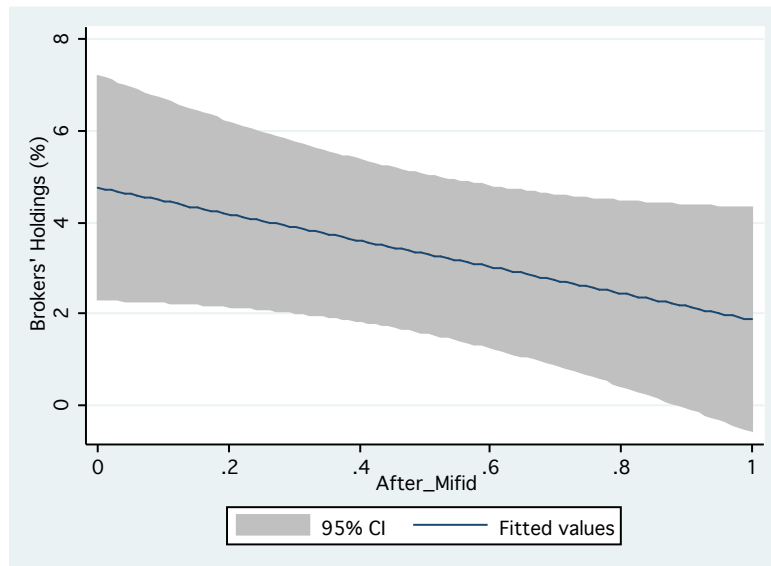


Table V.3 below shows that brokers' holdings fell by almost 60% after the deregulation.

Table V.3

Brokers' shareholdings before (Mean 0) and after (Mean 1) deregulation
(% of outstanding shares)

Variable	Mean 0	Mean 1	M1-M0	t-stat	P
Brokers	4.574	1.898	-2.677	-2.286	*

Brokers clearly and significantly reduce their combined stake in exchanges: at NYSE Euronext, from 17.2% in 2005 to 2.1% in 2011; and at Nasdaq, from 7.2% to 1.3% over the same period. It is during this period that brokers invest in – and start transferring their business to – AVs. As I have discussed in Parts I, II and III, and examined in detail in a separate box in Part IV, the founding owners of platforms such as Turquoise, BATS and Chi-X include many large shareholders in LSE, Nasdaq and NYSE Euronext. I have not found any significant changes in IMs' shareholdings in organized

exchanges, at the aggregate level, that would be attributable to the introduction of Mifid and Reg NMS, although a shift is noticeable at LSE, from 70.3% in 2005 to 48.8% in 2011.

Other relevant data

Some performance measures are not shown in the graphs or tables above, either because they are not comparable across exchange type or because some part of the sample does not yield significant results. They nonetheless deserve to be mentioned briefly.

The main variables omitted here are related to dividend payments, and the reason they are omitted is that Nasdaq never paid a dividend in the period under study, so this variable cannot be used as a proxy for firm performance, nor can it be compared to the dividend policies of other firms in the sample. However, it is interesting to examine the dividend policy when there is one. For those firms that did pay dividends, the dividend yield rose as a result of the fall in the share price, as they strived to maintain a constant cash dividend in the face of falling profits.

Reluctance to cut the dividend even when justified by a fall in income (or “dividend smoothing”) is a well-documented attitude, notably in signaling theory literature, including by Black (1976) and Shao, Kwok and Guedhami (2008).

As exchanges maintain the level of their cash dividend, while their profits fall, the percentage of profits paid out as dividend shoots up. While they paid less than a quarter of their net profit in dividend in 2007, this proportion rose to more than 60% in 2011. In effect, this is a sign that the exchanges are behaving as cash cows in strategy parlance: with little or no growth prospects, they invest less and instead distribute their cash back to shareholders in the form of dividends. And this trend is self-reinforcing. As they invest little, future profitability prospects shrink, leaving even less to distribute.

V.6. Conclusion

With technological advances and deregulation constantly changing the competitive landscape, the operating environment has changed dramatically over the

200-odd years of the existence of organized stock exchanges. The exchanges' traditional set-up, as non-profit mutuals or cooperatives, allowed them to resist change for much longer than a "normal" firm, accountable to shareholders, would have survived under similar competitive pressure.

Only recently, a combination of factors has exposed the full extent of the inadequacy of the exchanges' organizational structure. The two main factors are: deregulation, which allowed unfettered competition; and technology, which made it possible for nimble competitors to offer many of the services provided by exchanges (most notably cash equity trading) for a fraction of the cost. Computerized trading has allowed alternative trading venues gradually to snatch market share from the national exchanges over several years, especially in the US and to some extent in the UK. However, since the quasi-simultaneous implementation of Mifid and Reg NMS in 2007, the loss of market share by established exchanges has extended to the previously shielded exchanges, such as NYSE Euronext's European markets and Deutsche Boerse.

As in many previous technology-driven disruptive events, four outcomes are possible for the incumbents: change to adapt to the new environment; acquire a new entrant; be acquired by one; or perish. The first three have already occurred in the exchange landscape. LSE is trying to befriend the newcomers (offering to sell them its proven technology) and has acquired one (Turquoise). NYSE, the grandest of the old-style exchanges, was taken over by ICE, a newcomer. Meanwhile, BATS Chi-X, having grown in two decades to match the size that took organized exchanges two centuries to reach, has chosen to turn itself into a mainstream exchange and be regulated as such. The fourth scenario has not yet occurred, but the signs are growing louder by the day that Euronext (comprising the national exchanges of France, the Netherlands, Belgium and Portugal), after its spin off from NYSE by its new owners, could become the first domino to tip over.

This raises the question of what happens next: do exchanges disappear altogether, because their structure is no longer profitable or flexible enough to allow them to survive? Do they hobble on while they still can? Or do they rebound and regain their former glory.

It is quite possible that the same regulators who set the stage for the waning of the stock exchange will come to its rescue. In Europe, signs of this are already apparent:

the European Commission, which issued the Mifid directive back in 2006, is now conducting a Europe-wide consultation with the aim of legislating again, in the form of a Mifid revision. Early drafts of the text contain numerous provisions to place restrictions on the new players (the EC calls this the “level playing field”). In effect, it aims to put some restrictions on AVs’ ability to compete.

Alarm bells were sounded in April 2014 after the publication of a book by Michael Lewis, in which he claims that the fragmentation of orders has created opportunities for front-running investors’ trades.^{cxv} In a review of the book, *The Economist* newspaper explains how this situation is a consequence of the regulations (Mifid and Reg NMS) stipulating that brokers must compare prices across platforms before executing an order at the best conditions available: “When an investor presses the button to deal, that signal is sent to a broker or bank, who in turn is supposed to search the many different stock exchanges for the best price. But because of the time taken for trading signals to be sent down the wire, those orders arrive at different stock exchanges at separate times. The HFTs were sitting in wait, and used their advantage to exploit the time differences.”^{cxvi}

The snowballing controversy following the publication of Lewis’s book will no doubt fuel the debate.

Part VI

General conclusion

Conclusion

Writing this dissertation sometimes felt like running after a bus trying to catch it at the next traffic light: every time it stopped and I felt I was getting closer, the lights changed and it moved off.

Among the changes that occurred between 2011 and 2014, the world's largest exchange, NYSE, was acquired by a start-up, ICE; four former national exchanges (those of France, the Netherlands, Belgium and Portugal) were spun off at barely half the price they were worth a decade earlier; Europe's leading exchange, LSE, stopped being one in the strictest sense (by pulling out of FESE, the industry's European lobby); and Europe's largest exchange in terms of trading volumes turned out to be a company, BATS, that was not even an exchange when I started writing (but eventually applied to be regulated as a recognized exchange).

To help explain the events witnessed by the industry in the past decade or so, this research presents evidence that shareholder identity played a significant role. Thus, analyzing shareholders' nature and motivations should join the ranks of existing tools used in governance research, alongside the analysis of shareholding fragmentation/concentration (Holderness), contract theory (Williamson), the political approach (Roe) and the legal approach (La Porta, Lopez, Shleifer and Vishny), in order better to understand the strategy and performance of public corporations. As the case studies show, shareholder motivations can have as much influence on a firm's performance as the fragmentation or concentration of its share ownership, or the balance of power between insiders and outsiders. This applies even to listed companies with widely dispersed and easily tradable shares. The presence among a firm's shareholders of a hostile owner (or frustrated potential acquirer) can cause havoc within the firm. Similarly, an IPO is no guarantee that the firm will focus on value maximization, as the theory suggests should happen when a company's shares become tradable. Instead, it might take years for the company to escape from the clutches of its former masters. This is clear in some instances where brokers remain shareholders in the demutualized exchange, or when management stays entrenched in spite of the arrival of new owners.

Earlier research on demutualization of exchanges shows contrasting results. While Morsy and Rwegasira (2010) find that demutualization and public listing improve exchanges' performance, Serifsoy (2008) shows that demutualization alone brings most of the benefits, and that an IPO does not add any significant value after that. This is where I believe that examining shareholder identities can help to clarify why some exchanges perform better than others even under very similar governance structures.

There are many reasons why exchanges are a particularly interesting industry to study from the governance angle, especially at this point in their evolution, and the following characteristics are prominent among them:

- First, all the main players changed their governance regime (from mutual to listed firm) over a relatively short timespan.
- Second, many of them retain their former stakeholders amidst their new shareholding in sufficiently large numbers to influence management and corporate strategy.
- Third, the concentration process is far from over, so exchanges may have to continue living with cumbersome shareholders (such as direct competitors) for years to come.
- Fourth, the two main drivers of change in the sector (regulatory change and technological advances) are still evolving rapidly.

The upshot is that in their new environment and under their modified corporate structures, exchanges have not yet moved fully to the mainstream corporate landscape. In order to succeed, they must constantly juggle between the typical value-maximizing goals of their new shareholders and the stakeholder-type behavior that motivates their old constituency to remain on board.

It will be interesting to try to generalize the findings of this research, by testing the methodology in other environments. Further research could include applying this approach to the demutualized sector at large. Several industries come to mind: insurers, which had their own waves of demutualization; and banks, some of which have been completely demutualized (British building societies in the 1990s); others, such as the French cooperative banks, floated shares of an entity that remains mutually owned. Both the insurance and banking sectors consist of larger samples, and have longer histories (as listed entities) than the exchanges. This offers a chance to get more robust statistical results to corroborate the findings detailed in this dissertation. By studying longer

periods, it should also be possible to determine whether the peculiarities of listed demutualized firms are eroded over time, so that these companies end up performing more like traditional publicly listed corporations. Looking at samples consisting exclusively of listed mutual entities can further our knowledge of stakeholder models, since these structures (epitomized by *Crédit Agricole* in France) strive to maintain a hybrid governance structure. Also, it would be interesting to find out if QAPs exist in other types of companies, including those that did not undergo changes in their governance regime.

Looking at shareholders kept me busy enough so I barely touched on the make up of exchanges' boards of directors, which are also riven with conflicts of interest. In Part IV ("Tunneling" at the LSE?) I highlight the fact that a number of LSE directors are (or were recently) closely tied to some of the exchange's clients who were responsible for the controversial acquisition of *Turquoise*. Closer study of exchange boards could shed light on other, similar, cases of obvious conflict of interest.

The ramifications of this research also extend beyond the realm of pure corporate governance and raise questions pertaining to financial market microstructures, which I have not delved on in this dissertation. How much fragmentation of securities trading is desirable? Does this fragmentation raise or lower the ultimate funding costs of companies that finance themselves on exchanges? On the one hand, cheaper trading is likely to have reduced the cost of capital of listed companies. On the other, extreme fragmentation would be expected to increase bid/offer spreads (and therefore the total cost of buying shares), ultimately increasing funding costs.

Other questions that arise from – but are not in the scope of – this dissertation pertain to the definition and formation of a market price. In many instances, the nominal value of derivatives based on a listed security account for a multiple of the market capitalization of the underlying security. In this case, how do investors live with several "market prices"? What if the market price is contractually defined as the on-exchange price, but the volume of on-exchange trading is only a fraction of the amounts traded off-exchange?

To some market participants, it is a foregone conclusion that exchanges are a thing of the past and that we can easily live without them. But a time might come when events

show that a centralized exchange would be desirable. What if such a time comes, but it is already too late and exchanges are no longer there (or have shrunk into irrelevance)?

The more I analyzed exchanges' recent behavior to answer existing questions, the more I started asking myself new ones. One question that gradually took shape as I learned more about recent events is: why do the owners of new-look stock exchanges keep trying to reproduce the mutualist/cooperative model that they lobbied so persistently to have removed? ICE, which was started from scratch in the 1990s without the shackles of legacy stakeholders, unilaterally offered its early shareholders a profit sharing agreement based on their usage of the exchange – in effect turning them into a sort of customer/owner akin to a mutualist member. Similarly, when the LSE took control of Turquoise from some of its disgruntled customers, its chief executive hailed the “partnership” with his customers. If combining ownership and custom is so beneficial to an exchange, then why did those same customers lobby so hard to have the two roles separated just a decade ago? Which in turn leads to the somewhat ironic question: is remutualization the remedy to the shortcomings in exchange governance that are highlighted here?

My results also raise the question of whether regulators should have a say on who is allowed to own shares in exchanges. Australian law already restricts foreign ownership in exchanges. Canada has recently blocked a merger between local exchanges and the LSE. It is not unreasonable to suggest that people who stand to gain by destroying value in a company should be prevented from controlling it. Is it normal that the LSE is controlled by a direct competitor? And that Nasdaq's dominant shareholders for a long time were the customers who paid for its services? Such issues were not raised when exchanges were mutually owned, but have become relevant now that their shares are also held by retail investors and pension funds.

More generally, exchanges and regulation are inextricably intertwined. In Part V, I looked specifically at the effects that regulation had on the exchanges. Although this dissertation does not aim primarily to analyze developments in financial regulation, but rather their impact on exchanges, it nonetheless highlights the need to look at the flip side of what was analyzed, notably the effects that exchange demutualizations can have on regulation. This has been the subject of an ongoing debate between two sides: the pro- and the anti-self-regulation. Neither side has won the argument decisively, nor is

this debate likely to end soon. However, the financial crisis has tilted the balance in favor of detractors. In his weekly post on FT.com, Willem Buiters wrote that the crisis had exposed self-regulation as “a joke [...] an expensive joke”.^{cxvii} In a 2011 report, the Boston Consulting Group called self-regulation “an illusion”.^{cxviii} Sutherland Asbill & Brennan, a Washington, DC-based law firm, conducts an annual survey of disciplinary action taken by the US’s Financial Industry Regulatory Authority (Finra). Finra was established in July 2007 by merging the self-regulatory operations of NYSE and Nasdaq. The aim was to tighten the regulation of market activities undertaken on organized exchanges in the US. Ironically, as can be seen in Table VI.1 below, the total fines imposed by the beefed-up Finra in 2010 were less than a quarter of those levied by its predecessors (NYSE Regulation and the NASD) in 2005.^{cxix}

Table VI.1
Disciplinary action taken by Finra

	Approximate fines (in millions of dollars)	Year-to-year percentage change	Number of disciplinary actions	Year-to-year percentage change
2005	184	N/A	1,412	N/A
2006	111	< 40 >	1,147	< 19 >
2007	77	< 31 >	1,107	< 5 >
2008	28	< 64 >	1,007	< 9 >
2009	50	79	1,090	8
2010	45	< 10 >	1,310	13

Source: Sutherland Asbill & Brennan LLP.

Arguments like these give ammunition to those in favor of entrusting regulation to government-backed authorities. Their case revolves around two main issues: (i) the conflicts of interest inherent in a situation where the regulated entity is a client of the regulator; (ii) the fact that the powers of a private sector regulator are by definition more limited than those of a government entity. Point (i) has been addressed in the literature review of Part III (notably the section on the SEC’s 2005 request for comments). The conflicts of interest faced by self-regulatory organizations were illustrated again in 2013, when the SEC fined the Chicago Board Options Exchange, one of the largest derivatives exchanges in the US, \$6 million for “systematic breakdowns in its regulatory functions”.^{cxx} Point (ii) above also raises other complex issues. Finra, for

example, can be accused in turn of having too much and too little power. In a 2013 paper, the CFA Institute highlighted this problem.^{cxxi} On the one hand, Finra does not have the power to subpoena, so the regulated entities can only be investigated insofar as they agree to cooperate. On the other hand, as a semi-government entity, Finra can claim sovereign immunity (and therefore avoid scrutiny by the courts). Also, because it is not a pure public sector actor, Finra does not have to respond to Freedom of Information Act requests, a situation that can allow it to be less accountable than, say, the SEC.

Proponents of self-regulation have also been busy arguing their side. The two main arguments in favor of private sector-led regulation are neatly summarized by Omarova (2010): (a) industry insiders have timely access to market information that outsiders cannot match; and (b) governmental organizations have consistently failed to monitor risks across jurisdictional borders. Another argument that is regularly put forward is that financial markets have become so complex that public-sector bodies can no longer afford to pay the salaries required to attract the necessary skills. Yet another argument of the pro-self-regulation camp is that civil servants who are employed by the regulator are vulnerable to political pressure. Pritchard (2003) argues that when unfavorable economic conditions coincide with financial scandals, it is tempting for politicians to blame business. “Politicians falling all over themselves to outdo each other in ‘getting tough on corporate crime’ [is a typical case] of political overreaction to the fallout of corruption revealed by a bear market.” (p.35).

The two opposite views are clearly summed up by Cary (1963) and Pirrong (1995). William Cary, a former chairman of the SEC, says exchanges are allowed to regulate themselves not because the government does not wish to fulfill this role but rather because market forces provide an incentive for exchanges to take this responsibility seriously and to apply it strictly. Furthermore, he says, self-regulation is not absolute, and the SEC remains the ultimate overseer of the self-regulatory institutions. Pirrong, meanwhile, argues that because competition among exchanges is not absolute, the punishment for weak standards (loss of confidence in the exchange leading to a fall in activity) is not immediate. Examining 10 exchanges in the US, he says they take “few, if any, measures to curb manipulation”. This view was bolstered by Michael Lewis’s recent allegations that demutualized exchanges have facilitated front-running by high-frequency traders, notably by renting them computer space within their

facilities, which allows them to execute trades faster than final investors who transmit their trades through conventional brokers' networks. (This issue is mentioned in Part I and revisited in the conclusion of Part V). Sylla^{cxxii} also argues in favor of outside regulation. He says the view that market forces lead important information to become public does not hold historically, because people with access to information that could be used to make money have strong incentives to keep the information to themselves.

Overall the case against self-regulation, in the current context of increasing competition and the race for profits, seems to be gaining ground. Aggarwal, Ferrell and Katz (2006) pick holes in the arguments put forward by proponents of self-regulation. In order to justify it when exchanges were owned by their members, they insisted that the task of regulating market operations was best entrusted to people who are "close to the market". But when questioned about the potential conflicts of interest brought about by demutualization, the same exchange executives now argue that these can be handled by appointing independent directors, who are not too close to the market. Macey and O'Hara (2005) also question the compatibility of profit-seeking behavior with a regulatory role that can upset potential customers. They argue that due to intensifying competition for listings, exchanges can no longer be trusted to rule whether companies are fit to offer their shares to outside shareholders, especially retail investors. Oversight of the listing function, they say, should therefore be taken away from exchanges and transferred to the SEC. A typical example of regulatory arbitrage was provided in summer 2014 by Alibaba, a Chinese internet company. The company's IPO was originally due to take place on the Hong Kong Stock Exchange, but was moved to NYSE instead, because Hong Kong applies a one-share-one-vote rule, but NYSE agreed to waive this requirement. In reaction, the Hong Kong Stock Exchange launched a consultation, inviting comments on a proposal to loosen listing requirements.^{cxxiii}

As in many complicated debates, some participants advocate a middle-of-the-road approach. One widely expressed view is that national regulators should focus on regulation aimed at preventing systemic risk, while the day-to-day supervision of market participants' behavior is best left to self-regulatory organizations. This is the argument espoused in the UK by the Institute of Economic Affairs.^{cxxiv} Omarova (2010) also advocates splitting roles, but along different lines. Regulatory separation, she argues, should be based on the nature of the risks associated with different activities.

Firms dealing in OTC derivatives and complex financial instruments would be regulated by a national regulator. Self-regulation, she says, is sufficient to handle firms with more conventional activities, such as banks and brokers, but also capital markets underwriters (in short, financial firms that “facilitate capital formation” (p.476)).

All said, regulators and the regulated will undoubtedly continue playing cat-and-mouse for years to come, giving academics abundant material for future work. I, for one, look forward to conducting research in such an exciting, fast moving, field.

Appendix I

A.I.1. List of abbreviations and acronyms.

Companies:

Arca: Archipelago, a US ECN acquired by NYSE in 2005.

BATS: Better Alternative Trading System

BATS Europe: Result of the 2011 merger of BATS' European arm and Chi-X

CBOT: Chicago Board of Trade

CME: Chicago Mercantile Exchange

CME Group: Result of CME merger with the Chicago Board of Trade

DB: Deutsche Boerse

DTB: Deutsche Terminboerse (Deutsche Boerse's derivatives arm)

Euronext: Pan-European exchange operator resulting from the March 2000 merger of the Paris, Amsterdam and Brussels exchanges, followed by the 2002 acquisitions of Liffe and the Lisbon and Oporto exchanges

ICE: Intercontinental Exchange

ISE: International Securities Exchange, small US derivatives exchange acquired by Deutsche Boerse

Liffe: London International Financial Futures and Options Exchange

LSE: London Stock Exchange

Nasdaq: National Association of Stock Dealers Automated Quotation

Nasdaq OMX: Result of Nasdaq merger with Nordic Exchanges

NYSE: New York Stock Exchange

NYSE Euronext: Group resulting from the 2006 merger of NYSE and Euronext

Regulators and Regulations:

EC: European Commission, the executive arm of the European Union

EU: European Union

Finra: Financial Industry Regulatory Authority

FSA: Financial Securities Authority (UK regulator)

ISD: Investment Services Directive

Mifid: Markets in Financial Instruments Directive

Reg ATS: Regulation of Exchanges and Alternative Trading Systems

Reg NMS: Regulation National Market System

SEC: Securities and Exchange Commission

SRO: Self-regulatory organization

Other:

ATF: Alternative Trading Facility

AV: Alternative Venue (can be MTF, ECN or dark pool)

CME: Coordinated Market Economy

ECN: Electronic Crossing Network

FESE: Federation of European Stock Exchanges

IPO: Initial Public Offering

LME: Liberal Market Economy

MTF: Multilateral Trading Facility

NASD: National Association of Securities Dealers (operator of the Nasdaq platform)

VoC: Varieties of Capitalism

WFE: World Federation of Exchanges

A.I.2. List of variables.

Financial indicators:

Price Close: Price or value of the trading instrument at the end of the period (calendar year). The last price an issue traded at on the last trading day of the year.

Dividend Payout: Common Dividends (Cash)/ (Net Income before Preferred Dividends - Preferred Dividend Requirement) * 100

Price/Earnings Ratio – Close: Share Market Price-Year End / Earnings Per Share.

Dividend Yield – Close: Dividends Per Share / Market Price-Year End * 100

Book Value Per Share: book value (proportioned common equity divided by outstanding shares) at the company's fiscal year end for non-U.S. corporations and at the end of the last calendar quarter for U.S. corporations.

Quick Ratio (liquidity ratio): (Cash & Equivalents + Receivables (Net)) / Total Current Liabilities

Total Investment Return: = (Market Price Year End + Dividends Per Share + Special Dividend -Quarter 1 + Special Dividend-Quarter 2 + Special Dividend-Quarter 3 + Special Dividend-Quarter 4) / Last Year's Market Price-Year End - 1) *100

Net Income: Net Income Before Extraordinary Items +/- Extraordinary Items & Discontinued Operations

Return On Invested Capital: (Net Income before Preferred Dividends - Interest Expense on Debt - Interest Capitalized) / ((Last Year's Total Capital + Last Year's Short Term Debt & Current Portion of Long Term Debt) (Current Year's Total Capital + Current Year's Short Term Debt & Current Portion of Long Term Debt)/2) * 100

Price To Book Ratio Close: Market Price-Year End / Book Value Per Share

Total Debt Pct Common Equity (Debt/Equity or Leverage Ratio): (Long Term Debt + Short Term Debt & Current Portion of Long Term Debt) / Common Equity * 100

Operating performance indicators:

Operating Profit Margin: Operating Income / Net Sales or Revenues * 100

Sales Per Employee: Net Sales or Revenues / Employees

Return On Assets: (Net Income before Preferred Dividends - ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / Previous Year's Total Assets * 100

Pretax Margin: $\text{Pretax Income} / \text{Net Sales or Revenues} * 100$

Cash Flow To Sales: $\text{Funds from Operations} / \text{Net Sales or Revenues} * 100$

Gross Profit Margin: $\text{Gross Income} / \text{Net Sales or Revenues} * 100$

Net Margin: $(\text{Net Income before Preferred Dividends}) / \text{Net Sales or Revenues} * 100$

Return on Capital: $(\text{Profit before tax} / \text{Capital Employed}) * 100$

Selling General Admin To Sales: $(\text{Selling, General and Administrative Expenses} - \text{Research and Development Expense}) / \text{Net Sales or Revenues} * 100$

Other variables (independent and dummy variables):

Brokers: percentage of outstanding shares held by brokers.

IM: percentage of outstanding shares held by investment managers.

Strategic: percentage of outstanding shares held by strategic investors.

Total: percentage of outstanding shares held by declared entities = brokers + IM + strategic.

Freefloat: percentage of outstanding shares held by undeclared/unidentified entities = 100 - Total.

After Mifid: dummy variable used to differentiate between periods when the Mifid directive and Reg NMS were enforced, or not. After Mifid = 1 in years 2008 to 2011, and 0 in 2004 to 2007.

StratDom: dummy variable = 1 in years when an exchange has one or more dominant strategic investors controlling 20% or more of outstanding shares, and = 0 when total strategic shareholdings are less than 20% of outstanding shares.

IMDom: dummy variable = 1 in years when investment managers hold more than 50% of outstanding shares, 0 when they own less than 50%.

Diversified: dummy variable used to differentiate pure equity exchanges from exchanges that list and trade derivatives as well. Diversified = 1 for Deutsche Boerse and NYSE Euronext, and 0 for ICE (before the acquisition of NYSE in 2012), CME Group, London Stock Exchange and Nasdaq OMX.

A.I.3. List of variable abbreviations.

I have tried to use abbreviations sparsely, for clarity and readability purposes. I use them as a last resort, when doing so is the only way to fit a full table (or set of tables) on a page.

Price Close	Price
Dividend Payout	Div Pay
Price/Earnings Ratio Close	PER
Dividend Yield Close	Div Yld
Book Value Per Share	BVPS
Quick Ratio	QR
Total Investment Return	TIR
Net Income	NI
Return On Invested Capital	ROIC
Price to Book	PTB
Total Debt Pct Common Equity	DTE
Operating Profit Margin	OPM
Sales Per Employee	SPE
Return On Assets	ROA
Pretax Margin	PTM
Cash Flow To Sales	CFTS
Gross Profit Margin	GPM
Net Margin	Net M
Selling General Admin To Sales	SGATS
Brokers	Brokers
IM	IM
Strategic	Strategic
Total	Total
Freefloat	Freefloat
After Mifid	AM
Diversified	Div
Investment managers dominant	IMDom
Strategic investors dominant	StratDom

Appendix II

Comprehensive database.

The following pages contain all the available annual data used in the quantitative parts of this dissertation. All figures are at year-end and in US dollars. Downloaded from Thomson One Banker in 2011 and 2012.

Comprehensive database – London Stock Exchange

Year	Entity Name	Price	Div Pay	PER	Div Yld	BVPS	QR	TIR	NI	ROIC	DTE	StratDom		
2011	London Stock Exch	12.36	43.93	14.76	3.22	6.17	0.05	32.78	243.01	17.78	48.13	1		
2010	London Stock Exch	13.12	72.12	21.02	3.43	5.19	0.06	29.96	137.13	25.34	65.38	1		
2009	London Stock Exch	11.59		-4.48	4.31	5.07	0.11	-51.17	-484.47	-16.32	65.05	1		
2008	London Stock Exch	7.33	26.47	16.53	1.99	8.44	0.11	-1.6	345.43	20.1	58.34	1		
2007	London Stock Exch	39.39	30.29	24.79	1.44	-5.6	0.3	20.25	214.96	68.32	-71.06	1		
2006	London Stock Exch	25.64	32.25	37.99	1.14	1.94	3.14	135.37	122.63	26.92	0.38	1		
2005	London Stock Exch	10.64		19.64	1.54	1.86	1.97	12.68	117.53	20.33	1.32	0		
2004	London Stock Exch	11.17	20.25	16.15	1.37	3.07	3.13	46.54	117.07	19.06	1.34	0		
2003	London Stock Exch	5.96	21.06	15.47	1.54	2.26	3.75	-34.34	83.3	18.33	0	0		
2002	London Stock Exch	5.06	19.44	25.32	0.83	1.76	3.43		71.06	20.2	0	0		
Year	Entity Name	OPM	SPE	ROA	PTM	CFTS	GPM	Net M	SGATS	Brokers	IM	Strategic	Total	Freefloat
2011	London Stock Exch	37.64	631642.3	0.28	36.55	41.89	37.64	24.61	#N/A	0	48.82	29.01	77.92	22.08
2010	London Stock Exch	33.31	617362	0.68	23.56	36.76	33.31	14.93	#N/A	0	53.52	29.5	83.08	16.92
2009	London Stock Exch	43.07	847886.5	-1.04	-37.67	36.65	43.07	-50.34	#N/A	0.03	61.5	30.49	92.03	7.97
2008	London Stock Exch	48.96	897495.9	2.05	42.55	40.06	48.96	31.81	#N/A	0.05	49.52	32.54	82.08	17.92
2007	London Stock Exch	53.09	1544342	38.14	45.65	42.25	53.09	31.35	#N/A	0.05	63.89	32.85	96.79	3.21
2006	London Stock Exch	41.26	1007839	19.27	31.71	39.2	41.26	24.29	#N/A	0.04	63.54	34.56	98.1	1.9
2005	London Stock Exch	32.73	889823.2	15.03	35.76	35.43		25.45	53.81	0	70.26	8.67	78.91	21.09
2004	London Stock Exch	34.42	834778.3	14.6	36.99	38.04		26.87	55.67	0	65.57	10.38	75.97	24.03
2003	London Stock Exch	36.12	712712.3	14.08	34.71	40.5		23.33	55.42	0	57.66	10.11	67.65	32.35
2002	London Stock Exch	34.12	561447.3	15.57	35.91	36.69		24.15	57.41	0.68	51.04	12.44	64.04	35.96

Comprehensive database – Nasdaq OMX

Year	Entity Name	Price	Div Pay	PER	Div Yld	BVPS	QR	TIR	NI	ROIC	DTE			
2011	Nasdaq OMX	24.51	0	11.4	0	28.15	0.45	3.29	387	6.56	42.54			
2010	Nasdaq OMX	23.73	0	12.36	0	26.82	0.6	19.73	394	6.53	49.19			
2009	Nasdaq OMX	19.82	0	15.86	0	23.14	1.16	-19.79	268	4.81	42.46			
2008	Nasdaq OMX	24.71	0	15.64	0	20.4	1.04	-50.07	319.88	8.26	59.38			
2007	Nasdaq OMX	49.49	0	14.3	0	15.9	3.83	60.73	518.4	21.4	5.36			
2006	Nasdaq OMX	30.79	0	32.41	0	12.58	4.74	-12.48	137.34	8.49	103.18			
2005	Nasdaq OMX	35.18	0	61.72	0	1.9	1.7	244.9	63.92	8.02	754.75			
2004	Nasdaq OMX	10.2	0	340	0	0.33	1.78	7.94	2.08	3.3	1002.69			
2003	Nasdaq OMX	9.45	0	-13.9	0	0.34	2.01	-5.5	-53.39	-16.31	992.73			
2002	Nasdaq OMX	10	0	25	0	3.46	2.11	#N/A	33.36	7.17	330.69			
Year	Entity Name	OPM	SPE	ROA	PTM	CFTS	GPM	Net M	SGATS	Brokers	IM	Strategic	Total	Freefloat
2011	Nasdaq OMX	22.25	1413070.28	3.15	16.61	17.13	45.99	11.26	23.73	1.33	74.89	17.1	86.4	13.6
2010	Nasdaq OMX	21.11	1334864.3	3.54	16.39	17.55	31.37	12.32	10.26	1.85	63.84	15.47	81.26	18.74
2009	Nasdaq OMX	18.36	1538357.4	2.98	14.61	15.66	39.57	7.8	13.96	1.95	64.7	28.83	95.58	4.42
2008	Nasdaq OMX	18.24	1455402.07	5.03	13.6	11.28	37.48	8.77	13.2	3.21	65.11	30.41	98.74	1.26
2007	Nasdaq OMX	16.53	2734671.16	17.31	32.58	4.54	31.74	21.28	10.11	4.21	94.13	0.15	98.49	1.51
2006	Nasdaq OMX	16.42	1846075.72	6.76	12.8	10.69	38.75	7.72	13.95	5.29	90.21	0.14	95.74	4.26
2005	Nasdaq OMX	14.28	959562.7	5.59	12.05	16.64	52.17	7.01	19.5	7.17	64.62	19	90.78	9.22
2004	Nasdaq OMX	10.47	689338.01	1.81	0.47	24.29	49.87	1.21	2.96	0.04	17.25	56.16	73.46	26.54
2003	Nasdaq OMX	6.88	633560.69	-9.91	-11.25	9.12	57.77	-17.88	8.36	0.04	0.72	55.11	55.87	44.13
2002	Nasdaq OMX	12.48	620323.26	4.74	8.96	23.2	21.85	5.39	#N/A	0.04	16.05	55.29	71.39	28.61

Comprehensive database – NYSE Euronext

Year	Entity Name	Price	Div Pay	PER	Div Yld	BVPS	QR	TIR	NI	ROIC	DTE
2011	NYSE Euronext	26.1	50.57	11.06	4.6	25.5	0.78	-8.94	619	7.64	31.53
2010	NYSE Euronext	29.98	54.25	13.63	4	26.04	0.62	23.24	577	6.83	35.9
2009	NYSE Euronext	25.3		30.12	4.74	26.27	0.54	-3.21	219	3.07	40.49
2008	NYSE Euronext	27.38		-9.85	4.38	25.31	0.68	-67.44	-738	-5.84	47.85
2007	NYSE Euronext	87.77	30.95	32.51	0.85	35.41	0.61	-8.93	643	10.39	28.91
2006	NYSE Euronext	97.2	47.03	71.47	0	10.73	1.58		204.98	13.35	0
2005	NYSE Euronext	50	0			8.78	1.29		89.99	8.17	0
2004	NYSE Euronext	20.97	0				2.34		30.16	3.87	0

Year	Entity Name	OPM	SPE	ROA	PTM	CFTS	GPM	Net M	SGATS	Brokers	IM	Strategic	Total	Freefloat
2011	NYSE Euronext	21.18	1479363	5.54	16.12	17.44	#N/A	13.6	17.22	2.09	70	0.47	72.61	27.39
2010	NYSE Euronext	18.82	1490903	4.91	15.64	15.95	#N/A	13.04	17.13	3.57	66.73	0.12	70.6	29.4
2009	NYSE Euronext	16.98	1247538	2.21	4.33	8.94	#N/A	4.67	29.49	3.34	58.97	0.09	62.63	37.37
2008	NYSE Euronext	25.01	1251797	-4.34	-13.74	18.78	#N/A	-15.69	26.94	5.05	52.95	0.35	58.46	41.54
2007	NYSE Euronext	8.15	1134285	7.52	26.05	23.11	#N/A	18.39	37.29	9.9	51.14	0.48	61.7	38.3
2006	NYSE Euronext	16.91	660501.6	6.89	19.5	21.92	#N/A	12.04	45.85	10.38	48.81	0.93	60.29	39.71
2005	NYSE Euronext	22.94	844052.7	3.96	10.53	8.8	#N/A	5.4	41.88	17.24	51.45	2.96	71.65	28.35
2004	NYSE Euronext	4.31		1.76	4.31	12.33	#N/A	2.77	55.71	2.75	53.91	0	56.68	43.32

Comprehensive database – Deutsche Boerse

Year	Entity Name	Price	Div Pay	PER	Div Yld	BVPS	QR	TIR	NI	ROIC	DTE	IMDom
2011	Deutsche Boerse	54.54	46.03	9.44	5.33	20.91	1	-10.39	1101.86	6.31	529.11	0
2010	Deutsche Boerse	69.72	93.47	23.02	4.05	21.29	1	-6.94	560.49	4.15	315.01	1
2009	Deutsche Boerse	83.1	78.65	21.69	3.63	22.12	1	18.15	711.76	4.86	308.28	1
2008	Deutsche Boerse	70.62	39	9.37	4.13	19.86	1	-60.81	1436.38	9.34	362.82	1
2007	Deutsche Boerse	197.37	36.17	28.72	1.56	18.11	0.99	96.24	1332.9	8.79	462.17	1
2006	Deutsche Boerse	92.13	31.46	20.76	2.43	7.63	1.02	65.62	881.77	8.74	290.66	0
2005	Deutsche Boerse	50.97	17.34	21.6	2.43	6.37	1.03	100.05	504.15	6.33	237.18	0
2004	Deutsche Boerse	30.07	23.07	18.59	1.58	7.74	1.2	3.33	361.68	4.15	184.4	0
2003	Deutsche Boerse	27.43	19.98	19.77	1.26	6.6	1.11	15.92	310.67	4.24	188.47	0
2002	Deutsche Boerse	19.94	15.74	17.43	1.16	5.05	0.91	-13.62	246.7	6.63	165.26	0

Year	Entity Name	OPM	SPE	ROA	PTM	CFTS	GPM	Net M	SGATS	Brokers	IM	Strategic	Total	Freefloat
2011	Deutsche Boerse	45.59	808008.8	0.54	51.51	39.53	84.98	38.01	25.9	0	26.54	1.5	28.09	71.91
2010	Deutsche Boerse	42.86	832477.2	0.33	19.37	34.79	84.79	19.29	31.1	0	51.06	0	51.22	48.78
2009	Deutsche Boerse	44.16	860469.4	0.39	25.85	39.19	76.54	22.98	12.55	0	56.93	0	57.26	42.74
2008	Deutsche Boerse	55.55	1102203	1.09	54.57	41.38	82.26	38.39	10.45	0	56.17	0	56.34	43.66
2007	Deutsche Boerse	46.83	1076557	1.37	56.08	37.82	72.75	37.74	7.93	0	62.16	0	62.35	37.65
2006	Deutsche Boerse	47.05	891342.2	1.37	51.17	38.67	74.17	33.35	19.43	0	48.61	0	48.74	51.26
2005	Deutsche Boerse	38.16	704960.9	1.52	39.88	30.94	69.54	24.48	22.32	0	41.76	0	41.93	58.07
2004	Deutsche Boerse	26.38	636137.4	3.44	29.61	34.14	62.09	17.43	27.1	0	41.97	0	42.08	57.92
2003	Deutsche Boerse	26.55	590601.9	3.58	29.6	34.54	59.29	16.27	26.88	0	35.65	0	35.8	64.2
2002	Deutsche Boerse	23.55	370302.5	5.66	31.98	39.57	66.49	20.08	36.26	0	27.23	0	27.31	72.69

Comprehensive database – CME Group

Year	Entity Name	Price	Div Pay	PER	Div Yld	BVPS	QR	TIR	NI	ROIC	DTE
2011	CME Group	48.73	20.57	8.97	2.3	13.03	1.11	-22.53	1812.3	8.14	9.78
2010	CME Group	64.35	32.09	22.48	1.43	12	1.11	-2.86	951.4	4.65	12.59
2009	CME Group	67.19	37.01	27.07	1.37	11.6	1.01	63.64	825.8	4.09	11.99
2008	CME Group	41.62	85.98	17.16	2.21	11.19	1.02	-68.26	715.49	4.17	19.65
2007	CME Group	137.2	23.02	45.95	0.5	9.16	1.21	35.25	658.53	7.75	24.59
2006	CME Group	101.95	21.49	43.94	0.49	1.71	1.45	39.4	407.35	13.49	140.23
2005	CME Group	73.5	20.62	41.71	0.5	1.27	1.33	61.49	306.86	12.11	193.16
2004	CME Group	45.74	15.97	35.85	0.45	0.93	1.32	217.5	219.55	11.7	194.81
2003	CME Group	14.47	16.89	20.1	0.87	0.65	1.1	67.18	122.13	8.5	178.67
2002	CME Group	8.73	18.38	13.95	0	0.55	1.1		94.07	8.08	222.46

Year	Entity Name	OPM	SPE	ROA	PTM	CFTS	GPM	Net M	SGATS	Brokers	IM	Strategic	Total	Freefloat
2011	CME Group	61.61	1197299	4.98	59.16	45.38	#N/A	55.24	26.17	1.72	69.04	5.54	76.64	23.36
2010	CME Group	60.94	1168755	2.91	57.54	43.81	#N/A	31.67	22.66	1.47	67.92	5.48	75.15	24.85
2009	CME Group	61.02	1156106	2.15	55.28	42.67	#N/A	31.61	23.34	2.3	70.48	0.43	73.46	26.54
2008	CME Group	61.97	1113487	2.3	49.96	48.11	#N/A	27.94	25.11	2.97	63.54	0.43	67.25	32.75
2007	CME Group	60.33	891421.8	5.98	63.2	46.14	#N/A	37.5	28.15	2.04	66.87	0.43	69.79	30.21
2006	CME Group	56.96	762200.7	11.35	62.26	44.14	#N/A	37.37	34.03	1.86	79.52	0.68	82.2	17.8
2005	CME Group	57.83	739815.3	10.1	52.02	44.12	#N/A	31.4	33.09	1.52	70.54	0.09	72.28	27.72
2004	CME Group	51.36	586751.4	6.02	48.84	45.99	#N/A	29.17	38.27	0.8	55.3	0.12	56.29	43.71
2003	CME Group	39.44	446178.5	3.12	37.84	35.2	#N/A	22.42	46.85	0.4	33.46	0	33.9	66.1
2002	CME Group	37.6		3.87	32.88	30.11	#N/A	20.05	48.34	0.31	15.61	0	15.91	84.09

Comprehensive database – ICE

Year	Entity Name	Price	Div Pay	PER	Div Yld	BVPS	QR	TIR	NI	ROIC	DTE
2011	ICE	120.55	0	17.47	0	42.84	1.02	1.17	509.67	14.32	28.43
2010	ICE	119.15	0	22.27	0	37.43	1.02	6.1	398.3	13.52	20.83
2009	ICE	112.3	0	26.3	0	32.65	1.02	36.22	315.99	12.89	12.81
2008	ICE	82.44	0	19.77	0	27.03	1.02	-57.17	300.97	15.33	18.91
2007	ICE	192.5	0	56.78	0	20.86	1.24	78.41	240.61	23.47	15.02
2006	ICE	107.9	0	44.96	0	7.56	8.71	196.84	143.27	41.75	0
2005	ICE	36.35	0	-93.2	0	4.19	6.01		-20.91	-8.81	0

Year	Entity Name	OPM	SPE	ROA	PTM	CFTS	GPM	Net M	SGATS	Brokers	IM	Strategic	Total	Freefloat
2011	ICE	60.94	1310455	1.7	57.19	53.35	#N/A	38.39	29.1	1.93	90.78	2.79	95.5	4.5
2010	ICE	58.11	1232523	1.71	53.06	49.31	#N/A	34.64	31.35	2.1	89.01	3.1	94.21	5.79
2009	ICE	52.15	1204344	1.8	49.63	46.7	65.11	31.76	12.97	1.2	90.41	3.79	95.4	4.6
2008	ICE	60.7	1022740	3.53	58.24	43.84	72.69	37.02	11.99	1.79	86.56	4.16	92.51	7.49
2007	ICE	63.5	1134966	15.37	62.41	38.92	76.65	41.9	12.85	1.93	82.62	10.92	95.47	4.53
2006	ICE	65.21	1388491	37.8	67.73	38.07	79.78	45.66	11.68	9.95	69.23	13.74	92.92	7.08
2005	ICE	48.77	767807.9	-7.72	38.49	35.31	67.38	-13.41	18.61	11.74	29.69	0	41.43	58.57

Appendix III

The following two pages show the detailed results of the regressions used in Part III. Shaded areas represent regressions with significant results, which are reproduced, analyzed and analyzed in Part III. Significant results are those with $p < 0.05$ (shown in the main text as *); $p < 0.01$ (shown as **); and $p < 0.001$ (shown as ***).

Independent variable: Freefloat

Number of observations: 54

Variable	R-squared	T-stat	P
tf.Price Close	0.03	-1.29	0.204
tf.Dividend Payout	0.078	2.04	0.047
tf.PERatio Close	0.019	-0.99	0.326
tf.Dividend Yield Close	0.085	2.18	0.034
tf.Book Value Per Share	0.059	-1.81	0.076
tf.Quick Ratio	0.01	-0.75	0.459
tf.Total Investment Return	0.006	-0.53	0.598
tf.Net Income	0.011	0.75	0.457
tf.Return On Invested Capital	0.159	-3.17	0.003
tf.Total Debt Pct Common Equity	0.089	2.28	0.027
tf.Operating Profit Margin	0.015	-0.09	0.371
tf.Sales Per Employee	0.351	-5.25	0
tf.Return On Assets	0.148	-3.03	0.004
tf.Pretax Margin	0.001	-0.19	0.85
tf.Cash Flow To Sales	0.002	0.28	0.78
tf.Net Margin	0.005	-0.52	0.605
tf.Selling General Admin To Sales	0.11	2.39	0.021

Independent variable: IM

Number of observations: 54

Variable	R-squared	T-stat	P
tf.Price Close	0.193	3.56	0.0008
tf.Dividend Payout	0.008	-0.62	0.54
tf.PERatio Close	0.01	-0.72	0.476
tf.Dividend Yield Close	0.015	-0.88	0.381
tf.Book Value Per Share	0.225	3.89	0.0003
tf.Quick Ratio	0.002	0.32	0.751
tf.Total Investment Return	0.004	0.41	0.684
tf.Net Income	0.036	1.4	0.166
tf.Return On Invested Capital	0.117	2.65	0.0105
tf.Total Debt Pct Common Equity	0.315	-4.94	0
tf.Operating Profit Margin	0.138	2.91	0.005
tf.Sales Per Employee	0.424	6.13	0
tf.Return On Assets	0.112	2.58	0.01
tf.Pretax Margin	0.12	2.68	0.0097
tf.Cash Flow To Sales	0.026	1.19	0.241
tf.Net Margin	0.136	2.88	0.006
tf.Selling General Admin To Sales	0.022	-1.01	0.319

Independent variable: Brokers

Number of observations: 44

Variable	R-squared	T-stat	P
tf.Price Close	0.064	1.71	0.094
tf.Dividend Payout	0.018	-0.86	0.397
tf.PERatio Close	0.019	-0.88	0.384
tf.Dividend Yield Close	0.028	-1.08	0.286
tf.Book Value Per Share	0.023	0.99	0.327
tf.Quick Ratio	0.125	2.48	0.017
tf.Total Investment Return	0.057	1.47	0.149
tf.Net Income	0.003	-0.33	0.741
tf.Return On Invested Capital	0.009	-0.62	0.542
tf.Total Debt Pct Common Equity	0.018	-0.88	0.386
tf.Operating Profit Margin	0.03	-1.15	0.257
tf.Sales Per Employee	0.017	0.83	0.411
tf.Return On Assets	0	0.05	0.962
tf.Pretax Margin	0.006	-0.49	0.624
tf.Cash Flow To Sales	0.126	-2.49	0.017
tf.Net Margin	0.025	-1.04	0.302
tf.Selling General Admin To Sales	0.002	-0.28	0.78

Independent variable: Strategic

Number of observations: 55

Variable	R-squared	T-stat	P
tf.Price Close	0.149	-3.05	0.004
tf.Dividend Payout	0.05	-1.61	0.114
tf.PERatio Close	0.113	2.55	0.014
tf.Dividend Yield Close	0.038	-1.41	0.163
tf.Book Value Per Share	0.102	-2.43	0.019
tf.Quick Ratio	0	-0.08	0.935
tf.Total Investment Return	0	-0.07	0.946
tf.Net Income	0.125	-2.75	0.008
tf.Return On Invested Capital	0.009	0.7	0.487
tf.Total Debt Pct Common Equity	0.148	3.03	0.004
tf.Operating Profit Margin	0.085	-2.21	0.031
tf.Sales Per Employee	0.014	-0.85	0.398
tf.Return On Assets	0.004	0.45	0.654
tf.Pretax Margin	0.163	-3.21	0.002
tf.Cash Flow To Sales	0.035	-1.39	0.171
tf.Net Margin	0.122	-2.72	0.009
tf.Selling General Admin To Sales	0.101	-2.28	0.027

Appendix IV

The following pages show all the results of the regressions used for the case studies in Part IV of the dissertation. Shaded areas contain the regressions that show significant results. These are reproduced and analyzed in Part IV.

Significant results are those with $p < 0.05$ (shown in the main text as *); $p < 0.01$ (shown as **); and $p < 0.001$ (shown as ***).

London Stock Exchange

Independent variable: Freefloat

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.617	-3.59	0.007
Div Pay	0.084	-0.74	0.486
PER	0.013	-0.33	0.752
Div Yld	0.067	-0.76	0.47
BVPS	0.064	0.74	0.481
QR	0.224	1.52	0.167
TIR	0.159	-1.15	0.288
NI	0.027	0.47	0.65
ROIC	0.06	-0.71	0.496
DTE	0.011	0.3	0.769
OPM	0.414	-2.38	0.045
SPE	0.506	-2.86	0.021
ROA	0.055	-0.68	0.516
PTM	0.079	0.83	0.432
CFTS	0.041	-0.58	0.575
Net M	0.074	0.8	0.446
SGATS	NA	NA	NA

Independent variable: IM

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.158	1.22	0.256
Div Pay	0.076	-0.7	0.508
PER	0.005	0.21	0.841
Div Yld	0.066	-0.75	0.475
BVPS	0.299	-1.85	0.102
QR	0.085	0.86	0.413
TIR	0.028	0.44	0.67
NI	0.081	-0.84	0.427
ROIC	0.017	0.37	0.722
DTE	0.264	-1.69	0.129
OPM	0.001	-0.09	0.927
SPE	0.276	1.75	0.119
ROA	0.271	1.72	0.123
PTM	0.013	-0.32	0.754
CFTS	0.087	-0.87	0.408
Net M	0.011	-0.3	0.771
SGATS	NA	NA	NA

Independent variable: Brokers

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.062	-0.72	0.489
Div Pay	0.116	-0.89	0.409
PER	0.055	0.68	0.514
Div Yld	0.154	-1.21	0.263
BVPS	0.02	-0.4	0.7
QR	0.132	1.1	0.301
TIR	0.015	0.33	0.753
NI	0.001	-0.11	0.919
ROIC	0	0	0.998
DTE	0.026	-0.46	0.657
OPM	0.03	-0.5	0.632
SPE	0.086	-0.87	0.41
ROA	0.02	0.41	0.694
PTM	0.011	0.29	0.777
CFTS	0.071	-0.78	0.457
Net M	0.008	0.25	0.809
SGATS	NA	NA	NA

Independent variable: Strategic

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.171	1.28	0.235
Div Pay	0.044	-0.61	0.56
PER	0.044	0.19	0.856
Div Yld	0.198	1.4	0.198
BVPS	0.013	0.32	0.758
QR	0.476	-2.69	0.027
TIR	0.065	0.69	0.51
NI	0	0.07	0.949
ROIC	0.027	0.47	0.65
DTE	0.057	0.7	0.505
OPM	0.475	2.69	0.027
SPE	0.146	1.17	0.276
ROA	0.013	-0.32	0.755
PTM	0.045	-0.62	0.554
CFTS	0.171	1.28	0.235
Net M	0.044	-0.61	0.56
SGATS	NA	NA	NA

Nasdaq OMX

Independent variable: Freefloat

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.573	-3.28	0.011
Div Pay	NA	NA	NA
PER	0.036	0.54	0.601
Div Yld	NA	NA	NA
BVPS	0.311	-1.9	0.094
QR	0.038	-0.56	0.592
TIR	0.008	-0.24	0.818
NI	0.444	-2.53	0.036
ROIC	0.624	-3.65	0.007
DTE	0.502	2.84	0.022
OPM	0.484	-2.74	0.025
SPE	0.582	-3.34	0.0102
ROA	0.586	-3.36	0.0099
PTM	0.661	-3.95	0.004
CFTS	0.122	1.06	0.322
Net M	0.647	-3.83	0.005
SGATS	0.186	-1.27	0.246

Independent variable: IM

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.745	4.83	0.0013
Div Pay	NA	NA	NA
PER	0.115	-1.02	0.338
Div Yld	NA	NA	NA
BVPS	0.428	2.45	0.04
QR	0.073	0.79	0.452
TIR	0.016	0.34	0.747
NI	0.593	3.41	0.009
ROIC	0.561	3.19	0.013
DTE	0.578	-3.31	0.0107
OPM	0.6	3.47	0.009
SPE	0.745	4.83	0.0013
ROA	0.551	3.14	0.014
PTM	0.731	4.67	0.0016
CFTS	0.23	-1.54	0.161
Net M	0.66	3.94	0.004
SGATS	0.292	1.7	0.133

Independent variable: Brokers

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.64	3.77	0.0055
Div Pay	NA	NA	NA
PER	0.046	-0.62	0.55
Div Yld	NA	NA	NA
BVPS	0.002	0.12	0.905
QR	0.163	1.25	0.248
TIR	0.427	2.28	0.056
NI	0.05	0.65	0.536
ROIC	0.26	1.68	0.132
DTE	0.049	-0.64	0.539
OPM	0.074	0.8	0.446
SPE	0.241	1.59	0.15
ROA	0.295	1.83	0.104
PTM	0.243	1.6	0.148
CFTS	0.183	-1.34	0.217
Net M	0.2	1.41	0.195
SGATS	0.206	1.35	0.22

Independent variable: Strategic

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.782	-5.36	0.0007
Div Pay	NA	NA	NA
PER	0.156	1.22	0.258
Div Yld	NA	NA	NA
BVPS	0.328	-1.98	0.084
QR	0.13	-1.1	0.305
TIR	0.047	-0.59	0.576
NI	0.503	-2.84	0.022
ROIC	0.433	-2.47	0.039
DTE	0.455	2.58	0.033
OPM	0.472	-2.67	0.028
SPE	0.711	-4.44	0.002
ROA	0.458	-2.6	0.032
PTM	0.621	-3.62	0.007
CFTS	0.301	1.68	0.1
Net M	0.522	-2.96	0.018
SGATS	0.249	-1.52	0.172

NYSE Euronext

Independent variable: Freefloat

Number of observations: 8

Variable	R-squared	T-stat	P
Price	0.026	0.4	0.703
Div Pay	0.092	-0.63	0.56
PER	0.062	0.51	0.635
Div Yld	0.185	-0.95	0.395
BVPS	0.035	0.43	0.688
QR	0.151	1.03	0.342
TIR	0.468	-1.63	0.203
NI	0.28	-1.53	0.178
ROIC	0.108	-0.85	0.427
DTE	0.005	-0.17	0.871
OPM	0.264	-1.47	0.192
SPE	0.118	-0.82	0.451
ROA	0.157	-1.06	0.332
PTM	0.139	-0.98	0.363
CFTS	0.061	0.62	0.556
Net M	0.184	-1.16	0.289
SGATS	0.351	1.8	0.122

Independent variable: IM

Number of observations: 7

Variable	R-squared	T-stat	P
Price	0.358	-1.83	0.117
Div Pay	0.303	1.32	0.257
PER	0.223	-1.07	0.345
Div Yld	0.505	2.02	0.113
BVPS	0.124	0.84	0.439
QR	0.168	-1.1	0.313
TIR	0.32	1.19	0.32
NI	0.215	1.28	0.247
ROIC	0.004	-0.15	0.882
DTE	0.231	1.34	0.228
OPM	0.063	0.63	0.549
SPE	0.722	3.6	0.016
ROA	0.01	0.25	0.81
PTM	0.009	0.23	0.824
CFTS	0.024	-0.38	0.716
Net M	0.064	0.64	0.545
SGATS	0.619	-3.13	0.021

Independent variable: Brokers

Number of observations: 7

Variable	R-squared	T-stat	P
Price	0.396	1.98	0.095
Div Pay	0.171	-0.91	0.415
PER	0.468	1.88	0.134
Div Yld	0.931	-7.32	0.002
BVPS	0.377	-1.74	0.143
QR	0.015	0.3	0.773
TIR	0.024	-0.27	0.803
NI	0.002	-0.1	0.923
ROIC	0.183	1.16	0.29
DTE	0.289	-1.56	0.169
OPM	0.03	0.43	0.68
SPE	0.658	-3.1	0.027
ROA	0.084	0.74	0.487
PTM	0.078	0.71	0.502
CFTS	0	-0.05	0.962
Net M	0.017	0.32	0.758
SGATS	0.168	1.1	0.313

Independent variable: Strategic

Number of observations: 7

Variable	R-squared	T-stat	P
Price	0.091	0.78	0.468
Div Pay	0.209	-1.03	0.363
PER	0.43	1.74	0.158
Div Yld	0.625	-2.58	0.061
BVPS	0.558	-2.51	0.54
QR	0.02	0.35	0.739
TIR	0.158	-0.75	0.508
NI	0.005	-0.18	0.864
ROIC	0.096	0.8	0.455
DTE	0.277	-1.52	0.18
OPM	0.159	1.07	0.328
SPE	0.394	-1.8	0.132
ROA	0.03	0.43	0.684
PTM	0.018	0.33	0.754
CFTS	0.086	-0.75	0.482
Net M	0.001	0.08	0.94
SGATS	0.063	0.64	0.548

Deutsche Boerse

Independent variable: Freefloat

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.558	-3.18	0.013
Div Pay	0.211	-1.46	0.182
PER	0.214	-1.47	0.179
Div Yld	0.009	-0.27	0.791
BVPS	0.258	-1.67	0.134
QR	0	0.07	0.943
TIR	0.056	-0.69	0.511
NI	0.299	-1.85	0.102
ROIC	0.113	-1.01	0.341
DTE	0.08	-0.84	0.427
OPM	0.414	-2.38	0.045
SPE	0.655	-3.9	0.0046
ROA	0.338	2.02	0.078
PTM	0.031	-0.51	0.627
CFTS	0.015	-0.35	0.732
Net M	0.099	-0.94	0.376
SGATS	0.652	3.87	0.0047

Independent variable: IM

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.544	3.09	0.015
Div Pay	0.199	1.41	0.196
PER	0.225	1.52	0.166
Div Yld	0.005	0.2	0.846
BVPS	0.235	1.57	0.156
QR	0	-0.06	0.954
TIR	0.058	0.7	0.505
NI	0.277	1.75	0.118
ROIC	0.111	1	0.348
DTE	0.065	0.74	0.478
OPM	0.39	2.26	0.054
SPE	0.63	3.69	0.006
ROA	0.313	-1.91	0.093
PTM	0.026	0.46	0.654
CFTS	0.013	0.32	0.758
Net M	0.086	0.87	0.41
SGATS	0.636	-3.74	0.0057

Independent variable: Brokers

Number of observations:

Variable	R-squared	T-stat	P
Price	NA	NA	NA
Div Pay	NA	NA	NA
PER	NA	NA	NA
Div Yld	NA	NA	NA
BVPS	NA	NA	NA
QR	NA	NA	NA
TIR	NA	NA	NA
NI	NA	NA	NA
ROIC	NA	NA	NA
DTE	NA	NA	NA
OPM	NA	NA	NA
SPE	NA	NA	NA
ROA	NA	NA	NA
PTM	NA	NA	NA
CFTS	NA	NA	NA
Net M	NA	NA	NA
SGATS	NA	NA	NA

Independent variable: Strategic

Number of observations:

Variable	R-squared	T-stat	P
Price	NA	NA	NA
Div Pay	NA	NA	NA
PER	NA	NA	NA
Div Yld	NA	NA	NA
BVPS	NA	NA	NA
QR	NA	NA	NA
TIR	NA	NA	NA
NI	NA	NA	NA
ROIC	NA	NA	NA
DTE	NA	NA	NA
OPM	NA	NA	NA
SPE	NA	NA	NA
ROA	NA	NA	NA
PTM	NA	NA	NA
CFTS	NA	NA	NA
Net M	NA	NA	NA
SGATS	NA	NA	NA

CME Group

Independent variable: Freefloat

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.496	-2.81	0.023
Div Pay	0.053	-0.67	0.522
PER	0.157	-1.22	0.257
Div Yld	0.21	-1.46	0.183
BVPS	0.31	-1.9	0.094
QR	0.075	-0.8	0.445
TIR	0.148	1.1	0.306
NI	0.343	-2.04	0.075
ROIC	0	-0.02	0.984
DTE	0.399	2.31	0.0501
OPM	0.88	-7.64	0.0001
SPE	0.474	-2.51	0.04
ROA	0.12	-1.04	0.327
PTM	0.879	-7.61	0.0001
CFTS	0.754	-4.95	0.0011
Net M	0.478	-2.7	0.027
SGATS	0.731	4.66	0.0016

Independent variable: IM

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.533	3.02	0.017
Div Pay	0.048	0.63	0.545
PER	0.221	1.5	0.171
Div Yld	0.157	1.22	0.257
BVPS	0.243	1.6	0.148
QR	0.107	0.98	0.355
TIR	0.092	-0.84	0.427
NI	0.263	1.69	0.13
ROIC	0.004	0.18	0.865
DTE	0.334	-2	0.08
OPM	0.845	6.61	0.0002
SPE	0.357	1.97	0.09
ROA	0.158	1.23	0.255
PTM	0.864	7.11	0.0001
CFTS	0.758	5.01	0.001
Net M	0.424	2.42	0.042
SGATS	0.673	-4.06	0.004

Independent variable: Brokers

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0.279	1.76	0.116
Div Pay	0.541	3.07	0.015
PER	0.022	0.43	0.681
Div Yld	0.366	2.15	0.064
BVPS	0.487	2.76	0.025
QR	0.027	-0.47	0.652
TIR	0.416	-2.23	0.061
NI	0.248	1.62	0.143
ROIC	0.156	-1.22	0.259
DTE	0.577	-3.3	0.011
OPM	0.751	4.91	0.0012
SPE	NA	NA	NA
ROA	0.001	-0.08	0.938
PTM	0.458	2.6	0.032
CFTS	0.571	3.26	0.011
Net M	0.168	1.27	0.239
SGATS	0.713	-4.45	0.002

Independent variable: Strategic

Number of observations: 9

Variable	R-squared	T-stat	P
Price	0	0.05	0.962
Div Pay	0.001	-0.1	0.925
PER	0.191	-1.37	0.207
Div Yld	0.359	2.12	0.067
BVPS	0.41	2.36	0.046
QR	0.047	-0.63	0.548
TIR	0.192	-1.29	0.238
NI	0.67	4.03	0.004
ROIC	0.089	-0.88	0.403
DTE	0.325	-1.96	0.086
OPM	0.187	1.36	0.212
SPE	0.396	2.14	0.069
ROA	0.037	-0.55	0.594
PTM	0.173	1.29	0.232
CFTS	0.063	0.74	0.483
Net M	0.411	2.36	0.046
SGATS	0.273	-1.73	0.122

ICE

Independent variable: Freefloat

Number of observations: 6

Variable	R-squared	T-stat	P
Price	0.52	-2.33	0.067
Div Pay	NA	NA	NA
PER	0.913	-7.23	0.0008
Div Yld	NA	NA	NA
BVPS	0.409	-1.86	0.122
QR	0.216	1.17	0.293
TIR	0.006	0.16	0.883
NI	0.579	-2.62	0.047
ROIC	0.506	-2.26	0.073
DTE	0.349	-1.64	0.162
OPM	0.485	-2.17	0.082
SPE	0.679	-3.25	0.023
ROA	0.19	-1.08	0.328
PTM	0.583	-2.64	0.046
CFTS	0.335	-1.59	0.173
Net M	0.936	-8.57	0.0004
SGATS	0	-0.02	0.988

Independent variable: IM

Number of observations: 6

Variable	R-squared	T-stat	P
Price	0.41	1.87	0.121
Div Pay	NA	NA	NA
PER	0.693	3.36	0.02
Div Yld	NA	NA	NA
BVPS	0.688	3.32	0.021
QR	0.486	-2.17	0.082
TIR	0.748	-3.45	0.026
NI	0.789	4.33	0.008
ROIC	0.211	1.15	0.3
DTE	0.6	2.74	0.041
OPM	0.254	1.3	0.249
SPE	0.475	2.13	0.087
ROA	0.018	0.3	0.774
PTM	0.302	1.47	0.201
CFTS	0.567	2.56	0.051
Net M	0.723	3.61	0.015
SGATS	0.026	0.36	0.731

Independent variable: Brokers

Number of observations: 6

Variable	R-squared	T-stat	P
Price	0.347	-1.63	0.164
Div Pay	NA	NA	NA
PER	0.372	-1.72	0.146
Div Yld	NA	NA	NA
BVPS	0.76	-3.98	0.011
QR	0.869	5.77	0.002
TIR	0.723	3.23	0.032
NI	0.708	-3.48	0.018
ROIC	0.008	-0.2	0.848
DTE	0.738	-3.76	0.013
OPM	0.053	-0.53	0.618
SPE	0.115	-0.81	0.456
ROA	0.055	0.54	0.613
PTM	0.058	-0.56	0.602
CFTS	0.529	-2.37	0.064
Net M	0.348	-1.63	0.163
SGATS	0.038	-0.45	0.675

Independent variable: Strategic

Number of observations: 6

Variable	R-squared	T-stat	P
Price	0.348	1.63	0.163
Div Pay	NA	NA	NA
PER	0.491	2.2	0.08
Div Yld	NA	NA	NA
BVPS	0.113	-0.8	0.461
QR	0.157	0.97	0.379
TIR	0.776	3.72	0.02
NI	0.018	-0.3	0.775
ROIC	0.837	5.07	0.004
DTE	0.088	-0.7	0.518
OPM	0.608	2.78	0.039
SPE	0.318	1.53	0.188
ROA	0.918	7.48	0.0007
PTM	0.734	3.72	0.014
CFTS	0.135	-0.88	0.418
Net M	0.425	1.92	0.112
SGATS	0.266	-1.35	0.236

Appendix V

The following data, underlying the quantitative section of Part V of the dissertation, are derived from the main database presented in Appendix I. The quantitative approach adopted in Part V (mean comparisons and difference-in-differences) required two dummy variables. Diversified (Div): Div = 1 for diversified companies that operate cash equities and derivatives exchanges; Div = 0 for specialized equity-only exchanges. After Mifid (AM): AM = 1 in the four years (2008 to 2011) after the implementation of Mifid and Reg NMS; AM = 0 in the four years before (2004 to 2007).

This approach also required that the two periods under study be of equal length. Because four years of data were available for the post-Mifid period, pre-Mifid data were also limited to four years. Data for the years pre-2004 were thus left out.

Significant results are highlighted in grey, and are reproduced and analyzed in Part V. Variables that show significant results in both samples (Diversified and Pure Players) are then used for the difference-in-differences approach in the following table.

Data trimmed for mean comparisons – measures of financial performance

Year	Entity Name	Price	Div Pay	PER	Div Yld	BVPS	QR	TIR	NI	ROIC	PTB	DTE
2011	Deutsche Boerse	54.54	46.03	9.44	5.33	20.91	1	-10.39	1101.86	6.31	2.68	529.11
2010	Deutsche Boerse	69.72	93.47	23.02	4.05	21.29	1	-6.94	560.49	4.15	3.26	315.01
2009	Deutsche Boerse	83.1	78.65	21.69	3.63	22.12	1	18.15	711.76	4.86	3.76	308.28
2008	Deutsche Boerse	70.62	39	9.37	4.13	19.86	1	-60.81	1436.38	9.34	3.56	362.82
2007	Deutsche Boerse	197.37	36.17	28.72	1.56	18.11	0.99	96.24	1332.9	8.79	10.9	462.17
2006	Deutsche Boerse	92.13	31.46	20.76	2.43	7.63	1.02	65.62	881.77	8.74	6.04	290.66
2005	Deutsche Boerse	50.97	17.34	21.6	2.43	6.37	1.03	100.05	504.15	6.33	4	237.18
2004	Deutsche Boerse	30.07	23.07	18.59	1.58	7.74	1.2	3.33	361.68	4.15	1.94	184.4
2011	London Stock Exch	12.36	43.93	14.76	3.22	6.17	0.05	32.78	243.01	17.78	2.16	48.13
2010	London Stock Exch	13.12	72.12	21.02	3.43	5.19	0.06	29.96	137.13	25.34	2.08	65.38
2009	London Stock Exch	11.59	#N/A	-4.48	4.31	5.07	0.11	-51.17	-484.47	-16.32	1.6	65.05
2008	London Stock Exch	7.33	26.47	16.53	1.99	8.44	0.11	-1.6	345.43	20.1	2.85	58.34
2007	London Stock Exch	39.39	30.29	24.79	1.44	-5.6	0.3	20.25	214.96	68.32	NA	-71.06
2006	London Stock Exch	25.64	32.25	37.99	1.14	1.94	3.14	135.37	122.63	26.92	9.42	0.38
2005	London Stock Exch	10.64	#N/A	19.64	1.54	1.86	1.97	12.68	117.53	20.33	4.61	1.32
2004	London Stock Exch	11.17	20.25	16.15	1.37	3.07	3.13	46.54	117.07	19.06	2.85	1.34
2011	NYSE Euronext	26.1	50.57	11.06	4.6	25.5	0.78	-8.94	619	7.64	1.02	31.53
2010	NYSE Euronext	29.98	54.25	13.63	4	26.04	0.62	23.24	577	6.83	1.15	35.9
2009	NYSE Euronext	25.3	#N/A	30.12	4.74	26.27	0.54	-3.21	219	3.07	0.96	40.49
2008	NYSE Euronext	27.38	#N/A	-9.85	4.38	25.31	0.68	-67.44	-738	-5.84	1.08	47.85
2007	NYSE Euronext	87.77	30.95	32.51	0.85	35.41	0.61	-8.93	643	10.39	2.48	28.91
2006	NYSE Euronext	97.2	47.03	71.47	0	10.73	1.58	#N/A	204.98	13.35	9.06	0
2005	NYSE Euronext	50	0	#N/A	#N/A	8.78	1.29	#N/A	89.99	8.17	NA	0
2004	NYSE Euronext	20.97	0	#N/A	#N/A	#N/A	2.34	#N/A	30.16	3.87	NA	0
2011	The Nasdaq OMX	24.51	0	11.4	0	28.15	0.45	3.29	387	6.56	0.87	42.54
2010	The Nasdaq OMX	23.73	0	12.36	0	26.82	0.6	19.73	394	6.53	0.88	49.19
2009	The Nasdaq OMX	19.82	0	15.86	0	23.14	1.16	-19.79	268	4.81	0.86	42.46
2008	The Nasdaq OMX	24.71	0	15.64	0	20.4	1.04	-50.07	319.88	8.26	1.21	59.38
2007	The Nasdaq OMX	49.49	0	14.3	0	15.9	3.83	60.73	518.4	21.4	3.11	5.36
2006	The Nasdaq OMX	30.79	0	32.41	0	12.58	4.74	-12.48	137.34	8.49	2.45	103.18
2005	The Nasdaq OMX	35.18	0	61.72	0	1.9	1.7	244.9	63.92	8.02	18.51	754.75
2004	The Nasdaq OMX	10.2	0	340	0	0.33	1.78	7.94	2.08	3.3	30.4	1002.69

Data trimmed for mean comparisons – measures of operating performance and dummy variables

Year	Entity Name	OPM	SPE	ROA	PTM	CFTS	GPM	Net M	SGATS	Brokers	IM	Strategic	Total	Freefloat	AM	Div
2011	Deutsche Boerse	45.59	808008.77	0.54	51.51	39.53	84.98	38.01	25.9		26.54	1.5	28.09	71.91	1	1
2010	Deutsche Boerse	42.86	832477.21	0.33	19.37	34.79	84.79	19.29	31.1		51.06	0	51.22	48.78	1	1
2009	Deutsche Boerse	44.16	860469.41	0.39	25.85	39.19	76.54	22.98	12.55		56.93	0	57.26	42.74	1	1
2008	Deutsche Boerse	55.55	1102203.08	1.09	54.57	41.38	82.26	38.39	10.45		56.17	0	56.34	43.66	1	1
2007	Deutsche Boerse	46.83	1076556.77	1.37	56.08	37.82	72.75	37.74	7.93		62.16	0	62.35	37.65	0	1
2006	Deutsche Boerse	47.05	891342.18	1.37	51.17	38.67	74.17	33.35	19.43		48.61	0	48.74	51.26	0	1
2005	Deutsche Boerse	38.16	704960.95	1.52	39.88	30.94	69.54	24.48	22.32		41.76	0	41.93	58.07	0	1
2004	Deutsche Boerse	26.38	636137.42	3.44	29.61	34.14	62.09	17.43	27.1		41.97	0	42.08	57.92	0	1
2011	London Stock Exch	37.64	631642.29	0.28	36.55	41.89	37.64	24.61	#N/A	0	48.82	29.01	77.92	22.08	1	0
2010	London Stock Exch	33.31	617361.99	0.68	23.56	36.76	33.31	14.93	#N/A	0	53.52	29.5	83.08	16.92	1	0
2009	London Stock Exch	43.07	847886.51	-1.04	-37.67	36.65	43.07	-50.34	#N/A	0.03	61.5	30.49	92.03	7.97	1	0
2008	London Stock Exch	48.96	897495.87	2.05	42.55	40.06	48.96	31.81	#N/A	0.05	49.52	32.54	82.08	17.92	1	0
2007	London Stock Exch	53.09	1544342.25	38.14	45.65	42.25	53.09	31.35	#N/A	0.05	63.89	32.85	96.79	3.21	0	0
2006	London Stock Exch	41.26	1007839.33	19.27	31.71	39.2	41.26	24.29	#N/A	0.04	63.54	34.56	98.1	1.9	0	0
2005	London Stock Exch	32.73	889823.2	15.03	35.76	35.43	#N/A	25.45	53.81	0	70.26	8.67	78.91	21.09	0	0
2004	London Stock Exch	34.42	834778.23	14.6	36.99	38.04	#N/A	26.87	55.67	0	65.57	10.38	75.97	24.03	0	0
2011	NYSE Euronext	21.18	1479363.02	5.54	16.12	17.44	#N/A	13.6	17.22	2.09	70	0.47	72.61	27.39	1	1
2010	NYSE Euronext	18.82	1490902.96	4.91	15.64	15.95	#N/A	13.04	17.13	3.57	66.73	0.12	70.6	29.4	1	1
2009	NYSE Euronext	16.98	1247537.93	2.21	4.33	8.94	#N/A	4.67	29.49	3.34	58.97	0.09	62.63	37.37	1	1
2008	NYSE Euronext	25.01	1251796.65	-4.34	-13.74	18.78	#N/A	-15.69	26.94	5.05	52.95	0.35	58.46	41.54	1	1
2007	NYSE Euronext	8.15	1134284.79	7.52	26.05	23.11	#N/A	18.39	37.29	9.9	51.14	0.48	61.7	38.3	0	1
2006	NYSE Euronext	16.91	660501.55	6.89	19.5	21.92	#N/A	12.04	45.85	10.38	48.81	0.93	60.29	39.71	0	1
2005	NYSE Euronext	22.94	844052.66	3.96	10.53	8.8	#N/A	5.4	41.88	17.24	51.45	2.96	71.65	28.35	0	1
2004	NYSE Euronext	4.31	#N/A	1.76	4.31	12.33	#N/A	2.77	55.71	2.75	53.91	0	56.68	43.32	0	1
2011	The Nasdaq OMX	22.25	1413070.28	3.15	16.61	17.13	45.99	11.26	23.73	1.33	74.89	17.1	86.4	13.6	1	0
2010	The Nasdaq OMX	21.11	1334864.3	3.54	16.39	17.55	31.37	12.32	10.26	1.85	63.84	15.47	81.26	18.74	1	0
2009	The Nasdaq OMX	18.36	1538357.4	2.98	14.61	15.66	39.57	7.8	13.96	1.95	64.7	28.83	95.58	4.42	1	0
2008	The Nasdaq OMX	18.24	1455402.07	5.03	13.6	11.28	37.48	8.77	13.2	3.21	65.11	30.41	98.74	1.26	1	0
2007	The Nasdaq OMX	16.53	2734671.16	17.31	32.58	4.54	31.74	21.28	10.11	4.21	94.13	0.15	98.49	1.51	0	0
2006	The Nasdaq OMX	16.42	1846075.72	6.76	12.8	10.69	38.75	7.72	13.95	5.29	90.21	0.14	95.74	4.26	0	0
2005	The Nasdaq OMX	14.28	959562.7	5.59	12.05	16.64	52.17	7.01	19.5	7.17	64.62	19	90.78	9.22	0	0
2004	The Nasdaq OMX	10.47	689338.01	1.81	0.47	24.29	49.87	1.21	2.96	0.04	17.25	56.16	73.46	26.54	0	0

Mean comparisons
 (Mean[0] = before Mifid; Mean[1] = after Mifid)

Diversified (NYSE and Deutsche)				Pure Players (LSE and Nasdaq)							
Variable	Mean 0	Mean 1	M1-M0	T-stat	P	Variable	Mean 0	Mean 1	M1-M0	T-stat	P
Price	78.31	48.343	-29.967	-1.391	0.186	Price	26.563	17.146	-9.417	-1.63	0.126
Div Pay	23.253	60.328	37.075	3.669	0.003	Div Pay	11.827	20.36	8.533	0.696	0.5
PER	32.275	13.56	-18.715	-2.191	0.049	PER	68.375	12.886	-55.489	-1.413	0.18
Div Yld	1.475	4.358	2.883	7.33	0	Div Yld	0.686	1.619	0.933	1.329	0.205
BVPS	13.539	23.413	9.874	2.604	0.022	BVPS	3.998	15.423	11.425	2.629	0.02
QR	1.258	0.828	-0.43	-2.196	0.046	QR	2.574	0.448	-2.126	-4.075	0.0011
TIR	51.262	-14.543	-65.805	-2.838	0.016	TIR	64.491	-4.609	-69.1	-2.122	0.049
NI	506.08	560.94	54.86	0.199	0.845	NI	162	201.25	39.509	0.34	0.739
ROIC	7.974	4.545	-3.429	-1.725	0.107	ROIC	21.98	9.133	-12.847	-1.511	0.153
PTB	5.737	2.184	-3.553	-2.601	0.023	PTB	10.193	1.564	-8.629	-2.31	0.038
DTE	150.415	208.874	58.459	0.637	0.534	DTE	224.745	53.809	-170.936	-1.174	0.26
OPM	26.341	33.769	7.428	0.946	0.36	OPM	27.4	30.368	2.968	0.432	0.672
SPE	849691	1134095	284404	2.239	0.043	SPE	1313304	1092010	-221294	-0.789	0.443
ROA	3.479	1.334	-2.145	-1.531	0.148	ROA	14.814	2.084	-12.73	-3.146	0.007
PTM	29.641	21.706	-7.935	-0.766	0.456	PTM	26.001	15.775	-10.226	-1.007	0.331
CFTS	25.966	27	1.034	0.17	0.868	CFTS	26.385	27	0.738	0.108	0.915
GPM	NA	NA	NA	NA	NA	GPM	44.48	39.674	-4.806	-1.234	0.241
Net M	18.95	16.786	-2.164	-0.283	0.781	Net M	18.148	7.645	-10.503	-1.091	0.294
SGATS	32.189	21.348	-10.841	-1.738	0.104	SGATS	26	15.288	-10.712	-0.899	0.395
Sales	2283	3876	1593	3.767	0.002	Sales	950	2206	1256	2.378	0.032

Difference in differences
(DiD = Pure Players [M1-M0] - Diversified [M1-M0])

Group	Variable	Mean 0	Mean 1	M1-M0	DiD
Pure Players	BVPS	3.998	15.423	11.425	
	QR	2.574	0.448	-2.126	
	TIR	64.491	-4.609	-69.1	
	PTB	10.193	1.564	-8.629	
	Sales	950	2206	1256	
Diversified	BVPS	13.539	23.413	9.874	1.551
	QR	1.258	0.828	-0.43	-1.696
	TIR	51.262	-14.543	-65.805	-3.295
	PTB	5.737	2.184	-3.553	-5.076
	Sales	2283	3876	1593	-337

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Abstract

This dissertation consists of three articles, examining the performance of demutualized securities exchanges from 2000 to 2011, in view of changes in governance and regulation. The first part is an empirical study of the influence of each type of shareholder (financial investor, broker, strategic or widely-held shares). The results show that fragmented ownership is correlated with lower performance and investment managers' presence with higher performance; strategic investors are on balance detrimental to shareholder value. The second article looks at the same exchanges individually, through case studies. The findings of the first article are validated. However, a closer look at strategic investors shows three outcomes: when they consist of founders, they increase shareholder value; when they are employed managers, they decrease it; and when the strategic investor is a competitor, the target company's performance becomes more volatile. The third article looks at the combination of technology and regulation. Through mean comparisons and a difference-in-differences approach, this section shows that recent market deregulation has allowed high-tech start-ups to challenge the dominance of the established exchanges, just like previous coincidences of regulatory and technological change resulted in significant market upheavals: the disappearance of London's jobbers following Big Bang and the Eurocurrency market displacing New York as a major center for dollar borrowing and lending. This dissertation introduces two new concepts: "quasi-agent principals" (shareholders who destroy value in their investment as a result of their conflicts of interest) and the "adjuvant effect" (when the combined effect of regulation and technology is a multiple of the effects of each).

Résumé

Cette thèse, sous forme de trois articles, tente d'expliquer le déclin des bourses organisées au profit de nouvelles plateformes de transaction, à la lumière des récents changements de gouvernance et réglementaires. Les deux premiers articles évaluent l'influence de quatre types d'actionnariat (flottant, courtiers, investisseurs financiers et actionnaires stratégiques) sur la performance de l'entreprise. Il existe une corrélation positive de la performance avec l'actionnariat institutionnel, et négative avec le flottant et avec les investisseurs stratégiques. Le deuxième article – six études de cas – valide ces résultats. L'analyse plus détaillée des actionnaires stratégiques montre que ceux-ci créent de la valeur quand ils sont fondateurs; la détruisent quand ils sont des dirigeants salariés; et augmentent la volatilité des performances de l'entreprise dans les cas de prise de contrôle avortée par un concurrent. Le troisième article analyse l'effet conjugué des changements réglementaires et technologiques. A travers une approche par comparaisons de moyennes, il apparait que les marchés exposés à la déréglementation souffrent plus de la concurrence des plateformes électroniques que les autres bourses. Cette thèse introduit deux nouveaux concepts: le « principal quasi-agent » (un actionnaire qui réduit la valeur de son investissement en raison de ses conflits d'intérêt) et l' « effet adjuvant » (ou comment la réglementation démultiplie les effets concurrentiels permis par les avancées technologiques).