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Three Essays on Mergers and Acquisitions and Bank Stability

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pour le grade de

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et de la Société**

présentée par

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Centre de Recherche en Economie et Management
IGR-IAE de Rennes

**Three Essays on
Mergers and
Acquisitions and
Bank Stability**

**Thèse soutenue à Rennes
le 29 Avril 2016**

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“But the question really is: What’s coming next? Where are we going? What are the interesting things in future?”

Robert F. Engle, III

RÉSUMÉ DE THÈSE

La crise financière de 2007-2008 a mis l'ensemble du système économique mondial dans une situation de stagnation pendant un court laps de temps. Si la survenance de cette catastrophe ne fût prévue ni par les chercheurs, ni par les décideurs politiques, l'ampleur de la perte sans précédent qui en a résulté a soulevé de sérieuses questions concernant la stabilité du secteur financier, en particulier dans les grandes institutions financières. La stabilité financière du système bancaire est essentielle, car un système bancaire instable peut avoir de graves conséquences sur l'économie globale. En Europe et aux États-Unis, plusieurs banques ont été témoin d'une évaporation significative d'environ 82 % (4.5 trillions des dollars américains) de leur capitalisation boursière entre 2007 et 2009. Nous avons aussi remarqué une série de plans des sauvetages pour protéger un certain nombre de banques en Europe et aux États-Unis. Les gouvernements et des agences monétaires ont à travers le monde pris plusieurs mesures pour limiter les implications de risque systémiques particulièrement associées à l'échec des institutions financières de grandes tailles. Par exemple, en 2010, le gouvernement américain a établi le Financial Stability Oversight Council conformément à l'acte de Dodd-Frank, tandis que la Commission européenne a établi European Systemic Risk Board (ESRB) en vue de surveiller le risque systémique. Les répercussions de cette crise bancaire sur l'économie globale a conduit à une diminution de PIB annuel de 15-20% en moyenne (Hoggarth et al., 2002) et les pertes subies pendant la Grande Récession de 2007-2008 ont atteint un record historique de 25 % de PIB (Laeven et Valence, 2010).

Si la survenance de cet événement majeur fût imprévue, le monde académique et financier a développé depuis de nombreux travaux pour analyser les causes, les conséquences et les mesures de redressement nécessaires afin d'éviter qu'un tel désastre ne se reproduise dans les temps futurs. Ce travail tente de participer à cet élan en étudiant plus particulièrement les activités de fusions-acquisitions (F&A) des banques au cours des deux dernières décennies et ses conséquences éventuelles avec la stabilité bancaire.

Depuis près de 30 ans, le secteur bancaire aux États-Unis et en Europe a enregistré une augmentation significative des activités de fusions-acquisitions dans le secteur bancaire. Ce processus de consolidation est principalement dû à la déréglementation de l'industrie, aux progrès

technologiques et à l'adoption de l'euro en l'Europe (Groupe des Dix, 2001; De Young et al., 2009). Cependant, cette consolidation s'est accompagnée d'effets collatéraux liés à la concentration, à l'opacité et à l'apparition d'institutions bancaires gigantesques et structurellement plus complexes qu'avant la crise financière. Plus particulièrement, les grandes banques, qui sont perçues comme "too big to fail" par le marché, ont tendance à exploiter certains filets de sécurité via des subventions (Mishkin, 2006). Au cours de ce travail doctoral, en tenant compte de plusieurs implications potentielles de l'activité F&A des banques, nous essayons d'examiner les relations entre ces mouvements de concentration et l'évolution de la stabilité bancaire.

Cependant, avant d'aborder les effets des F&A qui ont conduit à la consolidation, il est important de comprendre la notion de «stabilité financière». Initialement, Crockett (1997) définit la stabilité financière comme une absence «d'instabilité financière» proprement dite. Sous l'instabilité financière, la performance économique est compromise en raison de variations significatives des prix des actifs financiers ou de l'incapacité des institutions financières à s'acquitter de leurs obligations contractuelles. Il est à noter que même l'absence de crise financière ne signifie pas nécessairement que le système bancaire n'est pas fragile. En effet, les banques sont intrinsèquement fragiles pour plusieurs raisons. Tout d'abord, l'instabilité peut provenir d'un risque psychologique collégial bien connu, du fait que les banques continueront leurs activités à risque en raison de capacités limitées de surveillance des créanciers et des régulateurs (Stiglitz et Weiss, 1981). En second lieu, la hausse des taux de prêt peut inciter les banques à s'engager sur des créances douteuses (Boyd et De Nicolò, 2005) et créatrices de fragilité et d'instabilité. En outre, les banques peuvent également être motivées par la prise de risques excessifs en raison du concept de «too big to fail » (John et al., 1991). Enfin, une perte de confiance générale, en raison de l'asymétrie de l'information et du besoin d'être encadré, peut inciter les clients à s'éloigner de ces banques risquées (Diamond et Dybvig, 1983). Dans un système bancaire intégré, la présence d'une ou plusieurs des raisons mentionnées ci-dessus peut engendrer rapidement une instabilité financière (Acharya et al., 2009).

Depuis deux décennies, le secteur bancaire traverse une phase importante d'activité de fusions et acquisitions qui a provoqué une forte concentration, en particulier dans la partie développée de l'économie globale. Les marchés américain et européen ont été les gros

contributeurs à ce phénomène par le fait qu'ils couvrent presque 60% de toute activité F&A confondue (Source: Thomson Reuters' SDC Platinum M&A Database). Cela s'est traduit par une réduction importante du nombre des banques, pendant que le montant des actifs du secteur industriel augmentait de manière impressionnante. A titre d'exemple, l'industrie bancaire américaine affichait une baisse de 44% des institutions financières (banques commerciales, les caisses d'épargne et de crédit), tandis que l'actif global de l'industrie augmentait de plus de 170% au cours de la période de 1990 à 2006 (source: FDIC Statistical Database). De même, en Europe, le nombre d'institutions de crédit des 27 pays de l'UE était réduit d'environ 40% pendant cette période (source: ECB Consolidated Banking Data, 2011). La croissance de l'actif global de l'industrie bancaire a mené la croissance illustrée par le PIB des pays européens pendant cette période. Par exemple, en 2006, l'actif global des quatre plus grandes banques en Europe a dépassé le PIB cumulé des trois principaux membres de l'Union européenne : la France, l'Allemagne et le Royaume-Uni. En outre, pendant cette période, les deux marchés ont également connu des méga-fusions entre des institutions financières dont, entre autres, la fusion de Bank of America avec Nations Bank Corp. (US\$ 76 billions), Northwest Corporation avec Wells Fargo Bank (US\$ 42 billions) dans le secteur bancaire américain. En Europe, des transactions très importantes concernaient la fusion de Natwest avec RBS (38.4 billions USD) au Royaume Uni et Banca Intesa d'Italie avec San Paolo IMI (37.6 billions USD). La crise financière récente a ainsi ouvert plusieurs dimensions de recherches dans le cadre de la stabilité financière dans le secteur bancaire.

Au cours de cette thèse, nous nous centrons sur une littérature qui se focalise essentiellement sur l'activité F&A bancaire et sur les implications de cette activité F&A sur la stabilité bancaire.

Un important corpus théorique existe déjà sur ce thème concernant les entreprises non bancaires avec des avis très contrastés sur les conséquences des activités de F&A. L'opinion néoclassique (Harford, 2005; Ovtchinnikov, 2010, entre autres) estime que l'activité de F&A est une réponse efficace en présence de chocs, tels que des changements économiques brutaux, des réformes régulatrices profondes, et/ou des progrès technologiques. Ovtchinnikov (2010) attribue les vagues de fusion à la déréglementation de l'industrie. Jones et Critchfield (2008) estiment que la déréglementation est un facteur de facilitation important pour l'essor sans précédent de l'activité F&A dans le secteur bancaire depuis les deux dernières décennies. Jeon et Miller (2007)

démontrent l'impact positif de la déréglementation sur un nombre moyen de F&A dans l'industrie bancaire américaine pour la période 1978-2004. Les stratégies de F&A, adoptées par les banques en présence de tels changements, ont accéléré le processus de la consolidation dans le secteur bancaire (Berger et al., 1999). Kroszner et Strahan (2013) mettent en évidence la fragilité bancaire associée au processus de déréglementation aux États-Unis car il aboutit selon l'auteur à un secteur bancaire plus opaque et plus interconnecté. L'activité de F&A peut engendrer en effet des implications éventuelles sur la stabilité bancaire au niveau individuel ainsi qu'au niveau global.

La littérature existante met en avant des arguments théoriques et des preuves empiriques qui mettent en évidence les implications positives et négatives de l'activité de F&A sur la stabilité bancaire.

Il est possible que les F&A donnent lieu à un système bancaire stable de par l'efficacité accrue et une meilleure diversification des risques (Berger et al., 1999; Amel et al., 2004). L'activité de F&A des banques en dehors de leur cœur de métier et/ou sur plusieurs zones géographiques peut déboucher sur la diversification de leur portefeuille prêts-actifs et une réduction des risques. L'étude théorique de Wagner (2010) soutient que les risques sont réduits dans les institutions financières au niveau individuel par la diversification. Un certain nombre d'études empiriques à ce sujet ont pu retracer les effets de la diversification dans les banques. Par exemple, Emmons et al. (2004) préconisent une réduction des risques par la diversification dans les banques communautaires aux États-Unis. Cet effet est plus prononcé dans le cas de diversification de produits que dans celui de diversification géographique. Hughes et al. (1999) découvrent un faible risque d'insolvabilité et une efficacité élevée pour les grandes banques américaines qui se sont développées au niveau interétatique (diversification géographique). La diversification des risques macro-économique y joue en particulier un rôle majeur. Hughes et al. (2001) font le lien entre une meilleure diversification et des économies d'échelle, tandis que la prise de risque accrue et inefficace est le résultat des économies de plus petite échelle. Dans le cas de l'Europe, Chionsini et al. (2003) apportent des preuves de la diversification du risque de crédit dans les banques italiennes à partir d'un échantillon de F&A sur la période 1997–2001.

Plusieurs études se focalisent sur les gains d'efficacité via les F&A. Généralement, la présence d'économies d'échelle et de champ mène à une réduction du coût moyen de production pour une banque grâce à sa plus grande taille ou au nombre de services offerts. On considère que les banques qui fonctionnent à grande échelle disposent d'un avantage compétitif par rapport aux petites banques en adoptant par exemple des nouvelles technologies plus rapidement et à moindre coût. Ainsi, elles peuvent offrir des produits et des services innovants, et amortir, dans le même temps, les coûts considérables de mis en place (coûts fixes) sur des opérations de grande envergure. En ce qui concerne les économies de champ, la présence des complémentarités de coût telles que l'usage commun des intrants pour plusieurs produits/services peut réduire le coût moyen de production de ces produits ou de mis en place des services. Berger et Mester (1997) et Hughes et al. (2001) trouvent des économies d'échelle pour les banques qui ont un actif de plus de \$25 billions. Une étude récente de Wheelock et Wilson (2012) fournit également une preuve des économies d'échelle dans les banques américaines sur une période de 1984 à 2006. De même, Cavallo et Rossi (2001) trouvent des économies d'échelle considérables dans presque toutes les catégories d'actifs des banques en Europe en se référant aux données de panel de 442 banques en six pays européens sur la période de 1992–1997. Berger et al. (1993) mettent en évidence des économies de champ en utilisant des données de 1984 à 1989 pour les banques américaines. En utilisant les données de 17 pays européens, Vander et Vennet (2002) constatent des résultats similaires pour les conglomérats financiers.

Deux autres facteurs, étroitement liés au contexte des F&A, sont l'X-efficacité et productivité. X-efficacité fait référence au taux de productivité d'une banque quand elle convertit ses intrants en extrants vis-à-vis des entreprises de meilleures pratiques qui produisent les mêmes extrants, bien que la productivité signale une combinaison de changements qui apparaît à la frontière des banques ayant de meilleures pratiques (c-à-d., les banques qui fonctionnent à frontière efficace) et en X-inefficacité. Berger (1998) trouve de modestes améliorations en X-efficacité du coût par rapport aux F&A dans les grandes banques américaines. Altunbas et al. (2001), et Cavallo et Rossi (2001) retrouvent des X-inefficacités considérables sur des échantillons relativement grands des banques européennes. Du point de vue de la productivité, Berger et Mester (2003) trouvent qu'il y a eu une forte amélioration dans la productivité des bénéfices des banques américaines mais une détérioration en termes de productivité des coûts sur la période 1991–1997.

Contrairement aux aspects positifs, l'activité de F&A peut également exposer les banques à une instabilité à plusieurs niveaux (Hughes et al., 2001; De Nicoló et Kwast, 2002). Les implications sur le risque lié aux F&A remontent à l'origine des avantages régulateurs (Vallascas et Hagendorff, 2011) ainsi qu'au phénomène de « too big to fail » associé aux fusions (Boyd et Graham, 1991). Des facteurs tels que l'accroissement de la taille des banques, la complexité des structures suite aux F&A ou le risque moral lié au statut « too big to fail » font en sorte qu'elles sont sujettes à une certaine fragilité (Groupe des Dix, 2001; Amel et al., 2004). Il se peut qu'une activité de F&A effrénée des banques, à la fois dans le secteur bancaire et en dehors, mène à la création de grandes institutions financières de structure complexe, qui sont considérées être « too big to fail ». Boyd et Graham (1991), et John et al. (1991) prétendent que les banques ne poursuivent des stratégies de F&A qu'afin de devenir « too big to fail » en présence des plans américains d'assurance dépôt. Le soutien gouvernemental sous forme d'assurance dépôt et de sauvetages financiers génère en effet un problème de risque moral lié au fait que la survie des banques dépend de moins en moins de leur niveau de risque. Ainsi, de grandes banques peuvent continuer à prendre part à des activités risquées tandis qu'elles exploitent au maximum les subventions liées au soutien gouvernemental pendant les périodes de détresse et de crise financière. (De Nicoló et al., 2004; Stiglitz, 2010). En outre, la probabilité qu'une firme « too big to fail » reçoive un soutien financier peut avoir un impact considérablement positif sur l'évaluation du crédit des banques (Soussa, 2000 ; Rime 2005). Gropp et al. (2011) documentent les effets compétitifs des politiques de sauvetage financier du gouvernement sur les banques hors mesures de protection, et constatent que la perception du sauvetage financier augmente fortement la prise de risque des banques concurrentes. Des travaux récents au sujet des fusions-acquisitions en banque y compris, entre autres, Hagendorff et al. (2012), Molyneux et al. (2014), et Carbo-Valverde et al. (2008) étayent empiriquement l'argument relatif à l'exploitation implicite des avantages des mesures de protection associés aux « too big to fail ». Ainsi, Hagendorff et al. (2012) trouvent qu'il y a un impact significatif des régimes assurance de dépôt et de régulation pour les fusions nationales. En revanche, Carbo-Valverde et al. (2008) trouvent que les banques qui sont plus actives en F&A transfrontalières soutirent plus d'avantages des mesures de protection mais ne démontrent aucune amélioration en termes d'efficacité. En effet, il se peut que le déplacement géographique des opérations bancaires leur permette de transférer une partie de leur risque mal surveillé à d'autres pays. Molyneux et al. (2014) y trouvent une corrélation

positive entre des primes de fusion payées et la probabilité de devenir « too big to fail » pour les banques européennes. Cependant, ils ne trouvent pas de preuves concrètes concernant d'éventuels effets sur le risque systémique.

Le fait que les banques essaient de diversifier leurs gammes de produits peut également être une source de fragilité car il se peut que la récolte de tels avantages de diversification soit au-dessous des attentes ou contrebalancée par un taux de risque encore plus élevé au niveau individuel et/ou systémique (voir, par exemple, De Nicoló et al., 2004; Wagner, 2008; Vallascas and Hagendorff, 2011, entre autres). Par conséquent, la consolidation et des F&A ne mènent pas forcément à un système financier sûr. Un aspect important du débat sur la crise financière récente est lié aux conglomérats financiers et au modèle bancaire universel, avec une critique particulière du fait que les banques se concentrent de plus en plus sur les services bancaires d'investissement (De Jonghe, 2010). Les critiques énoncent que la diversification au sein du secteur financier pourrait mener à des similarités stratégiques dans les banques de grande taille, ce qui pourrait, à son tour, amplifier la probabilité du risque systémique. Selon Stiglitz (2010), la fusion des banques commerciales et d'investissement provoque de sérieux conflits d'intérêts. En conséquence, de telles liaisons pourraient exposer tout le système financier à une culture de prise de risque normalement plus répandue dans les services bancaires d'investissement. De plus, en raison de la nature instable de l'activité, il est tout à fait envisageable lors d'une période de crise, que les banques s'aperçoivent d'une baisse de revenu généré par des services bancaires d'investissement beaucoup plus forte que sur le revenu créé à partir des dépôts traditionnels. Wagner (2008) montre que la tendance des banques à ne plus faire des activités traditionnelles peut générer une augmentation du risque systémique liée au fait que les banques sont alors incitées à des prises de risque excessive. Les banques sont en effet de moins en moins dépendantes des sources externes de liquidité et peuvent ainsi limiter l'accessibilité à la liquidité de leurs pairs puisque leur risque devient plus homogène.

Concernant des preuves empiriques sur les risques liés à la diversification des banques Boyd et al. (1993) analysent les risques impliqués dans les fusions de la société américaine de portefeuille bancaire (BHC) avec des sociétés financières d'activités non-traditionnelle entre 1971 et 1984. Stiroh (2006) trouve un lien positif entre le risque et des sources de revenu non-traditionnelles y compris les activités de services bancaires d'investissement pour les banques

américaines. Stiroh et Rumble (2006) proposent ainsi que l'expansion des services bancaires d'investissement par des banques de commerce soit plafonnée. Concernant les banques européennes, Lepetit et al. (2008) constatent un taux plus élevé de risque d'insolvabilité lié à des activités de revenu autre que d'intérêts sur la durée de 1996–2002. De même, De Jonghe (2010) constate une hausse du risque systémique du système bancaire européen en raison de la dépendance accrue des banques sur des activités bancaires non-traditionnelles, bien que Vallascas et Hagendorff (2011) constatent que les transactions de diversification d'activité donnent lieu à une augmentation sensible du risque de défaut de paiement pour les banques de sécurité.

Les implications de risque dans la fusion-acquisition bancaire ainsi que les tendances de consolidation dans le secteur bancaire américain et européen, nous emmènent à explorer et à mieux comprendre le sujet dans un contexte plus général de liaison entre la concurrence (concentration) et la stabilité financière du système bancaire. La littérature financière est constituée de deux courants bien connus.

En premier lieu, l'opinion traditionnelle de "concurrence – fragilité" ou "concentration – stabilité" prétend que l'augmentation de la concurrence (baisse de concentration) risque de promouvoir une prise de risque excessive par les banques à cause de l'érosion du pouvoir de marché et de la réduction dans les taux de marge et des valeurs de franchise (Keeley, 1990; Carletti et Hartmann, 2003; Allen et Gale, 2004). Par conséquent, des bénéfices élevés et un pouvoir de marché plus fort dans un système bancaire moins concurrentiel et plus concentré servent à limiter la prise de risque excessive des banques et à apporter de la stabilité au système. De plus, il est plus aisé de surveiller un système financier plus consolidé avec peu de participants sur le marché. Ainsi, les partisans de l'opinion "concurrence-stabilité" affirment que la consolidation apporte de la stabilité au système financier en faisant baisser le risque particulier de l'acquisition des banques et, par conséquent, le risque systémique est aussi réduit. En second lieu, l'opinion contraire de "concurrence – stabilité" ou "concentration – fragilité", approuve les effets stabilisants de la concurrence (Boyd et De Nicoló, 2005; Boyd et al. 2006, De Nicoló et Loukoianova, 2007). Selon les avocats de cette opinion, quand le pouvoir de marché augmente les banques peuvent imposer des taux d'intérêts plus élevés aux emprunteurs, ce qui peut augmenter la probabilité qu'un prêt sera non-performant. Il se peut également que les

emprunteurs basculent sur des projets plus risqués en raison de la motivation accrue du risque moral, ce qui laisse les banques avec un groupe d'emprunteurs beaucoup moins sûrs (problème d'anti-sélection). De plus, il est possible que les mesures de protection mises en place par le gouvernement pour quelques grandes banques de structure complexe dans un marché plus concentré puissent les encourager à prendre des risques excessifs et donc apportent de l'instabilité au système bancaire global. De nombreuses études empiriques confirment malheureusement les deux courants (voir, par exemple, Keeley, 1990; Boyd et al. 2006, et De Nicoló et Loukoianova, 2007, entre autres).

Dès lors, notre compréhension des effets de l'activité F&A comme mode manifeste de consolidation sur la stabilité bancaire reste limitée. Via l'étude de plusieurs aspects de l'activité F&A, ainsi que son implication dans la stabilité du secteur bancaire aux États-Unis et en Europe sur une longue durée, ce travail doctoral cherche à contribuer utilement à cette piste de recherche.

Dans le premier essai de cette dissertation, nous examinons la relation d'activité de F&A de banques européennes sur la durée de 1990-2006 avec leur soutien gouvernemental et les notations de crédit pendant la crise financière. Ceci nous permet d'analyser les effets d'activité de F&A sur la matérialisation explicite du soutien gouvernemental pour les grandes banques en Europe. En même temps, l'utilisation de deux types différents de notations bancaires - cotes d'émetteur et cotes individuelles - nous aident à explorer deux facettes importantes du risque bancaire : le risque du défaut et le risque d'insolvabilité via les agences de notation. Dans ce chapitre, nous mettons aussi en lumière les différences d'intensité dans les politiques d'acquisitions des grandes banques européennes après la crise financière pour examiner si les banques bénéficiaires de sauvetages gouvernementaux ont subi des contraintes dans leur croissance externe très liée aux F&A que ce soit dans un contexte de crise ou non. Nous constatons une relation positive et statistiquement significative entre l'intensité de F&A de banques de la période 1990-2006 et leur support de sauvetage pendant la crise financière. De plus, nous trouvons aussi un lien robuste entre le support externe de la banque et le motif "too big to fail" lié aux F&A. Concernant l'analyse de notations de crédit, l'activité antérieure de F&A semble liée significativement à la détérioration dans les cotes d'émetteur alors qu'une telle relation significative apparaît avec l'amélioration de la notation individuelle. Curieusement, nous observons que les banques bénéficiaires de sauvetage démontrent une contrainte significative

dans leur motif lié avec augmentation de taille par F&A pendant la période post-crise. Ces résultats sont cohérents avec le fait que l'activité de F&A facilite l'exploitation de filets de sécurité particulièrement par les grandes banques. Il met aussi en évidence le contraste dans la relation d'intensité F&A avec les types divers d'notations bancaires assignées par des agences de notation (CRA).

Les résultats de notre premier article nous fournissent une base intéressante pour étendre notre analyse sur l'évolution des risques liés aux activités des F&A.

Ainsi, le deuxième essai examine- en plus de l'intensité F&A globale - les types d'activité F&A. Ceux-ci peuvent exposer des banques à la vulnérabilité pendant les chocs exogènes comme la crise financière de 2007-2009. Nous nous concentrons particulièrement sur l'activité de F&A exécutée dans la banque de détail et dans la banque d'investissement. Nous réalisons cette enquête en utilisant un échantillon de 1603 transactions de F&A exécutées par des grandes banques européennes pendant la période 1990-2006 tandis que nos mesures de risque (des variables dépendantes) incluent la notion de *distance à défaut* (DD) basé sur Merton (1974) et le Z-score calculé pendant l'année 2008. La DD est considéré comme une mesure du risque de liquidité qui intègre également le soutien gouvernemental implicite en temps de crise, tandis que le Z-score tend à refléter la situation de solvabilité des banques. Nous découvrons une relation positive et statistiquement significative entre le risque bancaire pendant la crise financière 2008 et leurs acquisitions pré-crise des activités de banque d'investissement. De plus, nous observons aussi que l'intensité d'activité des F&A dans le segment de banque de détail est liée de façon positive et statistiquement significative avec la solvabilité bancaire pendant la crise financière. Ainsi, nos résultats restent remarquablement stables lorsqu'on se concentre sur la période plus récente de 1997-2006 pour estimer l'intensité d'activité F&A du secteur bancaire.

Le dernier essai examine l'activité de F&A bancaires dans une perspective de déréglementation, de consolidation et de stabilité bancaire. Dans cet essai, nous étendons l'analyse au secteur bancaire américain et européen dans un modèle de différence-de-différence. Nous définissons les banques américaines comme un groupe qui a traversé une phase de déréglementation, tandis que les banques en Europe entrent dans notre modèle comme groupe de comparaison. Nous examinons ainsi les liens entre les actes saillants de déréglementation des

années 1990 (connu comme, l'acte de Riegle-Neal de 1994 et l'acte de Gramm-Leach-Bliley de 1999), la consolidation liée aux F&A et la stabilité dans le secteur bancaire américain. L'ancien acte a permis aux banques américaines de s'étendre à travers des états tandis que le dernier acte a autorisé la diversification à travers les services offerts et des activités exécutées par les banques. En général la dérèglementation démontre un rôle significativement positif dans l'accélération de la consolidation du secteur bancaire américain basée sur les F&A. Cependant, les motifs de diversification, que les deux actes de dérèglementation ont visés, ne se traduisent que peu dans les activités de F&A. En effet, si nous observons une relation significativement positive entre l'acte de Gramm-Leach-Bliley, l'activité de F&A et le motif de la diversification fonctionnelle, une telle relation significative ne prévaut pas quand nous analysons les effets de l'acte de Riegle-Neal sur l'activité de F&A orienté vers la diversification géographique des banques américaines. Nous observons que la période d'analyse (sans et avec crise financière) est un facteur critique dans la conduite de nos résultats : la significativité des résultats est généralement observée dans la période d'analyse qui exclut les crises financières. Finalement, les résultats sur la concentration et la stabilité, suggèrent les implications profondément négatives de la dérèglementation et de la consolidation, basée sur l'activité de F&A, sur la stabilité du secteur bancaire américaines dans la période d'analyse sans - et avec-la crise financière. Globalement, cet essai confirme que la dérèglementation bancaire dans un contexte de F&A peut être tenue pour partiellement responsable de l'épisode de crise de 2007 (Epstein et Montecino, 2015).

A travers cette thèse, nous espérons avoir réalisé quelques contributions. Tout d'abord, en examinant le thème de la stabilité financière dans l'industrie bancaire, surtout suite à la crise financière, nous étudions un évènement qui a concerné de nombreuses nations à travers le monde. Il n'existe pas encore une estimation précise du coût économique et social encouru par le monde à la suite de la crise financière de 2008. D'un point de vue pratique, nous essayons d'analyser la croissance des banques dans une perspective d'intensité des activités de F&A et ses implications pour leur stabilité. Nous démontrons que l'activité F&A des banques, et donc leur croissance externe, doit être surveillée avec beaucoup d'attention car ces opérations de F&A ont tendance à impacter fortement sur la stabilité financière de ces institutions. Finalement, nous montrons que la dérèglementation bancaire ne peut pas aisément être approuvée ou décriée : cette dérèglementation génère des effets divers selon le type d'actes au sein du secteur bancaire américain. Cette thèse expose quelques directions logiques pour prolonger ce débat sur la stabilité

bancaire. Ainsi, il semble pertinent d'examiner l'efficacité de l'acte de Dodd-Frank de 2010 pour corriger les faiblesses des deux actes de déréglementation des années 1990 particulièrement dans le contexte de "too big to fail" des banques.

GENERAL INTRODUCTION

The financial crisis of 2007–2008 brought the entire global economic system to a standstill situation in a short time span. The magnitude of an unprecedented loss that unfolded gradually with the passage of time raised some serious concerns about the stability of the financial sector with a particular focus on banking institutions. In Europe and the U.S. banks witnessed a significant evaporation of roughly 82% (US \$4.5 trillion) in their market capitalization between 2007 and 2009. In the U.S., many large banks including Bank of America, Citigroup, Goldman Sachs, JPMorgan Chase, Lehman Brothers, Merrill Lynch, Wachovia and Wells Fargo were badly affected and had to be bailed out by the U.S. government under the TARP facility.¹ A series of bailout packages were also noticed in the case of the European banks. Governments and monetary agencies across the globe took several measures to limit the systemic risk implications particularly associated with the impending failure of large sized financial institutions. For instance, in 2010, the U.S. government established Financial Stability Oversight Council under the Dodd-Frank act, while the European Commission formed European Systemic Risk Board (ESRB), to monitor systemic risk. The financial stability (alternatively termed as bank stability) of the banking system is vital because an unstable banking system may have severe repercussions on the overall economy. While 24 banking crisis that took place in the last two decades resulted in a loss of approximately 15-20% of annual GDP (Hoggarth et al., 2002), the losses incurred during the Great Recession of 2007-2008 jumped to an all-time high of 25% of GDP (Laeven and Valencia, 2010).

While the arrival of this catastrophic event was unforeseen by the world, researchers and policy makers are still engaged in establishing the variety of narratives on various avenues ranging from causes, consequences, and remedial measures in order to prevent such a disaster in future times. This dissertation is an attempt to contribute in these directions by studying in an extensive manner the significant mergers and acquisitions (M&A) activity the banking industry went through - particularly in the developed economies of the world - over the past two decades in a broader nexus of consolidation with the bank stability.

The consolidation process has been a distinctive feature of the banking industry from the early 1990s that was mainly spearheaded by the M&A activity (Group of Ten, 2001; De Young et al., 2009). On one hand, the benefits of this M&A activity (i.e., efficiency gains, value

¹Visit <http://projects.propublica.org/bailout/list/index>, for comprehensive details on Troubled Assets Relief Program (TARP).

creation, diversification, market competition etc.) are still viewed with a question mark at individual and industry level of banking. On the other hand, a strand of literature also documented concerns over the concentration trends, rising opacity, and the emergence of few large and structurally complex banking institutions prior to the advent of the financial crisis. In particular, the large size banking institutions that are viewed as “too big to fail” in the market tend to exploit safety net subsidies (Mishkin, 2006). Keeping in view several potential implications of M&A activity of banks, we attempt to extensively investigate its relation with some salient aspects of bank stability in this dissertation.

This dissertation primarily focuses on whether and how M&A activity relates to the different facets of the financial stability (fragility) of banks. Prior to further discussion on the effects of M&A led consolidation, it is important to understand the term ‘financial stability’ and the context of stability investigated in our dissertation. Crockett (1997) defines financial stability as an absence of ‘financial instability. Under financial instability, economic performance is impaired due to either significant variations in prices of financial assets or financial institutions’ inability to meet their contractual obligations. It is worth noting that even the absence of financial crisis does not necessarily mean that the banking system is not fragile. Indeed, the banks are inherently fragile due to several reasons. First, instability may stem out of well-known moral hazard dilemma that the banks will continue their risky activities due to limited monitoring abilities of creditors and regulators (Stiglitz and Weiss, 1981). Second, adverse selection problem in the wake of an increase in the lending rates may leave banks to sit on bad loans (Boyd and De Nicoló, 2005) and prone to fragility. Moreover, banks may also entice towards excessive risk taking due to their “too big to fail” status in the market (John et al., 1991). Finally, a general loss of confidence due to the information asymmetry and self-fulfilling prophecy may cause customers to run on banks (Diamond and Dybvig, 1983). In a highly integrated banking system, the presence of one or several of the above-mentioned reasons may trigger instability both at the individual and systemic level at a very rapid pace as in such an interconnected market failure of one institution may propagate shocks at the systemic level (Acharya et al., 2009). Thus, our dissertation primarily is focused on the stability of banks at the individual level of banking institutions.

The banking sector has witnessed a considerable level of M&A activity leading to consolidation during the past two decades, particularly in the developed part of the world economy. The U.S. and European market remained the most significant contributors to this

phenomenon by covering almost 60% of the total M&A activity (Source: Thomson Reuters' SDC Platinum M&A Database). This consolidation process was primarily in response to the deregulation of the industry, technological advancements, and adoption of the Euro in the case of Europe (Berger et al., 1999; Group of Ten, 2001). This, on one hand, led to a significant decline in the number of banking institutions in Europe and the U.S., and, on the other hand, the industry assets showed an impressive growth. For instance, U.S. banking industry showed a decline of 44% in its tally of financial institutions (commercial banks, savings institutions and credit unions), while the total industry assets mounted by more than 170% over the period of 1990 to 2006 (Source: FDIC Statistical Database). Likewise, in Europe, the number of credit institutions in 27 EU countries witnessed a significant drop of roughly 40% during this period (Source: ECB Consolidated Banking Data, 2011). Moreover, the growth in total assets of the banking industry spearheaded the one demonstrated by GDP of EU countries during this time. For example, aggregate assets of top four banking institutions in Europe surpassed the combined GDP of three important members of EU including France, Germany, and UK in the year 2006. In addition to this, both the markets also witnessed some mega mergers between financial institutions during this period. This includes, among others, the merger of Bank of America with Nations Bank Corp. (US\$ 76 billion), Northwest Corporation with Wells Fargo Bank (US\$ 42 billion) in U.S. banking sector. In the case of Europe, some salient transactions include the merger of Natwest with RBS (38.4 billion USD) in the UK and Banca Intesa of Italy with Sao Paolo IMI (37.6 billion USD). These significant trends demonstrated by the banking industry in U.S. and Europe motivate us to focus our attention on the two industry in addition to the fact that the two banking industry were indeed the epicenter of the 2007-2009 financial crisis.

A substantial body of work in the field of corporate control presents contrasting views on drivers of such aggregate M&A activity. Neoclassical view (for instance, one in Harford, 2005; Ovtchinnikov, 2010, among others) considers M&A activity as an efficient response to various shocks, such as abrupt changes in economic canvas, regulatory reforms, and/or technological advancements. Ovtchinnikov (2010) attributes merger waves to industry deregulation. Jones and Critchfield (2008) consider deregulation as an important enabling factor in the unprecedented surge in M&A activity of the banking sector during last two decades. Jeon and Miller (2007) show a positive impact of deregulation on the average number of M&A in U.S. banking industry during 1978-2004. While M&A strategies adopted by the banks in response to such changes in regulatory environment accelerated the pace of consolidation (Berger et al.,

1999), a detailed insight on deregulation in U.S. by Kroszner and Strahan (2013) also highlight fragility aspect of deregulation due to increasingly interconnected opaque banking industry. M&A activity may foster various potential implications over bank stability at both individual and aggregate level. The extant literature puts forth theoretical arguments and empirical evidence suggesting both positive and negative implications of M&A activity for bank stability in an extensive manner.

Risk reducing implications of M&A activity

M&A may result in a sound and stable banking system through enhanced efficiency and better risk diversification (Berger et al., 1999; Amel et al., 2004). Banks' M&A activity outside their core business line and/or across geographic zones may result in diversification of their loans and assets portfolio and consequently reduces risk. Theoretical study of Wagner (2010) contends risk reduction in financial institutions at the individual level through diversification. A number of empirical studies conducted on the topic have traced diversification effects in banks in different manifestations. For instance, Emmons et al. (2004) advocate risk reduction through diversification in U.S. community banks. This effect is more pronounced in product diversification than that of geographic diversification. Hughes et al. (1999) find a low insolvency risk and higher efficiency for large U.S. banks that expanded at the interstate level (geographic diversification). Macroeconomic risk diversification plays a major role in particular. Hughes et al. (2001) link better diversification with larger scale economies while increased and inefficient risk taking are results of smaller scale economies. In the case of Europe, Chionsini et al. (2003) provide evidence on diversification of credit risk in Italian banks using a sample of M&A spanning 1997–2001.

Several studies focus on efficiency gains including scale and scope economies achieved by banks through M&A. The presence of economies of scale and scope broadly mean a reduction in average cost of production for a bank due to increase in its size or number of services offered. Banks operating at a large scale are considered to have a competitive advantage over small banks in the adoption of new technology, offering innovative products and services, and can spread massive setup (fixed) costs over larger operations. With respect to scope economies, the presence of cost complementarities such as joint use of inputs among several products/services may result in lowering average cost of producing these products or rendering services. Berger and Mester (1997), Hughes et al. (1999; 2001) and Amel et al. (2004), among others, discuss the various channels and the extent to which the cost synergies are achieved. For instance,

Berger and Mester (1997) and Hughes et al. (2001) find economies of scale for banks with asset size greater than \$25 billion. A recent study by Wheelock and Wilson (2012) also provides evidence of economies of scale in the U.S. banks over an extended period of 1984-2006. Similarly, Cavallo and Rossi (2001) find significant economies of scale in almost all asset classes of banks in Europe using a panel data of 442 banks in six European countries over a period of 1992–1997. Altunbas et al. (2001) also document economies of scale at different levels of asset for European banks. In case of scope economies, the studies on U.S. and European banking sector bring mixed empirical evidences about the existence of such economies. For U.S. banks, Berger et al. (1993) find evidence of profit scope economies using data from 1984 to 1989, which is in contrast with Berger et al. (1996) that find no evidence of economies of scope over an extended period of 1978 to 1990. In Europe, many studies focused on complementarities between loans and investment related services in the setup of universal banking (Amel et al., 2004) and the benefits from *bancassurance* firms (Group of Ten, 2001). Altunbas and Molyneux (1996) find traces of scope efficiency only in German banks out of sample of four European countries (France, Germany, Italy, and Spain). Cavallo and Rossi (2001) find economies of scope at all production levels of banks in a sample of six European countries. Using data from 17 European countries, Vander Venet (2002) advocates similar results for financial conglomerates. One potential explanation of these deceptive results is that measuring economies of scope is difficult (Berger et al., 1993).

Two other closely linked factors in the context of M&A motives are X-efficiency and productivity. X-efficiency refers to how productively a bank converts its inputs into outputs vis-à-vis best-practice firms producing the same outputs, while productivity indicates towards a combination of shift that appears in the best-practicing banks' frontier (i.e., banks operating at efficient frontier) and in X-inefficiency. The banks operating at scale or scope efficiency may not be able to achieve higher X-efficiency due to wastage of some of their inputs, use of a wrong mix of inputs, and/or employing inputs to the benefit of management. Evidence on X-efficiency and productivity is inconclusive. Berger and Mester (1997) estimate both cost and profit X-efficiencies for U.S. banks over a period of 1990 to 1995 relative to the best practice firms. The authors find a higher level of mean profit inefficiency than the observed cost inefficiency in the banks. Berger (1998) finds modest improvements in cost X-efficiency relating to M&A in large U.S banks. Altunbas et al. (2001), and Cavallo and Rossi (2001) find significant X-inefficiencies on relatively large samples of European banks. On productivity

aspect, Berger and Mester (2003) find substantial improvement in U.S. banks' profit productivity and deterioration in cost productivity over the period 1991 – 1997.

Risk enhancing implications of M&A activity

Contrary to the aforementioned potential positives, M&A activity may also expose banks to instability at different levels (Hughes et al., 2001; De Nicoló and Kwast, 2002). The risk increasing implications of M&A can be traced back to regulatory incentives (Vallascas and Hagendorff, 2011) and “too big to fail” phenomenon associated with merger activity (Boyd and Graham, 1991). Factors including the increase in bank size, complexity in structure and moral hazard dilemma linked to banks' “too big to fail” status make them prone to fragility (Group of Ten, 2001; Amel et al., 2004). A rampant M&A activity of banks within and outside the banking sector may result in the creation of large and structurally complex financial institutions, which are considered “too big to fail”. Boyd and Graham (1991), and John et al. (1991) contend that banks pursue M&A strategies merely to become “too big to fail” in the presence of deposit insurance schemes. The availability of government support in the form of deposit insurance and bailouts invokes moral hazard problem as the banks' survival becomes less dependent on their choice of risk. Therefore, large banks continue to engage in risky activities while maximizing the subsidy from such government support during the times of distress and financial crisis (De Nicoló et al., 2004; Stiglitz, 2010). Moreover, the likelihood of a “too big to fail” firm to receive financial support may have significantly positive impact on bank credit ratings (Soussa, 2000; Rime 2005). Gropp et al. (2011) document the competitive effects of government bailout policies on banks outside safety net and find that bailout perceptions strongly increase risk-taking of competitor banks. Some recent work on bank M&A including, among others, Hagendorff et al. (2012), Molyneux et al. (2014), and Carbo-Valverde et al. (2008) empirically substantiate the argument relating to the extraction of safety net benefits associated with “too big to fail” under different settings. For instance, Hagendorff et al. (2012) find a significant impact of regulatory and deposit insurance regimes for domestic mergers. In contrast, Carbo-Valverde et al. (2008) find that banks more active in cross-border M&A extract higher safety net benefits but demonstrate no efficiency improvements. Indeed, Geographical shift in banks' operations may enable them to transfer portion of their risk poorly monitored to other countries. Molyneux et al. (2014), evaluate M&A activity of 9 EU countries between 1997 and 2008. They find positive correlation between merger premiums paid and probability of becoming ‘too big to fail’. However, they find no strong evidence about any potential effects of M&A activity on systemic risk.

Banks' attempt to diversify across product line can also be another source of fragility as reaping such diversification benefits may also stay short of expectations or is offset by an even higher level of risk for them at individual or/and systemic level (see, for instance, De Nicoló et al., 2004; Wagner, 2008; Vallascas and Hagendorff, 2011, among others). Therefore, consolidation and conglomerations may not necessarily result in a safe financial system. An important dimension of the debate on the recent financial crisis is linked to financial conglomerates and universal banking model, with a particular criticism on banks' increased focus towards the investment banking activity (De Jonghe, 2010). The critics cite that the diversification within the financial sector may result in the strategic similarities among the large size banks that may in turn amplify the likelihood of systemic risk. According to Stiglitz (2010), merger activity between commercial and investment banks results in a major conflict of interests. Hence, such marriages may expose the whole financial system to a culture of risk-taking that is more prevalent in the investment banking activities. Moreover, due to the volatile nature of the activity, banks may witness a significantly higher decline in their income generated from investment banking than that of the traditional interest income in turbulent situations like financial crisis. Wagner (2008) theoretically demonstrates how banks' shift from traditional activities may trigger systemic risk by encouraging their excessive risk-taking behavior. Banks become less dependent on external sources of liquidity and may curtail liquidity supply to their peers as their risk is homogenized.

Concerning empirical evidence on the risk implication of activity diversification of banks Boyd et al. (1993) find that merger of bank holding companies with security and real estate firms may increase their risk. Stiroh (2006) finds a positive link between risk and nontraditional sources of revenue including investment banking activities for U.S. banks over the period 1997-2004. Stiroh and Rumble (2006) also substantiate the aforementioned findings and suggest a cap on expansion in investment banking by commercial banks. In the case of European banks, Lepetit et al. (2008) find a higher level of insolvency risk linked to noninterest income activities on a dataset spanning 1996–2002. Similarly, De Jonghe (2010) advocates a rise in systemic risk of European banking system due to banks' increased reliance on non-traditional banking activities, while Vallascas and Hagendorff (2011) find that the activity-diversifying M&A result in a significant increase in the risk of default for safe banks.

Competition and stability in the banking industry

The above-mentioned implications of bank M&A can also be viewed in a broader context of the nexus between competition (concentration) and financial stability of the banking system. Finance literature presents two well-known views in this context. This includes the traditional “competition – fragility” or “concentration – stability” view, which contends that the increase in competition (decrease in concentration) may foster excessive risk-taking for banks due to erosion of market power, reduced profit margins, and franchise values (Keeley, 1990; Carletti and Hartmann, 2003; Allen and Gale, 2004).² Therefore, high profits and more market power in a less competitive and more concentrated banking system limit the banks’ excessive risk taking and bring stability to the system. Keeley (1990) provides a theoretical framework and empirical evidence on increased number of failures during the 1980s for large U.S. banks. The author attributes this failure episode primarily to the increase in competition that in turn reduced the monopoly rents and charter values of banks. This decline intensified the agency problem in the presence of deposit insurance schemes and enticed banks towards excessive risk taking. The reduction in informational monopoly rents may also affect banks’ incentives to monitor borrowers and result in financial fragility (Allen and Gale, 2000; 2004). Allen and Gale (2000) describe the interbank market as another important channel through which competition may foster instability in the banking system. They find that a situation of rising aggregate liquidity demand may prevent banks from providing liquidity to a troubled peer bank in order to satisfy their own liquidity requirements and further intensify liquidity crisis. In addition to this, a more consolidated financial system with few market participants can be easily and effectively regulated and supervised. Thus, the proponents of “competition-fragility” view contend that consolidation brings stability to the financial system by lowering the idiosyncratic risk of acquiring banks and, consequently, lowering systemic risk.

The proponents of contrary “competition – stability” or “concentration – fragility” view, including work of Boyd and De Nicoló (2005), Boyd et al. (2006), and De Nicoló and Loukoianova (2007), endorse stabilizing effects of competition. For example, Boyd and De Nicoló (2005) advocate a high likelihood of financial fragility in a more concentrated banking sector. An enhanced market power allows banks to charge higher interest rates to borrowers, which may increase the likelihood of a loan to be non-performing. Borrowers may also shift towards more risky projects because of increased moral hazard incentive, leaving banks to a

² See Carletti and Hartmann (2003) for a detailed survey on topic.

riskier set of borrowers (adverse selection problem). Boyd et al. (2006), and De Nicoló and Loukoianova (2007) provide empirical evidence consistent with these arguments. They find an inverse relation between Z-index (risk measure) and Herfindahl-Hirschman index (a concentration measure) using a large dataset from 134 countries over the period 1993-2004. Further, the provision of safety net by the government to a few large size and structurally complex banks in a more concentrated market may entice them to excessive risk taking and bring instability to the whole banking system (see, e.g., De Nicoló et al., 2004; Mishkin, 2006; Stiglitz, 2010; Stiglitz, 2010, among others). Survey of Carletti et al. (2002) discuss implications of merger waves on competition and stability of the banking sector in the European context. The authors document that different aspects of M&A wave (e.g., creation of a few “too big to fail” banks, issues relating to monitoring, market liquidity, and market discipline) may potentially cause instability in the banking system. Similarly, Carletti et al. (2007) explain the effects of mergers on the stability of the interbank market. They contend that mergers between large size banks may foster fragility to the market as they give rise to banks’ balance sheet asymmetries. An increase in expected aggregate liquidity needs in the wake of the high relative cost of refinancing may propagate liquidity crisis and thus, leading to government intervention.³

In light of the aforementioned evidence, we consider the relationship between concentration and financial stability elusive to understand, while the past M&A activity stands central in this nexus due to its significant role in changing trends of bank concentration and market structure over time. Thus, we find it interesting to explore various implications of M&A activity on the financial stability of banking sector spanning mainly over the period of 1990–2009. To do so, this dissertation presents three essays. We primarily focus on European and U.S. banking sector. The two markets cover roughly 60% of M&A activity of financial sector in the world (Source: Thomson Reuters’ SDC Platinum M&A Database) during the analysis period. Moreover, losses to the economy caused by financial instability are significantly large and rampant in such developed economies than the other economies of the world (Laeven and Valencia, 2010; Hoggarth et al., 2002).

In first essay of this dissertation, we investigate the relationship of ex-ante M&A activity of European banks over a time span of 1990-2006 with their bailout based governmental support and credit ratings during the financial crisis. This enables us to analyze the effects of

³ Relative cost of refinancing is the ratio of interbank borrowing to deposit funding cost.

bank M&A activity on explicit materialization of governmental support for the large sized banks in Europe. At the same time, use of two different types of bank ratings –bank issuer and individual ratings– helps us explore two important facets of bank risk namely the risk of default and insolvency risk from an external lens (credit rating agencies). Moreover, in this chapter of our dissertation, we also shed some light on the differences in the post-crisis acquisitiveness of large European banks to see if the bailout beneficiary banks demonstrated any restraint in their M&A led external growth in the backdrop of crisis or not. We find compelling evidence that indicates towards a positive and statistically significant relation between the ex-ante M&A intensity of banks and their bailout support during the financial crisis period. Moreover, we also find a robust link between the bank’s external support and the “too big to fail” related motive of M&A. Regarding credit rating analysis, while on one hand, the ex-ante M&A activity significantly relates to the deterioration in issuer ratings, such significant relation appears with the improvement in individual rating, on the other hand. Interestingly, we observe that the bailout beneficiary banks demonstrate a significant restraint in their size related motive of acquisitiveness in the post-crisis M&A activity. Overall, findings of this essay are consistent with the view that M&A activity facilitates exploitation of safety net benefits particularly by large banking institutions. It also highlights the contrast in the relationship of M&A intensity with various types of bank ratings assigned by credit rating agencies (CRA).

The findings of our first study provide us basis to further expand our analysis on the risk implications of M&A activity. Therefore, the second essay investigates –in addition to overall M&A intensity– the types of M&A activity that may expose banks to vulnerability during the exogenous shocks like the financial crisis of 2007-2009. We particularly focus on M&A activity performed in retail banking and investment banking segments of banking in this study as the bank’s increasing reliance on non-traditional sources of income is also considered as one of the major culprits of the financial calamity in 2007. We perform this investigation using a sample of 1603 M&A transactions performed by large size European banks over the period 1990-2006 while our risk measures (dependent variables) include Merton (1974) based Distance to Default (DD) and Z-score calculated during the year 2008. We uncover a positive and statistically significant relation between the bank risk during the 2008 financial crisis and their acquisitions of investment banking businesses in the pre-crisis period. Further, we also observe that the bank acquisitiveness in retail banking segment relates in a positive and statistically significant manner with the bank solvency during the financial crisis. Our findings largely remain robust over a sub-period analysis.

The last essay aims at investigating bank M&A activity in the perspective of deregulation, consolidation, and bank stability. In this chapter, we expand the analysis to the banking industry in the U.S. and Europe in a difference-in-difference setup, where the former remains our main focus and the latter serves the purpose of comparison. Specifically, we examine whether and how salient deregulatory acts of the 1990s (namely, Riegle-Neal act of 1994 and Gramm-Leach-Bliley act of 1999) relate to M&A centric consolidation and stability in the U.S. banking industry. The former act permitted U.S. banks to expand across states while the latter allowed diversification across the services offered and activities performed by the banks. Overall, the two deregulatory acts demonstrate a significantly positive role in spurring M&A centric consolidation in U.S. banking industry. However, the diversification motives that the two deregulatory acts were aimed at are not fully reflected in term of M&A activity. While we observe a significantly positive relation between the Gramm-Leach-Bliley act and functionally diversifying M&A activity, such significant relation does not prevail when we analyze effects of the Riegle-Neal act on geographically diversifying M&A activity of U.S. banks. Strikingly, time span (without- and with-crisis period) of analysis is a critical factor in driving our results as the significance of results is generally observed in the analysis period that excludes time of financial crisis. Lastly, results on concentration and stability, suggest profoundly negative implications of deregulation and M&A centric consolidation over the stability of U.S. banking industry in without- and with-crisis period analysis. Overall, this essay provides some important insight over the banking deregulation in the context of M&A activity as a popular narrative over the financial crisis holds it partially responsible for the extraordinary episode of 2007 (Epstein and Montecino, 2015).

Overall, we believe that this dissertation ultimately makes some vital contributions to the scientific research in particular and society in general. First, by exploring the topic of bank stability we attempt to address an avenue that has affected the life of several nations across the globe. An accurate estimate of the economic and social cost the world has incurred in the aftermath of the 2008 financial crisis is humongous. Second, from practitioner and regulators viewpoint, we attempt to analyze an M&A intensity based perspective of banks' growth and its implications for their stability. We show that the growth of financial institution through M&A activity must be extra cautiously monitored as it does foster implications to the stability of these institutions in different manifestations. Lastly, we also show that bank deregulation may not necessarily be termed good or bad as a whole, rather it entails investigating the effects various types of deregulatory acts foster to the banking sector. Nevertheless, this dissertation

sets forth some logical directions to prolong further on the topic of bank stability. For instance, one related project that we are currently working on delves into the effectiveness of Dodd-Frank act of 2010 in rectifying the weaknesses of the two deregulatory acts of the 1990s particularly in the context of “too big to fail” banks.

This dissertation proceeds further by presenting in an orderly manner the three essays. We present a general conclusion of the thesis at the end.

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PAPER 1: TRACING THE M&A FOOTPRINTS IN THE BAILOUTS AND CREDIT RATINGS OF EUROPEAN BANKS DURING THE 2008 FINANCIAL CRISIS⁴

ABSTRACT

We empirically investigate whether and how merger and acquisition (M&A) activity of banks relate to their much-debated bailouts and credit ratings during the 2008 financial crisis. Our M&A sample comprises of 1603 transactions performed by 41 large sized European banks over the period 1990–2006. We find that the intensity of bank M&A activity relates in a positive and statistically significant manner –both in likelihood and extent terms– with their bailout support during the financial crisis. Moreover, this activity negatively (positively -though in a limited manner) affects issuer (individual) ratings, suggesting towards a higher default risk and better solvency for the sample banks. We also substantiate a significantly positive link of the bank bailout support with the joint effect of M&A activity and “too big to fail” factor. While we obtain widely robust results on credit rating analysis under alternate specifications, relatively weaker evidence of robustness exists in the case of rating based alternate measure of external bailout support. Further, findings of additional analysis over post-crisis M&A activity suggest that the bailout beneficiary banks in our sample generally appeared to demonstrate a significant restraint on their acquisitiveness after the 2008 financial crisis. However, terming this restraint as the one chosen by banks or enforced by the regulators rests an open question.

JEL Classification: G10, G21, G24, G34

Keywords: Bank Bailout, Credit Ratings, Financial Crisis, Merger and Acquisition

⁴ This paper is submitted to the International Journal of Finance and Economics (CNRS rank 3). Different versions of the paper have also been accepted for presentation at conferences including F.E.B.S 2014 in Surrey, UK and IFABS 2014 in Lisbon, Portugal. This recent version is submitted to AFFI 2016 in Liège, Belgium.

1. Introduction

Bank bailouts and credit ratings are the two issues that perhaps share the list of the most widely discussed topics under the debate over 2008 financial crisis. Banks that were termed strong by credit rating agencies (CRAs afterward) were trapped in the financial distress in a very short time span and subscribed to the hefty bailouts to come out of this turmoil. The existing literature has investigated a variety of issues pertaining to the banking industry in the context of these two features of crisis. This includes factors explaining the bailout support, benefits derived by the banks, associated moral hazard, and assignment and the quality of credit ratings, to name a few. On one hand, a well set theoretical prior relates bank size to external support as increase in size facilitates banks to exploit higher safety net subsidies and further exacerbates the moral hazard problem. This, in turn, tempts banks to take on more risk. On the other hand, CRAs have been prone to assign such large banks with higher credit ratings particularly prior to the time of financial crisis. Banking industry in Europe went through a significant consolidation process since the decade of 1990s. Merger and acquisition (M&A) activity not only spearheaded this process of consolidation but also facilitated the emergence of few large and structurally complex banks dominating the industry. Thus investigating relationship of bank ex-ante M&A activity with bank bailouts and credit ratings during the 2008 financial crisis appears to be an interesting avenue of research.

While existing literature on bank M&A has mainly focused on conventional synergy gains (see, surveys of Berger et al., 1999; Amel et al., 2004; De Young et al., 2009 for a detailed review)⁵, M&A perspective is considerably lacked in the contributions over bank bailout and credit ratings. For instance, some recent studies including, among others, Dam and Koetter (2012), Gropp et al. (2011), Altunbas et al., (2011), and Beck et al., (2011) explore the relationship of bank risk-taking behavior with the governmental support, and credit ratings. However, a study that particularly focuses on M&A activity (external growth strategies) of banks in the context of their bailout and credit ratings, which indeed are useful exogenous indicators of financial distress, have not – to our knowledge – been investigated yet. We attempt to bridge this void. Considering M&A activity as an evident mode of size increase this paper explores its relationship with bank bailout and credit ratings during the 2008 financial crisis. We

⁵ Survey of Berger et al. (1999) documents 250 papers, followed by Amel et al., (2004) documenting 128 papers covering several aspects of consolidation in financial industry. More recently, DeYoung et al. (2009) discuss 150 papers from post 2000 literature.

particularly investigate, whether and how the ex-ante M&A activity of large sized banks relate to their bailout and credit ratings during the 2008 financial crisis.

The financial crisis of 2008 provides us a unique opportunity to explore such kind of research questions when many banks across the world indeed experienced instability. We focus on European banking industry, where many banks witnessed distress conditions and have been subscribed to bailout packages offered by their national governments in the form of capital injections and the government guarantees. Several large sized banking groups had to accept an increased role of the national governments in their ownership.⁶ Besides, many banks have also been subject to the significant downgrades in their issuer and support ratings issued by the renowned credit rating agencies. By focusing simultaneously on the bailout and credit ratings of banks, we cover both: (i) the manifestation of explicit governmental support available in the form of bailout packages, and (ii) the implicit perceptions that a bank will be saved by the government in case of an adverse event.

As stated above, banks may pursue M&A strategies to increase their size and enhance the so-called “too big to fail” incentives available in the form of deposit insurance and bailouts (see, for instance, John et al., 1991; Boyd and Graham, 1991). The aggressive growth strategies pursued by these banks not only allow them to capitalize on various scales and scope economies but also expose them to the size-related risk (Boyd and Runkle, 1993; Group of Ten, 2001; Amel et al., 2004). In the particular case of Europe, the overall stability of a more integrated financial system depends a lot on such large-sized financial institutions as they may potentially create systemic risk in a more concentrated market and yet reap the benefits of being “too big to fail” (Gropp et al., 2011). The findings of some recent studies on European bank mergers including Carbo-Valverde et al. (2008), Molyneux et al. (2014), and Hagendorff et al. (2012) substantiate the argument considering safety net benefits associated with “too big to fail” as a potential motive for M&A activity. They find significant safety net and regulatory regime related implications for domestic (Hagendorff et al., 2012) and cross-border M&A (Carbo-Valverde et al., 2008). Molyneux et al. (2014), find a positive correlation of merger premiums with banks’ “too big to fail” motives. Soussa (2000) documents evidence on improvements in banks’ credit ratings due to bank likelihood of receiving financial support. We believe that clearly observable bank distress indicators, such as bailouts and frequent downgrades in bank

⁶ For instance Royal Bank of Scotland and Lloyds TSB in the UK, Allied Irish Bank in Ireland, Dexia in Belgium, ABN Amro in Netherland, Fortis in Benelux among others.

ratings during the financial crisis, provide us with congenial conditions to perform an analysis to understand whether the past M&A activity of European banks relates to their bailout and credit ratings based measures of distress during this adverse shock or not.

We use a variety of measures relating to bank bailouts and credit ratings during the 2008 financial crisis. These measures are derived from information collected on financial rescue plans announced by several member states of the European Union and bank issuer and individual ratings assigned by the premier credit rating agencies namely Fitch Ratings, Moody's Investor Services (Moody's) and Standard and Poor's (S&P). Several studies have already employed bailout and credit rating based measures under different settings. This includes, among others, Cihak and Poghosyan (2011), Gropp et al. (2011), and Iannotta et al. (2013). In this study, we perform a set of Probit and standard OLS regressions on a sample of 1603 M&A transactions of large sized banks in Europe between 1990 and 2006 to ascertain the relationship of past M&A activity with their bailout and credit ratings during the 2008 financial crisis. We also ascertain robustness of our credit rating related results under alternate specifications of Ordered- Logit and Probit models. The significance of our bank sample is evident from the fact that almost 70 percent of the banks in our sample were included in European systemic risk dashboard, which is used to monitor systemic risk across the European Union by European Systemic Risk Board (ESRB).⁷

This analysis has several distinguished aspects. First, instead of focusing on individual deal analysis, we focus on the relationship of intensity of M&A activity in overall terms along with its focus on cross-border M&A and large size deals. Second, our dependent variables are indeed the ex-post measures of bank distress that cover both explicit and implicit manifestation of governmental support and guarantees. Moreover, the credit rating based measures (issuer and individual ratings) by definition reflect upon the banks' risk of default and insolvency (Iannotta et al., 2013). This feature of credit rating based measures makes our study relevant in providing a perspective on these two important dimensions of bank risk during the 2008 financial crisis from the lens of CRAs - despite its questionable reliability. We also perform an analysis of M&A activity and the governmental support constructed by using Moody's issuer and individual rating information for the banks in the sample. Moreover, we provide a further insight on "too big to fail" related motives of M&A by splitting our sample banks into different

⁷ European Systemic Risk Board (ESRB) is an autonomous oversight body of the European System of Financial Supervision supported by European Central Bank (ECB) in year 2010. The risk dashboard is a set of indicators used to monitor systemic risk and stability of banking system in EU.

asset classes (quartile based categories). Lastly, this study also delves upon how European banks that aggressively pursued M&A path to increase their size over a long period before crisis disciplined their acquisitiveness in the post-crisis period of 2010-2014.

Our empirical findings indicate that the intensity of ex-ante M&A activity carried out by the sample of large European banks has a significantly positive relation with their likelihood and the extent of bailout support during the financial crisis of 2008. Moreover, we also find significant evidence that positively relates bailout support with the acquisition of large size targets. Whereas, no substantial evidence is obtained with respect to any significant relation between the focus of banks on cross-border M&A and their bailout support during the financial crisis. On credit ratings based measures, we observe that the ex-ante M&A activity tends to positively link with the deterioration of bank average issuer ratings (higher default risk) and – though to a certain extent– with the improvement in their individual ratings (lower insolvency risk). We find a relatively limited evidence of such effects on credit ratings in case of large size deals and cross-border M&A. Results on credit rating based external support measure are substantially in contrast to our analysis using bailout information as we find no significant link between M&A activity at any level or size and credit rating based measure of external support except under the full specification. We also observe that the results of credit rating analysis remain substantially robust with the implementation of Ordered- Logit and Probit models as alternate specifications. Regarding asset quartile based analysis, we observe a significantly positive link of the bank bailout support with the joint effect of M&A activity and “too big to fail” factor; thus further substantiating “too big to fail” linked motive of bank M&A. Lastly, with respect to the investigation on post-crisis M&A activity, the bailout beneficiary banks in our sample generally appeared to demonstrate a significant restraint on their acquisitiveness after the financial crisis.

This paper contributes to various dimensions of the existing finance literature. First, we add to the research aimed at investigating the effects of M&A activity on bank stability as we analyze how the intensity of M&A activity of European banks –over an extensively long period before crisis– relate to their bailout support and credit ratings during the crisis period. These measures indeed represent the manifestation of bank distress in both explicit and implicit manner from an exogenous lens. Our study is particularly close to the work of Molyneux et al. (2014), and Hagendorff et al. (2012), which also attempt to analyze M&A in the light of bank size and safety net related arguments. Specifically, we show that the materialized safety net benefits

may not only be looked at in the context of individual M&A deals or their types but also in terms of rampant acquisitiveness of banks over a long period. Lastly, we also contribute to the growing body of literature on the financial crisis by exploiting the events of the 2008 financial crisis particularly as the bailouts and credit ratings were among the focal points of the policy debate on the crisis. In terms of policy implications, our findings do suggest further strict regulations relating to the M&A activity of banks, while supporting the regulatory concerns about implications of “too big to fail” factor on bank stability. Although, a significantly negative link between bank M&A activity and size as a determinant of post-crisis M&A does indicate towards a restraint in the acquisitive behavior of the bailout beneficiary banks. However, the extent to which this restraint should be termed as the one chosen by banks or imposed by regulators rests an open question. This study also set forth some possible extension on the topic. Given banks growing interest in non-traditional lines of business, it may seem interesting to analyze how acquisitiveness of banks in different segments (traditional vs non-traditional lines of business) relates to the external support and credit ratings. Additionally, considering that the bailout and credit rating based measure used in our study are indeed exogenous measures of financial distress, it can be intriguing to compare the results obtained from the two measures with the bank based measures of risk.

The rest of the paper proceeds as follows. Section 2 covers discussion on related literature directing us towards hypothesis development. In Section 3, we describe the sources and data collection in detail, while Section 4 discusses the construction of key variables and empirical method. Section 5 provides the detailed analysis of results and test of robustness. We conclude our work in Section 6.

2. Related literature

The recent financial crisis has opened several avenues of research pertaining to the topic of financial stability in the banking sector. Bailouts and credit ratings are the two important issues among several others that fetched immense criticism on banking institutions under the well set theoretical prior that the increase in size may benefit banks in winning governmental support and inflated credit ratings. A tremendous amount of work covering different facets of bank stability have already been realized and published in various top ranking economic and financial journals, and a lot more is in the pipeline. To quote a few, Gropp et al. (2011), document the competitive effects of government bailout policies on banks outside safety net by using a sample of banks from OECD countries. More specifically, they construct a bailout

perception variable for protected banks using rating information and analyze how it shapes the risk-taking behavior of unprotected banks. They find that bailout perceptions strongly increase risk-taking of competitor banks but leave the risk-taking of protected ones unaffected except for those with outright public ownership. Laeven and Levine (2009) attempt to explore the relation between bank risk-taking, governance and banking regulations on capital requirements, deposit insurance, activity restriction. Using a cross-country sample of the largest 279 banks, they find that governance critically relates to bank risk-taking with more powerful ownership leading to greater risks. Moreover, the effects of bank regulation on risk-taking may vary (positive or negative) with respect to shareholders' comparative power under a bank's corporate governance structure. Altunbas et al. (2011) study the relationship of risk with bank business model using the financial crisis of 2007-2009 as a platform. They attribute bank high-risk exposure and distress during the recent financial crisis to the factors including a weak capital base, large size, greater reliance on wholesale funding and aggressive credit growth. This strand of literature also includes among others Wheelock and Wilson (2012), Cihák and Poghosyan (2009), Houston et al. (2010).

In this study, we attempt to develop few hypotheses on the relationship of M&A activity of banks with their bailout and credit ratings during the 2008 financial crisis facilitated by a comprehensive review of the literature on implications of banking M&A, size induced moral hazard and risk.

Concerning the effects of M&A on bank risk, literature provides several arguments and empirical evidences for and against risk-increasing effects of M&A at both individual and aggregate levels (see, e.g., surveys of Berger et al., 1999; Amel et al., 2004; De Young et al. 2009, among others).

Positive perceptions relating to M&A risk implications are based on several potential benefits emanating from M&A activity. This include primarily synergies linked to economies of scale and scope (Wheelock and Wilson, 2012; Hughes et al. 2001; Cavallo and Rossi, 2001), better risk diversification (Mester 2008; Emmons et al., 2004; Hughes et al. 1999; Boyd et al., 1993) and productivity and X-efficiency gains to a certain extent (Berger and Mester, 2003). For instance, Wheelock and Wilson (2012) find plausible evidence on economies of scale in a large U.S. banking sample over the period 1984 - 2006. Hughes et al. (2001) document economies of scale in banks with asset size greater than \$25 billion. Cavallo and Rossi (2001) find significant economies of scale and scope in almost all asset classes and at all production levels

using a panel data of 442 banks from six European countries over a period spanning 1992–1997. On the account of diversification effects, Hughes et al. (1999) find a marked reduction in insolvency risk and enhanced efficiencies for large U.S. banks that expanded at the interstate level. Emmons et al. (2004) find risk mitigating effects of portfolio diversification more dominant than geographic expansions in U.S. community banks. Empirical evidence on X-efficiency and productivity is mixed. For instance, Berger and Mester (2003) find substantial improvement (deterioration) banks' profit (cost) productivity in the U.S. over the period 1991-1997. On the other side, Altunbas et al. (2001), and Cavallo and Rossi (2001) find significant X-inefficiencies on relatively large European bank samples.

Proponents of negative risk implications of M&A find that M&A activity may give rise to banks' idiosyncratic and/or systemic risk (see, for instance, Boyd and Graham, 1991; John et al., 1991; De Nicoló and Kwast, 2002). The argument primarily stands on moral hazard relating to bank size ("too big to fail" phenomenon), structural complexities, and other risks relating to activity diversification (Group of Ten, 2001; Amel et al., 2004). The first view is of moral hazard dilemma relating to the increase in bank size that may lead banks to enjoy their "too big to fail" status. Moral hazard is a situation when a bank may behave in a different manner under a risk-insulated environment (e.g., due to deposit insurance and bailout policies) than that of a full risk exposure (i.e., no government protections are available). Government support in the form of deposit insurance schemes or bailouts limits the downside risks of banks. Hence, banks continue to engage in risky activities in a bid to maximize their subsidy from such government interventions during the times of crisis or financial distress (Boyd and Runkle, 1993; De Nicoló et al., 2004; Stiglitz, 2010).

Banks may actively pursue M&A oriented growth strategies to enhance their benefits related to the "too big to fail" status (see, for instance, Boyd and Graham, 1991; John et al., 1991). Such banks may induce excessive risk taking knowing the fact that they will be bailed out at the cost of taxpayers' money if a risky bet goes sour but would bag all the profits in case of a successful gamble (Stiglitz, 2010). Hence, we may end up having few even bigger and more "too big to fail" surviving banks in our financial system. A study of De Nicoló et al. (2004) on a sample of large U.S. and European banks deduce from a significant deterioration in bank risk profile that consolidation and conglomeration may not lead to a safe financial system.

Another strand of literature focuses on challenges relating to structural complexities and other downside effects of activity diversification. When banks attempt to increase their

geographic reach or broaden the scope of their activity through M&A, they become complex in structure. This complexity may not only pose operational challenges to these financial institutions, but the opaque nature of some activities also makes them difficult to monitor (De Nicoló et al., 2004). This aspect has drawn a lot of attention from the concerned quarters during the recent financial crisis particularly in the context of commercial banks growing interest in nontraditional sources of income generation including investment banking and insurance businesses (De Jonghe, 2010). Moreover, diversification may foster strategic similarities and interdependencies among the large size financial institutions, which may increase the likelihood of systemic risk. According to Stiglitz (2010), mergers between commercial and investment banks give rise to the conflict of interest situation. This may expose the whole financial system to a speculative risk-taking culture which is primarily attributed to the investment banking firms.

Some recent studies conducted on bank M&A empirically substantiate our arguments relating to the link of “too big to fail” oriented subsidies and diversification. For example, Hagendorff et al. (2012) find a significant impact of regulatory and deposit insurance regimes for domestic mergers. In contrast, Carbo-Valverde et al. (2008) find that banks more active in cross-border M&A extract higher safety net benefits but demonstrate no efficiency improvements. Molyneux et al. (2014), evaluate M&A activity of nine EU countries between 1997 and 2008. They find a positive correlation between merger premiums paid and the probability of becoming “too big to fail”. However, they find no strong evidence about any potential contribution of M&A activity in increasing systemic risk. Then the likelihood of a “too big to fail” firm to receive financial support may have a significantly positive impact on bank credit ratings (Soussa, 2000; Rime 2005).

Concerning the activity diversification, Boyd et al. (1993) find risk increasing implications of mergers of U.S. bank holding companies with security and real estate firms using a sample over a period of 1971 - 1984. Lepetit et al. (2008) also find evidence on diversification related increase in the risk of European banks using a sample spanning 1996 – 2002. Carletti et al. (2003) frame their argument on M&A risk implications in the context of “competition – stability” view presented in the works of Boyd and De Nicoló (2005), and Boyd et al. (2006). Carletti et al. (2002) discuss several challenges – such as the emergence of “too big to fail” banks, monitoring of opaque activities, lower money market liquidity, poor market discipline

– emanated from M&A waves in the financial industry and have potentially resulted in an unstable banking system.

In the light of above-mentioned review, this study investigates following research questions:

- (i) *Whether the intensity of M&A activity of European banks over a long period before crisis significantly relate to their bailouts during the 2008 financial crisis?*
- (ii) *Whether the intensity of M&A activity of European banks over a long period before crisis significantly relate to the credit ratings of the banks during the 2008 financial crisis?*

These two research questions permit us to address two dimensions of bank stability. First, as stated above, by definition bank bailout and credit ratings are also considered as exogenous indicators of bank distress. Therefore, use of these measures indeed enables us to investigate the relationship of past M&A activity with bank distress during the financial crisis. Second, it also provides a further insight on size and safety net related motives of M&A discussed in the literature. Thus, an additional hypothesis that particularly attempt to verify presence of “too big to fail” motive across different asset classes of sample banks is:

Whether European banks engage in M&A activity to take advantage of the benefits of the “too big to fail” governmental subsidies?

External growth strategies of large sized European financial institutions may increase significantly their size and interconnectedness making their failure disastrous to the overall financial system, and their support more likely when they face such failures. Indeed, these large banks, which grow mainly through a series of M&A, are perceived as a threat to the stability of the financial system in the wake of exogenous shocks: their collapse would cause widespread disruptions in financial markets that could not easily be contained due to their big size and complex contractual relationships with many other institutions (Stern and Feldman, 2004).⁸ Therefore, we expect the safety net subsidies associated with the “too big to fail” status to be a major motivation of the M&A activity observed before the 2008 financial crisis.

⁸ The too-big-to-fail effect may operate not only on size, but also on the degree of the bank’s interconnectedness with other financial institutions (Fратиanni and Marchionne, 2013).

3. Data sources and sample composition

3.1.M&A sample

Since we attempt to analyze the relationship of intensity of M&A activity with the bailout and credit ratings of banks, we collect a sample of 1603 M&A transactions of large sized European financial institution from Thomson Financial SDC database. To reach this M&A sample, we first compile a list of European banks that have dominated the industry over a long period before the crisis. Therefore, we first extract a list of the 50 largest (in total asset terms) European banking firms based on SIC code classification for financial institutions from Thomson One Banker financial database for each year between 1990 and 2006. We obtain a unique list of financial firms by merging 17 yearly lists. We eliminate some firms because of misclassification or not having banking as their core business (e.g., Aegon NV, Allianz SE, ALM Brand etc.). This provides us with a list of 53 unique large banks from 17 European countries.

In the next step, we obtain information on our identified banks' M&A activity between 1990 and 2006 from Thomson Financial SDC database. We impose criteria to look for only those M&A deals where acquirer is one of the 53 banks identified, and transactions are completed with reported deal size. We exclude transactions undertaken by multiple acquirers.⁹ We place no restriction on the deal size, deal type (mergers, acquisitions, acquisitions of partial assets, etc.), target industry, target geographic location. This allows us to extract an exhaustive level of information about the M&A activity of the banks in our sample. This provides us necessary data for 1603 M&A transactions of the 41 large banking institutions (See Appendix A for the list of sample banks).¹⁰

Figure 1 provides a graphical depiction of the trend in M&A activity of European banks included in our sample. M&A waves at the end of the nineties and the M&A freeze in the wake of the internet bubble crash are very much apparent in the figure. The first peak of activity is observed around the Euro introduction in 1999 and 2001 and a second at the end of the analyzed period. The wave phenomenon is even stronger in value terms than in terms of the number of

⁹ Acquisitions by multiple acquirers operating jointly are quite frequent in the banking industry. We collect 458 such transactions during the 1990-2006 period for our 41 banks or approximately 20% of the total sample. It is in practice very difficult to allocate these acquisitions to specific banks. So, we exclude them from the sample. This implies that we under-estimate the intensity of the acquisition activities of the set of banks included in our analysis.

¹⁰ We employ identical filters to collect M&A activity of the sample banks for the period 2010-2014, which is used for additional analysis on post-financial crisis period

transactions, a general characteristic of the M&A market recently emphasized in Netter et al. (2011). Table 1 displays descriptive statistics for our sample. Panel A and B of the table report the distribution of banks by year and by country, respectively. In both panels, the number of M&A transactions, the corresponding percentages, the aggregate value of M&A transactions and the corresponding percentages are provided. Values are in the year 2006 Million USD terms. Inflation adjustment is computed using the consumer price index (CPI) of the home country of each bank. The aggregate amount of acquisitions by the 41 banks kept in our sample is an impressive 813,260 Million USD. Panel B provides the distribution of banks by country. The three countries with a significant presence in the sample are Italy (7 banks), Great Britain (6 banks) and France (4 banks). In terms of the value of M&A transactions, Great Britain, however, remarkably dominates the sample (29.81% of the aggregate amount of acquisitions), followed by Italy (12.58%), Switzerland (12.52%), and France (12.32%).

3.2. Data on bank bailouts, credit ratings, and controls

Our next step is to collect information on financial rescue plans offered to the sample banks in the form of capital injections, state-guarantees, or other government-sponsored programs during the financial crisis of 2008 in Europe. This enables us to construct our bailout based dependent variables. We extract this information using several sources, including database Factiva, and the websites of the European Commission, central banks, the Bank for International Settlements, etc. The database Factiva is offered by the Dow Jones Company. It provides comprehensive global news and business information, which are extracted and updated on a continuous basis from different sources including newspapers, business and trade journals, magazines, etc. Therefore, with the help of Factiva, we collect several press releases and news items published in international newspapers like the Financial Times, Wall Street Journal and Reuters during the period of the 2008 financial crisis.¹¹ These news items relate to bailout details on our sample banks or banking industry in their home countries. Use of other sources enables us to compile information in a comprehensive manner about these rescue plans (e.g., dates and types of interventions, the name of beneficiaries, total amounts of rescue package announced by each country etc.). We provide details on the financial support of our sample banks in Appendix A– Table A.1. We also collect data on financial rescue plans of countries include in the sample (see Appendix A– Table A.2). The construction of rating based dependent variables (both issuer and support rating) is accomplished by using information on

¹¹ See sample news items and press releases collected from Factiva and other sources in General Annexure 1 at the end of this dissertation.

bank ratings from Fitch Ratings, Standard and Poor's (S&P's) and Moody's Investor Services (Moody's). Issuer rating published by Standard and Poor's and Fitch Ratings are collected from Thomson One Banker database. Moody's Bank Financial Strength ratings (MBFS) and issuer ratings have been manually obtained from the website of Moody's Investors Service.¹²

For data relating to control variables, we primarily rely on data sources offered by Thomson One Banker financial database. We also consult, where required, the financial reports of banks in our sample obtained from their websites. We use data sources available with the World Bank and the European Central Bank (ECB) for macro data such as the consumer price index, gross domestic product (GDP) etc.

4. Research methods

4.1. Dependent variables

This study mainly aims to investigate the relation between past M&A activity of banks, and bailouts and credit ratings of large European financial institutions during the financial crisis of 2008. Despite being exogenous in nature, bailout and credit ratings, provide us useful information about banks' financial condition and fit well into the category of bank distress measures.

4.1.1. *Bailout support based measures*

The first set of dependent variables used in our study is calculated on financial support or rescue packages, to which the banks in our sample subscribed during the financial crisis of 2008. These measures are defined below.

- i. ***Bailout Dummy***_{*i,t*} – As mentioned above in section 3.2, we collect information on different rescue plans offered to the banks in the form of capital injections, issuance of state-guaranteed bonds, or other government-sponsored programs. We extract this information using several sources, including database Factiva, and the websites of the European Commission, central banks of the European nations in our sample. To look for pertinent news items on Factiva, we use keywords including 'rescue', 'bailout', 'financial support', 'distress', 'capital injection', 'liquidity support', 'government guarantee', 'government intervention', 'failure', 'troubled', etc. This search criterion to

¹² General Annexure 2 at the end of this dissertation provides few snapshots for sample banks' Moody's Bank Financial Strength ratings (individual rating) collected from Moody's Investors website.

identify distress banks is consistent with Cihak and Poghosyan (2011). We use this information to construct a dependent variable *Bailout Dummy* that is dichotomous in nature, and takes the value one if a bank i was subscribed to any kind of financial support offered by its government during the time period t (i.e., the period of financial crisis 2008 – 2009) and zero otherwise.

- ii. ***Bailout Percent* _{i,t}** – In order to ascertain further insight into the relation between banks’ M&A activity and external financial support, we introduce a second measure, which is based on the total amount of financial support received by each bank in our sample as a percentage of its home country’s total bailout package announced (see Table A.1 and A.2 of Appendix A). This measure may be useful indication towards the intensity of distress beyond its mere existence for banks during financial crisis. Hence, a distress variable *Bailout Percent* for a bank i at time period t is given by:

$$Bailout\ Percent_{i,t} = \frac{\sum_{j=1}^n Bailout\ Amount_{i,t}}{\sum_{j=1}^n Country\ Bailout_{k,t}} \quad (1)$$

Where;

- t represents the time of crisis spanning over years 2008 – 2009,
- j is the type of rescue packages available to banks and may constitute from one or several forms of financial supports including capital injections, state-guarantees, or other forms of government support offered,

k stands for the sample bank’s home country.

4.1.2. Credit ratings based measures

Our second set of dependent variables is based on credit ratings assigned to banks by different CRAs. These ratings are generally considered as a source of reducing asymmetric information between investors and firms by providing useful information about the financial position of the firms. Hence, they facilitate capital allocation (Pinto, 2006). We primarily find two important types of the bank ratings. First are the standard – Issuer Ratings – which are the most commonly used ratings. This synthetic measure is also considered as bank’s performance indicator on several avenues’ including profitability, asset quality, risk, management efficiency. Moreover, these ratings also incorporate information relating to the macroeconomic environment and the possibility of any external support a firm may potentially extract from different sources including their parents organization, regulator and/or government (Iannotta et al., 2013; Gropp

et al., 2011). The second important type of ratings are – Individual Ratings – that measure the inherent strength of a bank. This type of rating ignores the likelihood of external support in case a bank faces significant financial difficulties. Therefore, we may term it as a suitable measure to assess banks’ insolvency, irrespective of any possible government intervention triggered by such insolvency risk.

Iannotta et al. (2013) document two important advantages relating to the use of the above discussed two types of ratings in our study. First, due to the exogenous nature of such variables, we can avoid the problem of endogeneity that commonly comes across while using accounting ratios as dependent variables. Second, use of the two types of ratings clearly differentiates between bank’s default risk and insolvency risk, where the former type of risk incorporates external support factor and the latter does not consider such extreme occurrences. Credit ratings indeed provide an ordinal measure of distress. So despite having a questionable accuracy sometimes (Altman and Saunders, 2001), they are yet considered a useful relative measure of distress.¹³ For the purpose of this study, we use the two types of ratings in the construction of the following dependent variables.

- i. ***AVIssuer*** – is the average numerical value of Fitch Ratings (FLT), Moody’s (MLTD) and Standard & Poors’s (S&PLT) on long-term debt issues at the end of the fiscal year.¹⁴ A higher numerical value (worse rating) means an increase in distress for a bank, and vice versa.
- ii. ***Moody’s Individual*** – is the year-end numerical values of Moody’s Bank Financial Strength rating (MBFS) for the year 2008.¹⁵ Similar to issuer rating, a higher numerical value (worse rating) of MBFS means an increase in insolvency risk and distress for a bank, and vice versa.
- iii. ***Moody’s Support*** – is the absolute difference between Moody’s issuer and individual ratings (MBFS) converted into a numerical scale at the end of the year 2008.¹⁶

¹³ Altman and Saunders (2001) point towards two issues associated with rating assignments; first, ratings have backward orientation and second certain degree of opaqueness exist in methodologies used by rating agencies in corporate and sovereign risk assessment.

¹⁴ See Appendix B, Table B.1 for rating scales for issuer ratings provided by three rating agencies i.e., Fitch Rating, Moody’s and Standard & Poor’s.

¹⁵ Table B.2 of Appendix B reports rating scales for Moody’s Bank Financial Strength (MBFS) and Fitch Rating Individual (FRI). We only use MBFS as our access to information on Fitch rating data was quite limited one. We only use MBFS as our access to information on Fitch rating data was quite limited one.

¹⁶ Table B. 3 of Appendix B reports mapping of Moody’s Bank Financial Strength (MBFS) and issuer rating (MLTDS) as provided in Moody’s Investor Service (2005).

4.2. Independent and control variables

4.2.1. M&A intensity measure

We measure the intensity of the bank acquisitions by the sum of investment in M&A divided by the bank's market value:

$$AcqM\&A_i = \frac{\sum_{k=1}^N Deal\ Size_{i,k}}{MV_i}, \quad (2)$$

where N is the number of M&A completed by bank i during the period 1990-2006, $Deal\ Size_{i,k}$ is the corresponding deal size in 2006 equivalent million USD (home country consumer price index for inflation adjustment), MV_i is the bank i market value at the end of year 2006.

For a more in-depth analysis of M&A effects on the bank bailout and credit ratings during the financial crisis, we further use two M&A related variables. They cover two important dimensions of M&A including cross-border M&A and acquisition of large size targets. *Crossborder* is a dummy taking value 1 if a bank's cross-border M&A exceeds domestic M&A in value terms and 0 otherwise. *LDeals* is a dummy variable that takes value 1 if the total value of large size targets (value above or equal to USD 1bn in 2006 inflation-adjusted terms) is above the median of the total amount of M&A activity of acquiring bank and 0 otherwise. This filter enables us to see the impact of extremely large size deals. We put forward a few arguments to support the selection of these two additional variables on M&A activity. Concerning variable *Crossborder*, study of Carbo-Valverde et al. (2008) document higher safety net benefits for banks found to be active in cross-border deals while Hagendorff et al. (2012) find such benefits linked to domestic deals for European banks. Chionsini et al. (2003) also show that geographic diversification may induce risk implications stemming out of certain international factors (e.g., exchange rates, political instability, regulatory issues, cyclical sensitivities) affecting a particular region. With respect to the variable on large deals (*LDeals*), more emphasis on acquiring large size targets may not only render diversification benefits but also increase acquirer's influence with regulators and likelihood of receiving government support in times of crisis (Carbo-Valverde et al., 2008).

4.2.2. Control variables

We use a set of control variables relating to bank characteristics and economy that may have important implications with respect to the effects of M&A activity on our dependent variables.

This includes a set of *TBTF dummies* (to classify sample banks in different categories of total assets) that we use in some specifications to cater for bank size. The increase in size is widely discussed motive for banks to pursue their aggressive M&A strategies particularly due to benefits associated with “too big to fail” status (Boyd and Runkle, 1993; Stiglitz, 2010). Similarly, variable *Deposit Ratio* may reflect upon possible risk increasing (decreasing) implications relating to the bank’s strong deposit base and associated implicit (explicit) deposit insurances (Demirgüç-Kunt and Huizinga, 2004; Bertay et al., 2013). Capital ratio that equates bank equity over its total assets is also relevant in a sense that we expect well-capitalized banks to maintain better ratings and less likelihood of opting for governmental supports during the financial crisis compared to the weaker ones. Moreover, lower capitalization or higher leverage per se may not only be attributed to large banks but it also varies with respect to their specialization (Gropp et al., 2011). In the same spirit, type of ownership (mutual or publicly owned) tend to cast an effect on bank rating assignments (Ianotta et al., 2013) and governmental support (Gropp et al., 2011). Global Focus captures a bank's geographical presence across the world and may elaborate on banks expansion motives in a bid to make them systemically more important for regulators. Lastly, *Log of GDP* is to capture the differences relating to economic development that may have an influence not only in case of bank growth (i.e., M&A activity) but also on regulatory oversight and bailout policies (Carbo-Valverde et al., 2008). These variables have been used in our main analysis and are defined in Appendix C. In addition to this, we also use some alternative measures of bank characteristics including *Market to Book Ratio*, *Debt Ratio*, *Bank Size (log of assets)*, *Tier 1 Ratio* (Tier 1 capital over total capital), *ROAA* (return on average assets), *Offbal Ratio* (offbalance sheet assets over total assets), and *Income Diversity Ratio* (investment banking income over total assets) in robustness checks and additional analysis on post-crisis M&A activity of sample banks.

4.3. Empirical methods

The empirical method for our univariate and multivariate analysis varies depending on the nature of dependent variables employed.

4.3.1. European banks’ M&A activity and bailout support

First part of our analysis explores the relationship of intensity of bank M&A activity (external growth strategies) with the governmental support received by banks under different bailout packages. Several studies have used bailout information primarily as an ex-post measure of bank distress. This includes among others Dam and Koetter (2012), Altunbas et al. (2011),

Vazquez and Federico (2012) and Cihak and Poghosyan (2011). We use two dependent variables *Bailout Dummy* and *Bailout Percent*. *Bailout Dummy* is a binary variable. Therefore, it entails us to follow a classical probit specification. Standard OLS estimation serves our purpose while using *Bailout Percent* as the dependent variable. *AcqM&A* is our main variable of interest and is defined in section 4.2.

In the same spirit, we also perform univariate regressions using *Crossborder* and *LDeals* to further investigate the effects of two important M&A dimensions separately (i.e., crossborder M&A and acquisition of large size targets) on our dependent variables. These M&A features may have interesting financial support/safety net related implications. Full specification also includes control variables relating to bank deposits, capital base, ownership type, geographic spread and economic development (see section 4.2 for details). Thus, our full specifications for external support variables may be viewed as following:

$$Probit(BailoutDummy_{i,t}) = f(AcqM\&A_{i,t}, Other\ M\&A\ Features_{i,t}, Controls_{i,t}) + \varepsilon_{i,t} \quad (3)$$

$$OLS(Bailout\ Percent_{i,t}) = f(AcqM\&A_{i,t}, Other\ M\&A\ Features_{i,t}, Controls_{i,t}) + \varepsilon_{i,t} \quad (4)$$

Where i is for individual banks and t varies with respect to calculation period used for dependent and independent variables.

4.3.2. Bank M&A and credit ratings of European banks

The second part of our analysis attempts to investigate whether the intensity of M&A activity of European banks before financial crisis demonstrate a significant relation with their credit ratings during the 2008 financial crisis. The use of credit ratings in empirical research through a variety of statistical models dates back to the 1960s. For instance, Horrigan (1966) and Ianotta et al. (2013) used OLS model, Jackson and Boyd (1988) applied logit and probit regressions, while Feng et al. (2008) performed an analysis using ordered probit model. The nature of our dependent variables derived from bank issuer and individual ratings allows us to perform our analysis by using standard OLS regressions in both univariate and multivariate settings. Use of three dependent variables including *AVIssuer*, *MoodyIndividual* and *MoodySupport* (in robustness section) not only enable us to explore both insolvency and default risk of our sample banks exogenously but also their implicit likelihood of receiving bailout support in the 2008 financial crisis. Regression scheme is analogous to the one presented above in external support case and described in equation 4 for full specification case.

In this paper, we focus on large sized European financial institutions that have been dominant in the industry in the past two decades and aggressively pursued their growth ambitions via M&A activity. The importance of banks in our sample stems from the fact that despite being small in numbers (41 observations), these banks, nonetheless, held a considerable 52% (28,517 Billion USD) of the total assets of the European banking industry at the end of 2006, and cover major chunk of liquidity in the Euro system. Moreover, most of these banks have become part of the European Systemic Risk Dashboard (ESRB). However, small sample size (41 observations) exposes us to a trade-off between omitted variable biases and power of tests. If we include few control variables in our specification, the number of degrees of freedom is higher but results may be affected by the potential omission of variables (and vice-versa). We chose, therefore, to report systematically four specifications in our main results: the first includes only the main variable of interest, the second and third specifications use variables that capture aspects of cross-border and large size acquisitions. In estimation four, we combine M&A intensity variable with the M&A featuring variables and other control variables to formulate a full specification. This strategy enables us to have a good insight over different facets of our research hypothesis.

For inference, we use the percentile t bootstrap procedure to compute p -values in our multivariate analysis as it deemed essential. Bootstrap is useful for small sample analysis, where asymptotic normality of estimators does not apply (see Horowitz, 2002). We bootstrap the student statistics for each coefficient in our multivariate models as follows:

- We draw, with replacement from the original data matrix, 1000 bootstrap samples of the same size as in the original sample.
- For each bootstrap sample, we estimate the coefficients and t statistics of the multivariate model under consideration using heteroscedastic robust standard errors.
- We collect for each coefficient the bootstrapped t statistics and thereby build their bootstrapped empirical cumulative distribution functions.
- We use the bootstrapped empirical cumulative distribution functions to compute the coefficients' p -values (with a null hypothesis of the coefficient being equal to 0).

We adopt case-by-case resampling, which is robust to heteroskedasticity.

5. Empirical results

5.1. Descriptive statistics and bivariate analysis

Table 2 presents descriptive statistics for the variables used in this paper. Panel A of the table provides summary statistics on dependent variables including bailout and credit rating based measures of distress. On average banks in our sample received a hefty 39,866.85 Million USD from rescue plans (mainly comprising of recapitalization and state guarantees) offered by either their national governments or regulatory bodies during the 2008 financial crisis. This average accounts for approximately 12.6% of the total financial rescue plan announced by 17 European countries in our sample. Variable *Bailout Dummy* shows that 54% of the banks in our sample subscribe to the bailout packages.

AVIssuer and *Moody's Individual* ratings (Moody's MBFS rating) for our sample banks remain 5.51 and 6.07 respectively at the end of the year 2008. We observe better issuer ratings for our sample banks than their individual ratings. However, these numbers demonstrate deterioration in bank ratings for the year 2008 with respect to the year 2006 (unreported). *Moody's Support*, which is the absolute difference between numerical values of Moody's issuer and individual rating, and reflects the extent of external financial support stands at an average of 2.47. In Panel B of Table 2, we report descriptive statistics of M&A activity. The reported statistics cover three salient aspects of M&A strategies adopted by our sample banks including the overall intensity of M&A activity, focus on acquiring large size targets and cross-border M&A activity. Table 2 – Panel C reports figures for control variables relating to bank characteristics and economic development.

In Table 3, we perform *t*-test of mean equality for our sample banks based on their M&A activity. To do this, we split our sample into banks above and below the median value of *AcqM&A* variable. We compare the differences in means of our dependent variables including bailout and credit rating based measures; M&A characteristics and control variables used in the main analysis. We find that the banks above the median value of M&A intensity variable exhibit higher likelihood of receiving bailout support during the financial crisis of 2008. Moreover, these banks show significantly worse issuer and support rating than banks in below the median group. However, we find no significant differences between the two groups in terms of their individual ratings (Moody's MBFS).

Further, we observe that significant differences exist between the two groups in terms of other M&A features including absolute value of M&A activity and bank's focus on large size acquisitions. Statistics on *Total Assets* and *Global Focus* also demonstrate differences between the two groups. Clearly, banks present in the above median category of M&A activity ratio are the ones bigger in size and with greater geographical presence. These findings on the size and global focus indicate that our analysis may be affected by "too big to fail" phenomenon. Interestingly, we observe no significant differences between mean values of the two groups in terms of their deposit base, capitalization ownership type, and economic development.

5.2. Main results

5.2.1. M&A activity and bailout support during the 2008 financial crisis

We start our main results from Table 4 that reports estimations on our first hypothesis: *Whether the intensity of M&A activity of European banks over a long period before crisis significantly relate to their bailouts during the 2008 financial crisis?*

We are interested in the events of the 2008 financial crisis. In Panel-A of the table, we report probit regressions using variable *Bailout Dummy* as the dependent variable, while Panel-B of the table reports OLS regressions using *Bailout Percent* as the dependent variable. In columns 1 to 3 results are reported by using individually, variable *AcqM&A* (the main variable of interest; see Equation 2), and variables *Crossborder* and *LDeals* that represent banks' focus towards cross-border M&A and large size M&A, respectively. Column 4 of the table reports results by using *AcqM&A* along with variable *Crossborder* and control variables on banking characteristics and economic development.¹⁷

Tables 4 – Panel A results demonstrate a positive and statistically significant coefficient for variable *AcqM&A* in both univariate and multivariate specifications, with an improved significance in the case of latter. It indicates that the intensity of M&A activity of the banks over a long time span of 1990-2006 demonstrates a significantly positive relation with banks' likelihood to receive external support during the 2008 financial crisis. Moreover, results on large deals in column (2) show that banks that remained more focused towards acquiring large size targets subscribed to government support during the financial crisis period as displayed by the positive and statistically significant coefficient of variable *LDeals*. The coefficient of *Crossborder* variable shows a positive sign but without any statistical significance in both

¹⁷ *LDeals* is excluded from full specification due to its high correlation with variable *AcqM&A*

univariate and multivariate analysis. Concerning the control variables employed in the full specification, a positive and statistically significant coefficient estimated for *Deposit Ratio* indicates that higher deposit base positively relates to the likelihood of bailout support during the financial crisis as indicated in the literature. On the other side, negative and statistically significant coefficients for variables *Capital Ratio* and *Mutual* are supportive of the notion of conferment of bailout support mainly to the banks with weak capital base and public ownership. A negative and statistically significant coefficient of *Global Focus* suggests that the banks' wide geographical presence to be negatively linked with the likelihood of bailout support during the financial crisis. This in a way contradicts the notion that geographical diversification -though not calculated in M&A terms- fosters large safety-net related benefits to the banks as documented by Carbo-Valverde et al. (2008). Finally, a negative and statistically significant coefficient of *Log of GDP* tends to support findings of Carbo-Valverde et al. (2008) that observe higher safety net subsidies in small economies using a sample of EU-15 countries. We also notice an improvement in goodness of fit for our regressions in multivariate analysis in column (4) of the table.

Tables 4 – Panel B reports OLS estimates using *Bailout Percent* as the dependent variable. We employ an identical scheme of regressions as in Panel A of the table. Evidently, univariate regression results in column (1) to (3) are consistent with the ones reported in Panel A of the table (probit models): variable *AcqM&A* and *LDeals* show positive and statistically significant coefficients in their respective regressions. Moreover, the level of significance slightly improves in the case of *LDeals* coefficient. In our multivariate analysis of column (4), though the coefficient of *AcqM&A* maintains its statistical significance with a positive sign but none of the other variables demonstrate a significant coefficient at any statistical level.

Probit and OLS estimations in Table 4 provide us quite stable results with the two different measures of external financial support for European banks during the 2008 financial crisis. This enables us to understand the direction and extent of the relationship between the intensity of bank M&A activity over a long pre-crisis time period and the bailout support conferred to them during the financial crisis. Hence, concerning our first hypothesis, we may deduce from the above results that the European banks with a high level of M&A activity tend to tap higher bailout support during the period of financial crisis of 2008, which seemingly is a consequence of their “too big to fail” status. In other words, external growth strategies (M&A activity) of

large sized European banks may induce accumulation of risk making them prone to financial distress, and hence, a well deserving candidate for governmental support.

5.2.2. M&A activity and bank credit ratings during the financial crisis

Now, we move to our second hypothesis: *Whether the intensity of M&A activity of European banks over a long period before crisis significantly relate to the credit ratings of the banks during the 2008 financial crisis?*

In order to test this, we construct dependent variables based on two important ratings assigned to banks by three prominent credit rating agencies (Fitch, Moody's, and Standard & Poor's). The variables are (i) *AVIssuer*, which is an average of the numerical value of bank issuer ratings for the year 2008 (ii) *MoodyIndividual* that denotes numerical equivalent of Moody's bank financial strength rating (MBFS) for the year 2008. This analysis enables us to investigate first, the exogenous perspective on two important dimensions of bank distress via credit ratings (i.e., insolvency risk and default risk, see section 4). Second, it also facilitates us to perform a robustness test on the link between M&A activity and safety net support by using a credit rating based measure of external support perception (in robustness section).

Table 5 report results again in two panels. Panel A is dedicated to the analysis of issuer rating while Panel B provides results on Moody's individual rating (MBFS). The tables are organized analogously to the one presented in Table 4. Results in Panel A demonstrate a positive and highly significant coefficient for variable *AcqM&A* in both univariate and multivariate specifications. This indicates that the intensity of bank M&A activity negatively impacts their issuer rating during the 2008 financial crisis. A positive sign of the coefficient shows an increase in the average numerical value of rating variable, which means a downward adjustment in issuer ratings of the banks in our sample. Keeping in view the economic interpretation of issuer ratings, we may infer that the M&A activity of our sample banks tends to increase their likelihood of default risk during the period of financial crisis. Moreover, we also obtain a positive and statistically significant coefficients for variable *LDeals* reported in regression of column (2) of the table. Banks with a greater focus on acquiring large size targets are the ones that witnessed a downward adjustment in their issuer rating at the end of the year 2008. Moreover, the results of multivariate specifications in the column (4) also indicate that no other variable turns out to be significantly related to issuer ratings of the banks during the financial crisis.

In contrast, results of Table 5 – Panel B display a negative and statistically significant coefficient for *AcqM&A* in univariate estimations while it turns insignificant in the multivariate specification. Concerning the effect of large size deals, the coefficient of variable *LDeals* is also estimated to be negative and statistically significant at 1 percent level. The coefficient of *Crossborder* variable though remains positive but without any statistical significance in both univariate and multivariate regressions. Finally, consistent with the findings of Panel A, control variables in column (4) estimation demonstrate no significance at any statistical level. Negative and statistically significant coefficients for variables *AcqM&A* and *LDeals* show that banks with a greater intensity of M&A activity at the aggregate level and more focus on large size deals demonstrated improvements in individual ratings during the 2008 financial crisis. As mentioned previously, banks' individual ratings are by definition an indicator of their intrinsic financial strength (solvency of banks), the results of Panel B point towards lower insolvency risk for banks that actively pursued their M&A strategies.

The economic interpretation of these results could be that M&A activity at large banks may have enabled these banks to build greater solvency buffers to deal with such adverse shocks. Moreover, given the fact that our sample mainly represents large sized banks, this might be the case that any bad news about such gigantic financial institutions has been received in a less prompt and less strong manner by CRAs as far as the bank solvency is concerned.

5.3. Robustness

5.3.1. *Alternate measure of financial support*

In an attempt to further substantiate the findings of our first hypothesis we introduce an alternate measure of financial support derived from credit ratings termed as *MoodysSupport*, which is the numerical difference between the absolute value of Moody's issuer and individual rating for the year 2008. Fitch Rating Agency also provides a similar type of measure namely Fitch Support Rating (FSR) that reflects the likelihood of external support (Gropp et al., 2011). However, we confine to *MoodysSupport* due to our limited access to information on Fitch support rating.

We replicate our OLS estimations of Table 4–Panel B by using *MoodysSupport* as the dependent variable. We report results in Table 6. While a positive estimated coefficient of variable *AcqM&A* narrowly misses significance at 10% statistical level in the first column, it turns significant at 1% level in the multivariate specification. Moreover, the coefficient of

Deposit Ratio shows a statistically significant coefficient but with a negative sign. This result is in contrast with what we observed in results on bailout support based measures. Further, we observe no statistically significant relationship of large deals (specification 2) and cross-border M&A intensity (specification 3) with the credit ratings based measure of external support during the financial crisis. The contrast observed in some of our results based on bailout and credit ratings may potentially indicate towards different nature of two dependent variables used— former is based on explicit and clear information about the government support received by banks (bailouts) while the latter is derived from ratings assigned by CRAs. It may also be perceived that large banks’ influence and effective lobbying with supervisors may drive regulators decision to confer safety-net benefits instead of an actually monitored bank volatility (Carbo-Valverde et al., 2013; 2008). However, we refrain to vindicate this argument from the observed contrast for the following two reasons. First, money spent on the banks through these bailout packages was not completely lost; rather banks were subject to pay interest and fee on the borrowed amounts and guarantees received apart from increased governmental role in banks’ decision-making in certain cases. Second, rescue plans announced by governments were largely based on market information about the condition of different banks.

5.3.2. M&A activity and too big to fail effect

Whether European banks engage in M&A activity to take advantage of the benefits of the “too big to fail” governmental subsidies?

Since large European banks in our sample are considered to be significant players to maintain financial stability in Europe, “too big to fail” as a motive for bank acquisitive behavior have been established from the results of the main analysis with great reasonableness. However, this might be possible that such an effect varies with respect to certain asset classes of banks. Therefore, we decide to further extend upon our first hypothesis with an ancillary question that exclusively analyzes joint effect of “too big to fail” factor and M&A intensity of our sample banks on conferment of bailout support during the financial crisis. To do this, we first construct a set of dummies termed as *TBTF Dummies* to identify “too big to fail” banks in our sample. These dummies take the value 1 if total assets of a bank are above a certain threshold of sample banks’ total assets and 0 otherwise. The general perception is that larger banking organizations are more likely to be considered “too big to fail”, but since the specific TBTF threshold has never been officially defined (Brewer III and Jagtiani, 2013), we set thresholds on the basis of

quartiles of total assets of our sample banks. We then construct interaction terms using *TBTF dummies* with our *AcqM&A* variable and perform our analysis for all asset classes.

Table 7 reports the results of this robustness test in two panels. For each class of total assets, we perform estimations using the OLS model with *Bailout Percent* (Panel A) and *MoodySupport* (Panel B) as the dependent variables. Regarding control variables, we confine to the use of two alternate bank feature variables including *Market to Book* and *Debt Ratio* along with *Log of GDP* variable.

Results of Panel A of Table 7 show that the coefficient of the interaction term between *AcqM&A* and *TBTF* dummy stands positive and significant in the case of first and second quartile's estimations of Panel A while it remains insignificant for the estimation of the third quartile. The statistically significant and positive relation between interaction term and bailout variable further substantiate the argument which associates M&A activity of banks with benefits of "too big to fail" status. In other words, European large banks have paid billions of dollars in M&A transactions during 1990-2006 that allowed them to become a key player in banking and cross the perceived "too big to fail" size threshold to capture enhanced access to the government's safety net during the 2008 financial crisis.

On the other side, results of the Panel – B of the table that employs *MoodySupport* as a dependent variable, evidence of captioned "too big to fail" effects is limited to only 2nd quartile's specification that yields a positive and statistically significant coefficient of interaction term at 10% level.

5.3.3. *Alternative estimation models for credit rating*

As indicated in the section on the empirical method that ordered- Logit and Probit models are also widely used in previous studies related to credit ratings. Therefore, we also employ the two models to check the consistency of our results on the credit rating (issuer and individual) analysis presented in Table 5. Results are reported in Table 8 in two parallel panels. Panel A uses issuer rating related dependent variable *AVIssuer* while Panel B employs individual rating related dependent variable *MoodysIndividual (MBFS)*. For the purpose of brevity, we only report full specification under the two panels for Ordered- Logit and Probit models, respectively. The results obtained in the case of issuer rating regression demonstrate no substantial difference from the ones obtained previously. Estimated coefficient of variable *AcqM&A* retains both its sign and statistical significance under the two alternative models of regression -with an improved significance level to 1% in the case of latter. However, we observe that the coefficient of variable *Global Focus* also turns statistically significant in Ordered Probit model of regression while retaining its negative sign. No other variable shows up with a significant coefficient at any statistical level. Further in Panel B of Table 8, consistent with the main results, we find our main variable of interest retains a positive but statistically insignificant coefficient in both Ordered- Logit and Probit models of estimations. We also observe no substantial differences in behavior of other additional variables from the ones observed in main results.

5.3.4. *Analysis of post-crisis determinants of the European bank M&A activity*

Our main analysis on bailout support suggests its positive relationship with acquisitiveness of large European banks over a long period of time before the crisis. Despite that the financial crisis is also an opportunistic market particularly for well-capitalized banks to acquire target assets at fire-sale prices (Acharya et al., 2010), it is implied that large banks particularly the one that benefited from bailout should have faced a restraint on their acquisitiveness in the period after the financial crisis. This section attempts to provide an insight on M&A intensity of our sample of European banks after the financial crisis. The idea is to understand the direction and significance of some potential factors in explaining M&A activity of these banks and temptation to further grow over the period 2010-2014 as the dust of crisis started settling.

We provide this insight with the help of a mean and median comparison test between bailout beneficiary and non-beneficiary banks (Table 9) and panel data regression on M&A activity

over the period 2010-2014 (Table 10). Regression analysis is conducted at three levels, including bifurcation based on bailout support (beneficiary and non-beneficiary banks), and the group of banks that have *Moody support* rating above or equal to median during the crisis. Using unbalanced panel data, we perform, for each group, a random effect GLS¹⁸ regression of the M&A activity (as computed in the spirit of equation 2 and enters in the model as our dependent variable) upon a set of potential lagged explanatory variables. Based on literature and the context of financial crisis, our list of potential determinant includes *Bank size* (log of assets), *Tier 1 ratio*, *ROAA*, *Offbalance Sheet ratio*, *Market to Book ratio* and *Income Diversity ratio*.

In Table 9, we performed mean and median comparison tests of non-paired characteristics of bailout beneficiary and non-beneficiary banks in the post-crisis period. Our results point out statistically significant differences (both in terms of mean and median values) between the two groups of banks with respect to all characteristics except the Tier 1 ratio. Indeed, beneficiary banks are significantly larger than non-beneficiary ones. The results in Table 9 also clearly indicate that beneficiary banks are by far less efficient than the non-beneficiary ones with respect to ROAA, Market to Book and Income diversity during the post-crisis period (2010-2014). This suggests that the recovery of the banks that have received capital injections is likely to take a considerable amount of time. This result corroborates the findings of Kick et al. (2010), according to which more time might be required for the beneficiary banks “*until portfolios are set straight and processes are re-designed so as to ensure sustainable banking business*” (p. 5). Finally, the beneficiary banks exhibit a substantially low off-balance sheet ratio in after the financial crisis period. It appears that the beneficiary banks required off-loading significant volumes from off-balance sheet portfolios of assets as such portfolios were later proved an evident channel of transmitting risk across the financial system during the 2008 financial crisis. This result can also be viewed with regard to low-income diversity and ROAA ratios of the beneficiary banks since securitization and similar forms of assets held off-balance sheet are generally viewed as the major contributor to banks non-interest income (Boyd and Gertler, 1994; Barrell et al. 2010).

The results of our multivariate analysis reported in Table 10 suggest a negative and statistically significant coefficient of *Bank Size (log of assets)* for the beneficiary group of sample banks

¹⁸ We performed the Hausman test to decide between fixed or random effects. Our results fail to reject the null hypothesis of independence between the residual and the explanatory variables. The random effect model is therefore preferable.

which clearly indicate a significant reduction in acquisitiveness of banks with greater size. However, this result is not significant when support rating is used as an alternative measure of external support. Similarly, beneficiary banks (as well as banks with high support rating) with elevated levels of off-balance sheet exposure shied away from M&A market, perhaps due to extra monitoring with respect to transferring of toxic assets across subsidiaries and affiliates. With respect to the *Market to Book* ratio, we notice that, whatever is the measure of external support used (bailout or support rating), the coefficient associated with this variable remains positive and statistically significant at conventional thresholds. Indeed, the *Market-to-Book* ratio can be viewed as a measure of the efficiency and quality of a bank's management because investors will generally be willing to pay less for stocks in a poorly managed bank than a well-managed bank (Jagtiani, 2008). Under this interpretation, our results suggest that only beneficiary banks with valuable growth opportunities and efficient management are actively involved in M&A during the post-crisis period.

Overall, the results of our panel regressions evidently indicate towards a significant restraint on acquisitiveness of the bailout beneficiary banks in the sample. While bailout beneficiary banks may term this restraint a self-imposed and responsible act on their part, the regulator may term it an outcome of stern monitoring and regulatory measures aimed to discourage bank's excessive risk taking and mitigate moral hazard problems. Thus, reasoning this post-crisis restraint of large size European banks stands an elusive question –perhaps to be addressed in times to come.

6. Summary and Conclusion

This study empirically investigates the relationship of M&A activity of large European banks performed over a long period before the crisis with their bailouts and credit ratings during the 2008 financial crisis. The latter two have been at the center stage of the debate on financial crisis among several other issues related to banking while the former is considered an evident path that perhaps facilitated few banks to turn large, complex and engage in risky businesses that made the episode of 2008 imminent. We find a considerable lack of studies in the existing literature that analyze the bank M&A activity in the context of bank bailouts and credit ratings. Thus, we attempt to bridge that gap by analyzing the relationship of M&A sample of 1603 transactions performed by large sized European banks over a time span of 1990 to 2006 with bank bailouts and credit ratings during the 2008 financial crisis. We rely mainly on standard OLS and Probit models keeping in view the nature of dependent variables employed to conduct

hypothesis testing with percentile t bootstrap procedure to compute p -values that are robust to heteroskedasticity. We also introduce Ordered- Logit and Probit models as alternate specifications in robustness analysis related to credit ratings of banks during the financial crisis.

We find a positive and statistically significant relationship between the ex-ante intensity of M&A activity of the large sized European banks and their bailout support during the time of financial crisis. Our findings substantiate the argument considering M&A as one of the ways banks may attempt to enhance their safety net subsidies (Molyneux et al. 2014) not only in terms of its likelihood but also the extent of such support. Moreover, we also find significant evidence that positively relates bailout support with acquisitions of large size targets but such an effect could not be determined in the case of cross-border M&A intensity as observed by Carbo-Valverde et al. (2008). Concerning the analysis of credit ratings of European banks, our analysis shows that intensity of pre-crisis M&A activity relates positively to the deterioration in average issuer ratings (increase in numerical scale), and -to a limited extent- with the improvement in their individual ratings (decrease in numerical scale). This contrast in results of two different types of ratings indicates toward a higher risk of default but lower insolvency risk for the sample European banks during the financial crisis of 2008. Evidently, our findings on credit rating related analysis substantially remain robust under the alternate specification of Ordered- Logit and Probit models. However, the use of credit rating based variable as an alternate measure of bailout support revealed a relatively limited evidence supportive of its positive relation with ex-ante M&A activity. Also, we test whether the “too big to fail” phenomenon influence our main results when we analyze M&A activity with respect to different asset classes of banks. Our findings support the notion that banks tend to exploit safety net subsidies associated with “too big to fail” phenomenon through M&A activity. Finally, our analysis of the M&A activity determinants of European large banks in the post-crisis period spanning over 2010-2014 suggests towards a significant restraint demonstrated by the group of bailout beneficiary banks in our sample.

While this paper contributes to various dimensions of the existing finance literature over bank stability, our results highlight some important implications to the attention of regulators and academia. It suggests a further strict monitoring of acquisitiveness of large banks and support the regulatory concerns pertaining to the implications of “too big to fail” factor on bank stability in which M&A activity stands a potential facilitator to attain such status in the market. Although, a significantly negative link between bank M&A activity and their size –as a

determinant of post-crisis M&A— does indicate towards a restraint in the acquisitive behavior of the bailout beneficiary banks. However, the extent to which this restraint should be termed as a chosen one by banks or an imposed one by regulators rests an open question. This study also set forth some possible extension on the topic. Given banks growing interest in non-traditional lines of business that have also been part of the broader debate over the financial crisis, this topic can be extended to provide a further insight into the relation of the intensity of M&A activity in different segments of banking (traditional vs. non-traditional lines of businesses) with bailout and credit rating measures. Another general extension of the study could be to explore and compare the results based on bailout and credit rating based measures with the bank accounting based measures of distress as by definition our two measures reflect upon bank distress from an external lens.

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Appendix A: Bailout Support Information

Table A.1 — List of sample banks and their total financial support

Bank Name	Country	Capitalization	State Guarantee	Total Support
Allied Irish Banks PLC	Ireland	4,198.00	17,068.00	21,266.00
Banca Monte Dei Paschi	Italy	2,528.00	0.00	2,528.00
Banca Popolare Di Milano Scarl	Italy	676.00	0.00	676.00
Banco Bilbao Vizcaya Argentaria Sa	Spain	0.00	0.00	0.00
Banco Comercial Portugues SA	Portugal	0.00	0.00	0.00
Banco Espanol De Credito	Spain	0.00	0.00	0.00
Banco Popolare SC	Italy	1,849.00	0.00	1,849.00
Banco Popular Espanol SA	Spain	0.00	0.00	0.00
Banco Santander SA	Spain	0.00	0.00	0.00
Bank Of Ireland PLC	Ireland	4,198.00	18,751.00	22,949.00
Barclays PLC	Great Britain	0.00	0.00	0.00
Bayerische Hypo- Und Vereins	Germany	0.00	0.00	0.00
BNP Paribas SA	France	10,153.00	0.00	10,153.00
Commerzbank AG	Germany	31,237.00	19,079.00	50,316.00
Credit Agricole SA	France	3,988.00	0.00	3,988.00
Credit Industriel Et Commercial	France	1,595.00	0.00	1,595.00
Credit Suisse Group	Switzerland	0.00	0.00	0.00
Danske Bank A/S	Denmark	0.00	0.00	0.00
Deutsche Bank AG	Germany	0.00	0.00	0.00
Dexia SA	Belgium	8,977.00	138,919.00	147,896.00
Dnb Nor Bank ASA	Norway	0.00	0.00	0.00
Erste Bank Der	Austria	3,419.00	7,904.00	11,323.00
Espirito Santo Financial Group	Luxembourg	0.00	1,955.00	1,955.00
Fortis NV	Belgium	35,420.00	214,500.00	249,920.00
HBOS PLC	Great Britain	36,515.04	0.00	36,515.04
HSBC Holdings PLC	Great Britain	0.00	0.00	0.00
ING Groep NV	Netherlands	41,808.00	14,597.00	56,405.00
Intesa Sanpaolo SPA	Italy	5,426.00	0.00	5,426.00
Lloyds Tsb Group PLC	Great Britain	408,110.00	0.00	408,110.00
Mediobanca SPA	Italy	0.00	0.00	0.00
National Bank Of Greece SA	Greece	453.00	0.00	453.00
Nordea Bank AB	Sweden	0.00	0.00	0.00
Pohjola Bank PLC	Finland	0.00	0.00	0.00
Royal Bank Of Scotland Group PLC	Great Britain	62,549.00	466,115.00	528,664.00
Skandinaviska Enskilda Banken	Sweden	0.00	0.00	0.00
Societe Generale SA	France	4,631.00	0.00	4,631.00
Standard Chartered PLC	Great Britain	0.00	0.00	0.00
Svenska Handelsbanken AB	Sweden	0.00	0.00	0.00
UBS AG	Switzerland	5,300.00	60,000.00	65,300.00
Unicredito Italiano Spa	Italy	2,622.00	0.00	2,622.00
UBI Banca	Italy	0.00	0.00	0.00

Values reported in Millions USD

Table A.2 — Financial Rescue Plan of European Countries in Sample

Number	Country	Capitalization	Assets and debt guarantees	Total
1	Austria	47,861.00	93,345.00	141,206.00
2	Belgium	13,891.00	327,743.70	341,634.70
3	Denmark	17,770.00	783,783.78	801,553.78
4	Finland	0.00	67,567.57	67,567.57
5	France	81,489.00	699,556.00	781,045.00
6	Germany	107,768.00	811,080.00	918,848.00
7	Great Britain	82,719.00	386,022.00	468,741.00
8	Greece	6,927.00	29,619.00	36,546.00
9	Ireland	23,760.00	563,240.00	587,000.00
10	Italy	26,260.00	1,362.00	27,622.00
11	Luxembourg	529.00	20,804.00	21,333.00
12	Netherland	27,292.00	273,160.00	300,452.00
13	Norway	1,459.00	51,071.00	52,530.00
14	Portugal	5,156.00	26,942.00	32,098.00
15	Spain	108,658.00	271,200.00	379,858.00
16	Sweden	7,928.00	195,277.00	203,205.00
17	Switzerland	5,300.00	60,000.00	65,300.00

Values reported in Millions USD

Appendix B: Credit Rating Agencies Mapping Scale

Table B.1 — Issuer Rating Scales

Scale Number	Fitch Ratings Long Term (FLT)	Moody's Long Term Debt Senior (MLTDS)	Standard & Poor's Long Term (S&PLT)
1	AAA	Aaa	AAA
2	AA+	Aa1	AA+
3	AA	Aa2	AA
4	AA-	Aa3	AA-
5	A+	A1	A+
6	A	A2	A
7	A-	A3	A-
8	BBB+	Baa1	BBB+
9	BBB	Baa2	BBB
10	BBB-	Baa3	BBB-
11	BB+	Ba1	BB+
12	BB	Ba2	BB
13	BB-	Ba3	BB-
14	B+	B1	B+
15	B	B2	B
16	B-	B3	B-
17	CCC+	Caa1	CCC+
18	CCC	Caa2	CCC
19	CCC-	Caa3	CCC-
20	CC	Ca	CC
21	C	C	C
22	DDD	-	D
23	DD	-	SD
24	D	-	-

Numerical equivalents of each class of issuer ratings are reported for Fitch, Moody's and S&P respectively.

Table B.3 — Mapping Scale for Moody's Rating

Moody's Bank Financial Strength (MBFS)	Moody's Long Term Debt Senior (MLTDS)
A	Aaa
A-	Aa1
B+	Aa2
B	Aa3
B-	A1
C+	A2
C	A3
C-	Baa1
C-	Baa2
D+	Baa3
D+	Ba1
D	Ba2
D-	Ba3
E+	B1
E+	B2
E+	B3
E	Caa1
E	Caa2
E	Caa3

Moody's mapping of bank financial strength (individual) and issuer ratings as provided by Moody's Investors Service (2005)

Table B.2 — Individual Rating Scales

Scale Number	Fitch Ratings Individual (FRI)	Moody's Bank Financial Strength (MBFS)
1	A	A
2	A/B	B+
3	B	B
4	B/C	C+
5	C	C
6	C/D	D+
7	D	D
8	D/E	E+
9	E	E

Appendix C: Variables Definition and Sources

Variable	Definition	Source
<i>Bailout and Credit Rating Variables</i>		
Bailout Dummy	Dummy variable equal 1 if a bank was subscribed to any kind of financial support offered by its government during the financial crisis of 2008 and 0 otherwise.	Database Factiva, European Central Bank Statistical Data
Bailout Percent	This is a percentage of the total amount of financial support received by a bank to its home country's total financial rescue plan.	Database Factiva, European Central Bank Statistical Data
AVIssuer	This is the year-end average numerical value of Fitch Ratings Long Term (FLT), Moody's Long-Term Debt (MLTD) and Standard & Poor's Long-Term (S&PLT).	Thomson One Banker database, Fitch Ratings, Moody's Investors.
MoodysIndividual	This is yearend numerical values of Moody's Bank Financial Strength rating (MBFS) for period 2008.	Moody's Investor
MoodysSupport	This is calculated as an absolute difference between Moody's issuer and individual ratings (MBFS) converted into a numerical scale at the end of the year 2008. See Table B. 3 of Appendix B for mapping of Moody's Bank Financial Support Rating (MBFS) and issuer rating (MLTDS).	Thomson One Banker database, Fitch Ratings, Moody's Investors
<i>M&A Activity Variables</i>		
AcqM&A	This is the sum of inflation-adjusted M&A deal values undertaken by the banks during the period 1990-2006 divided Market Value at the end of the year 2006. Consumer price indexes of sample countries for the year 2006 are used as a reference for inflation adjustment.	Thomson One Banker SDC database
Crossborder	This is dummy variable taking value 1 if a bank's cross-border M&A exceeds domestic M&A in value terms and 0 otherwise.	Thomson One Banker SDC database
LDeals	Dummy variable that takes value 1 if the total value of large size M&A of a sample bank is above the median value of total M&A and 0 otherwise. Large deals are deals with the acquisition value (inflation adjusted terms) above or equal to 1 billion USD. Consumer price indexes of sample countries for the year 2006 are used as a reference for inflation adjustment.	Thomson One Banker SDC database
<i>Controls for Main Analysis</i>		
Deposit Ratio	This equals bank deposits divided by total assets at the end of the year 2006.	Thomson One Banker financial database
Capital Ratio	This equals bank book equity divided by total assets at the end of the year 2006.	Thomson One Banker financial database
Mutual	Dummy variable equals to 1 if a bank is classified as a mutual. The term <i>Mutual</i> refers to both mutual and cooperative banks.	Authors' calculation
Global Focus	Dummy variable taking value 0 if a bank has activities mainly within Europe and 1 if the bank is present all over the world.	Schomenmaker (2011)
TBTF Dummy	The set of dummies equal 1 if total assets of the bank are above a threshold based on quartiles of sample banks' total assets at the end of the year 2006, and 0 otherwise.	Thomson One Banker SDC database
Log of GDP	This is natural logarithm of per capita GDP of sample banks' home countries at the end of the year 2006.	World Bank database on Financial Development and Structure

Variables for Additional Analysis

Bank Size (Log)	This equals natural log of bank assets calculated over the period 2010-2014. We use it after crisis analysis of M&A activity.	Thomson One Banker financial database
Tier 1 Ratio	This equals bank Tier 1 capital divided by its total capital; computed over the period 2010-2014. We use it for after crisis analysis of M&A activity.	Bloomberg
ROAA	This is the ratio of banks operating profit over average assets; computed over the period 2010-2014. We use it for after crisis analysis of M&A activity.	Bloomberg
Market to Book	This equals bank market value divided by book value at the end of the year 2006.	Datastream through Thomson One Banker database
Debt Ratio	This equals bank total debt divided by total assets at the end of the year 2006.	Thomson One Banker financial database
Offbal Ratio	This equals bank offbalance sheet assets by total assets; computed over the period 2010-2014. We use it for after crisis analysis of M&A activity.	Bloomberg
Income Diversity Ratio	This equals bank income from investment banking activities divided by total assets; computed over the period 2010-2014. We use it for after crisis analysis of M&A activity.	Authors' calculation from financial statements

Figure 1- M&A Activity of European Banks in Sample

This figure reports the evolution of M&A activity for 41 large sized European banks included in our sample during the period 1990-2006. The solid line shows the number of bank M&A (left scale) while the vertical columns represent inflation-adjusted deal values (right scale) in Billions USD. For inflation adjustment, consumer price index of the year 2006 for each sample country is used.

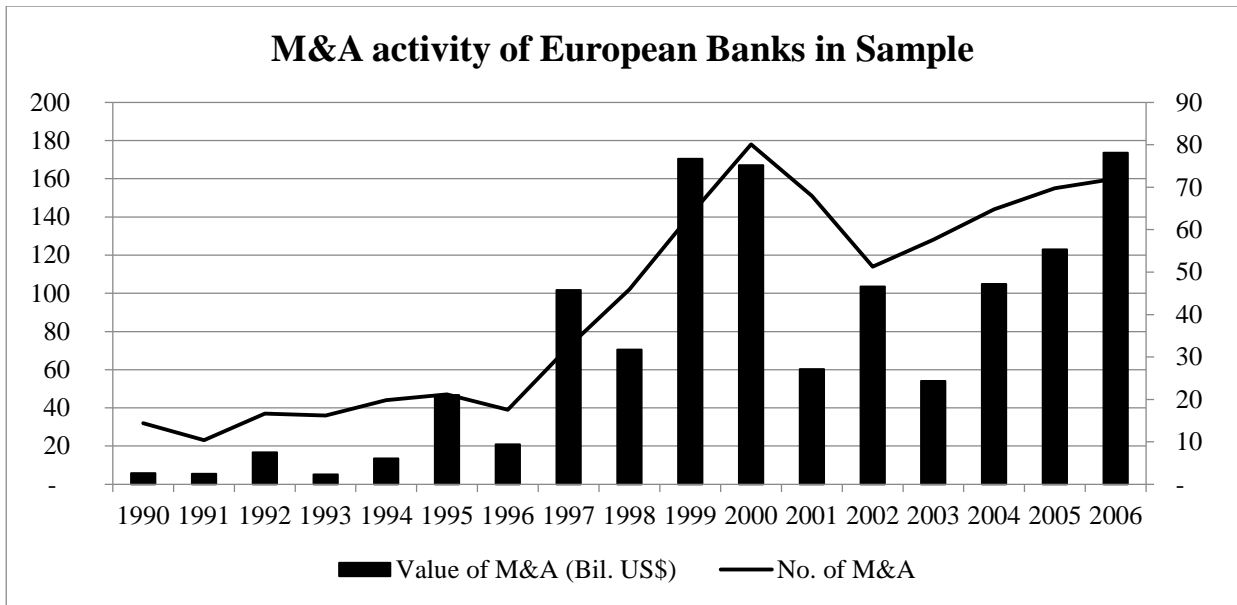


Table 1 – M&A Sample Composition

This table presents descriptive statistics about the sample composition. In Panel A, the distribution by year of the number of banks, number of M&A deals and the corresponding aggregate deal values in USD (inflation adjusted) are provided. For inflation adjustment, consumer price index of the year 2006 for each sample country is used. In Panel B, we provide the corresponding distribution by country.

Panel A – Number of Observations by Year

Year	No. of Banks		Number of M&A deals		Value M&A deals (Million USD)			
	<i>N</i>	<i>N</i>	%	Absolute Values		Inflation Adjusted Values		
				Million USD	%	Million USD	%	
1990	10	32	1.79	2,607.73	0.35	3,836.97	0.47	
1991	11	23	1.28	2,632.42	0.35	4,512.71	0.55	
1992	14	37	2.06	8,449.76	1.13	10,948.71	1.35	
1993	12	36	2.01	2,683.35	0.36	3,499.24	0.43	
1994	14	44	2.46	7,224.44	0.97	9,243.50	1.14	
1995	16	47	2.62	25,202.04	3.37	29,561.86	3.63	
1996	15	39	2.18	11,540.60	1.54	13,555.02	1.67	
1997	23	72	4.02	54,776.23	7.33	61,337.88	7.54	
1998	23	102	5.69	41,616.89	5.57	48,704.66	5.99	
1999	25	141	7.87	97,913.77	13.10	110,082.28	13.54	
2000	29	178	9.93	96,590.50	12.92	106,992.81	13.16	
2001	27	151	8.43	35,400.16	4.74	38,711.00	4.76	
2002	25	114	6.36	60,674.54	8.12	65,394.60	8.04	
2003	29	128	7.14	33,095.27	4.43	34,996.14	4.30	
2004	32	144	8.04	67,756.06	9.06	71,051.04	8.74	
2005	29	155	8.65	80,589.72	10.78	82,113.34	10.10	
2006	30	160	8.93	118,718.87	15.88	118,718.87	14.60	
Total		1,603	100.00	747,472.32	100.00	813,260.64	100.00	

Panel B – Number of Observations by Country

	Country	Number of Banks		Number of M&A deals		Value of M&A deals	
		<i>N</i>	%	<i>N</i>	%	Million USD	%
1	Austria	1	2.44	16	1.00	8,237.34	1.01
2	Belgium	2	4.88	33	2.06	21,004.04	2.58
3	Denmark	1	2.44	3	0.19	10,637.11	1.31
4	Finland	1	2.44	2	0.12	76.76	0.01
5	France	4	9.76	187	11.67	100,155.82	12.32
6	Germany	3	7.32	183	11.42	70,849.22	8.71
7	Great Britain	6	14.63	511	31.88	242,455.16	29.81
8	Greece	1	2.44	16	1.00	9,447.49	1.16
9	Ireland	2	4.88	36	2.25	8,646.31	1.06
10	Italy	7	17.07	104	6.49	102,315.80	12.58
11	Luxembourg	1	2.44	1	0.06	36.16	0.00
12	Netherland	1	2.44	105	6.55	48,957.44	6.02
13	Norway	1	2.44	4	0.25	399.82	0.05
14	Portugal	1	2.44	29	1.81	12,948.94	1.59
15	Spain	4	9.76	121	7.55	60,476.66	7.44
16	Sweden	3	7.32	50	3.12	14,793.34	1.82
17	Switzerland	2	4.88	202	12.60	101,823.24	12.52
		41	100.00	1603	100.00	813,260.64	100.00

Table 2 – Descriptive Statistics

This table presents summary statistics for the variables used in our study. The sample mean, median, and the standard deviation is reported respectively in columns (1) to (3). Panel A includes bailout and credit ratings based variables. Bailout Amount is an absolute value of financial support received by banks during 2008 financial crisis. Bailout is a binary variable that equals 1 if a bank subscribes to government rescue plans and 0 otherwise. Variable Bailout Percent is bailout amount for any bank as a percentage of country's total bailout package. AVIssuer variable represents the average of issuer ratings of the bank for the year 2008 assigned by three rating agencies. MoodysIndividual stands for numerical equivalents of Moody's bank financial strength rating (MBFS) at the end of the year 2008. MoodysSupport is the absolute difference between numerical equivalents of Moody's individual and issuer rating for the year 2008. Panel B highlights M&A activities. AcqM&A is computed using M&A activity over the period of 1990 – 2006 (see section 4.2 for further details). Panel C of the table represents controls relating to bank characteristics and economic variables used in the main and additional analysis (See section 4.2 and Appendix C for definitions). For dummy variables, averages correspond to percentages.

Variable	Entire Sample		
	Banks = 41 Average	M&A deals = 1603 Median	St. Dev
Panel A: Bailout and Rating Variables			
Bailout Amount (Mil.USD)	39,866.851	676.003	109,295.470
Bailout Dummy	0.54		0.50
Bailout Percent	0.126	0.005	0.280
AVIssuer	5.512	5.000	1.886
MoodysIndividual	6.075	6.000	1.623
MoodysSupport	2.475	2.000	1.414
Panel B: M&A Variables			
AcqM&A	0.337	0.321	0.246
Crossborder	0.512		0.505
LDeals	0.171		0.381
Panel C: Control Variables for Main & Additional Analysis			
Size (Million USD)	710,512.552	470,916.520	637,845.605
Deposit Ratio	0.353	0.360	0.117
Capital Ratio	0.046	0.041	0.024
Market to Book	2.061	2.005	0.498
Debt Ratio	0.417	0.430	0.138
Mutual	0.171	0.000	0.381
Log of GDP	10.545	10.543	0.280
Global Focus	0.292		0.461
TBTF dummy- 1 st Quartile	0.73		0.45
TBTF dummy- 2 nd Quartile	0.49		0.51
TBTF dummy- 3 rd Quartile	0.24		0.44

Table 3 – Bivariate Comparison of Bailout, Credit Ratings, and Control Variables

This table presents a bivariate comparison of mean values of the bailout, ratings, M&A features and other control variables for the 41 banks included in our M&A sample. The sample is divided into two groups on basis AcqM&A ratio above and below the median. Mean values of select variables for two groups are reported besides *t*-state and *p*-values. Bailout Amount is an absolute value of financial support received by banks during 2008 financial crisis. Bailout is a binary variable that equals 1 if a bank subscribes to government rescue plans during 2008 financial crisis, and 0 otherwise. Variable Bailout Percent is bailout amount for any bank as a percentage of country's total bailout package. AVIssuer variable represents average of numerical equivalents of issuer ratings of the bank for the year 2008 assigned by three rating agencies. MoodysIndividual stands for numerical equivalents of Moody's bank financial strength rating (MBFS) at the end of the year 2008. MoodysSupport is the absolute difference between numerical equivalents of Moody's individual and issuer rating for the year 2008. Total M&A is the sum of (inflation adjusted) M&A deal values (Million USD) for transactions completed by a given bank. Consumer price index for the year 2006 for each sample country is used as a reference for inflation adjustment. All other variables are defined in Section 4.2, and Appendix C. N is the number of observations.

Variable	N	M&A above Median	M&A below Median	<i>t</i>-stat	<i>p</i>-value
Bailout Amount	41	7,3481.14	4,571.85	2.10	0.04
Bailout Dummy	41	0.75	0.34	2.85	0.01
Bailout Percent	41	0.20	0.02	2.29	0.03
AVIssuer	41	6.62	4.35	4.79	0.00
MoodysIndividual	40	6.33	5.79	1.06	0.30
MoodysSupport	40	2.90	2.00	2.11	0.04
Total M&A	41	33,558.57	5,426.78	5.05	0.00
Crossborder	39	0.52	0.50	0.15	0.88
LDeals	39	0.61	0.15	6.13	0.00
Total Assets (Mil. USD)	41	1,285,694.00	521,230.00	2.76	0.01
Deposit Ratio	41	0.35	0.34	0.32	0.74
Capital Ratio	41	0.04	0.05	-1.46	0.15
Market to Book	40	2.04	2.08	-0.31	0.76
Debt Ratio	41	0.39	0.44	-1.10	0.27
Mutual	41	0.09	0.25	-1.29	0.20
Global Focus	41	0.43	0.15	2.01	0.05
Log of GDP	41	10.50	10.59	-0.94	0.35

Table 4 – M&A Activity and External Support during Financial Crisis

This table presents regression results using external support based measures as dependent variables. Panel–A results are obtained via Probit specification using dependent variable Bailout Dummy that equals 1 if a bank in our sample subscribes to government rescue plans offered during 2008 financial crisis, and 0 otherwise. Results in Panel–B are obtained via OLS estimation with dependent variable Bailout Percent that shows bailout amount received by a sample bank as a percentage of the home country’s total bailout package announced. Estimation results are presented in an identical manner in two panels. First three estimations provide results by using individual variables of interest relating to overall M&A intensity, large size deals, and cross-border M&A. Estimation four combines the main variable of interest with cross-border M&A and other control variables. Variable definitions are provided in section 4, and Appendix C. Bootstrap *p*-values are provided in parenthesis. *N* is the number of observations.

Panel A: Probit estimates with *Bailout Dummy*

Variables	(1)	(2)	(3)	(4)
AcqM&A	2.550 (0.02)			3.878 (0.00)
LDeals		0.845 (0.06)		
Crossborder			-0.567 (0.34)	-0.875 (0.30)
Deposit Ratio				12.254 (0.00)
Capital Ratio				-57.611 (0.03)
Mutual				-1.357 (0.07)
Global Focus				-1.553 (0.01)
Log of GDP				-2.452 (0.04)
Constant	-0.414 (0.35)	0.223 (0.31)	0.442 (0.23)	24.272 (0.06)
N	41	41	41	41
Pseudo R ²	0.13	0.04	0.02	0.41
Wald- chi ²	5.86	3.48	0.92	22.48

Panel B: OLS estimates with *Bailout Percent*

Variables	(1)	(2)	(3)	(4)
AcqM&A	0.418 (0.02)			0.435 (0.04)
LDeals		0.435 (0.04)		
Crossborder			-0.125 (0.23)	-0.18 (0.21)
Deposit Ratio				0.127 (0.71)
Capital Ratio				-0.168 (0.92)
Mutual				-0.014 (0.86)
Global Focus				0.065 (0.56)
Log of GDP				0.329 (0.11)
Constant	-0.028 (0.44)	0.036 (0.03)	0.173 (0.04)	-3.461 (0.11)
N	41	41	41	41
R ²	0.15	0.38	0.00	0.48
Wald- chi ²	5.55	5.77	1.42	6.04

Table 5 – M&A Activity and Bank Credit Ratings during Financial Crisis

This table presents regression results using bank credit rating based measures as dependent variables. Results are obtained via OLS estimation. Panel–A reports results using AVIssuer rating variable as the dependent variable. AVIssuer is average of numerical equivalents of three ratings including Fitch Long Term (FLT), Moody’s Long-Term Debt Senior (MLTDS) and Standard & Poor’s Long-Term (S&PLT) for a bank (See section 4 and Appendix B for definition and numerical equivalents). Panel–B reports results using MoodysIndividual as a dependent variable that denotes numerical equivalents of Moody’s bank financial strength rating (MBFS). Both dependent variables are computed at the end of the year 2008. Estimation results are presented in an identical manner in two panels. First three estimations provide results by using individual variables of interest relating to overall M&A intensity, large size deals, and cross-border M&A. Estimation four combines the main variable of interest with cross-border M&A and other control variables. Variable definitions are provided in section 4 and Appendix C. Bootstrap *p*-values are provided in parenthesis. N is the number of observations.

Panel A: OLS estimates with AVIssuer rating

Variables	(1)	(2)	(3)	(4)
AcqM&A	3.655 (0.00)			3.988 (0.01)
LDeals		0.933 (0.10)		
Crossborder			0.081 (0.93)	0.436 (0.67)
Deposit Ratio				1.976 (0.43)
Capital Ratio				-6.309 (0.70)
Mutual				-0.792 (0.32)
Global Focus				-1.153 (0.12)
Log of GDP				0.051 (0.97)
Constant	4.308 (0.00)	5.353 (0.00)	5.13 (0.00)	4.305 (0.00)
N	41	41	41	41
R ²	0.22	0.04	0.00	0.32
Wald- chi ²	8.40	2.67	4.49	9.17

Panel B: OLS estimates with *Moody's Individual rating* (MBFS)

Variables	(1)	(2)	(3)	(4)
AcqM&A	-1.577 (0.10)			0.527 (0.79)
LDeals		-1.208 (0.01)		
Crossborder			-0.45 (0.33)	0.756 (0.49)
Deposit Ratio				-1.898 (0.60)
Capital Ratio				8.932 (0.77)
Mutual				-0.224 (0.83)
Global Focus				-0.661 (0.32)
Log of GDP				-0.163 (0.91)
Constant	5.948 (0.00)	5.636 (0.00)	5.651 (0.00)	7.763 (0.63)
N	40	40	40	40
R ²	0.07	0.09	0.01	0.05
Wald- chi ²	2.67	7.61	0.94	1.40

Table 6 – (Robustness i) M&A Activity and Bank Support Rating

This table presents regression results using credit rating based measure of external support as our dependent variable. Results are obtained via OLS estimation. The dependent variable *MoodysSupport* is the absolute difference between the numerical equivalents of Moody’s Issuer and Individual ratings at the end of the year 2008. First three estimations include only variables of interest relating to overall M&A intensity, large size deals, and cross-border M&A. Estimation four combines the main variable of interest with cross-border M&A and other control variables. Variable definitions are provided in section 4, and Appendix C. Bootstrap *p*-values are provided in parenthesis. N is the number of observations.

OLS estimates with *MoodysSupport* rating

Variables	(1)	(2)	(3)	(4)
AcqM&A	1.214 (0.11)			3.037 (0.01)
LDeals		0.636 (0.25)		
Crossborder			0.15 (0.74)	0.838 (0.31)
Deposit Ratio				-5.967 (0.07)
Capital Ratio				36.066 (0.12)
Mutual				0.952 (0.14)
Global Focus				-0.488 (0.45)
Log of GDP				1.392 (0.16)
Constant	2.073 (0.00)	2.364 (0.00)	2.401 (0.00)	-13.065 (0.24)
N	40	40	40	40
R ²	0.05	0.03	0.00	0.22
Wald- chi ²	2.52	1.33	0.004	12.145

Table 7 – (Robustness ii) M&A Activity and Too Big to Fail Effect

This table presents regression results on “too big to fail” effect. Results are obtained via OLS estimation. Panel–A reports results using Bailout Percent as a dependent variable that shows bailout amount received by a sample bank as a percentage of home country’s total bailout package announced. Panel–B reports results using *MoodysSupport* rating as the dependent variable. *MoodysSupport* is the absolute difference between the numerical equivalents of Moody’s Issuer and Individual ratings at the end of the year 2008. For each Quartile of total assets, we perform estimations by using variables of M&A intensity (*AcqM&A*), the interaction term between *TBTF* dummy and M&A activity (i.e., *AcqM&A** *TBTF Dummy*), and additional control variables including Market to Book, Debt Ratio, and Log of GDP. Variable definitions are provided in section 4 and Appendix C. Bootstrap *p*-values are provided in parenthesis. N is the number of observations.

Panel A: OLS estimates with Bailout Percent

Variables	1 st Quartile	2 nd Quartile	3 rd Quartile
AcqM&A	0.069 (0.79)	0.102 (0.52)	0.338 (0.06)
TBTF Dummy	-0.144 (0.23)	-0.121 (0.33)	-0.096 (0.73)
AcqM&A * TBTF Dummy	0.602 (0.09)	0.658 (0.09)	0.498 (0.52)
Market to Book	0.115 (0.31)	0.139 (0.20)	0.118 (0.22)
Debt Ratio	0.029 (0.91)	0.100 (0.65)	0.204 (0.45)
Log of GDP	0.249 (0.18)	0.181 (0.20)	0.266 (0.07)
Constant	-2.839 (0.15)	-2.232 (0.16)	-3.166 (0.06)
N	40	40	40
R ²	0.33	0.36	0.32
Wald- chi ²	9.87	9.33	9.31

Panel B: OLS estimates with *MoodysSupport* rating

Variables	1 st Quartile	2 nd Quartile	3 rd Quartile
AcqM&A	0.945 (0.69)	-0.187 (0.85)	1.690 (0.11)
TBTF Dummy	-0.132 (0.86)	-1.044 (0.25)	-1.805 (0.26)
AcqM&A * TBTF Dummy	0.866 (0.75)	3.503 (0.10)	1.924 (0.61)
Market to Book	-0.494 (0.34)	-0.337 (0.51)	-0.517 (0.22)
Debt Ratio	2.425 (0.17)	2.562* (0.10)	1.734 (0.36)
Log of GDP	0.998 (0.36)	0.55 (0.57)	1.464 (0.07)
Constant	-8.432 (0.46)	-3.779 (0.71)	-12.877 (0.14)
N	39	39	39
R ²	0.17	0.23	0.27
Wald- chi ²	11.26	11.42	13.51

Table 8 – (Robustness iii) Alternative Model for Credit Rating Analysis

This table presents regression results on credit rating (Table 5) using Ordered- Logit and Probit models as alternative empirical specifications in two parallel panels. Our dependent variables are AVIssuer rating (Panel–A) and MoodysSupport rating (Panel–B). AVIssuer is average of numerical equivalents of three ratings including Fitch Long Term (FLT), Moody’s Long-Term Debt Senior (MLTDS) and Standard & Poor’s Long-Term (S&PLT) for a bank (See section 4 and Appendix B for definition and numerical equivalents). Panel–B reports results using MoodysIndividual as a dependent variable that denotes numerical equivalents of Moody’s bank financial strength rating (MBFS). Both dependent variables are computed at the end of the year 2008. For the two panels, the first specification employs Ordered Logit model, whereas the 2nd estimation uses Ordered Probit model. Variable of main interest (AcqM&A) and other variables are defined in section 4, and Appendix C. Bootstrap *p*-values are provided in parenthesis. N is the number of observations.

Variables	Panel A- AVIssuer Rating		Panel B- MoodysIndividual rating (MBFS)	
	Ordered Logit	Ordered Probit	Ordered Logit	Ordered Probit
AcqM&A	4.922 (0.02)	2.794 (0.00)	1.131 (0.65)	0.654 (0.57)
Crossborder	0.46 (0.69)	0.213 (0.71)	0.838 (0.56)	0.527 (0.43)
Deposit Ratio	2.716 (0.18)	1.545 (0.19)	-2.221 (0.49)	-1.454 (0.36)
Capital Ratio	-3.895 (0.68)	-3.545 (0.53)	20.546 (0.49)	10.47 (0.49)
Mutual	-0.829 (0.37)	-0.541 (0.26)	-0.056 (0.96)	-0.11 (0.87)
Global Focus	-1.168 (0.13)	-0.731 (0.08)	-0.515 (0.43)	-0.413 (0.25)
Log of GDP	0.538 (0.72)	0.272 (0.72)	0.293 (0.87)	0.098 (0.90)
Cut points				
γ_1	5.408 (0.75)	2.523 (0.76)	2.268 (0.91)	0.356 (0.97)
γ_2	7.267 (0.66)	3.634 (0.66)	3.562 (0.86)	1.132 (0.90)
γ_3	8.00 (0.63)	4.079 (0.63)	4.372 (0.83)	1.637 (0.86)
γ_4	8.92 (0.59)	4.629 (0.58)	5.396 (0.79)	2.251 (0.81)
γ_5	9.742 (0.56)	5.103 (0.55)	6.372 (0.75)	2.787 (0.76)
γ_6	11.392 (0.50)	6.028 (0.47)	6.817 (0.73)	3.014 (0.75)
N	41	41	40	40
Pseudo R ²	0.10	0.11	0.01	0.02
Wald- chi ²	18.471	21.906	1.489	2.182

Table 9 – Post Crisis Mean and Median Comparison of Sample Banks

This table presents the results of the mean and median comparison tests of non-paired data of bailout beneficiary banks and non-beneficiary banks. Bailout beneficiary banks are banks that benefited from bailout during the financial crisis while non-beneficiary banks are banks which have not benefited from bailout during the financial crisis. *Bank Size* is the natural log of total assets of acquirer, Tier 1 Ratio is the Tier 1 capital over total capital, ROAA is the operating profit before taxes on average assets of the bank, Offbal Ratio is the ratio of off balance sheet assets over total assets, Market to Book is the ratio of market value to book value of equity and Income Diversity Ratio is the investment banking income over total assets.

Variables	Bailout beneficiary banks		Nonbeneficiary banks		Bootstrapped t-test		Wilcoxon rank-sum test	
	Mean	Median	Mean	Median	t-stat	p-value	z-stat	p-value
Bank Size (Log)	24.822	27.829	21.637	26.656	1.80	0.072	-2.95	0.003
Tier 1 Ratio	43.215	39.329	43.213	47.658	0.00	1.000	0.09	0.927
ROAA	-0.121	0.097	0.325	0.367	-3.16	0.002	4.31	0.000
Offbal Ratio	0.150	0.146	0.300	0.208	-2.83	0.005	2.13	0.033
Market to Book	0.588	0.530	0.864	0.843	-3.19	0.001	3.27	0.001
Income Diversity Ratio	0.008	0.008	0.012	0.011	-2.71	0.007	2.63	0.008

Table 10 – Additional Analysis on Post-Crisis M&A Activity of Sample Banks

This table presents regression results on the factors explaining acquisitiveness of sample European banks after the 2008 financial crisis. Results are obtained via GLS model using unbalanced panel data over the period of 2010-2014. The first estimation includes banks which have not benefited from bailout during the financial crisis, the second estimation includes banks that benefited from bailout during the financial crisis, while the last estimation includes banks with a supportrating \geq median value of the sample. AcqM&A Ratio is computed in the spirit of equation 2 of the paper with log values for M&A deals and market value of banks while one-year lag values of acquirer characteristics are used as independent variables. For sample banks Bank Size is the natural log of total assets of acquirer, Tier 1 Ratio is the Tier 1 capital over total capital, ROAA is the operating profit before taxes on average assets of the bank, Offbal Ratio is the ratio of off balance sheet assets over total assets, Market to Book is the ratio of market value to book value of equity and Income Diversity Ratio is the investment banking income over total assets. *P*-values are provided in parenthesis using method robust to heteroskedasticity. N is the number of observations.

GLS estimates with AcqM&A Ratio

Variables	Non-beneficiary banks	Bailout beneficiary banks	Banks with supportrating \geq median
Bank Size (Log)	-0.001 (0.73)	-0.038 (0.03)	-0.004 (0.79)
Tier 1 Ratio	0.005 (0.26)	0.002 (0.80)	-0.014 (0.08)
ROAA	-0.144 (0.01)	-0.921 (0.36)	-0.832 (0.19)
Offbal Ratio	0.039 (0.76)	-1.787 (0.07)	-0.992 (0.02)
Market to Book	-0.064 (0.54)	2.029 (0.00)	1.248 (0.08)
Income Diversity Ratio	0.32 (0.96)	26.395 (0.38)	14.656 (0.37)
Constant	-0.228 (0.17)	-0.027 (0.93)	0.026 (0.88)
N	29	30	45
R ²	0.34	0.15	0.19
Wald chi ²	15.35	51.36	8.69

The previous essay of this dissertation investigates the relationship of ex-ante M&A activity of European banks over a time span of 1990-2006 with their bailout support and credit ratings during the 2008 financial crisis. On one hand, it shows how M&A activity of large European banks relates to the governmental support conferred to them during the financial crisis. On the other hand, it explores whether the intensity of past M&A activity relates to the credit ratings –issuer and individual ratings– of the European banks in our sample during the 2008 financial crisis or not. Bailouts and credit ratings have been two important aspects of the policy debate on the financial crisis particularly in the context of large sized banking institutions. Concerning the bailouts, large banks have been subject to criticism as it is perceived that the increase in bank size allow such banks to draw benefits associated with “too big to fail” status in the market while they continue to engage in risky activities. Moreover, these large banks were prone to receive higher credit ratings by the credit rating agencies. However, the strong banks in the eyes of rating agencies faced a situation of impending financial distress in a very short time span. M&A activity is considered an evident mode through which banks strive to increase their size. Hence, the first paper attempts to connect the two significant features of 2008 financial crisis with the factor that facilitates banks’ attempt to increase the size and attain the status of “too big to fail” in the market. While we obtain a substantial evidence that shows the intensity of bank M&A activity did facilitate banks to tap higher external support during the crisis period; the evidence on credit ratings is mixed – past M&A intensity relates to poor issuer ratings and improved individual ratings in the times of crisis.

The two different types of bank rating measures used in this paper by definition reflect upon the bank risk of default and insolvency risk from the lens of credit rating agencies (CRAs). We take a lead from this point to expand further our analysis of the risk implications of M&A activity in the second paper in two distinct manners. First, we decide to employ risk measures which are calculated by using bank financial information and yet reflect upon banks’ risk of default and insolvency risk. Second, in addition to the overall M&A intensity, we extend the analysis to the different types of M&A activity that may expose banks to vulnerability during the exogenous shocks like the financial crisis of 2007-2009. We particularly focus on M&A activity performed in retail banking and investment banking segments of banking in this study as the bank’s growing reliance on non-traditional sources of income is also considered as one among major culprits of the financial calamity in 2007.

PAPER 2: BANK M&A ACTIVITIES AND FINANCIAL CRISIS VULNERABILITY: EVIDENCE ON LARGE EUROPEAN BANKS¹⁹

ABSTRACT

The year 2008 witnessed the most dramatic financial crisis since World War II. This paper investigates the relation between bank M&A activities during the period 1990-2006 and their vulnerability to this major event. Our sample is composed of the 41 largest European banks during the analyzed period. We use the Merton (1974) distance to default (DD) and the Z-score ratio to estimate the banks response to the financial crisis in terms of bankruptcy risk and solvency. Our results uncover a positive and significant relation between the banks' risk during the 2008 financial crisis and their acquisitions of investment banks during the 1990-2006 period.

JEL classification: G10, G21, G34

Keywords: Banks, Financial Crisis, Mergers and Acquisitions, Risk of Default, Solvency

¹⁹ A short version of this paper has been accepted with some revisions by Bankers, Markets and Investors (FNEGE rank 3). This paper has also been accepted for presentation at conferences including AFFI 2013 in Lyon (France) and World finance & banking symposium 2016 in New York (USA).

1. Introduction

The 2008 financial crisis represents probably the most dramatic event that the financial system underwent since the 1929 great depression. The banks in Europe and United States witnessed an unprecedented evaporation of approximately US \$4.5 trillion in their market capitalization. Public authorities were forced to come massively into play to save financial institutions and to avoid a major breakdown of the whole banking industry. In the U.S., the Treasury Secretary Henri Paulson and the Federal Reserve Chairman Ben Bernanke introduced the Troubled Asset Relief Program (TARP) on October 13, 2008. A hefty amount of \$125 billion was injected under this program in a week time to help 8 major U.S. banks to overcome the crisis. Similar plans have been adopted in Europe. The academic community is since then actively studying the causes and consequences of this exceptional event. References are so numerous that mentioning a few of them would be unfair with respect to the unquoted ones. It is sufficient to notice the creation of a Social Science Research Network electronic journal is dedicated to this topic (FEN Financial Crises eJournal) to become aware of the importance of the academic production on this topic.

How could the financial system be trapped in such a situation? The question of a possible correlation between the increase in bank risk and concentration has been raised since the decade of the 1990s as it also witnessed a significant concentration of systemic risk particularly in the developed economies of the world. Studies focused on the risk of large U.S. and European banks over the period of the 1990s indicate that the consolidation and conglomeration may not necessarily lead to a safe financial system (see, e.g., De Nicoló and Kawast, 2002; De Nicoló et al., 2004, among others). While, banks' investment in correlated assets may trigger systemic risks (Acharya, 2009), an increase in bank size may increase both the standalone and the systemic risk (Laeven et al., 2015). Other recent studies including, Boyd, De Nicoló and Loukianova (2009), Boyd et al. (2009), and Altunbas et al. (2015), among others, support these findings. Another strand of literature including, among others, Acharya et al. (2015) and Bertay et al. (2013), connects the increase in bank size with implicit subsidies related to “too big to fail”. Our study is focused on this size increase trend that the financial institutions displayed during the last two decades. More specifically, we study, whether the M&A activity – as an evident mode to increased bank size (Caiza et al., 2012) – did affect the vulnerability of large financial institutions to the exogenous shocks. The 2008 financial crisis is an episode particularly well suited for such a study as we can observe the resistance of banks from the outside during such extraordinary circumstances.

We chose the European banking industry as an empirical field. This choice is motivated by the global concentration trend observed during the last two decades at the European level under the pressure of deregulation, technological innovation, and the introduction of the Euro. The channel through which consolidation takes place is mergers and acquisitions (M&A). Various studies including Berger et al. (1999), Group of Ten (2001), Amel et al. (2004), and DeYoung et al. (2009) extensively review the aggressive external growth strategies pursued by the major players in the European financial industry over the past two decades. The authors argue that these strategies allowed banks to capitalize on various economies of scale and scope with the cost and profit efficiency. Whether M&A create value for acquirers remains yet a topic of debate (see, Eckbo, 2014 for review of recent research on the topic; and Amel et al., 2004, and DeYoung et al., 2009 for results specific to the financial industry) but is not a question we address here. We are interested in the relation between the intensity of external growth strategies (and their focus on specific banking activities such as investment banking and retail banking) and bank vulnerability during the financial crisis.

The relation between banks' M&A activity and their risk of default has already been addressed in the literature. Vallascas and Hagendorff (2011) use M&A sample from 1992 to 2007 for 134 bidding banks from 17 European countries. They show that, on average, bank mergers are neutral with respect to their risk exposure, except for the safest ones that suffer from an increase in default risk. The authors also indicate towards a more significant impact of large transactions. Emmons et al. (2004) report a decrease in the probability of default due to portfolio diversification effects using data on 7,137 U.S. banks over a period of 1989-1993. Concerning the geographic diversification, Hughes et al. (1999) and Akhavein et al. (1997) report conflicting results. The former supports risk reduction while the latter observes no impact. While, a recent study by Koerniadi et al. (2015) finds significant reduction in risk of U.S. acquirers due to cross-border M&A by using sample of 375 firms over the period of 1997-2011, Furfine and Rosen (2011) document an increase in default risk of U.S. acquiring firms due to domestic M&A by analyzing a large sample of 3600 firms. We believe that the 2008 financial crisis provides a unique opportunity to gain a better understanding of risk implications of M&A for financial institutions because, at that time, the risk indeed materialized.

To carry out our study, we track the M&A transactions of the 41 largest banks in Europe from 1990 to 2006. We identify 1,603 M&A transactions, for a total of 813 Billion USD (2006 inflation adjusted). These 41 banks originate from 17 European countries. More than half of

the M&A was directed into the retail banking sub-industry while acquisitions in the investment banking industry amounted to 6% of the total activity. Similarly, acquisitions in the insurance sector add 7% to the sample along with 5% and 6% for real estate, and other related financial services, respectively.

We use several indicators to characterize the acquisition activities of these 41 banks: the total value of completed acquisitions in the percentage of the 2006 bank size, the corresponding percentages of M&A in the retail banking sub-industry and the investment banking sub-industry. Summations cover the 1990 to 2006 period. These are our main independent variables. We use as the dependent variable the Merton (1974) based distance to default (*DD*) to capture bankruptcy risk and the Z-score to measure bank solvency. The *DD* has been recently used in several contributions dealing with the bank probability of failure (see, for instance, Koerniadi et al., 2015; Vallascas and Hagendorff, 2011; Gropp et al., 2006). The *DD* relies on the Black and Scholes (1973) option valuation model to estimate the standardized distance between the market value of a bank's assets and the book value of its debt, a measure of bankruptcy risk. This reliance of the *DD* on market data raises, however, an issue to study the effects of external growth on the financial institutions' bankruptcy risk. As financial institutions are growing in size, investors may indeed incorporate in their anticipations the "too big to fail" effect. The *DD* will then only provide a measure of bankruptcy risk effects of external growth net of this implicit guarantee of being saved in case of adverse outcome. Therefore, we complement the *DD* measure with the use of Z-score (see, for z-score, Bertay et al., 2013; Laeven and Levine, 2009; Boyd et al., 2006, among others). The Z-score, a measure of solvency, relies only on financial statement data and incorporates both an estimate of asset profitability and the bank equity to asset ratio. We estimate the relation of our two risk measures - the average *DD* and the Z-score - during the year 2008, the heart of the financial crisis, with the intensity and nature of bank M&A activity. It allows us to study the interaction of bankruptcy risk and solvency exposure of our sample of banks when an adverse outcome materializes, with their external growth strategies. We add in our multivariate specifications a large set of M&A transaction and bank specific control variables to fight against the classic issue of omitted variables. We also replicate our analysis on the 1997 to 2006 sub-period to test whether our results are not driven by the earlier period acquisition activities for which obtaining exhaustive information is more complicated.

Our main results are as follows:

- (i) The aggregate amount of M&A transactions has no significant impact on either the average 2008 *DD* or *Z*-score, whether we measure it in percentage of the bank size or in absolute value (unreported);
- (ii) However, the repartition between sub-industries of retail and investment banking does matter. In particular, the higher the percentage of M&A transactions in investment banking during the 1990 to 2006 period, the lower the average 2008 *DD* (higher bankruptcy risk) and *Z*-score (lower solvency). Our results also show that M&A transactions directed to retail banking lead to an increase in 2008 *Z*-score (higher solvency).

Why do M&A transactions directed towards investment banking increase the probability of bankruptcy and decrease solvency in case of the adverse economic outcome? While further investigation is called for, we see two potential explanations: (i) acquisitions in the investment banking activity increase funding needs of banks, and thus, their dependence on the interbank market, (ii) such functional diversity may expose banks to a volatile source of revenue generation, and increasing banks' risk thereby, and (iii) investment banks may have been far more active in credit default swap and securitization markets, through which toxic assets were disseminated all over the world. Thus, such large European banks were exposed to the two major characteristics of 2008 financial crisis. In the robustness section, we provide some empirical evidence in support of our explanations.

While, a broad array of work, including aforementioned studies, uncovers the risk-taking behavior of banks under different settings, we focus on the risk of large size European banks in the context of their M&A activity. To our knowledge, we are the first to analyze exclusively the risk implications of the kinds of M&A undertaken by banks. Our contribution to the existing literature is to show that it is not the intensity of external growth in itself that affects bankruptcy risk and solvency of the European banks but the nature of the acquired activities. The closest paper to our work is by Vallascas and Hagendorff (2011). The authors also use the *DD* indicator to study the relation between European banks' M&A and their risk of default. However, our approach differs in addressing the M&A risk implications as we look at the past two decades of M&A activity instead of analyzing risk implications around individual deals. Moreover, our study also complements evidence on solvency risk by adding *Z*-score as an additional measure of risk, and thus, covering two important facets of financial vulnerability during the crisis. Finally, the use of the 2008 financial crisis as an exogenous shock allows us to study what

happens when an adverse outcome materializes, which is, in the end, what really matters. Our results also have policy implications for regulators. Our key findings that distinguish the risk implications of M&A in the investment banking from those of retail banking M&A imply that the regulators should differentiate between these two kinds of acquisition activities.

We start this paper in Section 2 by reviewing briefly the existing literature. We then describe our sample and our main variables in Section 3. Section 4 displays our results and robustness checks. We finally conclude in Section 5.

2. Literature review

Our paper mainly relates to the two important streams of finance literature on banking industry: M&A and risk. The extant literature addresses the various dimensions of the two streams in an extensive manner.

2.1.M&A activity and bank risk

The finance literature suggests numerous theoretical arguments as potential factors driving M&A activity of banks. M&A may result in a sound and stable banking system through enhanced efficiency and better risk diversification (Amel et al., 2004; Berger et al., 1999). Several studies indicate that M&A strategies enable banks to achieve diversification benefits by spreading their business across different product lines and their geographic outreach, and affect their liquidity and solvency risks. For instance, Emmons et al. (2004) advocate risk reduction through product diversification rather than geographic expansions. Hughes et al. (1999) find a low insolvency risk and higher efficiency for large U.S. banks that expanded at the interstate level (geographic diversification). Macroeconomic risk diversification plays a major role in particular. Hughes et al. (2001) link better diversification with larger scale economies while increased and inefficient risk taking are results of smaller scale economies. Similarly, Wheelock and Wilson (2012) also provides evidence on economies of scale in the U.S. banks over an extended period of 1984-2006. More recently, Hughes and Mester (2013) use a dataset on 842 bank holding companies in U.S. in 2007 and claim that diversification emanating from geographical consolidation may increase scale economies of banks with notably more pronounced effect for large banks. In the case of Europe, Chionsini et al. (2003) provide evidence on diversification of credit risk in Italian banks using a sample of M&A

spanning 1997–2001. Cavallo and Rossi (2001) find significant economies of scale and scope in almost all asset classes of banks in Europe, using panel data of 442 banks from 1992 to 1997.

Contrary to the aforementioned motives of M&A, the finance literature suggests that M&A activity may expose banks to a higher level of risk both at the individual and systemic level (see, e.g., Weiß et al., 2014; De Nicoló et al., 2004; De Nicoló and Kwast, 2002; Hughes et al., 2001). The risk increasing implications of M&A may stem from factors such as an increase in bank size, structural opacities, and associated moral hazard tempting banks to take on, even more, risk. However, an important and fundamental question is that how the increase in bank size may foster instability to the banks. A rampant M&A activity of banks within and outside the banking sector may result in the creation of large and structurally complex financial institutions that deemed to be “too big to fail”. Boyd and Graham (1991), and John et al. (1991) contend that banks pursue M&A strategies merely to become “too big to fail” in the presence of deposit insurance schemes. The availability of government support in the form of deposit insurance and bailouts invokes moral hazard problem as the banks’ survival becomes less dependent on their choice of risk (Acharya et al., 2015; Bertay et al., 2013). Therefore, large banks continue to engage in risky activities and maximize the subsidy from such government support during the times of distress and financial crisis (Stiglitz, 2010; De Nicoló et al., 2004).

According to Stiglitz (2010) if a “too big to fail” bank succeeds in a risky venture it bags the profits. However, in the case of failure, the taxpayer takes the burden of such risky bets, while the surviving banks may turn even bigger and more “too big to fail”. De Nicoló et al. (2004) deduce from deterioration in the risk profile of large U.S. and European banks that consolidation and conglomeration may not necessarily lead to a safe financial system. In addition, although banks’ investment in correlated assets result in a reduction of idiosyncratic risk but may also increase their aggregate risk and trigger a shock at the systemic level (Acharya, 2009). Similarly, Altunbas et al. (2015) relate pre-crisis variations in bank characteristics including large size, high leverage, and less reliance on deposit funding with the increase in bank risk during 2008 financial crisis.

Moreover, literature that zooms in at diversification effects of M&A for banks indicate that banks’ attempt to broaden scope of their activities or expand geographically may stay short of targets or offset by an even higher level of default risk (Wagner, 2010), particularly for M&A transactions of relatively safe banks (Vallascas and Hagendorff, 2011). The critics contend that the activity diversification within the financial sector may result in the strategic similarities

among the large size banks that may, in turn, amplify the likelihood of systemic risk (Wagner 2010; De Nicoló and Kwast, 2002). While, on one side, merger activity between commercial and investment banks results in a major conflict of interests, it may also expose the whole financial system to the culture of risk-taking that is more prevalent in the investment banking (Stiglitz, 2010). Moreover, due to the volatile nature of the activity, banks may witness a significantly higher decline in their income generated from investment banking than that of the traditional interest income in turbulent situations like the financial crisis.

Results of Boyd et al. (1993) on risk implications for U.S. bank holding company (BHC) mergers with security and real estate firms during the period of 1971-1984 indicate that such mergers tend to increase bank risk. Stiroh (2006) and Stiroh and Rumble (2006) observe a positive link between risk of U.S. banking firms and nontraditional income and suggest a cap on expansion in investment banking by commercial banks. Similarly, Lepetit et al. (2008) find a higher level of insolvency risk linked to noninterest income activities in case of European banks over a period of 1996 to 2002. While De Jonghe (2010) provide evidence on a rise in systemic risk of European banking system due to their increased reliance on non-traditional activities, Weiß et al. (2014) show an international evidence on domestic and cross-border M&A contribution to instability in financial systems.

2.2.Competition and stability in the banking industry

A broad lens of research looks at the above-mentioned risk implications of bank M&A in the context of competition and financial stability relationship in the banking system, as the social and economic costs of instability can be extremely large. Finance literature documents two well-known views in this regard. This includes the traditional “competition-fragility” view, which contends that the increase in competition may foster excessive risk-taking for banks due to the erosion of market power, reduced profit margins, and franchise values (Keeley, 1990; Carletti and Hartmann, 2003; Allen and Gale, 2004).²⁰ Therefore, high profits and more market power in a less competitive and more concentrated banking system limit the banks’ excessive risk taking, reduces idiosyncratic risk, and foster stability in the system. Keeley (1990) provides a theoretical framework and empirical evidence on increased number of failures during the 1980s for large U.S. banks. The author attributes this failure episode primarily to the increase in competition that in turn reduced the monopoly rents and charter values of banks. This decline

²⁰ See Carletti and Hartmann (2003) for a detailed survey on topic.

intensified the agency problem in the presence of deposit insurance schemes and enticed banks towards excessive risk taking. While, higher capital buffers of monopolistic banks, may serve as a cushion to shelter the financial system from external shocks, a reduction in their monopoly rents may curtail their incentives to monitor borrowers and trigger financial fragility (Allen and Gale, 2000; 2004). A recent study on Japanese banks claims that in a more consolidated banking industry, despite a significant decline in cost efficiencies, increase in market power enables banks to shelter their profit efficiency (Montgomery et al., 2014).

The proponents of contrary “competition-stability” view including work of Boyd and De Nicoló (2005), Boyd et al. (2006), and De Nicoló and Loukianova (2007) endorse stabilizing effects of competition over the financial system. For example, Boyd and De Nicoló (2005) advocate a high likelihood of financial fragility in a more concentrated market. An enhanced market power allows banks to charge higher interest rates to borrowers that may increase the volume of non-performing loans in a bank’s portfolio. Borrowers may also shift towards more risky projects because of increased moral hazard incentive, leaving banks to a riskier set of borrowers (adverse selection problem). Boyd et al. (2006), and De Nicoló and Loukianova (2007) provide empirical evidence consistent with these arguments. They find an inverse relation between Z-index (risk measure) and Herfindahl-Hirschman index (concentration measure). Further, the provision of the safety-net by the government to a few large size and complex banks in a more concentrated market may entice them to excessive risk taking and bring instability to the whole banking system (Mishkin, 1999). While De Nicoló and Kwast (2002) attribute the increase in the risk of U.S. banks as a consequence of 1990s consolidation, Uhde and Heimeshoff (2009) find detrimental effects of rising concentration over the financial stability of European banks. Similarly, Weiß et al. (2014) support “competition-stability” view by providing direct evidence on the increase in the systemic risk of banks related to their M&A activity.

Our understanding on the effects of M&A activity as an evident mode of consolidation on value and risk in the financial industry remains, in fact, limited. Many theoretical arguments are suggested, and empirical results are contradictory. By studying the risk implications of acquisitions undertaken by the 41 largest European financial institutions during the period 1990-2006, we hope to contribute usefully to this debate. The 2008 financial crisis offers us a fantastic so-called bad outcome, the time at which risk materializes. Whether the acquisition

strategies pursued during a long period affect the exposure of these large size European banks to such a shock is our central question.

3. Data and methods

3.1.Data

Our goal is to track acquisitions by the largest European financial institution over a long period before the 2008 financial crisis. We select large players because (i) acquirers are known since long to be on average large firms (Jensen and Ruback, 1983) and (ii) we are interested in the relation between the external growth of banks and their risk exposure. To do so, for each year between 1990 and 2006, we first use Thomson One Banker financial database to identify the 50 largest European firms that are active in the banking industry with the SIC-codes ranging from 6000 to 6299 or equaling 6712 to cater for bank holding companies. The ranking is based on total assets. Then we merge these 17 yearly lists in one unique list yielding 72 financial firms. After elimination of some wrongly classified firms and security firms whose core activities are not banking, this leaves us with a list of 53 unique banks from 17 European countries. Next, we collect M&A transactions undertaken by these 53 banks using Thomson SDC Platinum database. Our selection criteria are:

- (1) The acquirer must be one of the 53 banks identified in the first step;
- (2) Deal size must be reported;
- (3) The transaction must be completed;
- (4) The transaction must be undertaken by a single acquirer²¹.

To obtain information about acquisition strategies as exhaustive as possible, we put no restriction on the deal size, on the deal type (mergers, acquisitions, acquisitions of partial assets, etc.), target industry, target geographic location etc. We are able to find necessary data for 41 banks (See appendix 1 for names of banks in the final sample).

Table 1 displays descriptive statistics for our sample. Panel A and B of the table report the distribution of banks by year and country respectively and Panel C provides top ten transactions

²¹ Acquisitions by multiple acquirers operating jointly are quite frequent in the banking industry. We collect 458 such transactions during the 1990-2006 period for our 41 banks or approximately 20% of the total sample. It is in practice very difficult to allocate these acquisitions to specific banks. So, we exclude them from the sample. This implies that we under-estimate the intensity of the acquisition activities of the set of banks included in our analysis.

performed by banks in our sample. In panels A and B, the number of M&A transactions, the corresponding percentage, the aggregate value of M&A transactions and the corresponding percentage are provided. Values are in the year 2006 Million USD terms. Inflation adjustment is computed using the consumer price index (CPI) of the bank's home country. Panel A shows that our sample size is steadily growing through time. It can be a consequence of exclusion due to data availability constraints. The more we go back in the past, the more we lose observations. We check, therefore, in Section 4 the robustness of our results to this possible sample selection bias by presenting results for the 1997 to 2006 sub-period. Despite that, our sample size grows through time, the M&A wave of the end of the nineties and the M&A freeze in the wake of the internet bubble crash appear clearly. The first peak of activity appears between 1999 and 2001 and a second at the end of the analyzed period. The wave phenomenon is even stronger in value terms than in number of transactions, a general characteristic of the M&A market recently emphasize in Netter et al. (2011). The aggregate amount of acquisitions by the 41 banks kept in our sample is an impressive 813,260 Million USD. Panel B provides the distribution of banks by country. The three countries most present in the sample are Italy (7 banks), Great Britain (6 banks) and France (4 banks). In terms of the value of M&A transactions, Great Britain dominates, however, by far the sample (29.81% of the aggregate amount of acquisitions), followed by Italy (12.58%), Switzerland (12.52%) and France (12.32%). Panel C presents the top ten transactions of sample banks in value terms over the period. The values in percent, which are calculated with respect to the aggregate amount of M&A deals, show that 27.07% of the total sample value is contributed by the ten largest deals. The acquiring banks in Panel C are mainly drawn from top 15 banks in our sample sorted by the total assets at the end of the year 2008 (Appendix 1).

In order to compute our dependent (DD and Z-score) and control variables, we also use various other data sources. For example, to collect accounting and market data for sample banks, we mainly rely on different data sources offered by Thomson One Banker database. We consult banks' financial reports available on their websites in a bid to verify and fill the missing information to the maximum and make data more comprehensive. We use data sources available with the World Bank, European Central Bank (ECB) and sample countries central banks for macro data such as the consumer price index and the yield on the short-term securities. The next section provides the details on the computation of our dependent and control variables.

3.2. Variables

Dependent variables

We use two measures of bank risk as dependent variables: the Merton (1974) based distance to default (*DD*) as used notably in Koerniadi et al. (2015), Vallasas and Hagendorff (2011), and Vassalou and Xing (2004), and the Z-score used by Bertay et al. (2013), Boyd et al. (2006), and Laeven and Levine (2009) among others. The *DD* relies on investor anticipations because its computation requires stock market data. As financial institutions are growing in size, investors incorporate most probably in their anticipations the “too big to fail” effect (in fact, under the semi-strong efficient market hypothesis, it should be the case). The *DD* will then only provide a measure of bankruptcy risk effects of external growth net of this implicit guarantee of being saved in case of adverse outcome. The Z-score on the other side relies only on financial statement data and is, therefore, free of this issue.

To compute the *DD*, we follow Vassalou and Xing (2004). The *DD* for financial institution i at time t is as follows:

$$DD_{i,t} = \frac{\ln(V_{A,i,t}/X_{i,t}) + ((\mu_{A,i} - (1/2)\sigma_{A,i}^2) \times T)}{\sigma_{A,i} \times \sqrt{T}}, \quad (1)$$

where $V_{A,i,t}$ is financial institution i 's asset value at time t , $X_{i,t}$ is the corresponding debt value, $\mu_{A,i}$ is the expected rate of return of financial institution i 's assets, $\sigma_{A,i}^2$ is the corresponding variance, and T is the time horizon. The model assumes that $V_{A,i,t}$ follows a Brownian motion. However, $V_{A,i,t}$ is not directly observable. Vassalou and Xing (2004) advocate the use of Black and Scholes's (1974) formula to infer $V_{A,i,t}$ from the financial institution's market value of equity $V_{E,i,t}$. For the risk-free rate, we use yield on 1-year treasury bills or certificate of sample bank's home country.²² The terms $\mu_{A,i}$ and $\sigma_{A,i}^2$ are the arithmetic average and the variance of daily estimated $V_{A,i,t}$ returns, respectively. We estimate these parameters on a 1-year window as conventionally used in the above quoted references. We use these estimates iteratively to compute $V_{A,i,t}$ until convergence. The initial values of $\mu_{A,i}$ and $\sigma_{A,i}^2$ are set to correspond with

²² For some countries including Denmark, Switzerland, Portugal where we face lack of data on one year bills, 2 years annualized yield on government bond is used.

the values for equity, taking into account firm leverage. Finally, $X_{i,t}$ is financial institution i 's debt value at time t . We estimate the debt value by summing the book value of debts and deposits of each financial institution. Taking deposits into account is particularly important because we analyze banks.²³ Unavailability of data leads to the exclusion of one bank from DD estimation. In our multivariate analyses, we use, for each financial institution i , the arithmetic average of daily DD estimated during the year 2008 (255 trading days), the heart of the financial crisis:

$$\overline{DD}_i = \frac{\sum_{t=1}^{255} DD_{i,t}}{255} \quad (2)$$

For descriptive purposes, Figure 1 displays the behavior of the sample daily average $DD_{i,t}$ during the period 2005-2008. Two clear observations appear:

- (i) Banks included in our sample underwent a considerable shock during the year 2008. We see the materialization of the bad outcome event;
- (ii) The financial crisis started already during the 2007 year, in the mid of which average DD showed a steep decline and fell below zero.

The second observation motivates our choice to exclude the 2007 year from the acquisition strategy intensiveness estimation period of banks selected in our sample. The values for distance to default (DD) reported in Panel B of Table 2 clearly show a significant increase in the level of risk for our sample banks during the crisis period. The average value of the distance to default (DD) for our sample banks declines from 3.723 in 2005 to -0.674 in 2008.

The Z-score of bank i at time t is defined as follows:

$$Z_{i,t} = \frac{ARO A_{i,t} + \frac{Equity_{i,t}}{Assets_{i,t}}}{\sigma(ARO A)_{i,t}}, \quad (3)$$

where $ARO A_{i,t}$ is the arithmetic average of the bank return on assets over years t to $t - 4$, a proxy for the bank assets expected returns, $\sigma(ARO A)_{i,t}$ is the corresponding standard deviation, an estimate of the bank assets expected return risk and $\frac{Equity_{i,t}}{Assets_{i,t}}$ is the capital to

²³ Similar to Vassalou and Xing (2004), we divide long-term debts by 2, because these debts must not be rolled over on short horizons and therefore are less likely to lead to default than short-term debts.

assets ratio, estimated as the arithmetic average of realized capital to assets ratio also over the past 5 years.

The Z-score is a bank's distance-to-insolvency measure as it provides the lower bound for the number of standard deviations the bank's expected return have to drop to exhaust the bank's equity (Laeven and Levine, 2009; Boyd et al., 2006). A higher Z-score indicates that the bank is in the zone of low probability of insolvency. The popularity of Z-score as a measure of bank's soundness is due to its low data requirements, only information from financial statements being required, and its statistical interpretation (Cihak and Phogosyan, 2011). The main limitation is related to the frequency at which financial statements are published (at best quarterly).

Figure 2 and 3 depict the trend in average Z-score for our sample banks and a comparison of Z-score with distance to default measure respectively. We observe that the Z-score starts moving in tandem with the DD values from almost mid of 2007 but remain overall in a positive band during the crisis period. Moreover, the decline in Z-score is relatively less steep than the one in DD values that enter into a negative zone in the crisis episode and remain there till the end of 2008. We also report the descriptive statistics on Z-score in Panel B of Table 2 besides DD values. The average value of Z-score remains quite stable during the period 2005 to 2007 around 25, but in the year 2008, it comes down to 15.295 (a significant 60% decline). However, the movement of Z-score in a relatively stable and positive zone indicates that adverse effects on the liquidity side were more significant than the solvency of banks (a distinct feature of the 2008 financial crisis).

Furthermore, we also examine the distribution of our risk measures (i.e., average DD and Z-score) across sample banks' M&A activity and the size of their total assets. First, we sort the sample banks based on their M&A intensity over the analyzed period. We provide the trend in the riskiness of top and bottom quartile of the banks for the period 2005-2008 in Figure 4. Similarly, in Figure 5, we show the risk distribution for our sample banks in top and bottom quartiles sorted on the basis of their total assets in the year 2008. The trends remain qualitatively unchanged across the risk measures and the basis of quartile sorting. Both the figures show a significant deterioration during the crisis period in the risk profile of banks mainly in the top quartile that represents the most acquisitive and large size banks in our sample.

In Figure 4.a, average DD values for both quartiles tend to decline in quite a similar manner. However, during the whole period, average DD of banks in the bottom quartile (e.g., -0.33 in 2008) of M&A activity stays slightly above than that of banks in the top quartile (e.g. -0.66 in 2008). Z-score (Figure 4.b) demonstrate a different trend. The average score of banks in the top quartile remains higher than the bottom quartile till 2007. It moves in a range of 26 to 29. Then in 2008, it shows a significant drop and comes down to 11.40. On the other side, banks in the bottom quartile show a relatively stable trend with Z-score moving in a range of 18 to 24 over the period.

Figure 5 replicates Figure 4 but sorts the banks on the basis of their total assets in the year 2008. The pattern observed in DD values (Figure 5.a) is quite similar to the one reported in Figure 4 but with a slightly wider gap between the lines of two quartiles. However, the average Z - score for banks in top asset quartile shows an upward trend from the year 2005 to 2007 and climbs to a peak of 37.01. In the year 2008, it drops down to an average of 22.41. The bottom quartile of asset witnesses a gradual decline in average Z-score from 26.15 in the year 2005 to 15.07 in the year 2008.

Independent variables

We measure the intensity of the bank acquisition strategy by the sum of investment in M&A divided by the bank's market value:

$$AcqM\&A_i = \frac{\sum_{k=1}^N Deal\ Size_{i,k}}{MV_i}, \quad (4)$$

where N is the number of M&A completed by bank i during the period 1990-2006, $Deal\ Size_{i,k}$ is the corresponding deal size in 2006 equivalent million USD (home country consumer price index for inflation adjustment), MV_i is the bank i market value at the end of year 2006.

To gain further understanding of the implications of external growth strategies on bank risk exposure, we create two variables capturing the importance of acquisitions in investment banking and retail banking sub-industries:

$$InvestM\&A_i = \frac{\sum_{k=1}^{NI} Deal\ Size_{i,k}}{MV_i} \quad (5)$$

$$RetailM\&A_i = \frac{\sum_{k=1}^{NR} Deal\ Size_{i,k}}{MV_i} \quad (6)$$

where *NI* and *NR* are respectively the number of acquisitions in the investment banking sub-industry and in the retail banking sub-industry.

Table 2 – Panel A reports descriptive statistics for these three variables. The *AcqM&A* ratio for our sample banks is 33.7% while the variables *RetailM&A* and *InvestM&A* value at 18% and 1.5%.

Control variables

In our multivariate analysis, we use a large set of control variables. Concerning the M&A acquisition strategy, we choose *Cash M&A Percentage*, *Large M&A Percentage* and *Out of Europe M&A Percentage*. These characteristics of M&A may play a significant role in shaping risk profile of banks. For instance, concerning the percentage of cash M&A transactions, Furfine and Rosen (2011) argue that an extensive use of cash in M&A transforms acquirer's safe assets (cash) into the target riskier balance sheet items. This transformation may increase exposure to bankruptcy. With respect to the percentage of large size M&A, such transactions may not only entice banks towards excessive post-merger risk taking but also increase the level of opacity in an even bigger and more complex resulting firms; thus, it increases risk of default for banks (Vallascas and Hagendorff, 2011; Hughes et al., 1999). Transactions outside of Europe may have risk implications due to international factors (exchange rates, political instability, regulatory issues, cyclical sensitivities, etc.) affecting a particular region (Caiza et al., 2012; Chionsini et al., 2003). The selected bank characteristics are *Interest Expense to Interest Income ratio*, *Market to Book Ratio*, *Mutual*, and *Global Focus*. These variables should capture the different dimensions of the bank profile that may potentially affect their risk (valuation, interest rate margins, financial environment and geographical scope of activities). In the robustness section of our paper, we also use variables *Deposit Funding* and *Interbank Funding* to test the stability of our results relating to the M&A intensity in sub-industries retail banking and investment banking while controlling for bank funding structure. It may enable us to understand the impact of banks funding structure on banks' risk (Altunbas et al., 2015). Lastly, banks increasing focus on non-traditional activities (e.g., investment banking and

insurance businesses) may enhance their exposure to such volatile sources of income and foster instability at both idiosyncratic and systemic level (Wagner, 2010; De Jonghe, 2010). These variables are defined in Appendix 2.

Table 2 – Panel A provides summary statistics about M&A acquisition characteristics. 37.2% is paid in cash on average. *Out of Europe* acquisitions accounts for 19.7% and *Large M&A* (deal value 1 billion USD and above) for 39.6% respectively. Table 2 – Panel B reports figures for bank characteristics. The *Market to Book ratio* is (on average) 2.58. Bank market valuations were clearly very high at the end of 2006 and may capture the effect of executive hubris on merger-related risk implications for sample banks (Vallascas and Hagendorff, 2011). The ratio of *Interest Expense to Interest Income*, which is a proxy for management quality and may have merger-related risk implications, remains 67% on average. While *Deposit Funding* and *Interbank Funding* variables that represent bank funding structure remain on average 35.3% and 14.7% respectively, *Non-interest Income* that captures banks income from non-traditional activities stands 0.08% on average. 15% of banks included in our sample are mutual banks and 29% are significantly present outside Europe.

3.3.Method

The academic literature introduces a broad range of econometric approaches to model bank exposure to bankruptcy, which is in most cases transpositions of techniques used to model firm bankruptcy. Several studies including Altman (1968) and more recent works of Vallascas and Hagendorff (2011), and Kerstin and Andreas (2011) rely on classical ordinary least square regression (OLS) and discriminant analysis techniques. Discrete response models (logit, probit) are already used in Martin (1977), and Demirguc-Kunt and Detragiache (2005) among others. More sophisticated methods have also been applied. Berger and DeYoung (1997) use Granger-causality tests to study the dynamics between the proportion of non-performing loans and reductions in cost efficiencies. We decide to stay with the classical OLS regression approach. Our goal is indeed to identify determinants of bank risk exposure and not to predict as accurately as a possible bank failure. The OLS framework offers us a well-understood toolbox for hypotheses testing and robustness checks.

Even if the aggregate total assets of the 41 banks included in our sample amounts to 28,517 Billion USD at the end of 2006, a sizeable 52% of the aggregate total assets of the European banking industry at that time, our sample size is small with respect to econometric criteria. We

are, therefore, faced to a trade-off between omitted variable biases and power of tests. If we include few control variables in our specification, the number of degrees of freedom is higher, but results may be affected by the potential omission of variables (and vice-versa). Therefore, we chose to report systematically 3 specifications: the first includes only the independent variable(s) of interest, the second adds M&A acquisition activity control variables and the third one, the bank characteristics control variables. This strategy provides a good picture of the robustness of the results.

For the inference, we use the percentile t bootstrap procedure to compute p -values in our multivariate analysis. Bootstrap is indeed particularly interesting for small sample analysis, in the case of which asymptotic normality of estimators does not apply (see Horowitz, 2002). We bootstrap the student statistics for each coefficient in our multivariate models as follows:

- We draw, with replacement from the original data matrix, 1000 bootstrap samples of the same size as the original sample.
- For each bootstrap sample, we estimate the coefficients and t statistics of the multivariate model under consideration using heteroskedastic robust standard errors.
- We collect for each coefficient the bootstrapped t statistics and thereby build their bootstrapped empirical cumulative distribution functions.
- We use the bootstrapped empirical cumulative distribution functions to compute the coefficients' p -values (with a null hypothesis of the coefficient being equal to 0).

We adopt a case-by-case resampling, which is robust to heteroskedasticity.

4. Results

4.1. Main results

We first focus on the determinants of the Merton (1974) based distance to default (DD). Table 3 reports results first using $AcqM\&A$ (the sum of investment in M&A divided by the bank's market value, see Equation 4) as independent variable (Panel A) and then in Panel B, $RetailM\&A$ and $InvestM\&A$ (the importance of acquisitions in retail banking and investment banking sub-industries respectively, defined in Equations 5 and 6). In each panel, the first column provides results with the inclusion of only the independent variable(s). In the second column, we add M&A related control variables and in the third, bank feature control variables.

Table 3 – Panel A results are without ambiguity: the *AcqM&A* variable is not significant (though with a negative sign) in all the three specifications. The aggregate amount of investment in M&A does not appear as a factor affecting the *DD* during the 2008 financial crisis at any statistically significant level. In the full specification (column 3), *Market to Book* and *Interest Expense to Interest Income* ratios are significant with negative coefficients: banks with high market valuations and low management efficiency appear to be more exposed to the financial crisis in terms of *DD measure* of risk. A positive and significant coefficient for *Global Focus* variable indicates towards the stability of banks having a significant presence outside Europe. Table 3 – Panel B reports a negative and significant coefficient for *InvestM&A* in all three specifications. More acquisitions in the investment banking sub-industry appear, therefore, to increase bank risk during the 2008 financial crisis, as perceived by investors. In our second specification, a significant and positively signed *RetailM&A* variable indicates that M&A dedicated to retail banking tend to reduce the overall risk of sample banks. In the third estimation, the control variables on bank features including *Market to Book*, *Interest Expense to Interest Income* ratios and *Global Focus* report significant coefficients with signs consistent with those reported in Panel A. Moreover, a positive and significant coefficient of dummy variable *Mutual* demonstrates less exposure to the risk of failure for such banks during the crisis period.

Results on Z – score analysis are reported in Table 4. The table organization is identical to the one presented in Table 3. Panel A shows that *AcqM&A*, like for *DD*, has never been significant. Using the Z-score as a measure of bank risk during the 2008 financial crisis, we confirm the results obtained with the *DD* indicator: the intensiveness of the bank past acquisition strategy does not appear to be a significant determinant of bank risk during the 2008 financial crisis. Similarly, ratios for *Market to Book* and *Interest Expense to Interest Income* in the third estimation of Panel A provide results consistent with the results reported in Panel A of Table 3. However, in this estimation coefficient for *Mutual* dummy turns significantly positive and *Global Focus* dummy turns negative but with a loss of significance. In Panel B, *InvestM&A* has a negative and highly significant coefficient in all the three estimations. Interestingly *RetailM&A* also provide positive and significant coefficients in line with *InvestM&A* in all three specifications. These results confirm that acquisitions in the investment banking sub-industry reinforced bank risk exposure to the 2008 financial crisis and acquisitions in retail banking appears to limit this exposure. In column (2) of the Panel B, the significant coefficient for *Out of Europe M&A Percentage* with positive sign advocates the risk mitigating effects of

M&A outside of Europe. Whereas a negative and significant coefficient for *Large M&A Percentage* means an increase in risk level (decline in Z-score) for banks due to the high proportion of large size deals in the sample. Both the variables maintain their signs in the full specification reported in column (3) of the table but *Large M&A Percentage* turns insignificant. The results for our bank feature variables remain largely consistent with the results provided in our full specification of Panel B of Table 3. Only *Global Focus* variable gives a contradictory sign but without any statistical insignificance.

Why do acquisitions in the investment banking increase risk exposure in case of bad economic outcome? We see three potential explanations:

- (i) Acquisitions in the investment banking activity increase funding needs of banks and their dependence on the interbank market. One of the main characteristics of the 2008 financial crisis has indeed been a general freeze of the interbank market due to the dissemination of so-called toxic assets among market participants. Therefore, the more banks acquired investment banking activities in the past, the more they have been hit by this freeze.
- (ii) An increased focus of commercial banks towards such non-traditional sources of income generation may increase volatility in banks' income structure that in turn could cause more fragility in the banking system.
- (iii) Investment banks may have been far more active in CDS and securitization markets, through which toxic assets were disseminated all over the world. The more banks acquired these activities, the higher the probability that they will face losses on these assets.

In the next section, we provide some empirical evidence in support of the above arguments.

4.2. Robustness checks

We perform different estimations in order to evaluate the robustness of our results and substantiate their explanation with further empirical evidence.

M&A activity period

The statistics reported in Table 1– Panel 1 highlights that the number of banks included in our sample increases significantly through time. Before 1997, it varies between 10 and 16 while in

the next ten years, it is systematically above 20. So, we report in Tables 5 and 6 a replication of Tables 3 and 4, but using the sub-period 1997 to 2006 to estimate M&A activities, to test whether our results are affected by the earlier period data collection issue. The results are as follows:

- For the *DD*, the *AcqM&A* variable has a negative coefficient in the three specifications of Panel A but remains statistically insignificant at the usual level of confidence. The *InvestM&A* variable has a negative and highly significant coefficient in all three columns of Table 5–Panel B. The coefficient for *RetailM&A* is positive and statistically significant in the second estimation.
- For the *Z-score*, again the *AcqM&A* variable has a negative coefficient in two out of three specifications with no statistical significance at the usual level of confidence. The *InvestM&A* variable coefficient is negative and statistically significant in all the three columns of Table 6 – Panel B. The coefficient of *RetailM&A* variable demonstrates the same behavior with a positive sign.

These results show that our analysis are remarkably stable when focusing on the more recent 1997-2006 period to estimate the intensiveness of the bank M&A activities.

M&A types, Funding and Income Characteristics

A general freeze in the interbank markets of the U.S. and Europe after a dramatic rise in interbank rate is considered to be a significant event that further propagated instability during the 2008 financial crisis. Interbank market is considered as a convenient and well-disciplined source of funding activity of banks. It allows banks to raise large volumes of funds at relatively low cost (Calomiris and Kahn, 1991; Demirgüç-Kunt and Huizinga, 2010). Retail deposits, which are typically insured by the government, are another important but relatively less flexible source of funding due to their instantly demandable nature (Demirgüç-Kunt and Huizinga, 2010). Acquisition of investment banking firms indicates towards a growing focus of banks to generate income from non-traditional banking activities. While, on one side, investment banking activities may increase volatility in banks' profits (Wagner, 2010; De Jonghe, 2010), banks' funding requirements and dependency on the interbank market may also increase. Therefore, it becomes pertinent to test the consistency of our main results relating to M&A activity in sub-industries of retail banking and investment banking while taking into account bank funding structure and their non-interest income.

We replicate first two estimations of our baseline model (see Table 3 – Panel B) that use *RetailM&A* and *InvestM&A* as independent variables. We introduce variables *Deposit Funding*, *Interbank Funding* and *Non-interest Income* to represent bank funding structure and income from non-traditional activities in both specifications. Table 7 – Panel A, report results using DD as the dependent variable. Panel B of the table uses Z-score as the dependent variable. The results are as follows:

- In the case of DD (Panel A of the table), *Interbank Funding* variable appears to impact the risk of our sample banks with a negative and statistically significant coefficient in both estimations. However, the relation of *Deposit Funding* and *Non-interest Income* with DD of banks during 2008 financial crisis remain insignificant.
- For Z-score (Panel B of the table), while *Interbank Funding* variable shows a consistent behavior in line with Panel A's results, *Deposit Funding* provides a positive and statistically significant coefficient only in the first estimation. Interestingly, we also observe a negative and statistically significant coefficient for *Non-interest Income* under the two specifications, which indicates an increase in insolvency risk of banks due to income from investment banking activities.

The above findings indicate towards negative risk implications – both for DD and Z-score measure of risk – associated with interbank funding, and non-interest income (limited to z-score though); our results on the risk implications of M&A intensity in sub-industries of investment banking and retail banking segment broadly remain in line with the main results.

5. Conclusion

This paper investigates the effects of banks' external growth strategies implemented through M&A on their risk during the 2008 financial crisis for a sample of large size European banks. Using Merton based distance to default (DD) and Z-score as bank's measures of risk; we find no evidence of any statistically significant relation between the overall intensity of banks' M&A activity and their risk during the 2008 financial crisis. At the aggregate level of activity, the negatives of M&A relating to moral hazard associated with "too big to fail" phenomenon, diseconomies of scale and limited competition appear to be offset by positive effects emanating from diversification, exploitation of synergies between acquirers and targets, and monopoly rents under more concentrated markets. However, the analysis of M&A in sub-industries of

retail banking and investment banking reveal that M&A activity focused towards the investment banking segment adversely affects banks' risk during the 2008 financial crisis (lower DD value and Z-score). On the other hand, M&A in retail banking segment appear to have a positive relation primarily with the solvency of banks measured by Z-score.

Our results remain robust over a sub-period analysis. We also test the robustness of our results after taking into account banks' funding structure and non-interest income generated mainly through investment banking activities. While, interbank funding tends to substantially increase bankruptcy risk (lower average DD) and solvency risk (lower Z-score), we negative risk implications of non-interest income on bank risk stand limited to solvency side (lower Z-score). These findings not only corroborate our main results but also help us to understand further about channels through which acquisitions in investment banking may transmit risk to the financial institutions.

Our findings have some important implications in the context of 2008 financial crisis. Should we cap the growth of banks or should we stop commercial banks' further transgression into non-traditional activities, are the questions widely under debate in order to limit the adverse effects of such dramatic events in future. Our key findings that M&A in investment banking expose banks to higher risk, while retail banking M&A improve the bank's risk profile should draw the attention of regulators. It entails regulations that may clearly distinguish between these two kinds of acquisition activities.

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Appendix 1 – List of sample European banks sorted by 2008 total assets

Sample Banks	Country	Total Assets*
Royal Bank of Scotland Group	Great Britain	3,442.79
Deutsche Bank AG	Germany	3,049.79
Barclays PLC	Great Britain	2,947.84
BNP Paribas SA	France	2,879.61
HSBC Holdings PLC	Great Britain	2,482.29
Credit Agricole SA	France	2,292.31
UBS AG	Switzerland	1,884.89
ING Groep NV	Netherlands	1,831.90
Societe Generale SA	France	1,566.70
Unicredito Italiano SpA	Italy	1,438.95
Banco Santander SA	Spain	1,438.72
Credit Suisse Group	Switzerland	1,089.58
HBOS PLC	Great Britain	988.25
Dexia SA	Belgium	899.42
Intesa SanPaolo SpA	Italy	877.69
Commerzbank AG	Germany	860.72
Banco Bilbao Vizcaya Argentaria SA	Spain	747.08
Danske Bank A/S	Denmark	661.62
Nordea Bank AB	Sweden	650.08
Bayerische Hypo-Und Vereins	Germany	634.20
Lloyds TSB Group PLC	Great Britain	625.71
Standard Chartered PLC	Great Britain	427.83
Credit Industriel Et Commercial	France	348.37
Skandinaviska Enskilda Banken	Sweden	317.13
Bank of Ireland PLC	Ireland	312.61
Banca Monte DEI Paschi	Italy	292.22
Erste Bank der	Austria	278.91
Svenska Handelsbanken AB	Sweden	272.94
DnB NOR Bank ASA	Norway	261.56
Allied Irish Banks PLC	Ireland	252.85
UBI Banca	Italy	168.47
Banco Espanol de Credito	Spain	166.23
Banco Popolare SC	Italy	166.15
Banco Popular Espanol SA	Spain	152.73
National Bank of Greece SA	Greece	140.49
Banco Comercial Portugues SA	Portugal	130.44
Fortis NV	Belgium	128.57
Espirito Santo Financial Group	Luxembourg	108.15
Mediobanca SpA	Italy	101.09
Banca Popolare di Milano Scarl	Italy	62.27
Pohjola Bank PLC	Finland	45.01

*In Billion USD (inflation adjusted)

Appendix 2 – Control Variables Definition

Variable	Definition
<i>Cash M&A Percentage</i>	Sum of inflation-adjusted cash payments in M&A deals undertaken by the bank during the period 1990-2006 divided by the sum of all inflation adjusted M&A deal values undertaken by the bank during the corresponding period. Consumer price indexes of sample countries for the year 2006 are used as a reference for inflation adjustment. M&A cash payments are collected from the SDC database.
<i>Global Focus</i>	Dummy variable taking value 0 if a bank has activities mainly within Europe and 1 if the bank is present all over the world. Bank activities scope classification is from Schoenmaker (2011).
<i>Interest Expense-to-Interest Income Ratio</i>	The ratio of bank interest expenses to interest incomes at the end of the year 2006. Interest expenses and interest income statistics are collected from Thomson One Banker database.
<i>Large M&A Percentage</i>	Sum of inflation-adjusted large M&A deal values undertaken by the bank during the period 1990-2006 divided by the sum of all inflation adjusted M&A deal values undertaken by the bank during the corresponding period. Large deals are deals with an acquisition value above or equal to 1 billion USD. Consumer price indexes of sample countries for the year 2006 are used as a reference for inflation adjustment. M&A deal values are collected in SDC database.
<i>Market to Book Ratio</i>	The ratio of the bank market value to the book value of equity. Market value and book value of equity are estimated at the end of the year 2006 and collected from Datastream.
<i>Mutual</i>	Dummy variable equals to 1 if a bank is classified as a mutual. The term <i>Mutual</i> encompasses both mutual and cooperative forms of banking.
<i>Out of Europe M&A Percentage</i>	Sum of inflation-adjusted M&A deal values undertaken by the bank outside Europe during the period 1990-2006 divided by the sum of all inflation adjusted M&A deal values undertaken by the bank during the corresponding period. Consumer price indexes of sample countries for the year 2006 are used as a reference for inflation adjustment. M&A deal values and target countries are collected in SDC database.
<i>Deposit Funding</i>	The ratio of customer deposits to total assets at the end of the year 2006. Customer deposits and total assets are collected from Thomson One Banker database.
<i>Interbank Funding</i>	The ratio of short-term funds borrowed from the interbank market to total assets at the end of the year 2006. Short term funds borrowed from the interbank market include funds with a maximum maturity up to one year. It excludes the funds borrowed from central banks. The data on short-term funding from interbank is manually collected by authors from financial statements of sample banks.
<i>Non-Interest Income</i>	The ratio of non-interest income to total assets at the end of year 200. It includes mainly income generated through investment banking activity including fee & commissions. This information is manually collected by authors from financial statements of sample banks.

Figure 1 – Daily average Merton (1974) based distance to default

Figure 1 reports the evolution of the daily average of Merton (1974) based distance to default for our sample of European banks during the period 2005-2008. Banks included in the sample are listed in appendix 1. The Merton (1974) based distance to default is computed as in Vassalou and Xing's (2004). Section 3.2 presents the details.

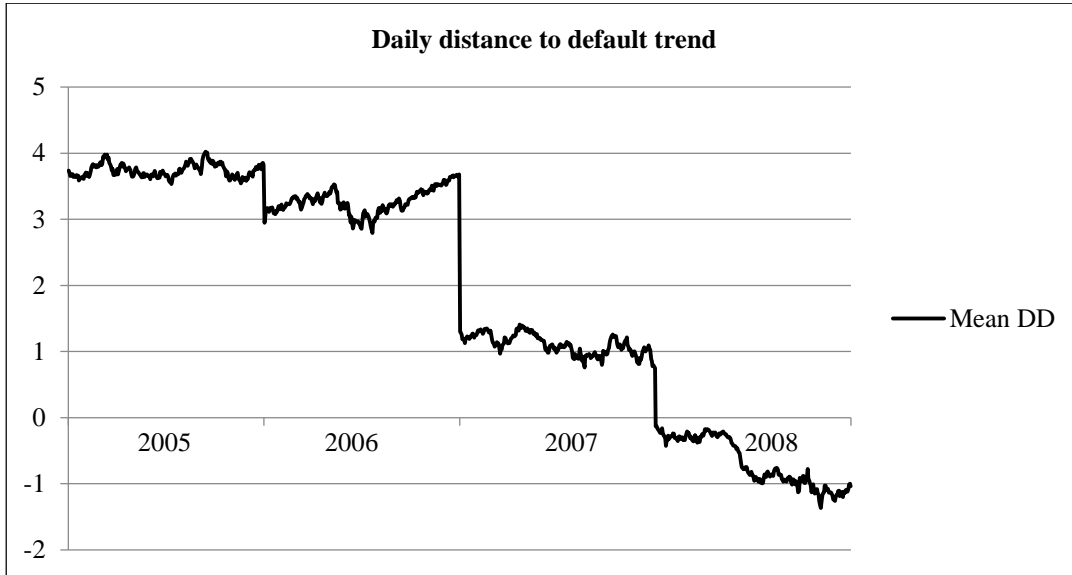


Figure 2 – Bank Z-Score

Figure 2 reports the trend in Z-score values (second risk measure) for our sample of European banks during the period 2005-2008. Banks included in the sample are listed in appendix 1. Section 3.2 presents the details on the calculation of Z-Score.

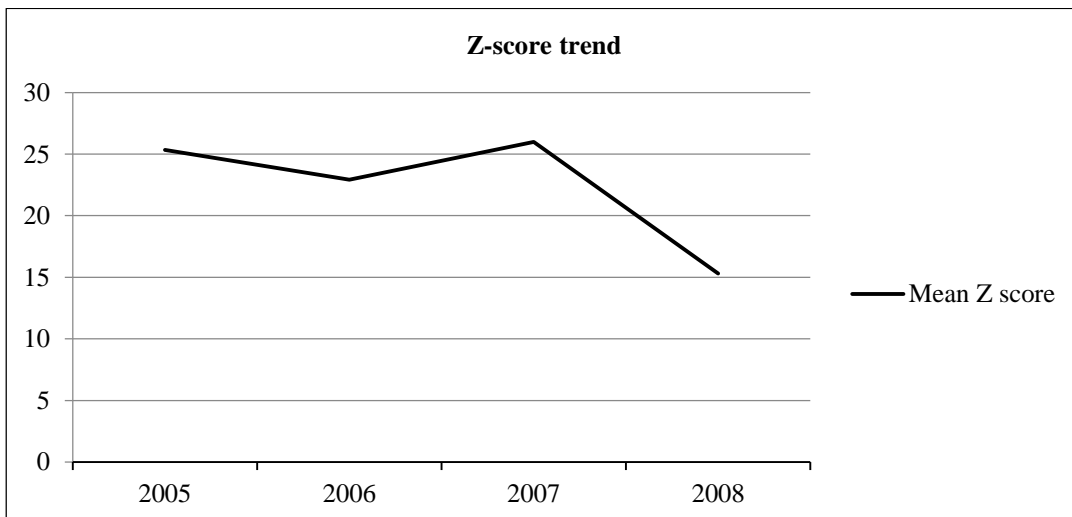


Figure 3 – Average distance to default and Z-Score measures of risk

Figure 3 puts together figure 1 and 2 for a comparative trend analysis of distance to default and Z-score values on an annual basis for our sample banks during the period 2005-2008. The solid line depicts the distance to default (left vertical axis) and the dotted line is used for Z-score values (right vertical axis).

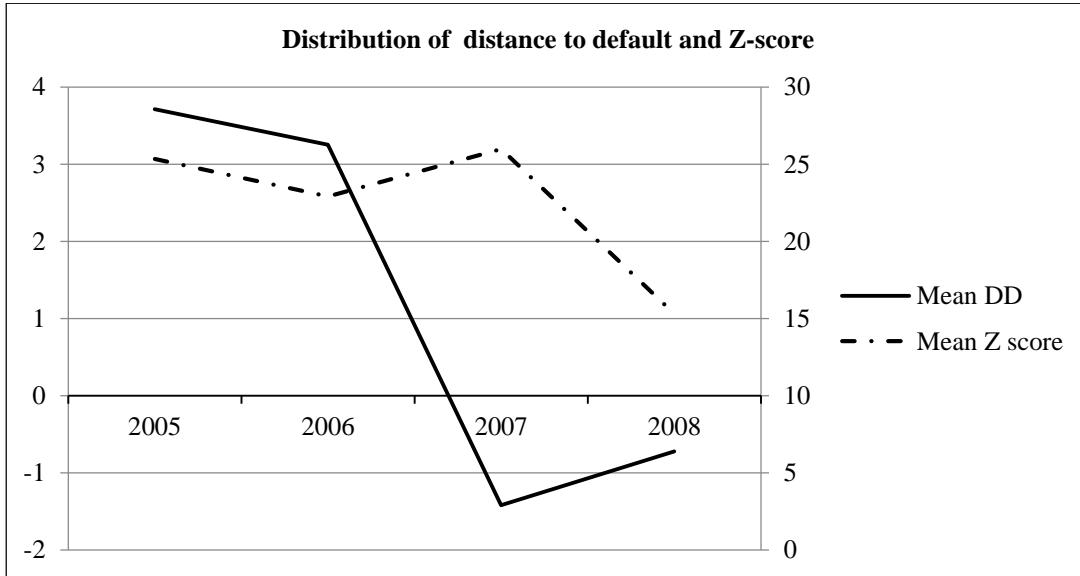


Figure 4 – Bank’s risk distribution based on M&A intensity

Figure 4 reports the distribution of our risk measures in top (solid line) and bottom (dotted line) quartile of banks in sample sorted by volume of M&A activity. Annual averages of distance to default values (Fig. 4.a) and Z-score (Fig.4.b) are provided for the period 2005-2008.

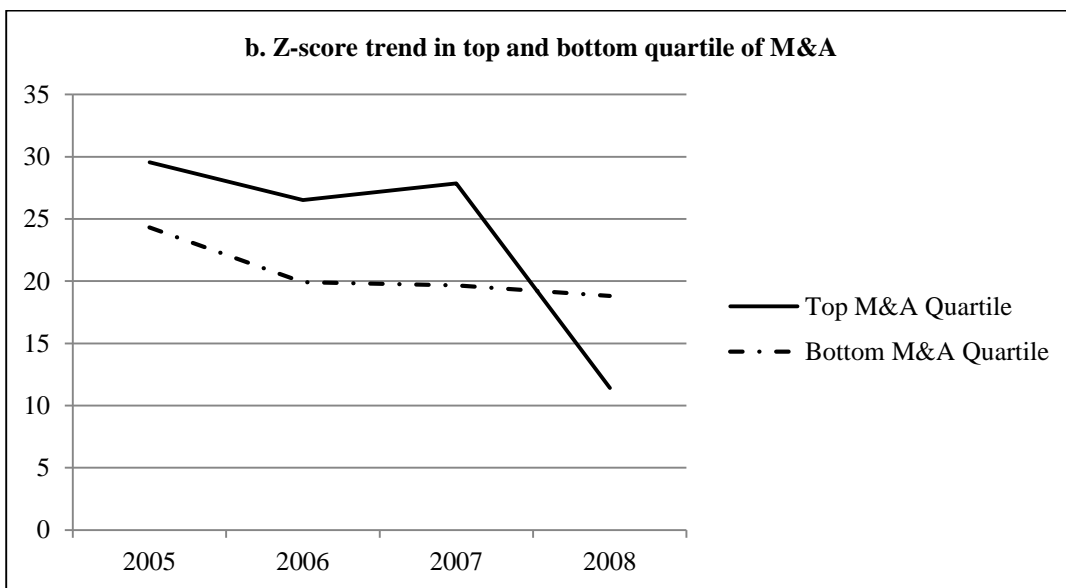
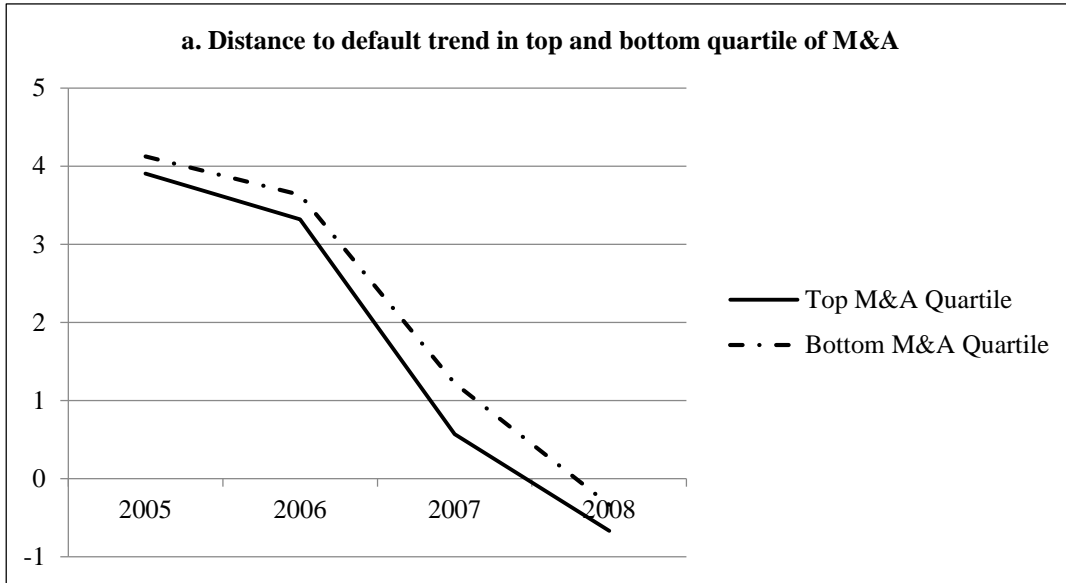


Figure 5 – Bank’s risk distribution based on asset size

Figure 5 reports the distribution of our risk measures in top (solid line) and bottom (dotted line) quartile of banks in sample sorted by 2008 total assets. Annual averages of the Distance to default value (Fig. 5.a) and Z-score (Fig.5.b) are provided for the period 2005-2008.

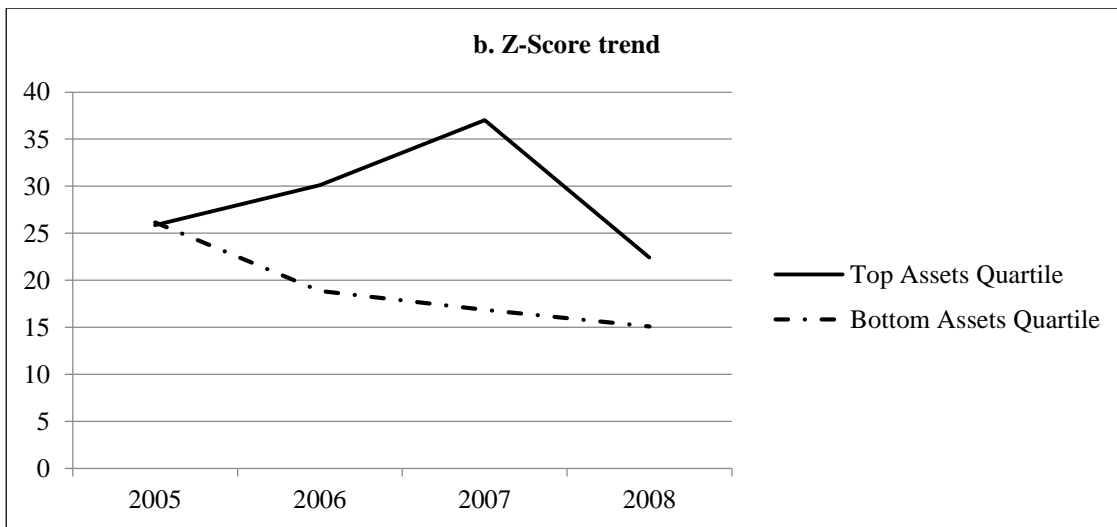
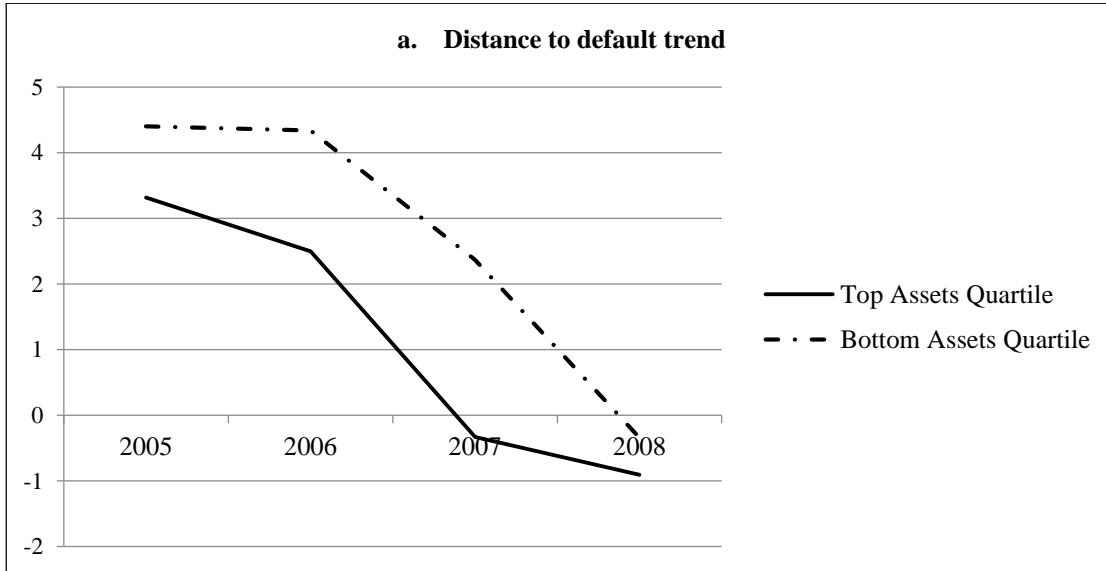


Table 1 – Sample Composition

Table 1 reports the descriptive statistics about the sample composition. In Panel A, the distribution by year of the number of banks, number of M&A deals and the corresponding aggregate deal values in USD (inflation adjusted) are provided. For inflation adjustment, consumer price index of the year 2006 for each sample country is used. In Panel B, we provide the corresponding distribution by country. Panel C presents top ten transactions (value terms) carried out by sample banks over the period 1990-2006 with their percentage representation in total sample value.

Panel A – Number of Observations by Year

Year	Number of Banks	Number of M&A deals	Value of M&A deals		
			%	Million USD	%
1990	10	32	1.79	3,836.97	0.47
1991	11	23	1.28	4,512.71	0.55
1992	14	37	2.06	10,948.71	1.35
1993	12	36	2.01	3,499.24	0.43
1994	14	44	2.46	9,243.50	1.14
1995	16	47	2.62	29,561.86	3.63
1996	15	39	2.18	13,555.02	1.67
1997	23	72	4.02	61,337.88	7.54
1998	23	102	5.69	48,704.66	5.99
1999	25	141	7.87	110,082.28	13.54
2000	29	178	9.93	106,992.81	13.16
2001	27	151	8.43	38,711.00	4.76
2002	25	114	6.36	65,394.60	8.04
2003	29	128	7.14	34,996.14	4.30
2004	32	144	8.04	71,051.04	8.74
2005	29	155	8.65	82,113.34	10.10
2006	30	160	8.93	118,718.87	14.60
Total		1,603	100.00	813,260.64	100.00

Panel B – Number of Observations by Country

Country		Number of Banks		Number of M&A deals		Value of M&A deals	
			%		%	Million USD	%
1	Austria	1	2.44	16	1.00	8,237.34	1.01
2	Belgium	2	4.88	33	2.06	21,004.04	2.58
3	Denmark	1	2.44	3	0.19	10,637.11	1.31
4	Finland	1	2.44	2	0.12	76.76	0.01
5	France	4	9.76	187	11.67	100,155.82	12.32
6	Germany	3	7.32	183	11.42	70,849.22	8.71
7	Great Britain	6	14.63	511	31.88	242,455.16	29.81
8	Greece	1	2.44	16	1.00	9,447.49	1.16
9	Ireland	2	4.88	36	2.25	8,646.31	1.06
10	Italy	7	17.07	104	6.49	102,315.80	12.58
11	Luxembourg	1	2.44	1	0.06	36.16	0.00
12	Netherland	1	2.44	105	6.55	48,957.44	6.02
13	Norway	1	2.44	4	0.25	399.82	0.05
14	Portugal	1	2.44	29	1.81	12,948.94	1.59
15	Spain	4	9.76	121	7.55	60,476.66	7.44
16	Sweden	3	7.32	50	3.12	14,793.34	1.82
17	Switzerland	2	4.88	202	12.60	101,823.24	12.52
		41	100.00	1603	100.00	813,260.64	100.00

Panel C – Top Ten Deals of Sample Banks (1990-2006)

	Acquirer Name	Acquirer Nation	Target Name	Value of M&A Deals	
				Million USD	% of Total Sample*
1	Royal Bank of Scotland	Great Britain	NatWest Bank PLC	42,573.52	5.23
2	Intesa SanPaolo SpA	Italy	SanPaolo IMI	37,624.20	4.63
3	UBS AG	Switzerland	Swiss Bank Corp.	24,837.70	3.05
4	Unicredito Italiano SpA	Italy	Hypo- und Vereins	18,634.40	2.29
5	Lloyds TSB Group PLC	Great Britain	Lloyds Bank PLC	18,226.42	2.24
6	Credit Agricole SA	France	Credit Lyonnais SA	17,523.63	2.15
7	Banco Santander SA	Spain	Abbey National	16,893.60	2.08
8	HSBC Holdings PLC	Great Britain	Household Intl.	16,407.10	2.02
9	Credit Suisse Group	Switzerland	Donaldson Lufkin	14,262.33	1.75
10	Unicredito Italiano SpA	Italy	UniCredit SpA	13,142.81	1.62
Total				20,125.78	27.07

*Percentage calculated with respect to the total inflation adj. the amount of M&A sample reported in panel A of Table 1.

Table 2 – Univariate Statistics

Table 2 reports univariate statistics for the 41 banks that compose our sample. The sample mean, median and standard deviation are reported respectively in columns (1) to (3). Panel A focuses on M&A activities. Panel B highlights bank features. Total M&A is the sum of (inflation adjusted) M&A deal values for transactions completed by a given bank. M&A Cash Payments are the corresponding payments in cash. Retail Banking is the sum of (inflation adjusted) M&A deal values for acquisitions in the retail banking sub-industry by a given bank. Investment Banking is the corresponding amount in the investment banking sub-industry. These four variables are reported in Million USD. Consumer price index for the year 2006 for each sample country is used as reference for inflation adjustment. The banks' risk measures (DD and Z-score) are described in details in section 3.2. All other variables are defined in Appendix 2. *N* stands for the number of observations in a given sample. For dummy variables, averages correspond to percentages.

Panel A – M&A activities

	All Sample <i>N</i> = 1603		
	(1)	(2)	(3)
	Average	Median	Standard Deviation
Total M&A	19,835.62	9,447.49	22,632.40
M&A Cash Payments	8,641.14	3,515.84	11,739.00
Total Retail Banking	10,832.34	5,239.64	14,037.33
Total Investment Banking	996.55	144.31	2,005.53
AcqM&A	0.337	0.321	0.246
RetailM&A	0.180	0.132	0.192
InvestM&A	0.015	0.002	0.025
Cash M&A Percentage	0.372	0.385	0.276
Out of Europe M&A Percentage	0.197	0.069	0.266
Large M&A Percentage	0.396	0.375	0.331

Panel B – Bank features

Variables	All Sample <i>N</i> = 1603		
	(1)	(2)	(3)
	Average	Median	Standard Deviation
<i>Risk measures (DD and Z-score)*</i>			
DD ₂₀₀₈	-0.674	-0.644	0.913
DD ₂₀₀₇	1.113	1.099	1.771
DD ₂₀₀₆	3.286	3.341	1.585
DD ₂₀₀₅	3.723	3.681	1.481
Z-Score ₂₀₀₈	15.295	14.914	8.221
Z-Score ₂₀₀₇	25.987	16.710	31.313
Z-Score ₂₀₀₆	22.923	18.274	18.002
Z-Score ₂₀₀₅	25.340	16.822	19.154
<i>Other controls</i>			
Size (Million USD)	710,512.55	470,916.52	637,845.60
Market to Book Ratio	2.583	2.030	3.383
Interest Expense to Interest Income Ratio	0.670	0.637	0.163
Deposit Funding	0.353	0.360	0.117
Interbank Funding	0.147	0.130	0.084
Non-interest Income	0.008	0.100	0.007
Mutual	0.150		0.362
Global Focus	0.292		0.461

*We use average *DD* and *Z-score* of 2008 as dependent variables in our estimations.

Table 3 – Average Distance to Default Determinants (period 1990-2006)

Table 3 reports results using the Merton (1974) based distance to default as the dependent variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3 and Appendix 1. Panel A focus on the intensity of acquisition strategy (measured by the variable *AcqM&A*). Panel B is dedicated to the analysis of the corresponding intensity in sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1990-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). *N* is the number of observations. R^2 is the R-square and *Fisher* is the Fisher statistic of joint test of coefficients (except constant) equal zero.

Panel A – Intensity of Acquisition Strategy

Variables	(1)		(2)		(3)	
	Coeff.	<i>P-val</i>	Coeff.	<i>P-val</i>	Coeff.	<i>P-val</i>
<i>Constant</i>	-0.54	<i>0.08</i>	-0.58	<i>0.05</i>	0.96	<i>0.05</i>
Independent variable						
<i>AcqM&A</i>	-0.38	<i>0.33</i>	-0.71	<i>0.12</i>	-0.81	<i>0.18</i>
M&A Features						
<i>Cash M&A Percentage</i>			0.04	<i>0.07</i>	0.04	<i>0.12</i>
<i>Out of Europe M&A Percentage</i>			-0.32	<i>0.42</i>	-0.80	<i>0.17</i>
<i>Large M&A Percentage</i>			0.31	<i>0.36</i>	0.12	<i>0.69</i>
Bank Features						
<i>Market to Book Ratio</i>					-0.06	<i>0.09</i>
<i>Interest Expense to Interest Income Ratio</i>					-2.29	<i>0.03</i>
<i>Mutual</i>					0.47	<i>0.14</i>
<i>Global Focus</i>					0.77	<i>0.08</i>
<i>N</i>	40		40		40	
R^2	0.01		0.06		0.37	
<i>Fisher</i>	0.42	<i>0.52</i>	0.58	<i>0.68</i>	2.31	<i>0.05</i>

Panel B – Retail Banking versus Investment Banking Intensity of Acquisition

Variables	(1)		(2)		(3)	
	Coeff.	P-val	Coeff.	P-val	Coeff.	P-val
<i>Constant</i>	-0.55	0.05	-0.64	0.04	0.63	0.14
Independent variable						
<i>RetailM&A</i>	0.41	0.25	0.82	0.08	-0.02	0.96
<i>InvestM&A</i>	-12.58	0.01	-12.95	0.02	-9.24	0.10
M&A Features						
<i>Cash M&A Percentage</i>			0.04	0.04	0.03	0.21
<i>Out of Europe M&A Percentage</i>			0.32	0.40	-0.43	0.37
<i>Large M&A Percentage</i>			-0.31	0.30	-0.23	0.37
Bank Features						
<i>Market to Book Ratio</i>					-0.06	0.09
<i>Interest Expense to Interest Income Ratio</i>					-1.86	0.07
<i>Mutual</i>					0.56	0.09
<i>Global Focus</i>					0.75	0.08
<i>N</i>	40		40		40	
<i>R²</i>	0.11		0.15		0.40	
<i>Fisher</i>	2.46	0.10	1.27	0.30	2.22	0.05

Table 4 – Z-score Determinants (period 1990-2006)

Table 4 reports results using the Z-score as the dependent variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3 and Appendix 1. Panel A focus on the intensity of acquisition strategy (measured by the variable *AcqM&A*). Panel B is dedicated to the analysis of the corresponding intensity in sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1990-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). *N* is the number of observations. *R*² is the R-square and *Fisher* is the Fisher statistic of joint test of coefficients (except constant) equal zero.

Panel A – Intensity of Acquisition Strategy

Variables	(1)		(2)		(3)	
	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>	Coeff.	<i>P-value</i>
<i>Constant</i>	16.87	<i>0.00</i>	17.39	<i>0.00</i>	34.70	<i>0.00</i>
Independent variable						
<i>AcqM&A</i>	-4.79	<i>0.23</i>	-6.10	<i>0.28</i>	-3.26	<i>0.39</i>
M&A Features						
<i>Cash M&A Percentage</i>			-0.22	<i>0.19</i>	-0.23	<i>0.13</i>
<i>Out of Europe M&A Percentage</i>			-2.63	<i>0.42</i>	3.22	<i>0.25</i>
<i>Large M&A Percentage</i>			2.15	<i>0.56</i>	1.62	<i>0.53</i>
Bank Features						
<i>Market to Book Ratio</i>					-0.49	<i>0.07</i>
<i>Interest Expense to Interest Income Ratio</i>					-27.69	<i>0.01</i>
<i>Mutual</i>					6.90	<i>0.06</i>
<i>Global Focus</i>					-1.14	<i>0.45</i>
<i>N</i>	41		41		41	
<i>R</i> ²	0.02		0.04		0.48	
<i>Fisher</i>	0.83	<i>0.37</i>	0.38	<i>0.82</i>	3.63	<i>0.00</i>

Panel B – Retail Banking versus Investment Banking Intensity of Acquisition

Variables	(1)		(2)		(3)	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
<i>Constant</i>	14.78	0.00	15.87	0.00	29.21	0.00
Independent variable						
<i>RetailM&A</i>	11.91	0.03	20.63	0.00	11.32	0.07
<i>InvestM&A</i>	-108.21	0.01	-122.57	0.00	-73.05	0.05
M&A Features						
<i>Cash M&A Percentage</i>			-0.10	0.33	-0.23	0.15
<i>Out of Europe M&A Percentage</i>			5.93	0.07	7.62	0.09
<i>Large M&A Percentage</i>			-8.33	0.00	-3.78	0.12
Bank Features						
<i>Market to Book Ratio</i>					-0.46	0.06
<i>Interest Expense to Interest Income Ratio</i>					-20.72	0.02
<i>Mutual</i>					7.47	0.05
<i>Global Focus</i>					-1.21	0.44
<i>N</i>	41		41		41	
<i>R²</i>	0.15		0.23		0.52	
<i>Fisher</i>	3.47	0.04	2.16	0.08	3.76	0.00

Table 5 – Average Distance to Default Determinants (period 1997-2006)

Table 5 reports results using the Merton (1974) based distance to default as the dependent variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3 and Appendix 1. Panel A focus on the intensity of acquisition strategy (measured by the variable *AcqM&A*). Panel B is dedicated to the analysis of the corresponding intensity in sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1997-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). *N* is the number of observations. R^2 is the R-square and *Fisher* is the Fisher statistic of joint test of coefficients (except constant) equal zero.

Panel A – Intensity of Acquisition Strategy

Variables	(1)		(2)		(3)	
	<i>Coeff.</i>	<i>P-value</i>	<i>Coeff.</i>	<i>P-value</i>	<i>Coeff.</i>	<i>P-value</i>
<i>Constant</i>	-0.53	<i>0.05</i>	-0.58	<i>0.06</i>	1.00	<i>0.05</i>
Independent variable						
<i>AcqM&A</i>	-0.51	<i>0.24</i>	-0.72	<i>0.12</i>	-0.60	<i>0.25</i>
M&A Features						
<i>Cash M&A Percentage</i>			0.04	<i>0.47</i>	0.14	<i>0.44</i>
<i>Out of Europe M&A Percentage</i>			0.02	<i>0.99</i>	-0.35	<i>0.37</i>
<i>Large M&A Percentage</i>			0.12	<i>0.69</i>	-0.27	<i>0.35</i>
Bank Features						
<i>Market To Book Ratio</i>					-0.06	<i>0.09</i>
<i>Interest Expense to Interest Income Ratio</i>					-2.33	<i>0.02</i>
<i>Mutual</i>					0.58	<i>0.07</i>
<i>Global Focus</i>					0.71	<i>0.09</i>
<i>N</i>	40		40		40	
R^2	0.02		0.03		0.35	
<i>Fisher</i>	0.69	<i>0.41</i>	0.30	<i>0.87</i>	2.04	<i>0.07</i>

Panel B – Retail Banking versus Investment Banking Intensity of Acquisition

Variables	(1)		(2)		(3)	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
<i>Constant</i>	-0.64	0.01	-0.73	0.01	0.60	0.14
Independent variable						
<i>RetailM&A</i>	0.72	0.11	1.21	0.03	0.31	0.53
<i>InvestM&A</i>	-12.73	0.01	-13.09	0.01	-10.25	0.09
M&A Features						
<i>Cash M&A Percentage</i>			0.06	0.19	0.03	0.58
<i>Out of Europe M&A Percentage</i>			0.60	0.17	-0.16	0.62
<i>Large M&A Percentage</i>			-0.58	0.07	-0.62	0.11
Bank Features						
<i>Market To Book Ratio</i>					-0.06	0.10
<i>Interest Expense to Interest Income Ratio</i>					-1.73	0.08
<i>Mutual</i>					0.65	0.05
<i>Global Focus</i>					0.76	0.09
<i>N</i>	40		40		40	
<i>R²</i>	0.14		0.19		0.39	
<i>Fisher</i>	3.07	0.06	1.63	0.18	2.14	0.06

Table 6 – Z-score Determinants (period 1997-2006)

Table 6 reports results using the Z-score as the dependent variable. In column (1), only the independent variable(s) of interest is included. In column (2), M&A related control variables are added. In column (3), bank related control variables are added. Variables are defined in Section 3 and Appendix 1. Panel A focus on the intensity of acquisition strategy (measured by the variable *AcqM&A*). Panel B is dedicated to the analysis of the corresponding intensity in sub-industries retail banking and investment banking (variables *RetailM&A* and *InvestM&A*). Independent variables are calculated over the period 1997-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). *N* is the number of observations. R^2 is the R-square and *Fisher* is the Fisher statistic of joint test of coefficients (except constant) equal zero.

Panel A – Intensity of Acquisition Strategy

Variables	(1)		(2)		(3)	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
<i>Constant</i>	15.99	<i>0.00</i>	16.88	<i>0.00</i>	33.91	<i>0.00</i>
Independent variable						
<i>AcqM&A</i>	-2.41	<i>0.45</i>	-3.97	<i>0.39</i>	0.38	<i>0.91</i>
M&A Features						
<i>Cash M&A Percentage</i>			-0.61	<i>0.11</i>	-0.54	<i>0.16</i>
<i>Out of Europe M&A Percentage</i>			-3.57	<i>0.30</i>	-1.36	<i>0.65</i>
<i>Large M&A Percentage</i>			2.96	<i>0.47</i>	0.72	<i>0.75</i>
Controls – Bank Features						
<i>Market to Book Ratio</i>					-0.47	<i>0.07</i>
<i>Interest Expense to Interest Income Ratio</i>					-26.96	<i>0.00</i>
<i>Mutual</i>					7.17	<i>0.07</i>
<i>Global Focus</i>					0.28	<i>0.84</i>
<i>N</i>	41		41		41	
R^2	0.01		0.04		0.47	
<i>Fisher</i>	0.20	<i>0.66</i>	0.40	<i>0.81</i>	3.48	<i>0.01</i>

Panel B – Retail Banking versus Investment Banking Intensity of Acquisition

Variables	(1)		(2)		(3)	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
<i>Constant</i>	14.74	0.00	15.92	0.00	29.42	0.00
Independent variable						
<i>RetailM&A</i>	12.31	0.05	20.12	0.00	11.48	0.08
<i>InvestM&A</i>	-119.25	0.00	-123.77	0.00	-69.93	0.06
M&A Features						
<i>Cash M&A Percentage</i>			-0.31	0.30	-0.49	0.20
<i>Out of Europe M&A Percentage</i>			2.70	0.20	0.87	0.78
<i>Large M&A Percentage</i>			-6.81	0.05	-3.35	0.20
Bank Features						
<i>Market To Book Ratio</i>					-0.47	0.06
<i>Interest Expense to Interest Income Ratio</i>					-20.52	0.02
<i>Mutual</i>					7.39	0.07
<i>Global Focus</i>					0.93	0.51
<i>N</i>	41		41		41	
<i>R²</i>	0.17		0.23		0.51	
<i>Fisher</i>	3.95	0.03	2.16	0.08	3.64	0.00

Table 7 – Bank Risk: M&A Types with Bank Funding and Income Features

Table 7 reports results on the relationship between banks M&A type, funding structure and risk. Panel A provide results using the Merton (1974) based distance to default as the dependent variable. In column (1) independent variable(s) corresponding M&A intensity in sub-industries of retail banking and investment banking (variables *RetailM&A* and *InvestM&A*) are tested with bank funding and income variables. In Column (2), M&A related control variables are further added to the first specification. Panel B replicates specifications used in Panel A with the Z - score as the dependent variable. Variables are defined in Section 3 and Appendix 1. Independent variables are calculated over the period 1990-2006. All estimations are obtained by OLS. P-values, in italic, are obtained using a percentile-t approach (see Section 3). *N* is the number of observations. *R*² is the R-square and *Fisher* is the Fisher statistic of joint test of coefficients (except constant) equal zero.

Panel A – Merton (1974) based distance to default

Variables	(1)		(2)	
	<i>Coeff.</i>	<i>P-value</i>	<i>Coeff.</i>	<i>P-value</i>
<i>Constant</i>	0.47	<i>0.51</i>	0.47	<i>0.51</i>
Independent variable				
<i>RetailM&A</i>	0.44	<i>0.46</i>	0.24	<i>0.81</i>
<i>InvestM&A</i>	-14.11	<i>0.02</i>	-14.17	<i>0.02</i>
M&A Features				
<i>Cash M&A Percentage</i>			0.06	<i>0.58</i>
<i>Out of Europe M&A Percentage</i>			0.36	<i>0.58</i>
<i>Large M&A Percentage</i>			0.25	<i>0.69</i>
Funding & Income Features				
<i>Deposit Funding</i>	-0.95	<i>0.47</i>	-0.08	<i>0.96</i>
<i>Interbank Funding</i>	-5.37	<i>0.02</i>	-6.95	<i>0.00</i>
<i>Non-interest Income</i>	1.21	<i>0.95</i>	-13.38	<i>0.57</i>
<i>N</i>	40		40	
<i>R</i> ²	0.24		0.33	
<i>Fisher</i>	2.16	<i>0.08</i>	1.94	<i>0.09</i>

Panel B – Z-Score

Variables	(1)		(2)	
	<i>Coeff.</i>	<i>P-value</i>	<i>Coeff.</i>	<i>P-value</i>
<i>Constant</i>	15.51	0.01	15.30	0.01
Independent variable				
<i>RetailM&A</i>	8.93	0.09	12.40	0.06
<i>InvestM&A</i>	-106.77	0.00	-116.62	0.00
M&A Features				
<i>Cash M&A Percentage</i>			8.93	0.09
<i>Out of Europe M&A Percentage</i>			-106.77	0.00
<i>Large M&A Percentage</i>			8.93	0.09
Funding & Income Features				
<i>Deposit Funding</i>	19.91	0.08	20.38	0.12
<i>Interbank Funding</i>	-42.06	0.01	-44.54	0.02
<i>Non-interest Income</i>	-245.09	0.09	-282.59	0.06
<i>N</i>	41		41	
<i>R²</i>	0.42		0.44	
<i>Fisher</i>	5.09	0.00	3.23	0.00

In the first two essays of this dissertation, we attempt to analyze implications of intensity of M&A activity of large European banks in the context of some important dimensions of bank stability including i) bailout support conferred by the governments; ii) credit ratings assigned by the credit rating agencies; and iii) Distance to default (DD) and Z-score measures of risk that are based on financial information of banks. While the first essay provides a robust evidence showing a significantly positive relation between the bailout support of large European banks and their ex-ante M&A intensity; the second essay shows that the investment banking M&A foster negative risk implications for the sample European banks through increased risk of default (measured by DD) and reduced solvency (measured by Z-score). In the previous essays, we also observe –though in a limited manner- positive stability effects of M&A activity directed to retail banking segment of industry for our sample of large acquiring institutions.

Now in the third and final essay of this dissertation, we not only expand the canvas of our analysis on bank M&A activity to a broader theoretical perspective encompassing deregulation, consolidation, and stability but also extend it to the banking industry from where the financial crisis actually emanated in the year 2007. Therefore, our third paper explores the role of bank deregulation in facilitating M&A centric consolidation and stability in U.S. banking industry in a difference-in-difference setup. We chose U.S. banking industry as a laboratory to perform this experiment due to the significant phase of deregulation it has witnessed since the start of the 1990s at the national level. Specifically, we examine whether and how salient deregulatory acts of the 1990s (namely, Riegle-Neal act of 1994 and Gramm-Leach-Bliley act of 1999) relate to M&A centric consolidation and stability in the U.S. banking industry. A salient aspect of this paper is that we use the M&A activity of European banking industry as a comparison group to perform this analysis. Moreover, we not only analyze the effects of two deregulatory acts on total M&A activity of U.S. banks but also on M&A activity focused towards the geographical and functional diversification that indeed the two deregulatory acts aimed at achieving. Lastly, this paper also attempts to shed some light on the joint effect of deregulation and M&A centric consolidation on the stability of U.S. banking industry.

PAPER 3: BANK DEREGULATION, CONSOLIDATION, AND STABILITY: M&A CENTRIC EVIDENCE²⁴

ABSTRACT

A popular narrative about the Great Recession of 2008 holds bank deregulation partially responsible for the calamity as the resulting consolidation turned the banking sector more complex and risky. Banks in U.S. were permitted to expand across the states and functions through the enactment of Riegle-Neal act (1994) and Gramm-Leach-Bliley act (1999). Using difference-in-difference approach on M&A activity of U.S. banking industry over a 1990-2009 time span, we investigate whether and how deregulation relates to consolidation and stability in the U.S banking industry. Our findings indicate a significantly positive effect of deregulation in spurring M&A centric consolidation in U.S. banking industry. On diversification motives of consolidation, we find that Gramm-Leach-Bliley (Riegle-Neal) act cast significantly positive (no) effect on activity (geographically) diversifying M&A. Time span (without- and with-crisis) of analysis is a critical factor in driving these results. Results on concentration and stability, suggest profoundly negative implications of deregulation and consolidation over the stability of U.S. banking industry in pre- and including-crisis period analysis.

JEL classification: G21, G28, G34, L16

Keywords: Banks, Deregulation, M&A, Consolidation, Concentration, Stability

²⁴ Target journal: Finance (FNEGE rank 2).

Conferences submitted: European Finance Association (EFA 2016), Oslo Norway; International Finance and Banking Association Society Conference (IFABS 2016), Barcelona Spain and Financial Engineering & Banking Society Conference (FEBS 2016) Malaga Spain.

“We will look back in 10 years’ time and say we should not have done this, but we did because we forgot the lessons of the past and that that which is true in the 1930s is true in 2010”

(U.S. Senator Bayron Dorgan, 1999)

1. Introduction

During the passage of the Dodd-Frank act in 2010, the above-quoted excerpt from Senator Dorgan’s interview with the New York Times (Labaton, 1999) must have been echoed in the U.S. Congress.²⁵ Deregulation in the U.S. banking industry started in the 1980s, took a significant turn with the passage of Riegle-Neal act (*RNA* henceforth) in 1994, and culminated with the enforcement of Gramm-Leach-Bliley act (*GLBA* henceforth) in 1999.²⁶ The two deregulatory acts permitted the U.S. banks to expand at interstate level (*RNA*) and diversify in terms of their activities (*GLBA*). The industry witnessed an unprecedented wave of consolidation over the last two decades causing a significant drop (rise) in banking firms (industry assets). While such industry-wide changes are partly attributed to the banking deregulation (Harjoto et al., 2012) spearheaded by mergers and acquisition (M&A) activity (Jeon and Miller, 2007), a popular narrative established in the backdrop of the Great Recession of 2007-2008 hold it partially responsible for the financial disaster (Epstein and Montecino, 2015; Roy and Kemme, 2012). Therefore, an extensive investigation is deemed important on the effects of deregulation in the context of consolidation, concentration, and stability.

A wide array of extant literature studies the topic of bank deregulation in various dimensions including efficiency, profitability, value, financial behavior and risk of banking and nonbanking firms. For instance, recently, Francis et al., (2014) investigate the effects of bank deregulation and consolidation on corporate cash holdings of U.S. nonbanking firms, while Chava et al., (2013) analyze effects of inter(intra) state deregulation on financial innovation and risk of young, private firms in U.S. Strahan (2003) finds substantially beneficial real effects of deregulation on U.S. economy. Concerning banking sector, Kroszner and Strahan (2013) provide a detailed insight into causes, consequences, and implications of U.S. bank deregulation over a longer period. The authors highlight striking differences in effects of deregulation on banking as on one side it improved

²⁵ Senator Dorgan was among voices of concern over the 1990s’ bank deregulation in U.S.

²⁶ The two acts are also known as Interstate Banking and Branching Efficiency (IBBE) act of 1994, and Financial Service Modernization act of 1999, respectively.

efficiency; while on the other side, it facilitated shadow banking and opaque interconnectedness of banks, thus a source of banking fragility. While some authors indicate towards increased consolidation of the banking sector as a consequence of deregulation (Berger et al., 1999), others find it surprising that this considerable phase of deregulation and consolidation fostered insignificant changes in the concentration measures like HHI or C-3 ratio (Jones and Critchfield, 2008). Loveland and Okoeguale (2013) explain effects of deregulation on U.S. M&A in light of neoclassical and behavioral explanations, along with other potential activity drivers. A recent investigation on effects of *GLBA* over U.S. acquirers by Filson and Olfati (2014) documents value creating effects of *GLBA* diversifying M&A with certain factors including the financial crisis and large size acquirers exerting a critical impact on results. Authors further note adverse implications of certain acquirer features with respect to risk. In the context of concentration and stability, De Nicoló et al., (2004) indicate towards the negative implications of consolidation and conglomeration on bank risk and financial stability. This is recently substantiated in the particular context of M&A by Weiß et al., (2014) using an international dataset. Contrarily, Beck et al. (2006) find empirical evidence on positive effects of concentration on bank stability, whereas, Beck et al., (2013) observes contrasting results for regulation, country, and institution-specific factors over concentration-stability. Building over the existing literature, we identify certain gaps to be filled. For instance, whether the deregulation in its entirety has been a significant phenomenon in spurring M&A based consolidation in U.S. banking sector over the long run or the type of deregulation matters. Then, whether and the extent to which motives of the two deregulatory acts (*RNA* and *GLBA*) are translated into corresponding types of M&A based consolidation. Lastly, given the nexus between consolidation, concentration and stability, whether and how deregulation and M&A based consolidation jointly cast an effect on concentration and stability of U.S. banking industry. This study attempts to fill such voids in the existing literature.

To accomplish this objective, we adopt a two-pronged approach. First, we perform an in-depth investigation of the effects of deregulation on M&A based intensity of consolidation, which is followed by a complementary analysis to ascertain the joint effects of consolidation and deregulation over banking concentration and stability in U.S. We use M&A activity based measures (industry adjusted average of M&A deals as in Jeon and Miller, 2007) of intensity of consolidation in several manners as M&A activity stands central to the process of consolidation. We focus on M&A activity of U.S. banks over the 1990-2009 time span. This period is extensive

as it covers the enactment of the two deregulatory acts and enables us to capture the consolidation trends in the industry over a period of time encompassing the financial calamity of 2007-2008, and it ends prior to the promulgation of Dodd-Frank in 2010 that marks beginning of a new era of reforms in banking.²⁷ Moreover, it also provides us with flexibility to perform analysis for without- (1990-2006) and with-crisis (1990-2009) period for comparison purpose. We adopt classic difference-in-difference (*D-in-D* henceforth) approach over an unbalanced panel at country- and year-level. Several studies (see among others, Francis et al. 2014; Kerr and Nanda, 2009; Jayaratne and Strahan, 1996), rely on a *D-in-D* method to ascertain the effects of policy reforms on the U.S. banking industry in different ways. In this paper, we introduce a novelty in approach by using European banking industry as a comparison group to assess the effects of deregulation on U.S. banking industry. More precisely, banking industries of 18 member countries of European Union (EU henceforth) enter in the empirical setup as treatment group experiencing the two deregulatory acts.²⁸ This novelty enables us to see the effects of U.S. bank deregulation from an external lens as the European banking industry was also going through significant structural changes under pressures of technological innovation and the introduction of Euro but unexposed to the two deregulatory acts under our scrutiny here. The treatment effect is the dummy variable that takes value 1 in the case of the U.S. banks and 0 for the banking industries of European banks; and it varies with respect to the level of analyzed deregulation (for instance, the entirety of deregulation vs. type of deregulatory acts). Thus, we explore the effects of deregulation on M&A based intensity of consolidation at the aggregate level, diversity of M&A activity at the geographical and functional level, and several other manners to establish robustness. The complementary section of this paper that evaluates the impact of deregulation and consolidation on concentration and financial stability of U.S. banks employs Herfindahl-Hirschmann Index (*HHI* henceforth) and *Z-score* for their respective measurement. Concentration in the banking industry can be measured in several ways, including standard assets concentration ratios based on the fraction of the total banking systems' assets held by the largest domestic banks (C-3 and C-5 ratios) or *HHI*. These ratios have been widely used in literature as a measure of concentration or market structure (Uhde and Heimeshoff, 2009). *Z-score* is a widely used measure of bank stability at the individual bank and industry level (see, for instance, Bertay et al. 2013; Uhde and Heimeshoff, 2009; De Nicolo et

²⁷ Year 2007 is included in period of financial crisis as the industry started showing crisis symptoms.

²⁸ EU nations: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden and United Kingdom.

al., 2004; Boyd and Runkle, 1993 to name a few). The combined effects of deregulation and M&A based consolidation are gauged by an interaction term between the variables used to represent deregulation and consolidation. We apply fixed effect models to explore concentration and stability effects.

The main empirical finding of this paper is that the bank deregulation in its entirety matters in a positive and statistically significant manner in spurring M&A activity based consolidation in the U.S banking. However, the time span of analysis appears a critical factor in driving our results as the significance of our results mainly prevails in prior to financial crisis period analysis and mostly disappears in case of the period that includes financial crisis. Importantly, our results also indicate towards a contrast when it comes to analysis of the effects of the types of the deregulatory act on diversity in M&A activity based consolidation. While we find predominantly positive and significant effects of *GLBA* specific deregulation over activity diversifying (cross-industry) M&A, there exist no significant effects of *RNA* specific deregulation over interstate (crossborder) M&A activity of U.S. banks. Thus, it suggests the extent to which each of the two deregulatory acts was able to influence banks' attempt to diversify both geographically and functionally through channels of M&A activity. Our results also maintain their stability under various robust settings including analysis: i) for intrastate (domestic) M&A; ii) with alternative comparison group; and iii) M&A activity measures for significant deals (in terms of percentage of shares acquired and in value terms). Concerning complementary analysis over the joint effects of bank deregulation and consolidation over concentration and stability of U.S. banks, we observe that the joint phenomenon cast significantly adverse effects over the stability of banking industry, whereas the effects on concentration are insignificant. Interestingly, the negative implication of deregulation and consolidation over financial stability prevailed irrespective of the window of analysis.

Our main contribution to the finance literature is that we provide an extensive insight over the effects of deregulation by (i) establishing its robust link with M&A centric consolidation, and (ii) analyzing its effect in the context of the nexus between consolidation, concentration, and financial stability. As the academia and governments are building narratives and reevaluating approaches relating to financial (de) regulation since the unfolding of drastic events in 2007, we hope to contribute to these vital dimensions of research and policy debate. The key references quoted above and otherwise, extensively analyze the effects of bank deregulation in various directions of the

banking industry and this work in certain manners extend and expound further upon some of these contributions. However, to the best of our knowledge, we are the first to analyze the effects of bank deregulation in U.S. banking industry from an external lens as we analyze it in comparison with the European banking industry. Lastly, our complementary analysis on stability implications of deregulation and consolidation relates this study to the growing literature on “concentration-stability” hypothesis. We attempt to connect the dots between deregulation, consolidation, and financial stability by providing an M&A centric evidence over U.S. banking industry.

The rest of the paper is structured in the following manner. The next section provides an overview about deregulation and consolidation in the U.S. banking industry. Section 3 discusses sample construction, key variables, statistics, and empirical method. Section 4 reports the empirical findings and discussion while we conclude in Section 5.

2. Deregulation, consolidation, and financial stability – A review

2.1. Overview of deregulation in the U.S. banking industry

The U.S. banking industry became highly regulated since the periods of the 1920s and 1930s in the backdrop of the Great Depression. The first curb on the banking institutions was enforced by the McFadden act of 1927 that restricted interstate branching. This act protected banks in the state from intense competition from outside. Besides, the state laws in almost all states of the U.S. restricted banks’ ability to expand intrastate by opening new branches or acquiring other banks’ branches, until the 1970s. On the other hand, the Glass-Steagall act of 1933 imposed restrictions relating to the product diversification, which means that banking institutions cannot engage in other financial services including investment banking, insurance, or brokerage businesses.²⁹

In the mid-70s, some states started dismantling these restrictions. Maine was the first state to lift the ban on intrastate (domestic) branching of banks, followed by the states of New York and New Jersey. Then, we observe a gradual dismantling of restrictions on interstate branching, which was again initiated by the state of Maine by allowing banks from other states to acquire banks in Maine under bilateral agreements. This state-level process of dismantling restrictions continued until the

²⁹ We limit overview to the two regulations that were primarily repealed by *RNA* in 1994 and *GLBA* in 1999. For a comprehensive account on history of deregulation in the U.S. banking industry, see among others, Jayaratne and Strahan (1997).

end of the 1980s, and led the congress finally to the passage of *RNA* in 1994 that fully repealed the McFadden act of 1927. Another significant development in the context of deregulation took place in 1999 when the congress repealed Glass-Steagall act of 1933 through promulgation of *GLBA*. This act dismantled all kind of restrictions on combinations of the banking, securities and insurance firms to work under one umbrella. This led to the creation of several financial conglomerates and universal banks and is considered as a monumental step that helped the decades-long process of deregulation in the U.S. to reach its zenith.

2.2. Bank deregulation, consolidation, and M&A activity

The process of deregulation has remained an area of great academic interest since long. Particularly, in the case of U.S. staggered history of banking deregulation has provided researchers a platform with many opportunities to study the effects of banking system's deregulation in various dimensions. For instance, Jayaratne and Strahan (1996) study the effects of deregulation in the U.S. banking industry on economic growth. They find a significant increase in real economic growth after deregulation at the intrastate level. Using state-level data spanning over 1978-1992, Jayaratne and Strahan (1997) provide evidence on improvement in efficiency of banks followed by the process of deregulation. However, the impact was stronger for intrastate banking in contrast with the interstate banking. Indeed, the removal of restrictions provided better-performing banks a chance to grow, forcing poor performers to exit from the local market. Stiroh and Strahan (2003), tend to substantiate the findings of Jayaratne and Strahan (1997), in their analysis over an extended period of 1976-1994. A Recent survey of Epstein and Montecino (2015) on U.S. banking system evaluates salient industry trends and highlights potential dangers of deregulation that consequently led to the financial crisis in 2007-2008. Roy and Kemme (2012) provide supporting evidence on deregulation as a cause of financial crisis by examining similarities in the run-up of cross-country banking crises that took place in the post-1980 era.

With regard to the impact on M&A activity and consolidation, in view of neoclassical explanation, deregulation should be a positive for M&A and consolidation (Harford, 2005). Studies including Jones and Critchfield (2008) and Berger et al. (1999), consider deregulation an important enabling factor in the unprecedented surge in bank M&A and consolidation. The empirical evidence of Jeon and Miller (2007), show a positive impact of deregulation on a state level average number of bank mergers over the period of 1978–2004. Similarly, Rhoades (1996; 2000), also attribute merger

activity in the U.S. banking sector to the intrastate and interstate deregulation. Rhoades (1996), covers the period spanning 1980–1994, while in Rhoades (2000), the time period is extended up to the year 1998. As documented by Rhoades (2000), the importance of M&A activity after the enactment of RNA can be well understood from the fact that about one-half of the total acquired banking assets over the period of 1980–1998 were acquired within a short span of 1995–1998. The author also highlights other key developments including a substantial decline in the number of banks, increase in the number of banking offices and a rise in the concentration of banking assets among the largest banks in the industry. However, the study casts doubts on the potential of *GLBA* in maintaining or further accelerating the momentum of M&A activity based consolidation. Loveland and Okoeguale (2013) explain effects of deregulation on U.S. M&A in light of neoclassical and behavioral explanations, along with other potential activity drivers using annual observations over a time span of 1979-2009. Kroszner and Strahan (2013) provide a detailed insight into causes, consequences, and implications of U.S. bank deregulation over a longer period. The authors discuss that deregulation has resulted in an efficient, increasingly consolidated but less locally concentrated banking industry in U.S. However, they also term deregulation as a potential source of fragility in banking as it facilitated shadow banking and opaque interconnectedness of banks. Harjoto et al., (2012) document supporting evidence using acquisition data over 1992-2005 that deregulation is instrumental in banks' decision to acquire nonbanking firms. On value and risk effects of deregulation, according to a recent study *GLBA* appears to be a value creating event for M&A (Filson and Olfati, 2014) deals completed from 2001 to 2011 in U.S. banking industry. Moreover, authors not only find that certain factors -financial crisis and large size acquirers- exert a critical impact on results but also observe negative risk implications for acquirers.

Some recent studies that analyze the effects of bank deregulation on non-financial firms include among others, Francis et al., (2014) and Chava et al., (2013). Two studies, respectively, investigate the effects of bank deregulation and consolidation on corporate cash holdings and financial innovation and risk of U.S. nonbanking firms.

2.3. Bank consolidation and financial stability

With regard to the effects of M&A led consolidation on concentration and financial stability, several studies have been performed to explore the topic in light of two well-known but contrasting views: “concentration-stability” view (Allen and Gale, 2004) and “concentration-fragility” view

(Boyd and De Nicolo (2005). The first view considers high concentration a positive for bank stability mainly because: (i) monitoring few large sized banks in such markets is easy and less costly, and (ii) high profits and enhanced market power in a more concentrated market act as a buffer against bank fragility and prevent managers from excessive risk taking. Beck et al. (2006) empirically support the notion of financial stability in a more concentrated banking system using data on 69 countries from 1980–1997. Second view finds high level of concentration detrimental for bank stability because: (i) few banks with more market power may impose high-interest rates on borrowers, which may lead borrowers to opt more risky projects, and (ii) banks may tap higher governmental subsidies due to their too big to fail status and aggravate the moral hazard problem and encourage excessive risk-taking. Uhde and Heimeshoff (2009) provide empirical evidence exclusively from banks in EU-25 countries. The authors find that market concentration has negatively affected financial soundness of European banking system measured by Z-score. De Nicoló and Loukoianova (2007) find an inverse relation between Z-index (risk measure) and HHI (concentration measures) in a cross-country analysis spanning over 1993–2004 period. De Nicoló et al. (2004) also support “concentration-fragility” view on bank consolidation and conglomeration. More recently Weiß et al. (2014) substantiate this thought in the particular context of M&A over an international dataset. Lastly, substantial evidence also links “too big to fail” related safety-net benefits with domestic and cross-border M&A activity (Hagendorff et al., 2012; Carbo-Valverde et al., 2008). Wagner (2008) theoretically demonstrates how banks’ shift from traditional activities may trigger systemic risk by encouraging their excessive risk-taking behavior while De Jonghe (2010) put forth supporting evidence in this regard. Lastly, Beck et al., (2013) indicate towards differences in results for regulation, country, and institution-specific channels using cross-country data from 1994-2009. With the help of an evidence that is supportive of both the views presented above, authors indeed explain why do the results of different studies on the topic vary in signs and magnitude.

Theoretical arguments and empirical evidence presented above provide us reasonable grounds to formulate some broad hypothesis to examine the relation between deregulation, consolidation and stability in an M&A activity centric framework over a long run. Thus, following hypothesis are tested in main and complementary analysis of deregulation, consolidation, and stability:

Hypothesis 1: whether the bank deregulation affects aggregate M&A activity centric consolidation of banks in U.S.

Ancillary hypothesis (a): whether the enactment of RNA in 1994 affects crossborder M&A activity centric consolidation of banks in U.S.

Ancillary hypothesis (b): whether the enactment of GLBA in 1999 affects activity diversifying M&A centric consolidation of banks in U.S.

Hypothesis 2: whether the bank deregulation and M&A centric consolidation jointly affect concentration and stability of banks in U.S.

3. Data, variables, statistics, and method

3.1. Data sources and sample construction

M&A Sample

Since our study uses M&A activity based measures to gauge the pace of consolidation, we collect information on M&A of U.S. and European banks from Thomson Reuters' SDC Platinum database. We mainly focus on acquiring institutions drawn from the sub-categories of SIC (Standard Industrial Classification) code 60 that relate to commercial banks and saving institutions, and 6712 that pertains to bank holding companies (BHCs). Our motive to focus on these banking institutions is due to their well-known role in ushering the two deregulatory acts. Our M&A sample consists of deals announced and completed between 1990 and 2009, with reported transaction value. This choice of period serves three purposes. First, an analysis of M&A that spans over almost past two decades helps us, on one side, to capture the effects of deregulation over the long run. On the other side, it will enable us to see whether the effects of deregulation persist over varying windows of analysis based on without- and with-crisis-period. Second, by starting from 1990, we disentangle from our analysis, M&A of the 1980s which are widely attributed to the state level campaign of deregulation in U.S. Lastly, the year 2010 is marked with the passage of another significant reform in U.S. – the Dodd-Frank act – that repeals some salient features of 1990s deregulation. This entails us to limit our analysis to the end of 2009. Our sample criteria exclude transactions involving share repurchases or joint ventures (Hagendorff et al., 2012). We impose no restriction relating to the percentage of shares acquired, target industry or

geographical zone etc., to collect information in an extensive manner. Using these filters, we also extract M&A activity of banks from 18 EU member countries, which enter in our empirical setup (*D-in-D*) as the comparison group (see details in section 3.3).

Hence, the composition of our M&A sample is as follows:

- For treatment group, which is the U.S. banking industry, we have a total of 3,447 M&A deals with an impressive value of US\$ 1,311 billion,
- While, for the comparison group, which consists of banks from 18 E.U countries, we have 1,922 M&A deals amounting to US\$ 1,056 billion.

This sample leads us to the formulation of an unbalanced panel for two groups over the period 1990-2009. We also collect other important information about our M&A sample including target location (nations or states), a form of transaction (e.g. mergers, acquisitions and acquisitions of partial assets), target industry, the percentage of shares acquired etc.

We present the graphical depiction of the trends in M&A activity of the U.S. and the European banks in Figure 1 while Table 1 statistically describes the composition of M&A sample by year for U.S. and European banks. It is evident from the trends shown in figure 1 and their subsequent statistical presentation in Table 1 that the U.S. banking industry demonstrates an upward surge in the M&A activity around the passage of the RNA in 1994. This surge is quite visible in terms of the number of deals as it crosses 300 deals in 1994, and moves within a range of 200 – 300 until the passage of the *GLBA* act in 1999 but with a visible downward shift in activity. In the periods after the *GLBA*, the number of M&A demonstrates a relatively steady trend until the end of the analysis period except another small peak prior to the financial crisis. In terms of transaction value, we clearly notice the occurrence of some mega mergers around the enactment of the *GLBA* in 1999. Particularly the peak in the year 1998 that represents a mammoth value above US\$ 200 billion accounts for almost 15% of the total value of the M&A activity of U.S. banks. This notably includes, among others, the merger of Bank of America with Nations Bank Corp., (valuing US\$ 76 billion), Northwest Corp., with Wells Fargo Bank (valuing US\$ 42 billion), and Banc One Corp., merger with First Chicago (valuing US\$ 36 billion). Unlike the U.S. banking sector, we notice that the M&A activity of commercial banks from European countries shows a steady trend from 1990 to 1997 and then it records two successive peaks of 144 and 148 deals during 1998-2000, which

is a period when the Euro was introduced as a common currency in the Eurozone. The patterns shown in terms of M&A transaction values for European banks again demonstrate two major peaks; first in 1998-1999 (Euro adoption) and the second one before the start of financial crisis. We further observe a sharp decline in the M&A activity of both the U.S. and European banks during 2007 to 2009 - the period of financial crisis. Overall, the M&A activity of the U.S. banks stays mostly well above the European banks' M&A activity during the analysis period.³⁰

The information about financial, economic, and regulatory variables is extracted using data sources offered by FDIC, Bloomberg, ECB, and the World Bank. We provide details about the use of these data sources in Appendix A.

3.2. Variable description and statistics

3.2.1. *Dependent variables*

D-in-D analysis: To investigate our hypothesis, we use M&A activity based variables calculated at different levels of activity. This primarily includes total M&A activity and its focus towards geographical and functional diversification. Our main dependent variable for *D-in-D* estimation is

$$M\&A\ Rate_{c,t} = \frac{NDeals_{c,t}}{NBanks_{c,t}} \quad (1)$$

Where,

- t denotes time window for our analysis as follows: i) 1990-2006 for without crisis period analysis, and ii) 1990-2009 for with crisis period analysis
- c represent countries representing treatment (U.S.) and comparison (EU) group
- $NDeals$ is the total number of M&A transactions
- $NBanks$ is number of total banking institutions

Numbers of banks for U.S. are from FDIC database. For EU countries, various sources provide conflicting numbers for banking institutions particularly for the period prior to Euro adoption. We

³⁰ We find these trends broadly consistent with the M&A activity of the total financial sector reported in Thomson Reuters' SDC Platinum database.

compile a list using data available with ECB, G-10 report on financial consolidation (2001). Then we reconcile and complete this list (where numbers were missing) from information personally collected by contacting central banks of some of the European countries.³¹

Since our *D-in-D* estimator is defined at the country-, and year-level, so we opt to construct the dependent variable at the country-, and year-level instead of the bank-level as in the latter case the spurious correlation between unobserved bank features and deregulation may indeed affect our results. In the spirit of above equation, we calculate variable *M&A Rate* for cross-border and activity diversifying M&A to test our ancillary hypothesis on deregulation. However it is important to note that crossborder M&A are the transactions outside the home state (for U.S. banks) or home country (for European banks), whereas activity diversifying M&A include transactions in investment banking, securities and insurance businesses.

Banking structure and stability analysis: For complementary analysis on effects of deregulation and consolidation over bank structure and stability in U.S., we respectively, use Herfindahl-Hirschman index (HHI) and Z-score calculated at the country- and year-level. These variables are defined in the following manner:

- ***HHI*** is the summation of square of market share of each countries' banking institutions in total assets terms such that:

$$HHI_{c,t} = \sum (Market\ Share)_i^2 \quad (2)$$

Where, market share is calculated at bank *i* level by dividing its total assets to the industry assets.

- ***Z-score*** values are obtained from World Bank financial structure database (2013), and is defined in the following manner at country- and year-level:

$$Z_{c,t} = \frac{ROA + equity/assets}{sd(ROA)} \quad (3)$$

³¹ We thank Teresa Lopes from Banco de Portugal, Barbara Krysztofiak from Oesterreichische National Bank, Tiziana Todini from Banco d'Italia, Breda Mc Loughlin from Central Bank of Ireland for providing us relevant information.

Where, ROA is Return on Assets, equity/assets is the capital ratio, and $sd(ROA)$ is the standard deviation of Return on Assets. Z-score is a widely used measure of banking risk (see, for instance, Bertay et al., 2013; Uhde and Heimeshoff, 2009). In economic terms, this measure of insolvency provides the lower bound for a number of standard deviations the bank's expected return would have to drop to deplete all its equity. Thus, a higher (lower) Z-score value would indicate towards financial stability (instability) for a bank or banking system.

3.2.2. *Explanatory and control variables*

D-in-D analysis: To represent deregulation of the 1990s, we use indicator variable *PostDereg* that takes value 1 for the U.S. banks from 1994, the time when *RNA* was promulgated. Since *GLBA* was promulgated -four years after enactment of *RNA*- in 1999 while analyzing second ancillary hypothesis relating to activity diversifying M&A we come across a challenge to disentangle the effects of *RNA* over M&A activity in order to exclusively capture effects of *GLBA*. We try to fix this issue by excluding period 1994-1996 from our analysis over activity diversifying M&A centric consolidation and name our deregulation variable as *PostGLBA* to distinguish it from *PostDereg*. Therefore, dummy *PostGLBA* takes value 1 from the year 1999 –time when *GLBA* was enacted– for U.S. banks.

Banking structure and stability analysis: In light of some well-established theoretical priors on the nexus between bank consolidation, concentration, and stability mentioned above, our complementary analysis intends to provide a further insight on the topic which is M&A centric. More precisely, we want to ascertain how phenomenon of deregulation coupled with rampant M&A based consolidation affects the concentration and stability of the banking industry in U.S. Our variable of interest is the interaction term between *PostDereg* dummy and *M&A rate* to capture the effects M&A centric consolidation for the U.S. banking industry (treatment group) where deregulation indeed took place ($PostDereg=1$ from 1994). In addition to the two predictors and their interaction term, we also use *Bank size* which is the natural log of total industry assets computed at country- and year-level to control for industry size related implications on bank concentration and stability.

Control variables: We also include in our main and complementary analysis a variety of control variables on financial structure, economic development, and regulatory environment. For instance, to characterize the financial structure and economy at the country level we include following five ratios: *Private credit to GDP*, *Deposit to GDP*, *Overhead*, *Interest margin*, *Capitalization*. For the regulatory environment, we use variables including *Restrict*, *Supervisory*, *Deposit insurance*, and *Governance*. Detailed definitions and data sources for these variables are provided in Appendix A.

3.2.3. Descriptive statistics

Table 2 provides descriptive analysis on dependent and explanatory variables used in this study. Table 2(a) reports stats on mean, median and standard deviation for a complete sample while Table 2(b) demonstrates comparative analysis on mean values of the key M&A features and other variables between the U.S. banks and European banks at the group level. Since we compare the means at the group level, thus for European banks, we aggregate the country level observations on a yearly basis. The top segment of Table 2(a) shows that average value of variable *M&A Rate* is 3% for the countries included in our analysis, whereas for cross-border and activity diversifying M&A based consolidation, this ratio remains on average at 1.5% and 2% level. Next, under concentration and stability caption we note mean values for *HHI* and *Bank size (log terms)* remain 12% and 14.65 (log terms) while *Z-score* of banking industry of our sample countries stands on average at 8.82. Further, we also note the significance of banking sector (in private credit extension and high deposit base) with respect to the GDP of sample countries, flourishing capital markets, and a robust regulatory environment.

Comparison of the mean statistics in Table 2(b) indicates that there exist wide variations at the group level for U.S. and European banks. A contrast is particularly noticed while comparing the means of absolute deal numbers and *M&A rate* variable based on the deal number. Although, the mean value for M&A deals performed by U.S. banks is almost double than that of banks in Europe but when we compare the means of variable *M&A rate* between two groups mean value for European banks (3.3%) stays higher than U.S. banks (2.1%) with a significance at 5% level. Similarly ratios for cross-border and activity diversifying M&A are significantly higher for European banks (1.6% and 0.5%, respectively) than the banks in U.S. (1.2% and 0.1%, respectively). With regard to concentration and stability, we observe a significantly higher

concentration in European banking industry (12.6% on average) compared to that of U.S. (4.3% on average) measured by *HHI*. Further, as we observe a significant difference between the size of U.S. and EU banking industry, we find no differences in the mean values of their *Z-score* at any significance level. Financial structure and economic variables are mostly found with significantly higher means for treatment group (U.S. banks) than the comparison group (European banks) except *Private credit to GDP* that demonstrates higher mean value for European countries. Similarly, most of the regulatory environment variable show higher mean values for U.S. in comparison with European countries at 1% significance level with the only exception of *Governance* variable where we notice significantly higher average value of the index for European countries than the U.S. banking industry.

3.3.Methodology

The process of deregulation which is marked with the enactment of *RNA* in 1994 and *GLBA* in 1999 resulted in removal of restrictions on interstate expansion and activity diversification for banks in U.S. This provides us an ideal platform to conduct an empirical investigation on how deregulation relates to the spur in M&A centric consolidation in U.S. banks over a long period of 1990-2009. Such policy reforms are quite commonly analyzed by using difference-in-difference approach. For instance, several studies including among others Francis et al., (2014), Kerr and Nanda (2009), and Jayaratne and Strahan (1996) analyze the impact of gradual removal of restrictions on several dimensions for banking and nonbanking firms in the U.S. In case of Europe, more recently, De Bodt et al., (2013) employ difference in difference technique to analyze the impact of the introduction of Euro on systemic risk of Euro-zone countries. In this study, our focus is to analyze the effects of bank deregulation on M&A activity centric consolidation in U.S. banking industry. Its implementation via OLS framework requires the construction of three dummies. This includes dummy *pre* to show if the observation is in the treatment group, dummy *post* that represents times after treatment, and the interaction term of pre and post that indeed is the coefficient of interest that captures *D-in-D* effect. However, in the case of datasets involving more than one cross section and several time-periods, Stock and Watson (2012) suggest the implementation of the *D-in-D* test in the setup of panel regression models. Following the above-quoted studies, we formulate our baseline test of *D-in-D* estimation in the following manner:

$$Y_{c,t} = \beta_c + \beta_t + \gamma PostDereg_{c,t} + \varepsilon_{c,t} \quad (4)$$

Where, $Y_{c,t}$ represents the set of dependent variables used to measure the M&A based intensity of consolidation at various levels including aggregate level, and its focus on geographical and activity diversification. Further, c indexes country and t indexes time-period. β_c and β_t denote the country- and year-fixed effects that respectively control for country-specific, time-invariant and year-specific, country-invariant, unobserved factors. $PostDereg_{c,t}$ is the dummy variable used to represent deregulation enacted through the two regulatory reforms in U.S. banking (defined in section 3.2.2). Our *D-in-D* estimate is γ to capture the effects of banking deregulation on M&A activity centric consolidation of U.S. commercial banks. We can further understand this estimator as the difference in the level of bank M&A activity in U.S. before and after the bank deregulation in comparison with this difference for European countries in our sample that did not go through the two deregulatory acts. Although inclusion of un-treated observations (European comparison group) may help controlling for other potential determinants influencing M&A activity (Francis et al., 2014) but it does not fully eliminate potential existence of omitted variable bias (De Bodt et al., 2013). For instance, it is possible that a rapidly changing landscape of financial industry or other characteristics of regulatory environment have pressed the enforcement of two deregulatory acts in U.S. Therefore, we include some control variables relating to the banking industry structure and regulatory environment to address this issue. This setup is also used in an altered manner to perform complementary analysis over effects of bank consolidation and deregulation on bank concentration and stability in the U.S.

4. Empirical findings and discussion

4.1. Bank deregulation and M&A activity centric consolidation

Hypothesis 1: whether the bank deregulation affects aggregate M&A activity centric consolidation of U.S. banking industry

Our first hypothesis is focused upon effects of deregulation on M&A activity based consolidation of banks in U.S. in its entirety (both deregulatory acts). Therefore, our dependent variable *M&A Rate* is formulated by using M&A activity of banks in aggregate terms. We perform *D-in-D* analysis and report results in two parallel panels of Table 3 over two different time windows

(without- and with-crisis period). Panel A of Table 3 reports results of the period before the financial crisis (1990-2006), while Panel B of this table is dedicated to results obtained by including the financial crisis period (1990-2009). For both panels, first column presents results of baseline specification, the second column further includes industry structure and economic variables, while in the last column we augment the model by further adding control variables on the regulatory environment.

The results of Panel A of Table 1 that investigate M&A activity before crisis clearly demonstrate a positive and statistically significant relationship between bank deregulation and M&A activity based consolidation of U.S. banks. The coefficient of *PostDereg* not only remains positive across all three specifications but also improves in terms of the level of statistical significance in multivariate specifications. With respect to control variables on industry structure and economy we notice a negative and statistically significant coefficient only for *Interest margin ratio*. This indicates perhaps the fact that reduced industry margin in the wake of declining interest rates provides an impetus to M&A activity and vice versa. For regulatory environment variable, a negative and statistically significant coefficient for variable *Supervisory* indicates that improved supervision tends to decrease M&A activity. It is also intriguing to note that *Deposit Insurance* demonstrate a positive and statistically significant coefficient which supports the notion that bank pursues M&A to enhance their deposit subsidies (Weiß et al., 2014, Hagendorff et al., 2012). Panel B of Table 1 depicts totally contrasting results for a period of analysis including financial crisis. Variable *PostDereg* demonstrates no significance at any statistical level that indicates that inclusion of financial crisis period M&A turns the effects of deregulation of 1990s insignificant over long run M&A centric consolidation of the industry. It may also explain the level of extra caution exercised by investors during an uncertain period, irrespective of an opportunity –particularly available to strong banks– to acquire assets at fire-sale prices during crisis time for better gains and improved market share (Acharya et al., 2010, Berger and Bouwman, 2009). Moreover, coefficients of control variable demonstrate no significance at any level in our analysis for the time window extending over the crisis period. However, our model remains statistical significant under the two panels with varied levels of significance.

4.2. Bank deregulation and M&A diversification

In the above analysis, deregulation dummy indeed represents enactment of *RNA* and *GLBA*. However, it is worth mentioning that the scope of the two deregulatory acts is entirely different as the former allowed U.S. banks to expand and diversify geographically, whereas the later permitted diversification across the activities performed by banks. Thus, it stands vital to investigate whether the motives of the two reforms are reflected in the M&A centric consolidation focused on the two particular types of diversification. Thus, we provide analysis on our two ancillary hypothesis relating to the geographical and activity diversification in Table 4(a and b), respectively using scheme of regression analogous to the one presented in Table 3.

Ancillary hypothesis (a): whether the enactment of RNA in 1994 affects cross-border M&A centric consolidation of banks in U.S.

Testing our first ancillary hypothesis relating to cross-border M&A entails no change in our *D-in-D* estimator *PostDereg* as we encode it from the year that coincides enactment of *RNA*. However, dependent variable under this analysis is *Crossborder M&A rate* calculated by using M&A with targets located outside domestic market for treatment and comparison group countries.

Results for geographically diversified M&A activity are reported in Table 4(a). It is evident from the results of Panel A of the table that enactment of *RNA* cast no effect on cross-border M&A of U.S. banks in both the univariate and multivariate specifications. Although the coefficient demonstrates a negative sign but without any statistical significance. Moreover, in multivariate specifications, coefficients of control variables demonstrate no statistical significance at all. Results in Panel B that includes the years of financial crisis in the analysis period broadly remain in line with the results of Panel A. The only exceptions are coefficients of *Overhead ratio* (negatively signed in second regression) and *Deposit insurance* (positively signed in third regression) that show a statistically significant relation with cross-border M&A activity at 10% level of significance. Once again, our models mostly demonstrate statistical significance at varied levels. These findings on the cross-border intensity of U.S. bank M&A activity support findings of some previous studies (Francis et al., 2014, Berger et al., 1999) suggesting a more significant impact of deregulation at an intrastate level than that of interstate activity. We further confirm it in our robustness analysis.

Ancillary hypothesis (b): whether the enactment of GLBA in 1999 affects activity diversifying M&A centric consolidation of banks in U.S.

Second ancillary hypothesis over M&A activity based consolidation of U.S. banks focuses on their attempts to attain functional diversification, which was facilitated by the promulgation of *GLBA* in 1999 by U.S. congress. To test this hypothesis, we exclude the period of 1994-1996 in a bid to transform our *D-in-D* estimator for *GLBA*. This may enable us to disentangle—at least to a certain extent if not fully— momentum of M&A centric consolidation gained by the enactment of *RNA* from that of *GLBA*. Thus, we represent the deregulation of *GLBA* with dummy variable *PostGLBA* that takes value 1 from the year 1999 for U.S. banks and 0 otherwise, whereas dependent variable is defined based on M&A where the target is either an investment banking, security or insurance firm.

Table 4(b) reports results on the intensity of activity diversifying M&A of U.S. banks after promulgation of *GLBA*. In Panel A of the table, it is clearly apparent from a positive and highly significant coefficient of dummy *PostGLBA* that enactment of *GLBA* cast a positive effect on functionally diverse M&A activity of banks. This result holds both under the baseline and models augmented by control variables. Consistent with the results of basic regression (Table 3), we also notice a negative and statistically significant coefficient for *Interest margin ratio* in multivariate analysis. Further, variable *Governance* also enters in the last regression with a positive and statistically significant coefficient at 10% level, which indicates towards a positive effect of governance in facilitating banks' activity diversification through M&A in U.S. With regard to the results based on period extended over the financial crisis (Panel B), interestingly the coefficient *PostGLBA* shows a negative and statistically significant (5% significance level) coefficient in univariate regression; while it maintains (changes) the sign in second (third) specification but with loss of statistical significance. Perhaps the central role that investment banking and insurance business played in fostering the financial crisis led to a significant depress in this segment of M&A market and influenced the results in other direction at least in baseline regression. However, due to inconsistent behavior of the *D-in-D* estimator across three specification, this result should be cautiously interpreted. Lastly, all control variables remain statistically insignificant.

This analysis helps us in understanding the direction and extent to which deregulation facilitated the consolidation of U.S. banking industry by achieving their diversification goals on the geographical and functional front. While *GLBA* showed pronounced effects in spurring M&A led the consolidation of U.S. banks outside their banking segment -at least for prior to the crisis period analysis-, *RNA* apparently could not translate well in creating a similar kind of surge for M&A beyond intrastate markets. The above findings on M&A diversity, on one side, tend to contradict doubts cast by Rhoades (2000) on the potential role of *GLBA* in accelerating further the process of consolidation in U.S. banking sector. On the other side, they are also supportive of the notion of the insignificant role of *RNA* in intensifying M&A outside a domestic market in U.S.

4.3. Robustness checks

This section provides analysis over a variety of robustness checks performed to further substantiate findings of our main analysis.

Chek (i): D-in-D analysis using Eurozone as a comparison group

In our main analysis, we use 18 EU countries as comparison group from Europe to implement *D-in-D* analysis. It is worth mentioning that a significant event that took place in the European economy was the formation of Eurozone with the introduction of Euro in 1999. Therefore, it is interesting to assess the consistency of results using Eurozone countries as a comparison group as a different trend in the intensity of M&A centric consolidation within Eurozone may have an influence on our results. Results are reported in Table 5. For the purpose of brevity, we only report results of full regression from the scheme of regression employed in main analysis for both without- and with-crisis period analysis. For each panel, first regression is on overall M&A intensity, followed by the cross-border M&A intensity, and lastly the intensity in activity diversifying M&A. The results of two panels remain in line with the findings of the main analysis. For the period before the crisis, deregulation cast a positive and statistically significant effect on M&A activity based consolidation at aggregate level and activity diversifying M&A level (positive coefficient of *PostGLBA*), while it turns insignificant in case of cross-border M&A centric consolidation. The effects of deregulation go unnoticed over M&A in the case of analysis over period extended to the financial crisis. Moreover, we also observe that coefficients of some of the control variables also

turn significant but in an inconsistent manner (varying signs and statistical significance). In a nutshell, the choice of comparison group doesn't influence results of our main analysis.

Chek (ii) Deregulation and domestic M&A activity

While interpreting results of our first ancillary hypothesis on geographical diversification our conjecture was that the insignificant effects of deregulation on the intensity of interstate consolidation is perhaps due to a more active M&A market and greater competitive pressure faced at intrastate level. Consequently, banks choice to consolidate their position in the local market prior to moving at interstate level overshadows expected outcomes of *RNA* promulgation. Therefore, we test the evolution of domestic M&A activity with banking deregulation. We report results in Table 6. For the two periods of analysis in Panel A and B (Without- and with-crisis period) we perform and report the results of full regression. Results of analysis confirm our conjecture as the intensity of M&A of U.S. acquiring institutions at an intrastate level significantly increases post-enactment of *RNA* in 1994. Interestingly, dummy variable *PostDereg* demonstrates a positive and statistically significant coefficient in both without- and with-crisis period analysis mainly at 1% and 5% level of statistical significance.

Chek (iii) Analysis with alternative measures and levels of M&A centric consolidation

Our third robustness chek attempts to address some other potential channels of biases relating to this study. For instance, as we exhaustively collect M&A activity of banks in our analysis and aggregate it at year- and country-level, so the importance of results could be contested on the grounds of aggregation bias. Therefore, we try to address this in various manners. We calculate M&A activity with some additionally imposed filter particularly in terms of percentage of acquired shares and deal value, and we make a shift in the level of analysis from country- to acquirer-level. Thus, we opt to chek consistency of results in following three directions: i) M&A deals where 50% or above shares of target are acquired, ii) M&A activity where deal value equals or exceeds US\$ 1bn with M&A value based dependent variable; and iii) perform analysis by aggregating M&A at acquirer level instead of country level. Again for the sake of brevity, we perform and report the results of only full regression under the two panels of Table 7. Our findings are the following:

- *M&A deals with 50% or above acquired shares:* Our results in this dimension of M&A are in line with the one witnessed under main analysis as variable *PostDereg* demonstrates a positive and statistically significant coefficient in the analysis over the period without crisis (Panel A), while it turns insignificant for the analysis extending over the crisis period (Panel B).
- *M&A deals with value US\$ 1bn or above:* In order to test effects of deregulation on significant deals in value terms, we calculate dependent variable *M&A rate* by using the aggregate dollar value of M&A deals equal or above US\$ 1bn. Once again our results of both the panels indicate positive effects of bank deregulation on M&A activity of U.S. banks in line with the main results. Whether we analyze it for the period prior to the financial crisis or including financial crisis time, the coefficient of *PostDereg* remains positive and statistically significant. The prevalence of this relationship in case of with-crisis period may indicate toward the importance of deal value as a significant phenomenon in M&A activity of the past two decades.
- *Acquirer level analysis:* Our basic empirical setup to perform the *D-in-D* analysis is formulated using country- and year-level M&A activity of banks and doesn't necessarily entail a bank level analysis. However, it is interesting to see whether the results demonstrate consistency if we expand our analysis to acquirer level. To cut the trivial part out we focus on acquirers with more than one deal. Concerning this, results of the last specification of the two panels of Table 7 provide us some insight. We observe no change in the behavior of variable *PostDereg* compared to the one demonstrated in the results of two panels under the main analysis. While it shows a positive and statistically significant coefficient at 10% level of significance for the analysis over the 1990-2006 period (Panel A), it turns negative and insignificant in the analysis of M&A based consolidation over 1990-2009 (Panel B).

We observe no change in our results, whether we focus on significant M&A activity in terms of acquired shares and transaction value; or we change the level of analysis from the country- to acquirer-level. In a nutshell, these results predominantly remain stable and supportive to the notion established by our main findings about the role of bank deregulation in spurring M&A activity and accelerating the pace of consolidation in U.S. banking industry over the past two decades.

4.4. Complementary analysis on M&A centric consolidation, concentration and stability

Hypothesis 2: whether the bank deregulation and M&A centric consolidation jointly affect concentration and stability of banks in U.S.

As we address the topic of bank consolidation and deregulation over a long time period that encompasses the financial crisis as well, we find it interesting to get some insight on the topic in the context of the nexus between bank consolidation, structure, and stability. Whether the interaction of deregulation with the M&A based intensity of consolidation foster any implications for the structure and stability of U.S. banks. To do this, we employ *M&A rate* as a predictor along with variable *PostDereg*. However, our main variable of interest is the interaction between the two predictors that captures the effect of consolidation for the country (treatment group) where deregulation indeed took place (*PostDereg=1* from 1994). We report results in Table 8 for the period without- and with-crisis. In each panel, first regression is focused on market concentration (dependent variable: HHI) and the second regression reports results on bank stability (dependent variable: z-score). Our results are as follows:

- **Market concentration:** With regard to the effects on banking industry concentration, we observe no statistically significant effect of deregulation and consolidation over the structure of U.S. banking sector measured by *HHI*. In both panels of Table 8, the coefficient of the interaction term between variables *PostDereg* and *M&A rate* remains insignificant with varying signs. This result is in line with the findings of some previous studies suggesting towards insignificant variations in concentration measures of U.S. banking industry despite a significantly rampant M&A based consolidation over the past two decades (see Kroszner and Strahan, 2013; Jones and Critchfield, 2008).
- **Bank stability:** Concerning bank stability, our results indicate towards a significantly negative implications of M&A centric consolidation over the stability of the U.S. banking industry as a consequence of deregulation. We observe a negative and statistically significant coefficient of the interaction term. Importantly, the significance of relationship prevails across the two panels of Table 8. Nevertheless, the level of significance comes down to 10% in Panel B (with-crisis period) compared to that of 1% in Panel A (with-crisis period). With these results, we tend to substantiate the notion that consolidation may

increase the risk for banking system (see Weiß et al., 2014; De Nicolo et al., 2004) in the case of U.S. banking industry through channels of M&A intensity.

5. Concluding remarks

This paper empirically studies the relationship of bank deregulation with M&A centric consolidation, concentration, and stability of U.S. banks. In particular, we analyze the extent to which staggered enactment of two famous deregulatory acts of the 1990s – RNA and GLBA – contributed in: i) spurring the M&A activity based intensity of consolidation, and ii) joint effect of deregulation and consolidation over bank concentration and stability. Using European banking industry as a comparison group, we employ classical *D-in-D* setup over an unbalanced panel of M&A activity from 1990 to 2009 with varying time windows of analysis in terms of without- and with-crisis period. We use M&A activity of the banks in several ways to perform an extensive analysis on the relationship of deregulation with consolidation at the aggregate level, and its respective manifestation on geographical and functional diversification fronts.

We show that deregulation of the 1990s marked with two major reforms cast a significantly positive effect on M&A activity centric consolidation process in U.S. banking industry. However, the analysis period is a significant factor in influencing results as positive and statistically significant effects of deregulation mainly prevail for analysis period that excludes financial crisis. Another important finding of the paper is on how individual effects of the two deregulatory acts are manifested by geographical and functionally diverse M&A based consolidation. While GLBA specific effects are translated in a significantly positive surge in consolidation intensity channeled through activity diversifying M&A, such significant effects of RNA specific deregulation are not visible in case of interstate M&A based consolidation. Complementary analysis of concentration and stability of U.S. banks suggest that deregulation and consequent M&A based consolidation cast significantly negative effects on the stability of U.S. banking system, whereas their effects on concentration remain insignificant. Importantly, over findings on stability prevail over both without- and with-crisis period analysis.

This study contributes in several manners to the existing literature of finance and the ongoing policy debate on regulations and stability in the banking system. We not only establish a robust link between bank deregulation and M&A centric consolidation in U.S. banking industry but also analyze the consequences in the context of the broader nexus between consolidation, concentration and financial stability. While we refrain to hold deregulation squarely responsible for the drastic events unfolded in 2007, we do highlight potential channels through which it may foster implications for banking stability. To the best of our knowledge, we are the first to analyze the effects of bank deregulation in U.S. banking industry in a broader context of consolidation, concentration and stability from an external lens by comparing its M&A centric consolidation with that of European banking sector. This study also sets forth some future directions of research. As this year marks the fifth anniversary of the enactment of Dodd-Frank act, it will be interesting to investigate whether and how the effects of regulations emanating from a drastic exogenous shock differ from those resulting from various industry pressures for the banking industry.

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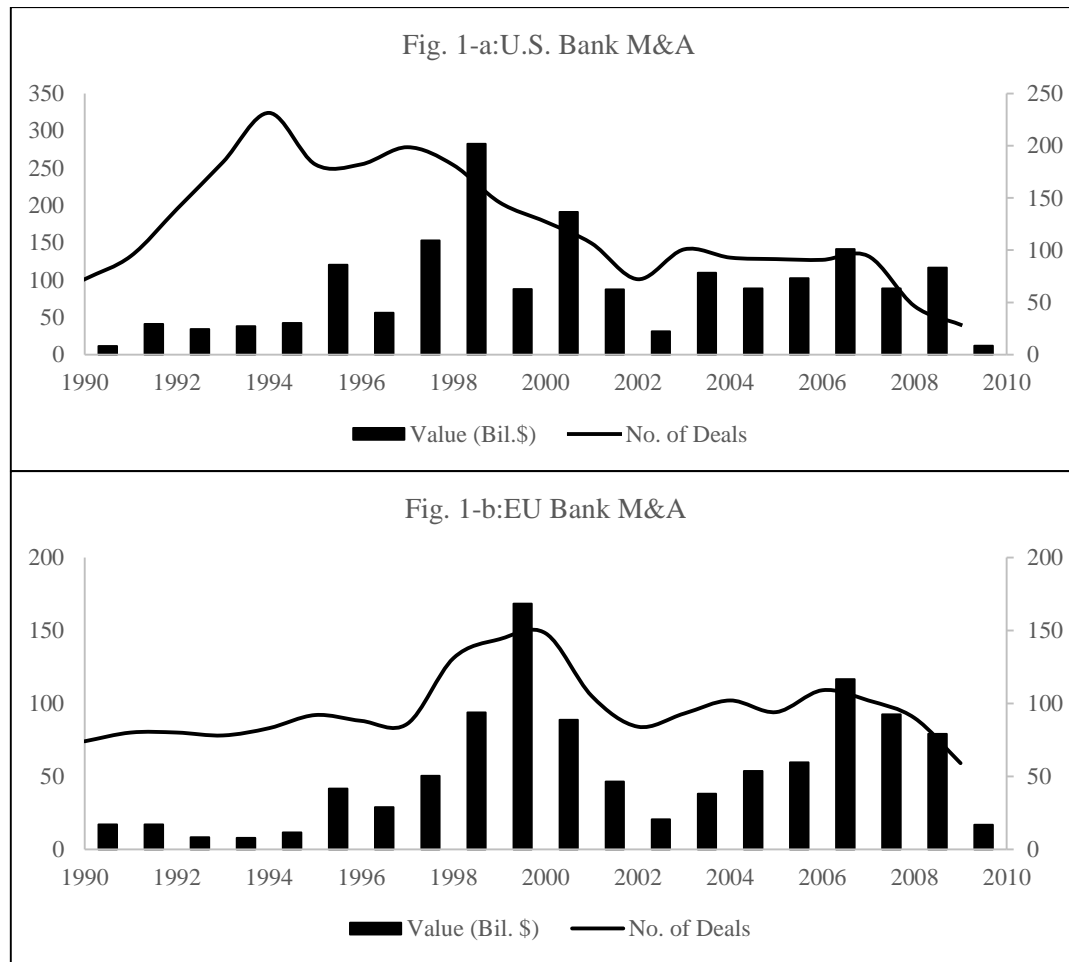
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Appendix A –Definition of variables and sources

Variable	Definition	Source
<i>Private credit to GDP Ratio (%)</i>	This is the ratio of private credit by deposit money banks and other financial institutions to GDP of a country.	World Bank database on Global Financial Development (2013)
<i>Deposit to GDP Ratio (%)</i>	This is the ratio of total bank deposits to GDP of a country, where total deposits include time and saving deposits.	World Bank database on Global Financial Development (2013)
<i>Overhead ratio (%)</i>	This is ratio accounting value of a bank's overhead costs as a share of its total assets.	World Bank database on Global Financial Development (2013)
<i>Interest margin ratio (%)</i>	Accounting value of bank's net interest revenue as a share of its interest-bearing (total earning) assets.	World Bank database on Global Financial Development (2013)
<i>Capitalization ratio (%)</i>	Ratio of total value of listed shares to GDP for sample countries	World Bank database on Global Financial Development (2013)
<i>HHI</i>	This is the sum of a square of bank market share of each country, where the market share of a bank equals the share of its total assets to the total assets of all banks in the country.	FDIC, ECB, Bloomberg
<i>Bank size Z-score</i>	Natural logarithm of total assets of banking industry Z-score is estimated as $(ROA+equity/assets)/sd(ROA)$; $sd(ROA)$ is the standard deviation of ROA.	FDIC, ECB, Bloomberg World Bank database on Global Financial Development (2013)
<i>Restrict</i>	Overall Restrictions on Banking Activities including Securities Activities + Insurance Activities + Real Estate Activities with values 1—4 (Higher values indicate more restrictive)	World Bank database: Bank regulation surveys released in 1999, 2003, 2007 and 2012.
<i>Supervisory</i>	This indicates official supervisory power whether the supervisory authorities have the authority to take specific actions to prevent and correct problems with values 0—14 (Higher values indicate greater power)	World Bank database: Bank regulation surveys released in 1999, 2003, 2007 and 2012.
<i>Deposit insurance</i>	This indicates funding with insured deposits to measure the degree to which moral hazard exists. Pure number (Percent; higher values indicate more moral hazard).	World Bank database: Bank regulation surveys released in 1999, 2003, 2007 and 2012.
<i>Governance</i>	This is external governance index based on following factors: Strength of External Audit + Financial Statement Transparency + Accounting Practices + External Ratings and Creditor Monitoring + External Governance Index. 0—19 (Higher values indicate better corporate governance)	World Bank database: Bank regulation surveys released in 1999, 2003, 2007 and 2012.

Figure 1- M&A based consolidation trends

This figure depicts M&A based consolidation trends demonstrated by banking industry over the period of 1990–2009 for our treatment group, which consists of banking institutions from 48 U.S. states including District of Columbia (Fig. 1-a) and the comparison group that comprises of 18 EU countries (Fig. A-b). For both figures, solid line shows the number of bank M&A (left scale), while vertical columns represent deal values (right scale) in billions USD.



Source: Thomson Reuters' SDC Platinum database

Table 1 –M&A sample

This table presents statistics about the composition of M&A sample for U.S. banks (treatment group), and European banks (comparison group) drawn from 18 EU nations. The M&A activity spans over the period 1990-2009. The reported statistics include yearly distribution of the number of total banks, number and corresponding percentages for M&A deals and their values.

Year	U.S. Banks (Treatment Group) 48 U.S. States including District of Columbia					European Banks (Comparison Group) 18 EU countries				
	<i>N Bank</i>	<i>N Deals</i>	<i>Deal Value (Bil US\$)</i>		<i>N Bank</i>	<i>N Deals</i>	<i>Deal Value (Bil US\$)</i>			
1990	12343	101	2.93%	\$ 8	0.63%	9554	74	3.85%	\$ 17	1.62%
1991	11921	132	3.83%	\$ 29	2.23%	10211	80	4.16%	\$ 17	1.60%
1992	11463	195	5.66%	\$ 24	1.87%	10163	80	4.16%	\$ 8	0.78%
1993	10959	258	7.48%	\$ 27	2.08%	9272	78	4.06%	\$ 8	0.73%
1994	10452	324	9.40%	\$ 30	2.30%	8910	83	4.32%	\$ 12	1.09%
1995	9941	255	7.40%	\$ 86	6.56%	9593	92	4.79%	\$ 42	3.94%
1996	9528	255	7.40%	\$ 40	3.05%	9526	88	4.58%	\$ 29	2.73%
1997	9143	278	8.06%	\$109	8.35%	9336	86	4.47%	\$ 50	4.76%
1998	8774	254	7.37%	\$202	15.39%	8779	131	6.82%	\$ 94	8.88%
1999	8580	204	5.92%	\$ 63	4.79%	9114	144	7.49%	\$168	15.95%
2000	8315	178	5.16%	\$137	10.42%	8938	148	7.70%	\$ 89	8.40%
2001	8080	149	4.32%	\$ 62	4.77%	8264	105	5.46%	\$ 46	4.40%
2002	7888	101	2.93%	\$ 22	1.69%	7719	84	4.37%	\$ 21	1.95%
2003	7770	141	4.09%	\$ 78	5.96%	7592	93	4.84%	\$ 38	3.60%
2004	7631	130	3.77%	\$ 63	4.82%	8049	102	5.31%	\$ 54	5.09%
2005	7526	128	3.71%	\$ 73	5.57%	7029	94	4.89%	\$ 59	5.63%
2006	7401	127	3.68%	\$101	7.70%	7882	109	5.67%	\$117	11.03%
2007	8438	132	3.83%	\$ 63	4.82%	4761	102	5.31%	\$ 93	8.76%
2008	8242	65	1.89%	\$ 83	6.35%	4856	90	4.68%	\$ 79	7.48%
2009	7952	40	1.16%	\$ 8	0.65%	4472	59	3.07%	\$ 17	1.59%
Total		3,447	100.00%	1,311	100.00%		1,922	100.00%	1,056	100.00%

Table 2 – Summary statistics

Table 2(a) reports summary statistics of the key variables used in our *D-in-D* test, and complementary analysis on concentration and stability for the entire sample of banks. Top segment focuses on M&A activity variables, followed by variables featuring financial structure, economy, regulatory environment, concentration, and bank stability (see section 3.2 and appendix A for definitions). Table 2(b) presents classical test of mean difference between the U.S. and European banks performed at the group level.

Table 2(a)- Descriptive statistics of key variables

Variables	N	Mean	Median	St.Dev
M&A Characteristics				
<i>M&A rate</i>	326	0.03	0.02	0.06
<i>Crossborder M&A rate</i>	292	0.01	0.004	0.02
<i>Activity diversifying M&A rate</i>	234	0.02	0.007	0.03
Finance Structure & Economy				
<i>Private credit to GDP ratio (%)</i>	326	82.13	79.58	44.71
<i>Deposit to GDP ratio (%)</i>	326	65.64	59.33	56.07
<i>Overhead ratio (%)</i>	326	1.02	0.69	1.32
<i>Interest margin ratio (%)</i>	326	1.07	0.90	1.27
<i>Capitalization ratio (%)</i>	326	62.92	52.66	45.21
Regulatory Environment				
<i>Restrict</i>	326	5.59	6.00	1.99
<i>Supervisory</i>	326	9.92	10.00	2.45
<i>Deposit insurance</i>	326	8.57	0.00	20.32
<i>Governance</i>	326	5.81	0.00	6.39
Concentration and Stability				
<i>HHI</i>	326	0.12	0.11	0.09
<i>Bank size (Log of assets)</i>	326	14.65	14.67	1.56
<i>Z-score</i>	326	8.82	5.34	9.54

Table 2(b)- Group level differences

	N	Mean		t-stat
		<i>US Banks</i>	<i>European Banks</i>	
<i>Total M&A Deals</i>	20	193.151	103.150	4.26***
<i>M&A Value (Bil. US\$)</i>	20	61.646	53.444	0.58
<i>M&A rate</i>	20	0.021	0.033	-1.99**
<i>Crossborder M&A rate</i>	20	0.012	0.016	-2.79***
<i>Activity diversifying M&A rate</i>	20	0.001	0.005	-3.70***
<i>Private credit to GDP ratio (%)</i>	20	51.626	84.122	-11.39***
<i>Deposit to GDP ratio (%)</i>	20	66.113	65.609	0.14
<i>Overhead ratio (%)</i>	20	1.749	0.973	2.07**
<i>Interest margin ratio (%)</i>	20	1.973	1.014	2.28**
<i>Capitalization ratio (%)</i>	20	111.597	59.740	6.59***
<i>Restrict</i>	20	8.650	5.386	21.28***
<i>Supervisory</i>	20	13.300	9.696	17.00***
<i>Deposit insurance</i>	20	13.05	8.28	-1.02
<i>Governance</i>	20	2.420	6.193	-16.90***
<i>HHI</i>	20	0.043	0.126	-5.70***
<i>Bank size</i>	20	16.454	14.530	5.24***
<i>Z-score</i>	20	13.057	8.541	1.63

Table 3 – Bank deregulation and M&A centric consolidation

This table reports results of *D-in-D* analysis on the effects of deregulation on M&A activity based intensity of consolidation in U.S. banking industry using an unbalanced panel over the period 1990-2009. Panel A focuses on pre-crisis period M&A activity from 1990 to 2006 while in Panel B we extend the analysis period to 2009. Treatment group consists of banks in U.S., while comparison group contains banks drawn from 18 EU nations. For treatment and comparison group, dependent variable *M&A rate* is computed at country- and year-level by dividing the number of M&A transactions to the number of banking institutions. *The d-in-d* estimator is the dummy variables *PostDereg* that takes value 1 for banks in U.S. from the year 1994 when Riegle-Neal act was passed by the U.S. Congress. P-values are in parenthesis and are computed using robust standard errors clustered at the country level. All additional variables are defined in Appendix A. *, ** and *** show statistical significance at the 10%, 5%, and 1% levels, respectively.

	Panel A: Without-Crisis Period			Panel B: With-Crisis Period		
<i>Dependent variable: M&A rate</i>						
<i>PostDereg</i>	0.006*	0.010**	0.011**	-0.027	-0.01	0.003
	(0.07)	(0.01)	(0.01)	(0.11)	(0.51)	(0.90)
<i>Private Credit to GDP ratio (%)[†]</i>		-4.80E-05	-3.40E-05		-2.07E-04	-3.06E-04
		(0.23)	(0.41)		(0.41)	(0.26)
<i>Deposit to GDP ratio (%)[†]</i>		2.20E-05	1.40E-05		-3.30E-05	8.10E-05
		(0.46)	(0.67)		(0.82)	(0.58)
<i>Overhead ratio (%)</i>		0.001	0.001		-0.016	-0.028
		(0.78)	(0.81)		(0.28)	(0.30)
<i>Interest margin ratio (%)</i>		-0.005*	-0.004*		0.002	0.013
		(0.06)	(0.08)		(0.87)	(0.61)
<i>Capitalization ratio (%)[†]</i>		7.00E-06	8.00E-06		-2.93E-04	-3.61E-04
		(0.91)	(0.90)		(0.44)	(0.26)
<i>Restrict</i>			-0.001			0.014
			(0.50)			(0.58)
<i>Supervisory</i>			-0.002*			0.019
			(0.09)			(0.26)
<i>Deposit insurance</i>			0.002**			0.011
			(0.05)			(0.43)
<i>Governance</i>			0.000			-0.003
			(0.52)			(0.62)
Constant	0.015***	0.017***	0.034***	0.006	0.028	-0.224
	(0.00)	(0.00)	(0.01)	(0.65)	(0.12)	(0.41)
<i>No. of observations</i>	274	272	272	326	324	324
<i>R-square</i>	0.12	0.15	0.16	0.22	0.23	0.28
<i>Fisher</i>	1.907***	1.822***	1.696**	4.122***	3.429***	3.676***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)

[†]Results remain unchanged if we use log transformation of the variables

Table 4 – Bank deregulation and diversity in M&A centric consolidation

This table reports effects of banking deregulation on diversification trends observed in M&A activity based consolidation of U.S. banks using *D-in-D* approach using unbalanced panel spanning over 1990-2009. Table 3(a) focuses on geographical diversification while table 3(b) reports results on activity diversification. Panel A focuses on pre-crisis period M&A activity from 1990 to 2006 while in Panel B we extend the analysis period to 2009. Treatment group consists of banks in U.S., while comparison group contains banks from 18 EU nations. Dependent variable *M&A rate* is computed by dividing the respective number of geographical and activity diversifying M&A to the number of banking institutions at country- and year-level. P-values are in parenthesis and are computed using robust standard errors clustered at the country level. All additional variables are defined in Appendix A. *, ** and *** show statistical significance at the 10%, 5%, and 1% levels respectively.

Table 4(a): Geographical diversity facilitated by RNA of 1994

For geographical diversification, we take interstate M&A deals in case of U.S. banks and cross-border M&A in the case of banks from EU countries. *The d-in-d* estimator is the dummy variables *PostDereg* that takes value 1 for banks in U.S. from the year 1994 when Riegle-Neal act was passed by the U.S. Congress.

	Panel A: Without Crisis Period			Panel B: With Crisis Period		
<i>Dependent variable: Crossborder M&A rate</i>						
<i>PostDereg</i>	-0.003 (0.37)	-0.007 (0.13)	-0.006 (0.18)	-0.004 (0.18)	-0.007 (0.14)	-0.006 (0.16)
<i>Private credit to GDP ratio (%)[†]</i>		-2.20E-05 (0.56)	-1.80E-05 (0.63)		-4.80E-05 (0.11)	-5.40E-05 (0.14)
<i>Deposit to GDP ratio (%)[†]</i>		3.30E-05 (0.13)	3.20E-05 (0.15)		2.30E-05 (0.36)	2.70E-05 (0.29)
<i>Overhead ratio (%)</i>		-0.004 (0.20)	-0.004 (0.20)		-0.004* (0.07)	-0.004 (0.15)
<i>Interest margin ratio (%)</i>		0.006 (0.18)	0.006 (0.18)		0.005 (0.14)	0.005 (0.25)
<i>Capitalization ratio (%)[†]</i>		2.00E-06 (0.98)	1.00E-06 (0.99)		-2.00E-05 (0.78)	-1.10E-05 (0.85)
<i>Restrict[†]</i>			-2.64E-04 (0.79)			-9.37E-04 (0.74)
<i>Supervisory</i>			-0.001 (0.46)			3.82E-04 (0.77)
<i>Deposit insurance</i>			0.001 (0.11)			0.002* (0.10)
<i>Governance[†]</i>			1.52E-04 (0.40)			1.19E-04 (0.76)
<i>Constant</i>	0.012** (0.02)	0.011 (0.15)	0.017 (0.27)	0.011** (0.03)	0.013* (0.06)	0.011 (0.66)
<i>No. of observations</i>	243	243	243	292	292	292
<i>R-square</i>	0.13	0.18	0.19	0.10	0.13	0.15
<i>Fisher</i>	1.754 (0.03)	1.954 (0.00)	1.747 (0.02)	1.387 (0.12)	1.429 (0.09)	1.439 (0.07)

[†]Results remain unchanged if we use log transformation of the variables

Table 4(b): Functional diversity facilitated by GLBA of 1999

For functional diversification, we consider M&A deals performed where the target is either, investment banking, security company, or an insurance firm. *D-in-D* estimator is the dummy variables *PostGLBA* that takes value 1 for U.S. banks from the year 1999 when Gramm-Leach-Bliley act was passed by the U.S. Congress.

	Panel A: Without Crisis Period			Panel B: With Crisis Period		
<i>Dependent variable: Activity diversifying M&A rate</i>						
<i>PostGLBA</i>	0.001*** (0.00)	0.008*** (0.00)	0.008*** (0.00)	-0.012** (0.03)	-0.006 (0.29)	0.001 (0.93)
<i>Private Credit to GDP ratio (%)[†]</i>		2.80E-05 (0.56)	2.60E-05 (0.55)		-5.20E-05 (0.64)	-7.50E-05 (0.49)
<i>Deposit to GDP ratio (%)[†]</i>		-1.80E-05 (0.46)	-2.00E-05 (0.17)		-1.10E-05 (0.87)	1.00E-05 (0.89)
<i>Overhead ratio (%)</i>		0.003 (0.36)	0.004 (0.16)		-0.001 (0.85)	-0.004 (0.70)
<i>Interest margin ratio (%)</i>		-0.006** (0.04)	-0.006** (0.03)		-0.002 (0.76)	-2.16E-04 (0.98)
<i>Capitalization ratio (%)[†]</i>		-2.70E-05 (0.23)	-3.50E-05 (0.24)		-1.17E-04 (0.36)	-1.47E-04 (0.22)
<i>Restrict</i>			-0.002 (0.20)			0.003 (0.71)
<i>Supervisory</i>			-0.001 (0.31)			0.002 (0.58)
<i>Deposit insurance</i>			0.002 (0.14)			0.003 (0.46)
<i>Governance</i>			0.001* (0.05)			-0.001 (0.50)
<i>Constant</i>	0.004** (0.04)	0.005* (0.06)	0.022 (0.10)	0.002 (0.64)	0.01 (0.19)	-0.022 (0.73)
<i>No. of observations</i>	161	161	161	199	199	199
<i>R-square</i>	0.21	0.25	0.332	0.293	0.302	0.329
<i>Fisher</i>	1.77 (0.04)	2.172 (0.00)	2.59 (0.00)	3.995 (0.00)	3.127 (0.00)	2.927 (0.00)

[†]Results remain unchanged if we use log transformation of the variables

Table 5 – Robustness check (i): *D-in-D* with Eurozone as alternate comparison group

This table reports results of further analysis of *D-in-D* estimation on the effects of deregulation on M&A activity based intensity of consolidation in U.S. banking industry with alternative comparison group comprising of Eurozone banks. Panel A focuses on pre-crisis period M&A activity from 1990 to 2006 while in Panel B we extend the analysis period to 2009. Treatment group consists of banks in U.S., while comparison group contains banks from Eurozone countries. For treatment and comparison group, dependent variable *M&A rate* is computed by dividing the number of M&A transactions to the number of banking institutions at country- and year-level. *D-in-D* estimators are the dummy variables *PostDereg* (first two specifications of each panel), and *PostGLBA* that takes value 1 for banks in U.S. from the year 1994 and 1999, times of their respective enactment by U.S. congress. P-values are in parenthesis and are computed using robust standard errors clustered at the country level. All additional variables are defined in Appendix A. *, ** and *** show statistical significance at the 10%, 5%, and 1% levels respectively.

Dependent variable: M&A rate	Panel A: Without Crisis Period			Panel B: With Crisis Period		
	All M&A	Crossborder M&A	Activity diversifying M&A	All M&A	Cross-border M&A	Nontraditional M&A
<i>PostDereg</i>	0.015** (0.01)	-0.005 (0.30)		0.016 (0.62)	-0.006 (0.27)	
<i>PostGLBA</i>			0.006** (0.01)			-0.001 (0.93)
<i>Private credit to GDP ratio (%)[†]</i>	-4.80E-05 (0.40)	-2.50E-05 (0.52)	4.60E-05 (0.22)	-0.001 (0.22)	-7.00E-05 (0.18)	-1.23E-04 (0.47)
<i>Deposit to GDP ratio (%)[†]</i>	2.50E-05 (0.51)	3.40E-05 (0.21)	-4.40E-05 (0.01)	1.42E-04 (0.62)	2.30E-05 (0.52)	-7.30E-05 (0.34)
<i>Overhead ratio (%)</i>	-0.004 (0.22)	-0.009*** (0.01)	0.005* (0.07)	-0.039 (0.37)	-0.008** (0.03)	-0.006 (0.65)
<i>Interest margin ratio (%)</i>	-0.002 (0.46)	0.011*** (0.01)	-0.007* (0.06)	0.009 (0.81)	0.008** (0.04)	0.002 (0.87)
<i>Capitalization ratio (%)[†]</i>	-4.90E-05 (0.39)	-2.10E-05 (0.78)	-7.40E-05 (0.10)	-4.91E-04 (0.29)	-2.90E-05 (0.66)	-1.43E-04 (0.37)
<i>Restrict</i>	3.61E-04 (0.91)	0.001 (0.60)	-0.005* (0.08)	0.045 (0.42)	-0.002 (0.76)	0.006 (0.62)
<i>Supervisory</i>	-0.001 (0.73)	-0.001 (0.70)	-0.002 (0.38)	0.025 (0.29)	-2.10E-04 (0.93)	-0.002 (0.77)
<i>Deposit insurance</i>	0.001 (0.39)	0.001 (0.35)	0.003 (0.11)	-0.005 (0.82)	0.003 (0.18)	-0.001 (0.93)
<i>Governance[†]</i>	-2.20E-05 (0.95)	1.10E-02 (0.46)	0.001 (0.22)	-0.003 (0.61)	5.70E-05 (0.91)	-0.001 (0.49)
<i>Constant</i>	0.021 (0.60)	0.011 (0.73)	0.043 (0.13)	-0.412 (0.38)	0.024 (0.65)	0.008 (0.94)
<i>No. of observations</i>	191	180	122	229	218	150
<i>R-square</i>	0.20	0.257	0.379	0.36	0.194	0.41
<i>Fisher</i>	1.485** (0.05)	1.876 (0.01)	2.309 (0.00)	3.624*** (0.00)	1.449 (0.07)	2.963 (0.00)

[†]Results remain unchanged if we use log transformation of the variables

Table 6: Robustness chek (ii): D-in-D over domestic M&A centric consolidation

This table reports results of *D-in-D* estimation on the effects of deregulation over domestic M&A activity based consolidation in U.S. banking industry. We report only full specification for with- and without crisis time periods. Treatment group consists of banks in U.S., while comparison group contains banks from 18 EU nations. For treatment and comparison group, dependent variable *M&A rate* is computed by dividing the number of domestic M&A to the number of banking institutions at country- and year-level. *D-in-D* estimator is the dummy variable *PostDereg* that takes value 1 for banks in U.S. from the year 1994 when Riegle-Neal act was passed by the U.S. Congress. P-values are in parenthesis and are computed using robust standard errors clustered at the country level. All additional variables are defined in Appendix A. *, ** and *** show statistical significance at the 10%, 5%, and 1% levels respectively.

Dependent variable: <i>M&A rate</i> for domestic M&A activity		
	Without Crisis Period	With Crisis Period
<i>PostDereg</i>	0.012*** (0.01)	0.013** (0.01)
<i>Private credit to GDP ratio (%)</i> [†]	-5.00E-06 (0.90)	-7.00E-06 (0.90)
<i>Deposit to GDP ratio (%)</i> [†]	-2.80E-05 (0.54)	-2.20E-05 (0.71)
<i>Overhead ratio (%)</i>	0.002 (0.39)	-0.001 (0.46)
<i>Interest margin ratio (%)</i>	-0.005*** (0.00)	-0.002 (0.30)
<i>Capitalization ratio (%)</i> [†]	-4.50E-05 (0.31)	-7.20E-05 (0.21)
<i>Restrict</i>	-0.002** (0.04)	-0.003 (0.25)
<i>Supervisory</i>	-0.002 (0.15)	-0.003 (0.12)
<i>Deposit insurance</i>	0.002** (0.02)	0.003* (0.09)
<i>Governance</i> [†]	6.30E-05 (0.77)	-4.98E-04 (0.13)
<i>Constant</i>	0.041** (0.02)	0.069* (0.10)
<i>No. of observations</i>	259	182
<i>R-square</i>	0.25	0.29
<i>Fisher</i>	2.673*** (0.00)	2.23*** (0.00)

[†]Results remain unchanged if we use log transformation of the variables

Table 7: Robustness chek (iii): D-in-D with alternate measures and levels

This table reports results of *D-in-D* analysis on the effects of deregulation on consolidation intensity of U.S. banks by using alternative measures of M&A activity and level of analysis for an unbalanced panel over 1990-2009. We report only full specification for with- and without crisis time periods. Under both panels A and B, alternative measures include: M&A with 50% or above-acquired shares (1st regression), M&A with \$1bn or above deal value (2nd regression); alternative analysis at acquirer level (3rd regression). Treatment group consists of banks in U.S., while comparison group contains banks from 18 EU nations. Dependent variable *M&A rate* is computed using the number of M&A at the corresponding level of analysis for 1st and 3rd regression while deal values are used for its computation in second regression. *D-in-D* estimator is the dummy variable *PostDereg* that takes value 1 for banks in U.S. from the year 1994 when Riegle-Neal act was passed by the U.S. Congress. P-values are in parenthesis and are computed using robust standard errors clustered at the country level. All additional variables are defined in Appendix A. *, ** and *** show statistical significance at the 10%, 5%, and 1% levels respectively.

	Panel A: Without-Crisis Period			Panel B: With-Crisis Period		
	Deals with $\geq 50\%$ shares acquired	Deals with value $\geq \$1bn$	Acquirer Level	Deals with $\geq 50\%$ shares acquired	Deals with value $\geq \$1bn$	Acquirer Level
<i>PostDereg</i>	0.007*** (0.00)	3252.188** (0.02)	0.003* (0.21)	0.003 (0.69)	3538.391*** (0.00)	-0.001 (0.28)
Financial Structure Controls	Yes	Yes	Yes	Yes	Yes	Yes
Regulatory Environment Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.018** (0.05)	-6520.403* (0.09)	0.014 (0.17)	-0.054 (0.29)	-1335.853 (0.56)	-0.065* (0.08)
<i>No. of observations</i>	249	71	1030	287	87	1101
<i>R-square</i>	0.124	0.681	0.14	0.263	0.589	0.523
<i>Fisher</i>	1.113 (0.32)	3.028 (0.00)	3.137 (0.00)	2.94 (0.00)	2.493 (0.00)	20.465 (0.00)

Table 8 – Complementary analysis: M&A consolidation, concentration, and stability

This table reports results of fixed effects specification for our complementary analysis on effects of deregulation and M&A centric consolidation on bank structure and stability in the U.S. during the period 1990-2009. Two parallel panels focus on analysis spanning over the period without-crisis (Panel A) and with-crisis (panel B). For each panel, first regression is on effects over the market structure, while second regression is on bank stability. Dependent variables are *HHI* (market structure) and *Z-score* (bank stability). The key predictor is the interaction term between dummy *PostDereg* and *M&A rate*. All additional variables are defined in Appendix P-values are in parenthesis and are computed using robust standard errors clustered at the country level. All additional variables are defined in Appendix A. *, ** and *** show statistical significance at the 10%, 5%, and 1% levels respectively.

	Panel A: Without Crisis Period		Panel B: With Crisis Period	
	Market Structure	Stability	Market Structure	Stability
<i>Dependent variables:</i>	HHI	Z-score	HHI	Z-score
<i>PostDereg</i>	0.01 (0.86)	26.849*** (0.00)	-0.243 (0.11)	14.634* (0.06)
<i>M&A rate</i>	0.032 (0.83)	-5.143 (0.88)	-0.04 (0.31)	-7.766*** (0.00)
<i>M&A rate*PostDereg</i>	-1.063 (0.44)	-742.607*** (0.00)	3.437 (0.25)	-395.795* (0.06)
<i>Bank size (Log of assets)</i>	0.034** (0.04)	-3.897* (0.07)	0.047 (0.20)	-2.013 (0.20)
<i>Financial structure controls</i>	Yes	Yes	Yes	Yes
<i>Regulatory environment controls</i>	Yes	Yes	Yes	Yes
<i>Constant</i>	0.544** (0.03)	42.326 (0.17)	-0.703 (0.22)	24.331 (0.20)
<i>No. of observations</i>	236	236	287	287
<i>R-square</i>	0.22	0.87	0.30	0.83
<i>Fisher</i>	2.000 (0.00)	45.780 (0.00)	3.404 (0.00)	37.885 (0.00)

GENERAL CONCLUSION

I embarked on the journey of writing this dissertation at the time marked with perhaps the most adverse calamity the world witnessed ever since the Great Depression of 1929 and was later rightly termed as the Great Recession of 2007-2008. The rampant unfolding of financial crisis adamantly started shaking the foundations of financial systems particularly in the developed economies of the world. In Europe, a small country like Belgium was preparing itself to face debacle of a financial giant like Fortis; that faced critical problems to fulfill its commitments with respect to, perhaps, the largest ever takeover (ABN Amro) in the banking history. On the other side of Atlantic, U.S. was also witnessing a perfect storm situation emanating from the failure of Lehman Brothers in September 2008, which turned to be one of the largest failures of the investment banks around the world. Thus, the academia, regulators, and other stakeholders started formulating a variety of narratives on the causes, consequences, and remedies moving in a variety of dimensions.

It triggered a question to me that what makes such financial institutions highly vulnerable to such drastic shocks. At first place, these banking institutions demonstrated an impressive external growth in the past decade mainly through channels of M&A and made the banking industry to stand on modern footings (Group of Ten, 2001). Then, the speed with which the whole banking industry came to a standstill situation during the financial crisis was far higher than the time it took in the growth of this industry. Thus, I decided to investigate the relationship of M&A activity with bank (fragility) stability.

I mainly framed this research question in light of the existing literature on M&A and the two contrasting theoretical views presented on the bank concentration and the stability (Allen and Gale, 2004; Boyd and De Nicoló, 2005). An extensive amount of work, in the past, has mainly focused on the conventional gains of bank M&A. However, risk and stability aspects of M&A activity largely remained unattended with some exceptions including theoretical contributions by Wagner (2008; 2010), and empirical evidences by Vallascas and Hagendorff, (2011) that investigate risk implications of bank M&A at individual deal level, and Weiß et al. (2014) that delve into systemic risk effects of bank M&A. Strand of literature that zooms in on risk implications of M&A activity suggests that M&A may add to the risk of banks at both individual and systemic level through increased bank size, structural opacities, and associated moral hazard tempting banks to take on,

even more, risk. While banks may pursue M&A strategies to exploit safety net benefits due to their “too big to fail” status in the market (John et al., 1991), moral hazard problem exacerbates further as the bank’s survival becomes less dependent on its choice of risk (Acharya et al., 2015). Banks pay large premiums for the target institutions carrying higher implicit bailout support (Molyneux et al. 2014). Concerning diversification, both geographic and activity diversification via M&A may fall short of the target or offset by an even higher level of risk (Wagner, 2010), particularly for relatively safe acquirers (Vallascas and Hagendorff, 2011). On one hand, merger activity between commercial and investment banks tends to propagate risk culture of investment banking to the whole organization (Stiglitz, 2010). On the other hand, impact on such nontraditional yet volatile part of income can be far more adverse than that of traditional sources of income during times of financial crisis.

The M&A risk implications can also be examined in the broader context of consolidation, concentration and bank stability in light of two well-known but contrasting views known as “concentration-stability” view (Allen and Gale, 2004) and “concentration-fragility” view (Boyd and De Nicolo (2005). The former suggests that a consolidated and concentrated banking industry ensures stability mainly due to ease of monitoring few large sized banks, while high profits and enhanced market power act as a buffer against bank fragility and prevent excessive risk-taking by banks. The latter finds more concentrated system highly prone to instability as few banks with more market power may extract monopoly rents that may lead borrowers to opt more risky projects. Moreover, as pointed above, few large banks may tap higher governmental subsidies due to their “too big to fail” status aggravating the moral hazard problem through excessive risk-taking. The empirical evidence supports both the views presented above under different settings. As M&A intensity based consolidation has been a distinct feature of banking since the decade of the 1990s, banking industry also witnessed significant deregulation during this period. Although neoclassical explanation terms deregulation a positive for bank M&A and consolidation (Harford, 2005), this deregulated industry was the one that witnessed the financial crisis in 2007. Thus, it also appears another vital avenue of research to connect the dots between deregulation, consolidation and bank stability in an M&A perspective.

I opted to focus on implications of M&A on bank stability with an aim to extend it towards the avenue of different facets of M&A intensity. This thesis attempts to explore the relation between M&A activity and bank stability. I use different empirical settings and employ a variety of risk measures calculated by using several endogenous (exogenous) sources of information to cover salient types of risk. Moreover, the intensity of bank M&A activity has been ascertained at various level ranging from aggregate terms to banks' geographical and functional diversity and acquisition of large financial targets.

The investigation under the first two essays of this dissertation focuses on M&A activity of large European banks over a long time span before the financial crisis to relate it with bank risk and other characteristics observed during the period of financial crisis. The relationship of ex-ante M&A activity of banks with the bailouts conferred by their governments and credit ratings assigned by the credit rating agencies during the financial crisis is analyzed in chapter 1 of dissertation. We construct bailout measures by collecting information on bank bailouts from several press releases using mainly database Factiva. The credit rating based measures were constructed by using information on ratings obtained from Fitch ratings, Moody's, and Standard and Poor's (S&P). Chapter two analyzes risk implication of this M&A activity and focus of acquisitiveness in retail and investment banking segments by employing two important bank risk measures including Merton (1974) based distance to default and Z-score. Indeed, the two risk measures reflect upon bank risk of default and insolvency during the financial crisis. The findings of these two chapters mainly substantiate that: (i) the M&A activity positively relates with bailout based subsidies tapped by large European banks and confirms "too big to fail" argument on M&A, (ii) ex-ante M&A activity relates positively with the deterioration in bank's issuer ratings and improvements in their individual ratings during the financial crisis, and (iii) acquisitiveness in investment banking segment positively relates with the higher risk of default and insolvency of European banks during the financial crisis.

The last chapter of this dissertation delves upon the deregulation perspective of M&A based consolidation and stability in the U.S. banking industry while using M&A activity of European banking industry as a comparison group in a difference-in-difference setup. We perform this experiment on U.S. banking industry as it witnessed the two significant deregulatory acts in the decade of 1990s that permitted the banks to expand across states (Riegle-Neal act of 1994) and

services offered (Gramm-Leach-Bliley act of 1999). This paper finds a significantly positive effect of deregulation in spurring M&A centric consolidation in the U.S. banking industry. However, such effects are not fully reflected in the types of diversification aimed at in the two deregulatory acts. Moreover, M&A intensity and deregulation jointly cast a negative effect on the stability of U.S. banking industry over the analyzed period.

Overall, this dissertation attempts to uncover relation of bank M&A activity with some salient aspects of bank stability in the two banking industries of the world that were the epicenter of the financial crisis of 2007-2009. However, this work is not free of limitations. For instance, in the first two studies, I work on a very specific sample of large size banks from Europe although with an extensive number of 1603 M&A transactions. This exposes the two studies to the potential of omitted variable bias by limiting the potential of adding a large number of explanatory variables. Similarly, in the third study, which focuses on the regulatory reforms in the U.S., since few years of the post-enactment period of the regulation is similar for the Riegle-Neal act of 1994 and the Gramm-Leach-Bliley act of 1999, we face an issue of time overlap while evaluating the effects of the two regulations. Therefore, disentangling the effects of the two regulations during that span of time turns challenging to us. However, we try to overcome these limitations through the empirical approaches employed in the analysis.

We hope to make some vital contributions to the scientific research in particular and society in general through this thesis. First, by exploring the topic of financial stability in the banking industry, particularly in the wake of the financial crisis, we address an event that has affected the life of several nations across the globe. It is hard to provide an accurate estimate of the economic and social cost the world has incurred in the aftermath of this financial crisis. We have shown that past acquisitiveness of the large financial institutions positively relates to their bailout support during the crisis period, which indeed turns to be a cost for the public exchequer. Then, we also indicate, with the help of different risk measures, towards the existence of negative (positive) risk implications associated with M&A activity focused towards investment (retail) banking segment. This finding supports the increasing concerns relating to banks' growing focus on nontraditional activities (De Jonghe, 2010). Moreover, we also contribute to the ongoing debate on banking regulations. While declaring the process of deregulation bad in totality would be too cynical, our

findings from the third paper do call for the individual review of the regulatory reforms introduced in the past. This may enable us to identify the good and the bad regulations.

Although the above-stated contributions are an attempt to fill some important gaps and extend further upon some dimensions of the topic already addressed in the literature, this dissertation also enable us to set forth a logical agenda for future research in light of the limitations discussed and the certain questions that came across us during the course of completion. For instance, in the spirit of our accomplished work, we are currently investigating the effects of Dodd-Frank act of 2010 over the stability of U.S. banking industry. Another possible extension of our work can be to delve upon the implications of M&A on liquidity risk of banking systems.

To conclude, in our humble opinion the findings of this dissertation are significant from both practitioner and regulators viewpoint as we investigate M&A activity in the context of bank stability; and the bank stability is a topic that was, is, and will remain a buzz not only in the financial industry but also in the broader economy. We show that M&A activity of banks, and hence their external growth, must be extra cautiously monitored as it may foster, in several manifestations, risk implications to the stability of banking institutions which in turn may have severe repercussions for the whole system.

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General Annexure

Annexure– 1: Sample of Press Releases on Bank Bailouts (Sources: Factiva, ECB)



Fortis scraps deals after bail-out

By Michael Steen in Brussels

363 words

1 October 2008

Financial Times (FT.Com)

English

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Fortis, the Belgo-Dutch banking and insurance group, said on Wednesday Dutch regulators had delayed "until further notice" the sale of some of the ABN Amro assets that it owns to Deutsche Bank for €709m.

European competition authorities had demanded the sale in return for approving Fortis's role in the acquisition of ABN Amro last year.

Fortis said the Dutch central bank, in postponing its decision on the sale, "referred to the exceptional circumstances on international financial markets, the uncertainty with regard to the future shareholder in ABN Amro Bank and the implications of this uncertainty to all parties involved."

The news would be a blow to Deutsche Bank, which was hoping to buy the Dutch commercial banking operations of ABN Amro for about €300m less than their net asset value.

For Fortis, however, the decision could aid its efforts to sell all its ABN Amro assets by offering them in one bundle.

The Dutch authorities are pressing for a swift sale of the assets following the €11.2bn state-sponsored rescue of Fortis on Sunday. ING, the most likely bidder, said late on Monday it would not be making an offer.

Fortis's ABN Amro assets are still held in a special vehicle, RFS Holdings, which is controlled by the Royal Bank of Scotland, which led the acquisition of ABN Amro last year, and in which Fortis owns 34 per cent. That has put pressure on RBS's share price despite assurances from the Scottish bank that Fortis's difficulties do not affect it.

On Tuesday night, Fortis also said it was scrapping its planned asset management joint venture with Ping An, the Chinese insurer that is a major Fortis shareholder.

Doubts had already emerged in Beijing over whether the Chinese regulator would sanction the €2.15bn deal.

Separately, Fortis also said it had increased its stake in Artemis, the UK fund management group, from 67.1 per cent to full ownership, for €397m under a prior contractual arrangement with Artemis management shareholders.

FRONT PAGE - FIRST SECTION
Banks thrown £39bn lifeline

By Peter Thal Larsen, Jane Croft, Jean Eaglesham and Kate Burgess

665 words

13 October 2008

Financial Times

London Ed3

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English

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HBOS, Lloyds and RBS in **bail-out** talks

Barclays wants time to raise its own capital

The government was last night preparing to pump about £39bn into three of the country's largest banks in a broad-based recapitalisation that could see it end up with controlling stakes in Royal Bank of Scotland and HBOS.

A Treasury team led by Alistair Darling, chancellor, and Paul Myners, the City minister, was locked in talks with executives from RBS, HBOS and Lloyds TSBBarclays to hammer out details of the partial nationalisation of the banks before the markets reopen today. Barclays also held discussions, but wants time to raise its own capital first.

Unlike the plans announced last Wednesday - which would have given the government non-voting preference shares - this bail-out would see the state's taking large voting stakes via ordinary shares.

This change was needed because regulations restrict the amount banks such as RBS and HBOS can raise through preference shares.

This change was needed because regulations restrict the amount banks such as RBS and HBOS can raise through preference shares.

The negotiations come after the Treasury, the Bank of England and the Financial Services Authority last week accelerated their efforts to end questions about the safety of British banks following continued -turmoil in the stock and credit markets.

Under the plans being discussed, RBS is likely to raise as much as £20bn in fresh capital. Of this, £15bn is expected to come in the form of a placing of ordinary shares with the government at a price of about 65p a share - compared with £5.46 a year ago and a closing share price on Friday of 71.70p - with the remainder in the form of preferred shares.

Existing RBS investors would be given an opportunity to buy the ordinary shares but if they did not the government would be left with a controlling stake.

Sir Fred Goodwin, RBS's chief executive, is expected to step down, to be replaced by Stephen Hester, the former banker who is chief executive of British Land. Sir Fred would become British banking's biggest casualty of the credit crisis.

HBOS is expected to raise about £12bn, of which £9bn would be in the form of ordinary shares, while Lloyds TSB - with which HBOS is due to merge - is expected to raise about £7bn.

Both Lloyds and HBOS insisted the deal was still on course last night.

However, attempts were being made to renegotiate the terms of the all-share deal. This is expected to be to the advantage of Lloyds shareholders, reflecting the fact that HBOS will have to raise significant equity.

Barclays executives were also last night locked in negotiations with the government over its capital needs.

The bank is maintaining it will raise around £7bn in new capital but is asking for the time to find the money without calling on the government.

The authorities are keen to boost banks' capital reserves and restore confidence in the system. In recent days, the Financial Services Authority has forced banks to "stress-test" their business plans for a deep recession. Only those it deems to have sufficient capital will be allowed to take advantage of the government's plans to guarantee around £250bn of new bank debt.

Banks participating in the bail-out will also be asked to continue lending to small businesses and homeowners, while restricting executive bonuses.

Government insiders last night stressed they had no desire to adopt a long-term role controlling the sector.

Yvette Cooper, chief secretary to the Treasury, said: "What you don't want to do is to have -government running banks. That's not what we're interested in at all."

The fundraising talks come days after the government unveiled a £400bn package designed to recapitalise the banks and unfreeze interbank lending markets.

Additional reporting by Chris Giles in Washington

Banks pressed, Page 2 Devil not in the detail, Page 3 ABN deal too far, Page 4

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Document FTFT000020081013e4ad0004o

DOWJONES



ING bail-out

391 words
20 October 2008
Financial Times (FT.Com)
English
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Just a few months ago, ING was still buying back stock to address criticisms that it was overcapitalised. Now the Dutch banking and insurance group needs €10bn, although "need" is hardly being systematically defined these days. ING has no liquidity or funding problems. It has about €100bn of untapped liquidity and can even fund itself below the interbank rate. The bank also has one of the most favourable loan-to-deposit ratios going, a proxy for stable funding in the crisis. Nor does ING have an investment bank chock-full of toxic assets. True, it has about €20bn of US Alt-A mortgage securities, where some credit losses are expected, and it has pre-announced a net loss of €500m for the third quarter.

But with the market fixated on a one-size-fits-all capital ratio across Europe, ING's own buffer to cope with future losses was perceived as inadequate. A tier one ratio of at least 10 per cent is this season's must-have. ING now sports one of more than 10 per cent, courtesy of the Dutch state. Maybe it was in recognition of ING's relative strength that it got its capital injection on relatively favourable terms. They are certainly better than those suffered by investors in UK banks.

First, ING's new capital allows the bank to keep control of its dividend policy. ING also has flexibility in how it buys the Dutch state out. Second, dilution to shareholders will be relatively low because the new equity-like securities issued to the government are not ordinary shares. The Dutch state has accepted some equity downside (it gets no dividend if there is none on ING's ordinary shares). And while the state has negotiated some upside (the new-fangled securities can be bought out at a premium), the upside is capped at €5bn.

Longer term, bank bosses will have to ponder the consequences of extreme capital cyclicality and the problem of having to raise capital when it is most expensive for them to do so. For now, ING, its share price rising by more than 20 per cent on the day, deserves some praise for making the best of a bad job.

To e-mail the Lex team confidentially [click here](#)

OR

To post public comments [click here](#)

20081020_24218_324.xml

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Brussels, 20 November 2008

State aid: Commission approves joint aid from Belgium, France and Luxembourg to rescue Dexia

In accordance with the state aid rules of the EC Treaty, the European Commission has approved a state guarantee for the Dexia financial group following the crisis in the Belgian financial market. The aid, to be provided jointly by Belgium, France and Luxembourg, is to be granted to ensure the group's survival, to restore investor confidence and to encourage inter-bank lending. Given Dexia's size, market share and the prevailing financial crisis, the group's collapse would have given rise to a systemic risk. The Commission has decided that the measure constitutes an appropriate, necessary and proportionate means of remedying a serious disturbance in the Belgian economy and is, therefore, compatible with the EU rules on state aid (Article 87(3)(b) of the EC Treaty), as explained in the Communication on how these rules apply to banks in times of crisis (see [IP/08/1495](#)). It has approved the aid as an emergency rescue measure for a period of six months which may be extended if the crisis continues. The three Member States have undertaken to submit plans for the future of the group within six months of aid being provided for the first time.

Competition Commissioner Neelie Kroes said that "The solution found for Dexia shows that cross-border cooperation is possible and can be approved rapidly as soon as we have all the relevant information."

Dexia is a financial group active in the banking and insurance sectors. The parent company, Dexia SA, is a limited company incorporated in Belgium and listed on the Euronext Paris and Euronext Brussels stock exchanges. Its market capitalisation was €11.7 billion as at 30 June 2008. Dexia specialises in loans to local authorities but also has 5.5 million private customers, 4 million of whom are in Belgium.

On 9 October Belgium, France and Luxembourg concluded an agreement on a joint guarantee mechanism – covered 60.5% by Belgium, 36.5% by France and 3% by Luxembourg – to facilitate Dexia's access to financing. Between that date and 19 November the Belgian, French and Luxembourg authorities informed the Commission of the measures taken to assist Dexia.

Under the combined impact of several factors (including Dexia's size, its dominant position in certain markets and the exceptional circumstances on the financial market at the time the aid was granted), the collapse of the bank would have had a snowball effect on the Belgian banking sector and, consequently, on the entire Belgian economy.

The aid is intended to facilitate Dexia's access to means of financing in order to restore investor confidence and encourage inter-bank lending. It is limited in time and will be repaid by Dexia at low rates based on the recommendations of the European Central Bank. In view of all these considerations, this measure to assist Dexia is proportionate, appropriate and necessary in order to remedy the group's difficulties.

This decision does not cover the capital increase of €6.4 billion, of which Belgian and French investors subscribed €3 billion in each case and Luxembourg investors €376 million, following a decision taken by Dexia's Board of Directors on 30 September 2008, with a view to countering the impact of the financial crisis on Dexia. Furthermore, it does not cover the guarantee announced on 14 November 2008 in the context of the sale of FSA, Dexia's US subsidiary.

The authorisation is limited to a period of six months. If the crisis continues, this period may be extended at the duly justified request of the Member States concerned. In order to continue to benefit from the derogation granted after the period authorised, the Member States concerned must submit a restructuring or liquidation plan to the Commission. The derogation will then be automatically extended until the Commission has taken a decision on this plan.

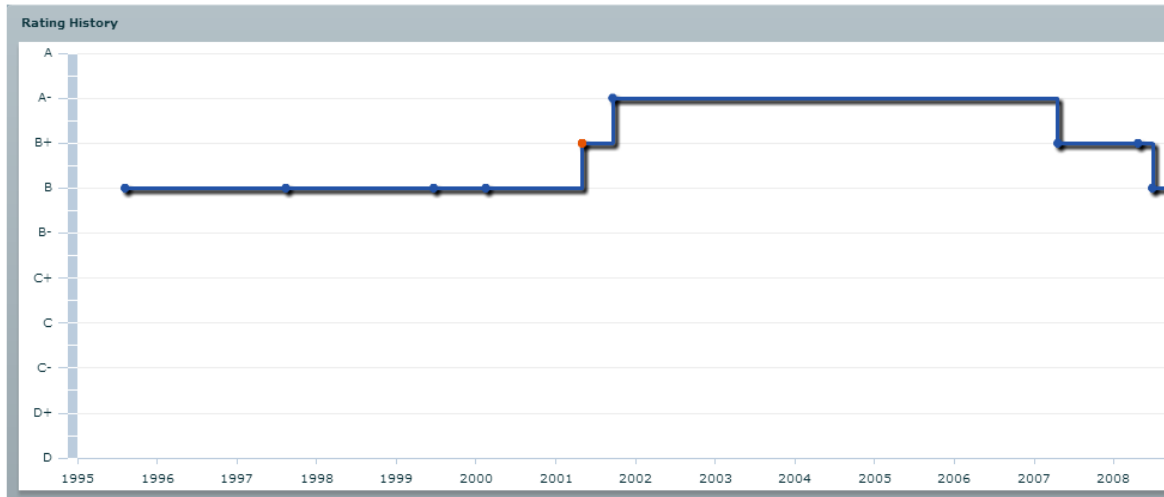
The non-confidential version of this decision will be published in the [state aid register](#) under numbers [NN 45/2008](#) (Luxembourg), [NN 49/2008](#) (Belgium) and [NN 50/2008](#) (France) on the [DG Competition website](#) once all the confidentiality problems have been resolved. The e-newsletter [State Aid Weekly e-News](#) contains a list of the most recent state aid decisions published in the Official Journal and on the website.

Annexure – 2: Snapshots of Moody’s Bank Financial Strength Rating

Royal Bank of Scotland plc

Moody's Org ID: 651920

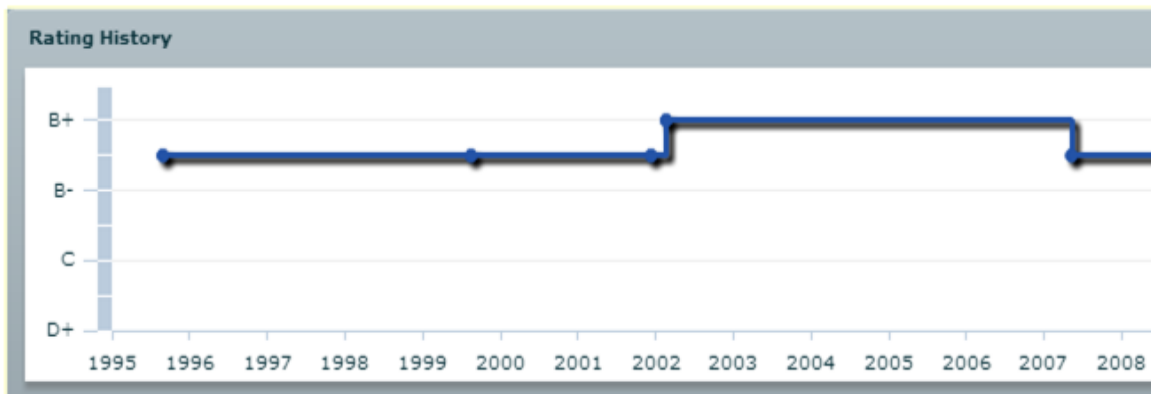
Rating Class History: Bank Financial Strength



BNP Paribas

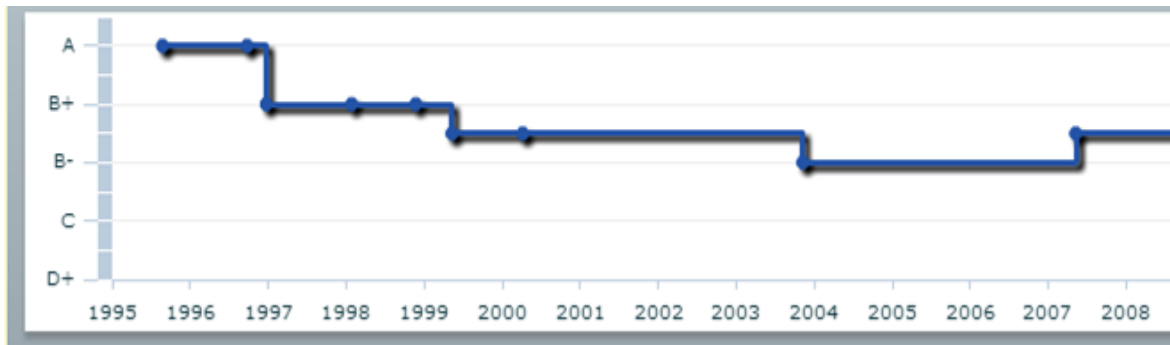
Ticker: BHP Moody's Org ID: 91000 Previous Name: BANQUE NATIONALE DE PARIS

Rating Class History: Bank Financial Strength



Deutsche Bank AG

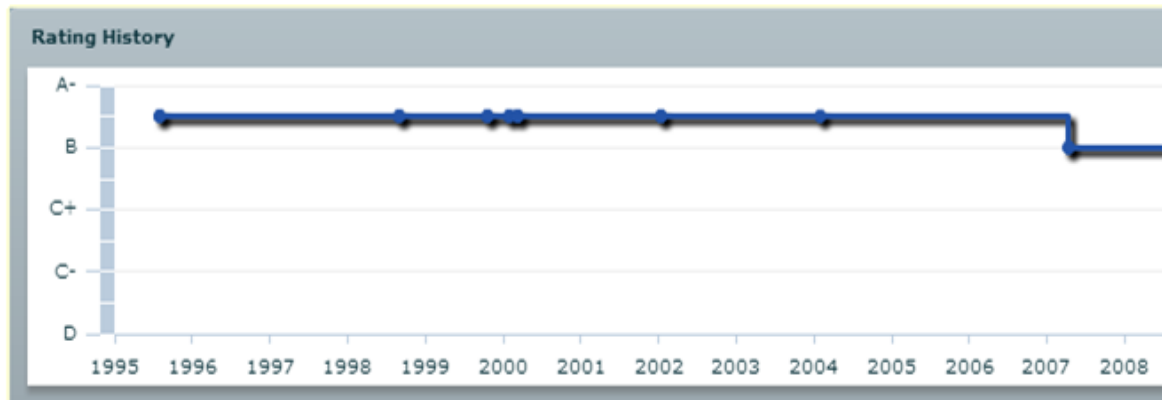
Ticker: DB Moody's Org ID: 232500



Banco Bilbao Vizcaya Argentaria, S.A.

Ticker: BBVA Moody's Org ID: 85515 Previous Name: BANCO BILBAO VIZCAYA, S.A.

Rating Class History: Bank Financial Strength



Trois Essais sur les Fusions-Acquisitions et la Stabilité du Secteur Bancaire

Résumé : Cette thèse est constituée de trois essais sur les activités de fusions-acquisitions (F&A) des banques et leurs effets sur la stabilité du secteur bancaire. Le premier essai analyse l'intensité de l'activité F&A des grandes banques Européennes au cours d'une période vaste de 1990-2006 et les liens avec les mesures de sauvetages et les notations de crédit pendant la crise financière de 2007-2009. Trois résultats importants sont mis en évidence à partir de notre étude. En premier lieu, l'intensité de l'activité F&A est liée positivement à la probabilité de sauvetage pendant la crise financière. En second lieu, cette intensité des activités de F&A est liée à la détérioration des notations des émetteurs, suggérant ainsi un risque de défaut plus élevé des banques acquéreuses pendant la période de crise. Enfin, on constate un lien positif entre les mesures de protection gouvernementales et l'effet combiné des activités de F&A et du facteur « too big to fail ». Ceci laisse penser que les banques peuvent poursuivre leurs activités de F&A pour exploiter des avantages de protection liés à leur statut de « too big to fail ». Le second essai analyse la relation entre les activités de F&A de grandes banques Européennes et leur vulnérabilité à la crise financière en utilisant l'indicateur DD de Merton (1974) et le ratio de Z-score comme mesures de risque de faillite et de solvabilité. Les résultats mettent en évidence que les stratégies d'acquisition de banques d'investissements sur une période de 1990-2006 sont liées significativement à l'augmentation en leur risque de défaut (mesuré par DD) et l'insolvabilité (mesuré par le Z-score) pendant la crise financière récente. Le troisième et dernier essai s'intéresse aux relations entre les opérations de F&A et les évolutions de la déréglementation bancaire et des réformes de régulation bancaire mises en place aux Etats-Unis. Nous analysons principalement les effets de deux actes de déréglementation significatifs des années 1990 qui ont permis aux banques américaines de s'étendre à travers les états (acte de Riegle-Neal de 1994 et acte de Gramm-Leach-Bliley de 1999). Nous comparons les activités de F&A des banques américaines avec comme groupe de contrôle les banques européennes sur la période 1990-2009. Nous constatons un effet significativement positif de la déréglementation sur les activités de F&A dans le secteur bancaire américain. Cependant, on peut remarquer que les effets constatés ne sont pas forcément les effets souhaités ou visés par les deux actes de déréglementation. De plus, nous montrons que l'intensité des activités de F&A et la déréglementation provoquent conjointement un effet négatif sur la stabilité du secteur bancaire américain, justifiant ainsi le lien souvent établi entre la concentration du système bancaire et sa fragilité.

Mot(s)-clé(s) : Banques, Institutions financières, Crise financière, Fusions-acquisitions, Sauvetages, Notations de crédit, Risque de défaut, Solvabilité, Déréglementation, Consolidation, Concentration, Stabilité

Three Essays on Mergers and Acquisitions and Bank Stability

Abstract: This dissertation consists of three essays on mergers and acquisitions (M&A) activity of banks and various dimensions of their stability. The first essay delves upon whether and how acquisitiveness of large European banks over an extensive period of 1990-2006 relate to their bailouts and credit ratings during the financial crisis of 2007-2009. Three important findings emerge from the performed analysis. First, the intensity of bank M&A activity positively relates to the likelihood and extent of their bailout support during the financial crisis. Second, the ex-ante acquisitiveness of banks relates in a significantly positive manner with the deterioration in bank issuer ratings – suggesting towards higher default risk of acquisitive banks during the crisis period. Third, a positive link between the external support and the joint effect of M&A activity and “too big to fail” factor substantiates that banks may pursue M&A activity to exploit safety net benefits associated with “too big to fail” status in the market. The second chapter analyzes the relation between M&A activity of large European banks and their vulnerability to the financial crisis using Merton (1974) based distance to default (DD) and the Z-score ratio as a measure of bankruptcy risk and solvency. The results suggest that a greater focus of sample banks towards acquiring investment banking operations over a time span of 1990-2006 significantly relates to the increase in their risk of default (measured by DD) and insolvency (measured by Z-score) during the recent financial crisis. Moreover, relatively limited evidence indicates towards the positive stability effects of the acquisitions performed in the retail banking segment of industry by the sample banks. The third and final essay of this dissertation provides M&A centric evidence on bank deregulation, consolidation, and stability in the U.S. banking industry. We primarily analyze the effects of two significant deregulatory acts of the 1990s that permitted U.S. banks to expand across states (the Riegle-Neal act of 1994) and functions performed (the Gramm-Leach-Bliley act of 1999). We employ difference-in-difference approach over M&A activity of U.S. (treatment group) and European (control group) banks over a time span of 1990-2009 in an unbalanced panel setting. We find a significantly positive effect of deregulation in spurring M&A centric consolidation in the U.S. banking industry. However, such effects are not fully reflected in the types of diversification aimed at in the two deregulatory acts. Moreover, we also show that M&A intensity and deregulation jointly cast a negative effect on the stability of U.S. banking industry –thus substantiating “Concentration – Fragility” view over banking.

Key Words: Banks, Financial institutions, Financial crisis, Mergers and acquisitions, Bailouts, Credit ratings, Default risk, Solvency, Deregulation, Consolidation, Concentration, Stability