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# Les fusions et acquisitions bancaires : enjeux en termes d'efficacité, de concurrence et de gouvernance de l'activité financière.

Qing Xu

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**Université Nice Sophia Antipolis**

Institut Supérieur d'Économie et de Management

École Doctorale DESPEG

GREDEG

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**Les fusions et acquisitions bancaires: enjeux en  
termes d'efficacité, de concurrence et de  
gouvernance de l'activité financière**

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Thèse en vue de l'obtention du Doctorat en Sciences Économiques  
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**Qing XU**

Le 17 Juillet 2014

**Jury:**

M. **Jean-Pierre Allegret** (Professeur, Université Paris Ouest Nanterre La  
Défense), Rapporteur

M. **Olivier Bruno** (Professeur, Université Nice Sophia Antipolis)

M. **Dominique Torre** (Professeur, Université Nice Sophia Antipolis), Directeur  
de thèse

M. **Laurent Weill** (Professeur, Université de Strasbourg), Rapporteur

*L'Université n'entend donner aucune approbation ni improbation aux opinions émises dans cette thèse ; ces opinions doivent être considérées comme propres à leur auteur.*

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# Introduction générale

## L'importance des activités de fusions - acquisitions

Considérées parmi les stratégies essentielles pour la croissance, les fusions et acquisitions aident les entreprises à réduire le coût du capital de l'acquéreur, à développer des synergies, à acquérir des actifs spécifiques, à réduire les risques de la diversification, à améliorer l'efficacité financière, à augmenter aussi le pouvoir de marché, enfin à équilibrer les cycles de revenus.

En tant que stratégies d'entreprises, les fusions et acquisitions constituent des options à long terme à la disposition de partenaires. Elles présentent un intérêt à la fois sur le plan productif, organisationnel, commercial et financier. Les fusions semblent particulièrement fréquentes et pertinentes dans le secteur financier. L'histoire de l'industrie bancaire montre des récurrences dans le domaine de la consolidation. Ces fusions-acquisitions ont, depuis plus d'un siècle, peu à peu recomposé et modifié le panorama concurrentiel dans le secteur bancaire.

Ces fusions-acquisitions bancaires ont été par moments simplement motivées par l'évolution de l'activité financière. Elles sont ainsi souvent considérées par les banquiers comme une stratégie concurrentielle pertinente pour gérer le développement des activités bancaires, ou pour moderniser leur organisation, pour restaurer la confiance après une crise, tout simplement pour assurer leur survie. Elles ont beaucoup influé sur l'économie mondiale, en particulier dans les phases de reprise et de croissance.

Par ailleurs, les fusions-acquisitions ont été ces dernières années un des facteurs marquants de l'accompagnement financier du développement dans de nombreux pays émergents. Dans ces cas, les fusions et acquisitions sont spécifiquement conçues comme un moyen de moderniser le secteur bancaire, d'accroître son efficacité à partir de conditions initiales souvent caractérisées par un système financier adapté à une économie moins ouverte, ou le rôle de l'Etat était plus important qu'il ne l'est devenu par la suite.

## **Les mouvements récents de fusions - acquisitions dans le secteur financier**

Depuis la fin du siècle dernier et dans la plupart des économies, les fusions - acquisitions se sont développées dans le secteur financier. Aujourd'hui, un grand nombre d'institutions financières nationales et internationales recourent à de telles opérations. Ces fusions - acquisitions ont eu beaucoup d'impact sur l'économie mondiale et ont permis de développer l'industrie bancaire. Celle-ci est essentielle à la croissance et au développement économique, ce qui suffit à motiver l'intérêt que l'on peut leur porter.

La mondialisation est une des raisons du nombre croissant des fusions - acquisitions dans le secteur financier, et en particulier dans le secteur bancaire. La mondialisation stimule la croissance des entreprises internationales qui ont besoin de plus de services financiers. De nombreuses banques ont ainsi mené des activités de fusions et acquisitions pour élargir leurs opérations, augmenter leur capital, améliorer la capacité concurrentielle et leur résistance aux risques.

On peut situer le début du trend actuel des fusions et acquisitions dans le secteur bancaire au début des années 90. Ces fusions ont débuté aux Etats Unis et se sont propagées au monde entier. Le secteur bancaire américain a été le premier à pratiquer à grande échelle des activités de fusions - acquisitions, sans doute pour apporter des solutions raisonnables à des cas de concurrence exacerbée. Par exemple, en 1998, Citicorp et Travelers Group ont fusionné pour former Citigroup qui est devenu la plus grande entreprise de services financiers à l'époque. First

Chicago NBD Corp. a été acquise par la Bank One Corp. qui était la cinquième plus grande banque des États-Unis; la 3ème banque américaine - NationsBank Corp. et la quatrième banque américaine - BankAmerica Corp. ont fusionné pour former la Bank of America Corp. qui est devenu la deuxième banque américaine.

Suite aux évolutions du secteur bancaire aux États-Unis, les activités de fusions – acquisitions se sont propagées en Europe. L'Allemagne, l'Espagne, la France, la Suisse, la Finlande et d'autres pays européens ont contribué à ces fusions. Par exemple : la Deutsche Bank a acheté Bankers Trust en 1998, la Deutsche Bank est devenue la plus première institution financière au monde par sa taille à cette époque. Ces fusions et acquisitions ont ainsi permis aux pays européens d'augmenter leurs facultés d'adaptation à la concurrence internationale. Santillan-Salgado (2005) relève par exemple, en commentant la situation au début du siècle, que le secteur bancaire aux États-Unis a subi un processus de consolidation réduisant de moitié le nombre de banques, le mouvement étant moins profond mais cependant marqué en Europe aussi.

## **Les fusions - acquisitions bancaires dans les pays émergents**

Parmi les pays asiatiques, le Japon s'est distingué dans le domaine des fusions et acquisitions bancaires. Après la crise financière asiatique, la Corée, l'Indonésie, la Malaisie, la Thaïlande et d'autres pays asiatiques ont dû aussi procéder à des fusions et acquisitions dans le secteur bancaire pour permettre à leur secteur bancaire de survivre à la crise. Le Brésil, l'Argentine, le Venezuela, le Chili et d'autres pays d'Amérique latine ont également pris l'initiative de fusions - acquisitions dans leur secteur bancaire.

La vague de fusions et acquisitions bancaires initiée après 1998 a souvent impliqué des banques cibles situées dans les pays émergents, acquises par des banques issues de pays développés (banques internationales). Les processus de consolidation des marchés émergents se distinguent de ceux des économies développées : (1) les fusions et acquisitions transfrontalières sont la source la plus importante de la consolidation dans les pays émergents; (2) la consolidation est utilisée pour

restructurer le secteur bancaire des pays émergents après des périodes de crise financière au lieu d'éliminer les excès de capacité, (3) les gouvernements des pays émergents sont des participants actifs dans ces processus de consolidation (Gelos and Roldos, 2004).

La libéralisation financière et les progrès technologiques ont stimulé les activités de fusions et acquisitions transfrontalières en modifiant les politiques publiques régulant l'entrée des banques étrangères et la prise de participation des banques étrangères dans le capital des banques nationales. Depuis le début des années 90, les grandes banques internationales ont acquis de plus en plus fréquemment des actions de banques des pays émergents. Ce processus de consolidation internationale reflète deux événements contribuant à équilibrer les forces du marché : (1) l'intensification de la concurrence sur les marchés bancaires dans les pays développés qui a forcé les grandes banques à aller plus loin dans la recherche de solutions pour diversifier les risques et générer des profits ; (2) l'abrogation des restrictions sur les investissements étrangers et les activités des banques étrangères, et la privatisation des institutions financières publiques par les gouvernements des pays émergents.

Les crises financières ayant frappé les pays émergents dans les années 90, on a pu observer la faiblesse de la capitalisation locale et la nécessité d'encourager la participation étrangère à la recapitalisation et la consolidation au sein des secteurs bancaires nationaux. Les grandes banques internationales souhaitent accéder à de nouveaux marchés au même moment que le système bancaire des marchés émergents s'ouvrait aux capitaux étrangers que ces banques internationales pouvaient fournir.

## **La situation en Chine**

Le développement de l'industrie bancaire chinoise passe par trois étapes : la période d'émergence et de développement (1949-1978), la période de réforme suivie d'un nouveau développement (1978-2008) et la période d'ajustement aux nouvelles opportunités (de 2009 à aujourd'hui).

Depuis son adhésion à l'Organisation mondiale du commerce (OMC) le 1er Janvier 2002, la Chine a toujours appliqué une politique d'ouverture dans le secteur bancaire. Toutes les restrictions pour les banques étrangères ont été supprimées en 2007.

Ainsi, dans leur pays d'origine, les banques chinoises sont en concurrence avec les banques étrangères sans aucune protection du gouvernement chinois. Face à cette concurrence forte et directe des banques étrangères, les banques chinoises doivent trouver leur meilleure voie de développement et utiliser des stratégies appropriées pour rivaliser avec les banques étrangères. La forte pression concurrentielle pousse les banques chinoises à améliorer les performances et à améliorer le service. Il est dès lors important d'avoir une bonne estimation de l'efficacité du secteur bancaire chinois.

En tant qu'économie émergente, la Chine a une structure économique et politique particulière. Le secteur bancaire chinois a ainsi accru sa diversité, il s'est ouvert à l'extérieur et à la concurrence, se transformant progressivement en une industrie bancaire moderne. L'essentiel du secteur bancaire appartient à l'Etat. Les 5 grandes banques commerciales publiques sont *Industrial and Commercial Bank of China Ltd*, *Agricultural Bank of China*, *Bank of China*, *China Construction Bank Corporation* et *Bank of Communications Ltd*. Plusieurs banques commerciales nouvelles ont aussi émergé, des banques commerciales de province et les banques tournées vers l'international, par exemple, *Hua Xia Bank Co., Ltd*, *China Citic Bank Co. Ltd*, *Shanghai Pudong Development Bank* etc.

Le secteur bancaire chinois rencontre plusieurs problèmes affectant sa compétitivité. Pas de droit de propriété transparent, surabondance de prêts non performants, sélectivité insuffisante sont les problèmes principaux. En Chine, le marché des droits de propriété est contrôlé par le gouvernement, spécifiquement pour les activités de fusions - acquisitions. Sur le marché chinois, ces opérations se soldent toujours par des rachats contrôlés par l'État. Selon Kent, Guo et Zhang (2007), la proportion des prêts non performants des 4 plus grandes banques chinoises est de 52,7% en 1997, 31,5% en 2000 et 22% en 2004. Ce ratio a diminué progressivement, en laissant cependant des proportions beaucoup plus grandes que celles des

banques étrangères.

Avec l'intensification de fusions - acquisitions associant des banques internationales dans le secteur bancaire, la Banque Populaire de Chine a examiné les différentes manières de pratiquer des fusions - acquisitions dans les institutions financières. Elle a inspiré certaines mesures de soutien politiques pour les acquéreurs (elle leur a par exemple fourni des soutiens politiques et les a aidés à se financer), a cherché à résoudre d'autres problèmes (par exemple par la mise en place d'institutions spéciales pour soutenir les activités de fusions et acquisitions) dans le secteur bancaire chinois.

Certaines économies asiatiques ont adopté des principes conduisant à une libéralisation interne plus marquée que la Chine. Pendant ce temps, la restructuration du secteur financier chinois était principalement financée par des émissions obligataires après l'entrée de la Chine dans l'OMC. Le niveau de pénétration des banques étrangères en Chine reste en conséquence très faible et le gouvernement chinois applique aux banques étrangères des exigences réglementaires compliquées. Sur la base de l'obligation légale du secteur bancaire chinois (les règlements concernant les banques étrangères), la part maximale qu'un investisseur individuel étranger peut prendre dans une banque locale est de 20% et la participation étrangère totale est fixée à un maximum de 25% du total. Le gouvernement chinois a également mis en place l'exigence d'un actif minimum pour les banques étrangères : par exemple une banque étrangère doit disposer d'un certain montant d'actifs pour l'établissement d'une succursale étrangère. Les succursales de banques étrangères ne sont pas admises comme banques de détail, seules les filiales des banques étrangères l'étant. Sous ces conditions, les banques étrangères sont encouragées à s'inclure dans le paysage bancaire chinois. Les banques étrangères qui n'investissent pas au minimum 1 million de RMB ne peuvent pas ouvrir de succursales.

## **La situation d'autres pays Asiatiques**

Une partie de ce travail analyse la situation de façon globale, en essayant de tirer quelques éléments de comparaison entre 6 pays asiatiques (Chine, Inde, Indonésie,

Corée, Philippines et Thaïlande).

## Inde

Depuis le début des années 1990, l'Inde a entamé son processus de libéralisation financière. L'environnement financier indien était initialement plus libéral que celui de la Chine. D'un point de vue général, le gouvernement indien ne discrimine pas entre les banques domestiques et les banques étrangères. Dans certains cas, le gouvernement indien s'est même montré plus favorable aux banques étrangères qu'aux banques domestiques. Au sein du secteur bancaire indien, les banques étrangères peuvent entreprendre presque toutes les activités bancaires. Le gouvernement indien a également élargi la présence des banques étrangères dans son secteur bancaire en leur permettant d'établir des succursales à l'étranger en propriété exclusive. En outre, la participation étrangère maximale autorisée dans les banques indiennes est passée de 49% (avant la crise asiatique) à 74%.

## Philippines

Depuis la crise financière asiatique, les Philippines ont procédé à une importante restructuration de leur système bancaire. Comme les autres pays d'Asie, le gouvernement philippin a modifié la loi bancaire pour faciliter l'entrée des banques étrangères. Avant la crise, les Philippines avaient une attitude relativement libérale face à l'entrée potentielle des banques étrangères. Après la crise, le Banque Centrale des Philippines a signé la nouvelle loi bancaire générale (2000) modifiant l'ancienne en allant vers plus d'ouverture. Selon l'ancienne loi de libéralisation des banques étrangères de 1994, les Philippines n'acceptaient que l'entrée des banques étrangères selon l'une des modalités suivantes: (1) l'acquisition d'un maximum de 60% des actions d'une banque domestique existante, (2) la détention de 60% au maximum des droits de vote d'une nouvelle filiale bancaire constituée dans les Philippines, ou (3) l'établissement une succursale de l'établissement bancaire (pour une durée de 5 ans, autorisation accordée à un maximum de 10 banques étrangères). La nouvelle loi élargit l'entrée des banques étrangères en portant ce délai à 7 ans. Toutefois, la loi souligne que la part des banques à capitaux majoritairement étrangers ne doit pas dépasser 30% du total des ressources ou des actifs

du système bancaire dans sa globalité.

### Indonésie

Fortement affectée par la crise financière asiatique, l'Indonésie a mené sa révolution financière sur la base d'un libéralisme enthousiaste. Elle a procédé à une restructuration financière globale. En 1998, l'Agence indonésienne de restructuration des banques a été mise en place par le gouvernement indonésien en vue de résoudre les problèmes dans le secteur bancaire domestique. Le but de l'Agence indonésienne de restructuration des banques a été d'abord la question des prêts non performants dans l'industrie bancaire domestique et de traiter les effets négatifs de la crise financière asiatique. En outre, le gouvernement indonésien a également introduit d'importants changements réglementaires. L'une des dispositions nouvelles les plus importantes consiste en la suppression de certaines restrictions à la participation étrangère dans son secteur bancaire domestique. En vertu de la nouvelle loi bancaire de 1998, les banques étrangères peuvent investir dans les banques cotées et non-cotées, et les institutions non bancaires à l'étranger. La nouvelle loi bancaire a également supprimé les restrictions sur l'expansion des succursales de banques joint-venture étrangères.

### Corée du Sud

Dans le processus de restructuration post-crise, le gouvernement sud-coréen a levé tous les obstacles réglementaires pour encourager l'entrée des banques étrangères. Le choc de la crise financière asiatique a conduit le gouvernement sud-coréen à prendre conscience de l'importance d'un maintien du niveau de la participation étrangère dans le but d'aider à la recapitalisation et d'améliorer l'efficacité des banques domestiques. Ainsi, le gouvernement coréen a encouragé l'investissement étranger en Corée en levant les obstacles financiers. Avant la crise asiatique, la limite de participation étrangère était de 49%. Après la crise, la commission de surveillance financière de Corée a supprimé cette restriction et a permis aux banques étrangères une participation de 100%. Quand les seuils de 10%, 25% et 33% et 100% sont atteints, la banque étrangère doit cependant être approuvée par la

commission de surveillance financière de Corée.

Thaïlande

De façon similaire à d'autres libéralisations agressives, la Thaïlande a mené la réforme de sa réglementation financière après la crise financière asiatique, en portant pour une période de 10 ans à 100% le maximum de la part d'investisseurs étrangers dans les institutions financières domestiques. En 2004, le plan du secteur financier permet aux banques étrangères d'appliquer deux types de licences : (1) une banque étrangère bénéficie, en tant que filiale, du même champ d'activité qu'en tant que banque commerciale domestique, et peut ouvrir une succursale dans Bangkok et 3 succursales ailleurs dans Thaïlande; (2) une banque étrangère peut bénéficier d'une succursale étrangère propre et jouir du même champ d'activité que les autres banques commerciales, mais n'est pas autorisé à ouvrir d'autres succursales.

## **L'impact de la banque étrangère sur l'industrie bancaire domestique**

Globalement, l'entrée de banques étrangères peut affecter le niveau de concurrence de l'industrie bancaire domestique, influencer sur l'efficacité des banques domestiques, et avoir un impact sur la stabilité du système bancaire domestique. L'entrée des banques étrangères a donc des effets positifs et des effets négatifs pour l'industrie bancaire nationale. Lorsque les banques étrangères accroissent leur présence sur le marché domestique, elles exercent une pression sur les banques domestiques les conduisant à effectuer certaines réformes : elles exercent une pression à la réduction des coûts, elles poussent leurs concurrentes locales à diversifier leurs produits et services, à adopter une organisation plus efficace, à apprendre de leurs pratiques. L'entrée des banques étrangères a aussi des effets concurrentiels plus négatifs : plus de concurrence peut réduire les marges et les bénéfices. Toutefois, l'entrée d'une banque étrangère a aussi un "effet d'écrémage" pour les banques domestiques ayant une expérience dans les transactions internationales. Les banques étrangères peuvent attirer de bons clients de banques domestiques, offrir de

meilleurs produits et services, avoir un meilleur accès aux marchés financiers internationaux. Les banques domestiques pourraient pâtir de ces différents avantages des banques étrangères. De nombreux travaux empiriques illustrent ce diagnostic.

Goldberg, Dages et Kinney (2000) relèvent ainsi 3 arguments en faveur de l'ouverture des secteurs financiers domestiques à la propriété étrangère : (1) l'entrée des banques étrangères diversifie le capital, augmente le montant du financement, soutient l'offre de crédit domestique et augmente la stabilité de prêts disponibles; (2) elle peut également améliorer la qualité, le prix et la disponibilité des produits et services financiers; (3) elle peut enfin améliorer l'organisation du système financier, les procédures comptables, la transparence du système, la réglementation financière.

Clarke, Cull, D'Amato et Molinari (1999) analysent la situation des banques argentines au milieu de la décennie 1990 et constatent que l'entrée des banques étrangères est associée à une concurrence accrue dans le secteur bancaire domestique et à une efficacité accrue des banques nationales. Demirguc-Kunt, Levine et Min (1998) travaillent sur un large échantillon de pays au cours de la période 1988-1995, et constatent que la participation de banques étrangère diminue l'incidence de crises bancaires locales et accélère la croissance économique globale en renforçant l'efficacité du secteur bancaire domestique.

Claessens, Demirfüç-Kunt et Huizinga (2001) analysent l'étendue et l'effet de la présence des banques étrangères sur le marché domestique à l'aide de 7900 banques de 80 pays pour la période 1988-1995. Ils observent que les bénéfices des banques étrangères sont plus élevés que ceux des banques domestiques des pays émergents et soulignent que l'entrée des banques étrangères pour les pays émergents est associée à une réduction de la rentabilité et de la marge pour les banques domestiques.

Hermes et Lensink (2001) reproduisent l'analyse de Claessens, Demirfüç-Kunt et Huizinga (2001) pour les pays émergents. Ils trouvent que l'entrée de banques

étrangères conduit à la croissance des revenus, des bénéfices et des coûts des banques domestiques. Leurs résultats indiquent que les coûts et les bénéfices ne diminuent que si l'entrée des banques étrangères a atteint un certain niveau.

Goldberg, Dages et Kinney (2000) mettent en évidence 3 arguments principaux contre l'ouverture du système financier domestique à la propriété étrangère: (1) l'accroissement des capitaux étrangers dans les institutions financières diminue la stabilité du secteur financier domestique; (2) les établissements étrangers ont un "effet d'écémage" en attirant des clients de haut niveau auprès des banques domestiques, (3) plusieurs institutions financières étrangères dans l'industrie financière domestique augmentera les défis pour la supervision.

Uiboupin (2004) évalue l'effet de l'entrée des banques étrangères sur la performance des banques en Europe centrale et de l'Est, et souligne que l'entrée de banques étrangères augmente la concurrence dans les pays d'accueil et a un effet négatif sur la rentabilité, les revenus et le revenu autre que d'intérêts des banques domestiques. Hellmann, Murdock et Stiglitz (2000) trouvent que l'entrée des banques étrangères détruit la valeur des banques nationales, mais qu'il facilite aussi l'investissement prudent.

## **Présentation du plan et résumé des chapitres de la thèse**

Le premier chapitre de cette thèse est une revue de la littérature générale relative aux fusions-acquisitions bancaires. Les fusions - acquisitions constituent l'un des moyens les plus importants du développement des services financiers. La tendance aux fusions -acquisitions dans le secteur bancaire a eu un impact important sur l'économie mondiale. Les fusions-acquisitions ont aussi été fondamentales pour le développement de l'industrie bancaire. Dans la mesure où l'activité bancaire s'avère cruciale à la croissance et le développement économique, il est important d'analyser les activités de fusions-acquisitions dans le secteur bancaire.

Le deuxième chapitre propose une analyse empirique des activités de fusions et acquisitions dans le secteur bancaire chinois. Le degré d'ouverture de l'industrie bancaire chinoise a augmenté depuis la fin des années 70. Après l'adhésion à l'Organisation Mondiale du Commerce (OMC) le 1er Janvier 2002, la Chine a appliqué une politique d'ouverture dans le secteur bancaire. De nombreuses restrictions affectant les banques étrangères ont été levées en 2007. En Chine, les banques chinoises sont donc actuellement en concurrence avec les banques étrangères. Face à une concurrence forte et directe des banques étrangères, il faut trouver la meilleure voie de développement et conduire les banques chinoises à adopter les stratégies appropriées. La forte pression concurrentielle pousse ces banques à améliorer leurs performances et leurs services, à bien utiliser les ressources bancaires. Il est dès lors important d'estimer correctement l'efficacité du secteur bancaire chinois : cette analyse intéresse non seulement les gestionnaires des banques chinoises, mais aussi les décideurs dont l'objectif peut être d'évaluer et d'améliorer la viabilité bancaire.

Akhavain, Berger et Humphrey (1997) appliquent une analyse en termes de frontière de production à l'étude des mégafusions bancaires dans aux Etats Unis et trouvent qu'elles entraînent une amélioration importante de l'efficacité des banques sur la base d'une analyse des profits des banques fusionnées. En particulier, les banques dont les rendements sont plus faibles avant la fusion bénéficient de la meilleure amélioration en termes d'efficacité. Zhang (2003) utilise une analyse DEA pour estimer 41 banques chinoises entre l'année de 1997 et 2001. Les résultats montrent que (1) les banques commerciales privées sont plus efficaces que les banques commerciales publiques ; (2) l'amélioration de la capacité de gestion interne pourrait améliorer l'efficacité de l'allocation bancaire ; et (3) l'évolution des conditions économiques et la politique de réglementation affectent le niveau d'efficacité des banques commerciales chinoises. Yang et Zhang (2007) ont réalisé une analyse DEA pour 14 banques commerciales chinoises entre l'année de 1996 et 2005, et leurs résultats montrent au contraire que la rentabilité et l'efficacité des banques commerciales privées est inférieure à celle des banques commerciales publiques.

Il n'y a que peu d'études consacrées à la variation de la productivité totale des facteurs des banques commerciales chinoises. Avec l'indice de Malquist, on peut en revanche identifier différence de productivité entre les entreprises. L'indice de

Malmquist a nombreux avantages: par exemple il ne nécessite pas la maximisation du profit ou la minimisation des coûts. En outre, les deux parties issues de la décomposition de l'indice de Malmquist aident les analystes à mieux comprendre l'évolution de l'efficacité. C'est donc une méthode appropriée à l'évaluation de la productivité de l'industrie bancaire.

Le deuxième chapitre propose une analyse des ratios financiers à l'aide de la technique d'analyse DEA qui examine les frontières d'efficacité des unités avant et après fusion. En utilisant des données extraites de l'Annuaire du secteur bancaire, de l'Annuaire statistique de la Chine et des rapports annuels des banques chinoises, j'utilise un modèle empirique du type "Malmquist total factor productivity change". J'analyse 14 banques commerciales chinoises entre l'année 1998 et 2007 en utilisant l'indice de Malmquist. Les résultats montrent que la productivité de ces 14 banques commerciales chinoises s'est accrue annuellement de 6,3% au cours de la décennie 1998-2007. Avec l'informatisation, les progrès technologiques expliquent essentiellement l'amélioration de la productivité. En raison de la mauvaise gestion interne, de la faible qualité du service, de nombreux prêts non performants et de l'intervention du gouvernement, les résultats de l'analyse prouvent que les plus grandes banques n'ont pas été très performantes.

Le but de l'analyse DEA n'est pas seulement de mesurer la valeur, mais aussi de révéler les déterminants de la productivité totale des facteurs (TFPC). Les équipes dirigeantes des banques pourraient, à partir de ces mesures, prêter plus d'attention à l'amélioration de ces déterminants, et finalement améliorer la TFPC des banques chinoises. J'ai alors poursuivi mes recherches, pour bien comprendre l'évolution de l'efficacité du secteur bancaire chinois.

J'ai aussi effectué une analyse de régression. Les résultats de cette régression montrent que le taux de croissance du PIB a influencé de manière remarquablement positive l'indice TFPC des banques commerciales chinoises. La croissance du PIB a amélioré l'efficacité du secteur bancaire chinois. L'inflation a une influence remarquablement négative sur l'index TFPC des banques commerciales chinoises. Les banques chinoises pourraient ainsi changer la structure financière de l'actif et du passif pour bénéficier de l'inflation à venir. Par conséquent, au terme de l'analyse de régression, il apparaît qu'un environnement macro-économique sain

et stable, et une bonne structuration de la banque sont très importants pour les banques commerciales chinoises. Les équipes dirigeantes des banques chinoises doivent donc continuer à optimiser la structure du secteur bancaire les processus opérationnels internes, si l'on admet que la croissance du pays est un élément qui leur échappe, lorsqu'on ces banques sont prises individuellement.

Le troisième chapitre utilise un modèle théorique pour analyser l'effet complexe d'entrée des banques étrangères sur l'activité des banques domestiques. Les pays émergents mettent en œuvre des réformes structurelles dans leurs secteurs financiers nationaux qui s'accompagnent de l'entrée de plus en plus de banques étrangères sur ces marchés émergents. Dans les pays émergents, les banques étrangères sont plus efficaces que les banques nationales. Ainsi, les nouveaux arrivants peuvent améliorer l'efficacité non seulement des banques nationales, mais aussi du secteur bancaire dans son ensemble. Claessens, Demirfütç-Kunt et Huizinga (2000) montrent que les banques étrangères ont eu dans les pays émergents une meilleure rentabilité et de meilleures marges d'intérêt que les banques domestiques, et les entrées des banques étrangères peuvent forcer les banques de pays émergents plus efficace.

Toutefois, l'entrée des banques étrangères peut avoir des effets négatifs pour les pays émergents. Sur la base de l'observation de plusieurs pays et de l'évolution de la banque chinoise, Bonin et Huang (2002) observent que, dans la plupart des cas, les banques étrangères sont en concurrence avec les banques domestiques pour les clients d'entreprises rentables et les clients individuels riches. En outre, bien que les banques domestiques aient des avantages informationnels et de bonnes relations clientèle, les banques étrangères peuvent attirer leurs clients avec des prix compétitifs.

Clarke, Cull, Martinez Peria (2006) combinent les réponses d'une enquête d'environ 3000 entreprises dans 35 pays émergents et en transition, avec des données sur la participation des banques étrangères. Ils estiment que l'entrée des banques étrangères peut réduire l'accès au crédit, en particulier pour certains secteurs de l'économie comme les petites et moyennes entreprises (PMEs). Ils montrent en outre que l'accès réduit au crédit pour les entreprises peut avoir un impact négatif

considérable sur l'économie globale dans des nombreux pays émergents. Detragiache, Tressel, et Gupta (2008) proposent un modèle théorique pour montrer que l'entrée de banques étrangères a un effet d'écrémage qui augmente les coûts d'exploitation globaux et réduit le bien-être global. Le modèle montre que l'entrée de banques étrangères bénéficie seulement aux entreprises les plus transparentes, laissant les autres entreprises dans une meilleure ou dans une moins bonne situation.

L'entrée de banques étrangères peut donc améliorer la gestion des établissements acquis et attirer des clients auprès des banques nationales, par un "effet écrémage" préjudiciable aux profits des banques domestiques, malgré l'amélioration de l'efficacité de gestion. Si l'entrée de banques étrangères se fait par fusions-acquisitions, l'accroissement de la part des banques étrangères dans le capital des banques nationales diminue les profits, les capacités et le contrôle des actionnaires nationaux.

Je modélise trois modes d'entrée de banques étrangères : (1) la création d'une nouvelle filiale, (2) des fusions et acquisitions avec une banque publique (grande banque généraliste) et (3) des fusions et acquisitions avec des Joint Stock Banks (petites banques spécialisées). Lorsque le marché des prêts "normaux" n'est pas entièrement couvert par les banques domestiques, ce qui peut s'identifier à une situation de rationnement du crédit, les résultats du modèle établissent que l'entrée des banques étrangères peut améliorer la situation générale dans le secteur bancaire, compensant ainsi la partie ou entièrement l'"effet écrémage" par une stimulation indirecte des banques nationales.

Le modèle analyse aussi l'effet de lois réglementaires possibles introduites par l'autorité nationale en vue d'améliorer les limites adéquates à l'entrée. Nous constatons que, lorsque l'entrée de banques étrangères se fait par la création d'une nouvelle filiale, les effets positifs dominent les effets négatifs quand la banque étrangère a un assez bon accès aux marchés monétaires internationaux. Nous avons également constaté que l'intérêt d'une limitation des ressources en provenance de banques étrangères dans le capital des banques domestiques dépend de la balance faite par les autorités domestiques du point de vue du bien-être entre la richesse des actionnaires initiaux et celle des futurs actionnaires des banques domestiques, ce qui équivaut à renvoyer la réponse à une appréciation du contrôle

du capital et pas seulement du bien-être immédiat attendu de l'entrée de banques étrangères.

Par la suite, sur la base de l'utilisation de la base de données "Thomson One", le quatrième chapitre de thèse est consacré à une analyse empirique (une analyse de régression) pour de 6 pays asiatiques (Chine, Inde, Indonésie, Corée, Philippines et Thaïlande). Ce travail économétrique examine l'effet de banques étrangères avant et après des opérations de fusions-acquisitions dans le secteur bancaire domestique. Ces pays ont effectué des changements réglementaires cruciaux dans leurs secteurs bancaires depuis la crise financière asiatique. Bien que différentes, ces réformes ont réduit les obstacles à la pénétration de banques étrangères. Sur la base de l'analyse des Sasidaran et Ramkishen (2010), nous pouvons séparer les pays asiatiques en 2 groupes, en fonction des réglementations qui limitent les capitaux propres étrangers dans le secteur bancaire national : les libéraux enthousiastes (Indonésie, Corée, Thaïlande et Philippines) et les libéraux prudents (Chine et Inde).

Ce chapitre démontre l'impact de l'entrée des banques étrangères sur la performance bancaire dans six pays émergents d'Asie. Nos résultats indiquent que l'entrée des banques étrangères est associée à une augmentation de la rentabilité des banques domestiques. Nous avons constaté que les fusions-acquisitions entre des banques domestiques et étrangères ont un effet positif sur la rentabilité des banques domestiques, en particulier pour les activités nécessitant le moins d'expertise. Nos résultats font cependant apparaître une certaine hétérogénéité des effets de ces fusions, en fonction de l'historique des systèmes bancaires nationaux et de la nature des réglementations passées ou en cours. Nos résultats montrent ainsi que, pour ces six pays asiatiques, le taux de pénétration des banques étrangères est plus important si la banque étrangère a déjà mené une activité de fusions - acquisitions avec les banques nationales. L'entrée des banques étrangères a à la fois un effet direct sur l'industrie bancaire domestique, l'année en cours et l'année suivante. En général, les effets directs sont plus forts que l'effet avec décalage d'un an.

# Chapter 1

## Literature Review

### 1.1 Concept of M&As activities

Considered as one of the essential growth strategies, Merger and Acquisition (M&A) represent one company purchases of entire companies or specific assets of another company (Yang & Hyland, 2006; Ahern & Weston, 2007). Generally speaking, M&A activities help companies lower the acquirer's cost of capital, get synergy, acquire unique capabilities and resources, reduce diversification risk, improve financial efficiency, build up market power and balance the revenue cycles (Yang & Hyland, 2006).

M&A activities “have been defined to be the purchase of entire companies or specific assets by another company” (Ahern & Weston, 2007). For both economies and individual firms, M&A activities carry out important functions and encompass many financial theory and corporate financial policy (Copeland, Weston & Shastri, 2007). The high level of M&A activities can also be a characteristic of the global economy.

According to Weston, Chung and Siu (1990), some M&A activities represent a new force that lead economies, provide creativities and productivities by internal restructuring, and related corporate control activities; while to others, the same activities are regarded as blight. That is to say,  $1+1$  may not be bigger than 2. The theories of “Big is beautiful” and “Too big to fail” sometimes would lead

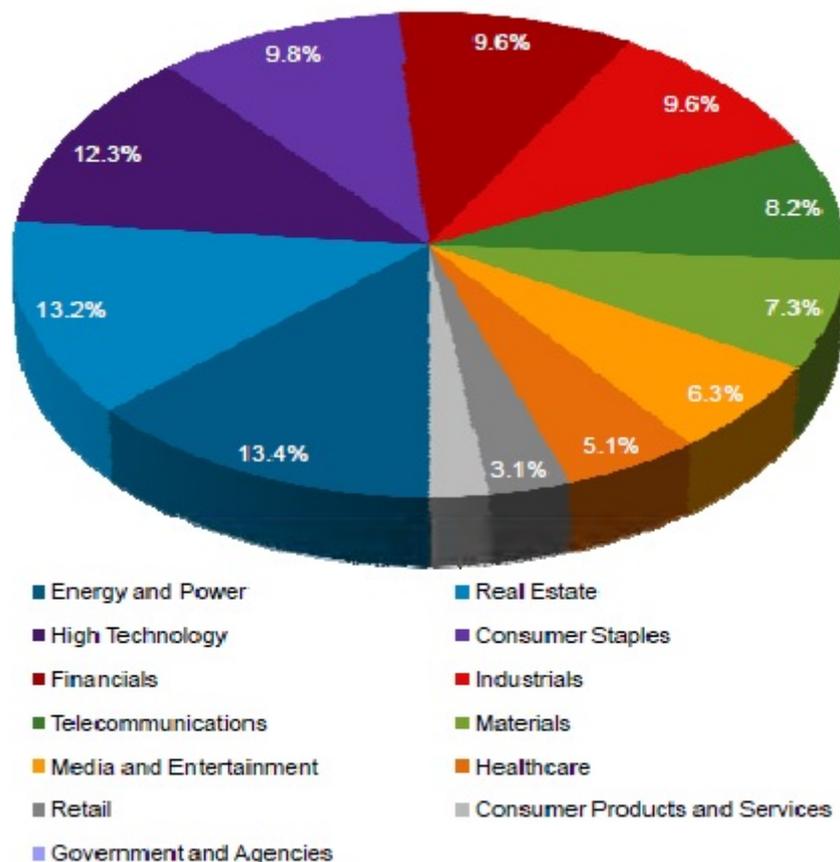
companies to unreasonably choose the M&A strategy.

In general, the motivation of M&A as choice emphasizes lowering the acquirer's cost of capital, improving financial efficiency, building up market power, balancing revenue cycles and reducing diversification risk (Yang & Hyland, 2006).

M&A activities are classified by the form of integration: statutory merger, subsidiary mergers and consolidation. In addition, M&A activities could also be categorized by different relatedness of the merging companies' business activities, for example: horizontal merger, vertical merger and conglomerate merger.

Currently, M&A activities take place in many industries. Energy and power, real estate, high technology, consumer staples and Financial Services are top five important consolidating industries which drive the biggest transactions (See FIGURE 2.1).

FIGURE 1.1: Worldwide Announced M&A Target industry by value.



## **1.2 Mergers and Acquisitions in Financial Market**

As a corporate strategy, Merger and Acquisition is one of the most important means of financial services development. Since the end of last century, M&A activities in financial sector have become more and more familiar in the majority of all the countries in the world. Nowadays, a large number of international and domestic financial institutions all over the world are engaging in M&A activities. Moreover, the trend of M&A in the banking industry has had a great impact on the global economy. M&A activities have been one of the most important factors for the development of the banking industry. Since the banking industry is vital to the growth and the development of the world economic, it is important to analyze these M&A activities in banking industry.

## **1.3 Global Trend of M&As Activities in the Banking Industry**

Due to the globalization, more and more M&As activities are emerging in the financial industry, especially in the banking industry. Globalization stimulates the growth of the international companies who need more financial services. Many banks carried out M&As activities in order to expand their scale of operation, increase the strength of capital and improve the competitive power and ability of resisting risk.

The wave of M&As activities in the banking industry began in the early 1990s and until now, came from America and then spread to the whole world. In order to maintain the overlord position all over the world The U.S. banking industry deployed large-scale of M&A activities. For example, in 1998, Citicorp and Travelers Group merged to form Citigroup which became the biggest financial service company at that time. First Chicago NBD Corp. merged into the Bank One Corp. which was the fifth biggest bank in U.S.; the 3rd US bank - NationsBank Corp. And the fourth US bank - BankAmerica Corp. merged into the Bank of America

Corp. which became the second U.S. Bank.

Under the pressure of U.S. banking industry revolution, European countries followed to perform M&As activities in their banking industry quickly and efficiently. For instance, Deutsche Bank bought Bankers Trust in 1998 and became the largest financial institution in the world at that time. Meanwhile, Spain, France, Switzerland, Finland and some other European countries also started M&A activities in the banking industry. With M&As activities in the European banking industry, European countries can boost their ability of international competition. Santillan-Salgado (2005) indicated that M&A activities made intensive reduction in number of banking institutions, for instance the U.S. banking industry suffered a dramatic compacting process that reduced the number of banks by half.

Among Asian countries, Japan is the most remarkable one in M&As activities in the banking industry. After the Asian Financial Crisis, Korea, Indonesia, Malaysia, Thailand and other Asian countries had to undertake M&A activities in the banking industry as a way to improve their ability of keeping away and resolving financial risk. Similarly, Brazil, Argentina, Venezuela, Chile and some other Latin America countries also undertook M&A activities in their banking industry.

## **1.4 M&As Activities in the Chinese Banking Industry**

As one of the emerging economies, China has a special economic and political structure. The Chinese banking industry has become a varied, open, and competitive bank system now and has gradually changed into a modern commercial banking industry. Generally, the majority of Chinese banking industry is state-owned. The big 5 state-owned commercial banks are Industrial and Commercial Bank of China Ltd, Agricultural Bank of China, Bank of China, China Construction Bank Corporation and Bank of Communications Ltd. There are also some new joint-stock commercial banks, province-level commercial banks and overseas banks, for example, Hua Xia Bank Co., Ltd, China Citic Bank Co., Ltd, Shanghai

Pudong Development Bank etc.

Chinese banking industry has several big problems which can weaken the competitive ability of Chinese banks. No transparent property right, superabundance of non-performing loans, and the extensive economy mode are the main problems. In China, the property rights market is controlled by the government specifically for M&A activities. M&A activities in the Chinese market always take place through state-controlled takeovers, such as the Property Rights Trading Center. The Property Rights Market effectively prevents the loss of state assets and provides an open platform for M&A activities.

According to paper of Kent, Guo and Zhang (2007), the non-performing loans ratio of the largest 4 Chinese banks are 52.7% in 1997, 31.5% in 2000 and 22% in 2004. Although the non-performing loans ratio decreased gradually, these values are much bigger than that of other foreign banks. The extensive economy mode means Chinese banks increase the inputs to increase the outputs, without the improvement of technology or efficiency.

With the intensification of international M&A activities in the banking industry, the Chinese central bank, People's Bank of China, tried to explore how to conduct M&As activities of financial institutions, undertook some political supports for the acquirers (e.g. providing political supports and helping them to finance), and quested for the methods to solve the problems (e.g. setting up special institutions to support the M&A activities) in the Chinese banking industry.

## 1.5 Bank Regulations and Supervision

Since banking industry is vital to financial stability of a country, national government also sets up special regulations to protect their banking industry, for instance, constituting barriers for foreign bank entry, protecting local banks from foreign investors and etc. These kinds of protection activities not only take place in developing countries but also in developed countries.

After the creation of the European Union (EU), EU countries have moved different barriers to cross-border banking M&A activities with the aim of the harmonization of regulations and liberalization. Commission of the European Communities (2005) made analysis about cross-border consolidation activities in the EU financial sector and found that cross-border M&A activities in financial sector are weak comparing to other sectors. In considering a differential in size of the acquiring and acquired companies, in the financial sector domestic deals are significantly larger than cross-border ones; while in the non-financial sectors domestic deals are smaller than cross-border ones (Commission of the European Communities, 2005).

The analysis of representative bodies for the financial sector presents several primary obstacles for cross-border consolidations in financial sector: (1) non-overlapping fixed costs, (2) multiple reporting requirements, (3) dividend taxation, (4) differences in product mix and (5) employees' reluctance (Commission of the European Communities, 2005). The analysis of respondents other than representative bodies for the financial sector shows that shareholders' apprehension of failure risks, absence of critical size and differences in economic cycles are main obstacles for cross-border consolidations in financial sector (Commission of the European Communities, 2005).

There are many cases demonstrate domestic government can constitute barriers to banking market integration in the EU. In 1998, the French Government announced its decision to sell the *Crédit Industriel et Commercial* (CIC) banking group to the *Crédit Mutuel*, even though the Dutch *ABN Amro* group had excellent track record comparing with other French bidders. French political influence played a very important role in this bidding war.

## **Chapter 2**

# **Efficiency of China's commercial banks: Malmquist total factor productivity analysis**

### **2.1 Introduction of the Chapter 2**

Assaulted by a strong trend of globalization, a huge pressure of competition and turbulent financial markets, commercial banks are continuously seeking new and safer ways to improve their performance, and to provide more products and service for clients.

The degree of openness of the Chinese banking industry has been increased since late 70's of the last century. After joining the World Trade Organization (WTO) on the first January, 2002, China has continuously enforced the so-called open door policy in the Chinese banking industry. All restrictions for foreign banks were cancelled in 2007. That is to say, in China the Chinese banks compete with foreign banks without any protection of Chinese government. Facing with strong and direct competition from the overseas banks, it is pressing for Chinese banks to find the best pathway for self-development and to use appropriate strategies in order to compete with foreign banks. The high competitive pressure pushes Chinese banks to improve performance, to ameliorate service and to fully utilize inputs. Therefore, it is important to have a good estimation of the efficiency of

the Chinese banking industry: this analysis could assist not only the managers of Chinese banks but also help the policy makers evaluate and improve banks' competitive viability.

The actual bank production process is like a black box: it is difficult to clearly estimate how a bank contributes to the value newly created by an economy which made by interconnected firms, consumers, financial institutions and public governments. Even if the method we use clearly excludes the external effects which are important in complex economic environments, the microeconomic efficiency of the bank production process - evaluated by the amount of output produced compared with certain amount of inputs - is a necessary stage for a more complete estimation of the bank industry's contribution to the global performances of the national economy. This chapter proposes to use the Malmquist total factor productivity analysis of the Chinese banking industry to provide internal estimation of the bank efficiency. We use this method to measure the technical efficiency change, the technical change in the production technology, the pure technical efficiency change, and the scale efficiency change of the 14 Chinese commercial banks from year 1998 to year 2007.

Section 2.2 presents a brief overview of the Chinese banking system. A review of the related studies is provided in section 2.3. I present the methodology in section 2.4, then data in section 2.5 where I also define the content of the input and output we consider. I present the results of the study in section 2.6, the regression analysis in 2.7 and conclude in section 2.8.

## **2.2 Brief overview of the Chinese banking system**

As one of the most important pillars of the Chinese financial sector, the Chinese banking industry is vital to sustain the economic growth. The current banking system dates from 1949, which is the date of establishment of the People's Republic of China. According to the development process of the current Chinese banking industry, there are three stages: the formation and development period

(from 1949 to 1978), the reform and development period (from 1949 to 2008) and the period of adjustment and opportunities (from 2009 to 2012).

As one of the emerging economies, China has a special economic and political structure. The Chinese banking industry has become a varied, open, and competitive bank system now and has gradually changed into a modern commercial banking industry. Generally, the majority of Chinese banking industry is state-owned. The big 5 state-owned commercial banks are Industrial and Commercial Bank of China Ltd, Agricultural Bank of China, Bank of China, China Construction Bank Corporation and Bank of Communications Ltd. There are also some new joint-stock commercial banks, province-level commercial banks and overseas banks, for example, Hua Xia Bank Co., Ltd, China Citic Bank Co., Ltd, Shanghai Pudong Development Bank etc.

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## 2.3 Overview of the related studies

The first attempts to analyze bank efficiency tend to focus on economies of scale and scope. The last period approaches generally apply X-efficiency and total factor productivity change analysis to evaluate bank efficiency.

Since the early fifties, bank efficiency is considered in the academic literature, generally by a reference to the economies of scale and of scope integrated by the bank technology. Alhadeff (1954) use financial ratio analysis for 210 California banks between the period from 1938 to 1950, and found that there displayed an increasing return to scale of output and a decreasing return to scale of cost. McKillop, Glass, and Morikawa (1996) investigate researches with an application to economies of scope in banking and confirm the existence of such economies for the large Japanese banks. Karafolas and Mantakas (1996) observe also operating-cost scale economies in the Greek banking industry but not total-cost scale economies during the period 1980 - 1989. Focus on the intensive trend of consolidation in the European banking industry in recent years, the study of Cavallo and Rossi (2001) shows that recent regulatory changes and progresses in technology have contributed to raising the optimal scale and mergers should be oriented to increase bank scale for small banks and to expand into new product lines for large banks.

The late 21<sup>th</sup> century, more and more researches of the efficiency of the banking industry consider the production efficiency which is usually measured by frontier analysis. There are two common approaches for the frontier analysis: Parametric approach and Non-parametric. Akhavein, Berger and Humphrey (1997) apply a frontier profit function on bank megamergers in the U.S. banking industry and find that there was a significant profit efficiency improvement for merged banks, especially for banks who have the lowest efficiencies prior to merging have greatest improvement. Isik and Hassa (2002) employ a non-parametric approach along with a parametric approach to estimate the efficiency of Turkish banks over the 1988-1996 period, finding that the heterogeneous characteristics of banks have significant impact on their efficiency and bank managements is responsible for scale inefficiency operation. Havrylchyk (2006) investigates DEA analysis for the polish banking industry between 1997 and 2001: the results indicate that "during the years analyzed greenfield banks have achieved higher levels of efficiency

than domestic banks, foreign banks that acquired domestic institutions have not succeeded in enhancing their efficiency". Fu and Heffernan (2007) employ the stochastic frontier approach for cost X-efficiency in China's banking sector over the period 1985-2002 and the results show that the joint-stock banks are found to be more X-efficient than the state-owned commercial banks.

The conclusions of these studies are not always convergent: the reasons include the divergences between methodologies, the difference of subjects, the huge heterogeneity in the internal management practices of banks and the external environment.

Since the beginning of 21<sup>th</sup> century, many empirical analyses have been published based on the efficiency of the Chinese banking industry. Wei and Wang (2000) employ DEA analysis for the Chinese banks in 1997, finding that improve staff quality, limiting the purchase of fixed assets and eliminate blind growth in loanable funds are the main ways to improve bank efficiency. Zhang (2003) use DEA analysis and the improved Malmquist efficiency index model to estimate 41 Chinese banks over the 1997-2001 period; the results show that joint-stock commercial banks are more efficient than state-owned commercial banks, the improved internal management ability could improve the allocative efficiency of banks, and the change in economic conditions and regulatory policy affect level of efficiency. According to Liu and Liu's (2004) DFA analysis (distribution free approach of the efficiency frontier analysis) for 14 commercial banks in China from 1996 to 2002, the four big state-owned commercial banks have lower efficiency which is consistent with research conclusion of Zhang (2003). Based on the study of Wu and Zhou (2007), to maintain high level of efficiency, the state should be the largest shareholder of the state-owned banks with the optimal holding ratio of 58% to 74%, and for other commercial banks the holding ratio of the state should not exceed 10%. Yang and Zhang (2007) conduct DEA analysis for 14 Chinese commercial banks over the 1996 -2005 period, and the result shows that the cost efficiency and profit efficiency of joint-stock commercial banks are lower than those of state-owned commercial banks.

Notwithstanding these works are devoted to scale efficiency, cost efficiency and profit efficiency of commercial banks, there are only a few studies devoted to the

total factor productivity change of the Chinese commercial banks. Malmquist TFP index, as a method for identifying productivity difference between firms over time, has many advantages: it doesn't require profit maximization, cost minimization, information of the inputs and outputs price. Furthermore, the two decomposed parts of the Malmquist TFP index help analysts to further understand the changes of the efficiency. Consequently, it is a suitable method to evaluate the productivity change of the banking industry. The rest of this chapter adopts this total factor productivity to analyze the change of the Chinese commercial banks from year 1996 to year 2007 and to investigate the effect of the total factor productivity change.

## 2.4 Methodology

There are two main methods to analyze the bank efficiency: (1) financial ratio analysis and (2) frontier analysis. Frontier analysis could provide meaningful insights in efficiency by considering the mix of service provided, which is beyond those available from financial analysis (Sherman and Gold, 1985). Moreover, financial ratio analysis could not offer a clear-cut rationale which would allow one to acquire a composite score on the overall financial soundness of a bank, because financial ratio analysis might use correlated variables or have index select error (Yeh, 1996). Frontier analysis has twofold power: it not only permits researchers with limited institutional background or experience to choose "best practice" institutions within the industry, but also consents individuals with sufficient institution knowledge like managers to identify "best practice" area in considering of complex service operations (Berger and Humphrey, 1997). The technique of the frontier analysis is useful when we consider the situation with multiple inputs and outputs, some of whose prices cannot be observed (Hulten, 2000). Especially, frontier analysis is particularly valuable in providing an overall, objectively determined, numerical efficiency value, an analysis result not always possible with traditional techniques. As a result, frontier analysis is now generally adopted to evaluate a bank's performance.

According to Berger and Humphrey's (1997) survey of 130 studies that apply frontier efficiency analysis to financial institutions in 21 countries, there are two

common approaches for the frontier analysis: Parametric frontier approach and Non-parametric frontier approach.

Non-parametric approach is assumed that there is a consistency between measured outputs/inputs and economic outputs/inputs, little structure on the specification of the best-practice frontier, no measurement error, and no luck that temporarily gives a decision making unit better measured performance on year from the next. Non-parametric approach does not require the specification of the best practice frontier and it is a distribution free method. Data Envelopment Analysis (DEA), Free Disposed Hull approach (FDH) and Index Numbers (IN) belong to Non-Parametric approach. Charnes, Cooper, and Rhodes (1978) developed DEA analysis, which is a linear programming technique. The set of DEA best-practice frontier are those by given certain outputs, there is no linear combination of unite which has as little or less of every input or by given certain inputs; and there is no other decision making unit which has as much or more of every output. DEA analysis assumes a linear substitution between inputs, while FDH approach presumes that no substitution is possible and has a step function formed input combinations other than piecewise linear forms. FDH approach is a special case of the DEA model and it generates larger estimates of average efficiency than DEA approach. Isik, Ihsan and Kabir (2003) analyzed the Turkish banking efficiency by using DEA analysis and Kirikal (2004) conducted DEA analysis for the Estonian banking industry.

The parametric approach takes the residual term and specific functional form into consideration. It includes Stochastic Frontier Approach (SFA), Thick Frontier Approach (TFA), Distribution Free Approach (DFA), and Recursive Thick Frontier Approach (TRFA). Kraft and Tirtiroglu (1998) use SFA analysis for bank efficiency in Croatia and the results show that new banks are less efficient but more profitable than both old privatized banks and state banks. Fiorentino, Karmann, and Koetter (2006) investigate the SFA analysis to analysis the efficiency of all German universal banks between year 1993 and year 2004.

### 2.4.1 Malmquist Total factor productivity index

Malmquist had earlier proposed constructing input quantity indexes as ratios of distance functions (Malmquist, 1953), after that, Caves, Christensen, and Divert (1982) firstly introduced Malmquist productivity index. A Malmquist productivity index, which is used to the comparison of relative productivity levels, could be decomposed into economically relevant sources of productivity change (Färe, Grifell-Tatje, Grosskopf and Lovell, 1997), for instance: a Malmquist productivity index can be expressed as products of an index of technical change and an index of technical efficiency change.

Färe et al. (1994) denote that using suitable panel data the Malmquist TFP index can be calculated applying a non-parametric DEA-like approach. More detailed, we could use distance functions to define the Malmquist TFP index (Caves et al., 1982 and Färe et al., 1994).

Suppose at the time period  $t$ , the production set of technology is written as:

$$P_t = (x_t, y_t) \tag{2.1}$$

Where  $x_t \in R^+$  and  $y_t \in R^+$ . Over the time period  $t$ , ( $t = 1, \dots, T$ ), input vector is  $x_t$ , and output vector is  $y_t$ . We can produce  $y_t$  outputs by using  $x_t$  inputs.

Then at time  $t$ , the output distance function can be defined as:

$$d_c^t(x_t, y_t) = \text{Inf}\{\theta : (x_t, y_t/\theta) \in P_t\} \tag{2.2}$$

Where, the subscript  $c$  denotes constant returns to scale technology as before. If  $d_c^t(x_t, y_t) \leq 1$ , the observation  $(x_t, y_t)$  belongs to the production set  $P_t$ .

Moreover, at time  $t+1$ , the output distance function can be defined as:

$$d_c^{t+1}(x_{t+1}, y_{t+1}) = \text{Inf}\{\theta : (x_{t+1}, y_{t+1}/\theta) \in P_{t+1}\} \quad (2.3)$$

To calculate the Malmquist TFP index, there are two more distance functions need to be defined:

(1) The distance of production  $(x_t, y_t)$  related to the technology at time period  $t + 1$  and  $P_{t+1}$ :

$$d_c^{t+1}(x_t, y_t) = \text{Inf}\{\theta : (x_t, y_t/\theta) \in P_{t+1}\} \quad (2.4)$$

(2) The distance of production  $(x_{t+1}, y_{t+1})$  related to the technology at time period  $t$  and  $P_t$ :

$$d_c^t(x_{t+1}, y_{t+1}) = \text{Inf}\{\theta : (x_{t+1}, y_{t+1}/\theta) \in P_t\} \quad (2.5)$$

According to Caves, Christensen, and Divert (1982), the period  $t$  total factor productivity index could be represented as equation 6 which measures the productivity change from period  $t$  observations to period  $t+1$  observations using period  $t$  technology as a benchmark.

$$M_o^t(x_{t+1}, y_{t+1}, x_t, y_t) = \frac{d_c^t(x_{t+1}, y_{t+1})}{d_c^t(x_t, y_t)} \quad (2.6)$$

Where, the subscript "o" denotes that the productivity change follows an output-oriented measure.

Deduced by analogy, equation 7 below is the period  $t + 1$  total factor productivity index which measures the productivity change from period  $t$  observations to period  $t + 1$  observations using period  $t+1$  technology as a benchmark.

$$M_o^{t+1}(x_{t+1}, y_{t+1}, x_t, y_t) = \frac{d_c^{t+1}(x_{t+1}, y_{t+1})}{d_c^{t+1}(x_t, y_t)} \quad (2.7)$$

The geometric mean of two total factor productivity indexes is Malmquist productivity index. Malmquist productivity index, shown as equation 2.8, measures the total factor productivity change between time period  $t$  (the base period) to period  $t + 1$ .

$$M_o^{t,t+1}(x_{t+1}, y_{t+1}, x_t, y_t) = \left[ \frac{d_c^t(x_{t+1}, y_{t+1})}{d_c^t(x_t, y_t)} \times \frac{d_c^{t+1}(x_{t+1}, y_{t+1})}{d_c^{t+1}(x_t, y_t)} \right]^{1/2} \quad (2.8)$$

If the value  $M$  is greater than one, there is a positive growth of productivity; if the value  $M$  is equal to one, the productivity is unchanged; while if the value  $M$  is smaller than one, there is a decline of productivity.

Moreover, the Malmquist productivity index can be decomposed into two components as in equation 2.9. The first component  $TEC$  measures the change of the technical efficiency between time period  $t$  and period  $t + 1$ . If  $TEC > 1$ , it means the producer is moving closer to the production frontier, there are improvements on efficiency; if  $TEC < 1$ , it implies the producer is diverging from the production frontier; and  $TEC = 1$ , it shows the technical efficiency of producer is unchanged. The second component  $TECP$  indicates the technical change in the production technology. The  $TECP > 1$  when technological best practice is improving; the

$TECP = 1$  when technological best practice is unchanged, and the  $TECP < 1$  when technological best practice is degrading.

$$M_c^{t,t+1}(x_{t+1}, y_{t+1}, x_t, y_t) = \underbrace{\frac{d_c^{t+1}(x_{t+1}, y_{t+1})}{d_c^t(x_t, y_t)}}_{TEC} \times \underbrace{\left[ \frac{d_c^t(x_{t+1}, y_{t+1})}{d_c^{t+1}(x_{t+1}, y_{t+1})} \times \frac{d_c^t(x_t, y_t)}{d_c^{t+1}(x_t, y_t)} \right]^{1/2}}_{TECP} \quad (2.9)$$

Furthermore, assuming constant returns to scale and variable returns to scale, the TEC component can be decomposed into two components: PTEC (the change of the pure technical efficiency) and SEC (the change of the scale efficiency) as formula 10.

$$M_{v,c}^{t,t+1}(x_{t+1}, y_{t+1}, x_t, y_t) = \underbrace{\frac{d_v^{t+1}(x_{t+1}, y_{t+1})}{d_v^t(x_t, y_t)}}_{PTEC} \times \underbrace{\left[ \frac{d_v^t(x_t, y_t)}{d_c^t(x_t, y_t)} / \frac{d_v^{t+1}(x_{t+1}, y_{t+1})}{d_c^{t+1}(x_{t+1}, y_{t+1})} \right]^{1/2}}_{SEC} \times \left[ \frac{d_c^t(x_{t+1}, y_{t+1})}{d_c^{t+1}(x_{t+1}, y_{t+1})} \times \frac{d_c^t(x_t, y_t)}{d_c^{t+1}(x_t, y_t)} \right]^{1/2} \quad (2.10)$$

Where, the subscript  $v$  denotes variable returns to scale technology.

## 2.5 Data, input and output definitions

Many authors applied DEA analysis to measure the efficiency of banks. They used different inputs and outputs (see Floyd, Lovell, Yaisawarng, 1999, and Venet, 2002). There are two main approaches to define the inputs and outputs of a bank: the production approach and the intermediation approach. Under the production approach, bank is the provider of deposit and loan. It employs capital

and labor to produce deposit and loan service. The inputs are capital and labor. The outputs are the business volume which presents as the amount of deposit and loans, or quantity of service banks provide. The intermediation approach considers the bank as an intermediary agency. Banks collect residual capital and provide capital to others. Therefore, the outputs are the amount of total loans and interest income, whereas deposits are defined inputs.

For the production approach, Berger and Humphrey (1997) indicate that it is recommended for analyzing the performance of banks whose managers do not have much control on the financing mix. According to Sathye (2001), Berger and Humphrey (1997), the intermediation approach is more relevant and suitable for analyzing financial institutions. The intermediation approach has become dominant to estimate the performance of the whole banking industry, because "it is better suited to capture the decisions taken to minimize the cost of the financing mix" (Mario and André, 2007).

In this paper, I use the intermediation approach to analyze the Chinese banking industry. By considering the bank as a multi-product organization, I model my target Chinese banks as multiproduct firms which use deposit ( $x_1$ ) and total asset ( $x_2$ ) as inputs to produce as outputs, loan ( $y_1$ ) and operating income ( $y_2$ ). I analysis these 14 Chinese banks by employing 2 inputs and produce 2 outputs.

For the empirical analysis, I consider annual data (for the 1998-2007 periods) for each of the 4 state-owned commercial banks (SOB) and 10 joint-stock commercial banks (JSB) as the Table 3.1. There are 140 observations. The main source of data for the present study is the Almanac of China's Finance and Banking, China Statistic Yearbook, and banks' annual reports.

The TABLE 3.2 below supplies the summary of descriptive statistic (the mean, max and min value, standard deviation and number of observations) for all variables used for Malmquist total factor productivity index for ten years.

TABLE 2.1: List of Chinese Banks

No.	Bank	Type
1	The Industrial and Commercial Bank of China	SOB
2	The Agricultural Bank of China	SOB
3	Bank of China Co., Ltd	SOB
4	China Construction Bank Corporation	SOB
5	Bank of Communications Co., Ltd	JSB
6	China CITIC Bank Corporation Ltd	JSB
7	China Everbright Bank Co., Ltd	JSB
8	Hua Xia Bank Co., Ltd	JSB
9	China Minsheng Banking Corporation	JSB
10	Guangdong Development Bank Co., Ltd	JSB
11	Shenzhen Development Bank Co., Ltd	JSB
12	China Merchants Bank Co., Ltd	JSB
13	Industrial Bank Co., Ltd	JSB
14	Shanghai Pudong Development Bank	JSB

TABLE 2.2: Data feature description (monetary unit: a hundred million Yuan)

Description	Loan	Operating income	Deposit	Total assets
Variables	y1	y2	x1	x2
Maximum value	39575,42	2541,57	68984,13	86842,88
Minimum value	111,00	11,20	179,78	252,35
Median	2741,42	156,74	3870,32	4939,08
Standard deviation	10310,14	588,90	15733,50	18961,13
Number of observed value	140	140	140	140

## 2.6 Results

Based on the statistics of 14 Chinese commercial banks, I use a data envelopment analysis computer program DEAP (see Coelli, 1996 for a general presentation of this program), to calculate Malmquist total factor productivity indexes for the time period 1998 to 2007. Resti (1997), Rao and Battase (1998), Ihsan and Kabir (2003), Coelli and Kirikal (2004) used already the computer program DEAP to provide analyses of the banking industry.

The TABLE 3.3 summarizes the productivity change result, that is, the evolution

TABLE 2.3: Malmquist Index Summary Annual Means

Year	TEC	TECP	PTEC	SEC	TFPC
1998–1999	1,029	1,310	1,008	1,021	1,348
1999–2000	0,829	1,318	0,899	0,922	1,093
2000–2001	1,152	0,699	1,163	0,990	0,805
2001–2002	0,869	1,425	0,969	0,897	1,237
2002–2003	0,945	0,921	0,961	0,983	0,870
2003–2004	0,817	0,988	0,916	0,892	0,808
2004–2005	1,142	0,894	1,006	1,135	1,021
2005–2006	1,183	1,379	1,012	1,168	1,630
2006–2007	1,006	1,002	1,089	0,924	1,008
Geometric mean	0,988	1,076	1,000	0,988	1,063
1998–2007	0,896	1,933	0,997	0,898	1,730

of the technical efficiency change (TEC), technical change in the production technology (TECP), pure technical efficiency change (PTEC), scale efficiency change (SEC) and Malmquist total factor productivity change (TFPC).<sup>1</sup>

The results of TABLE 3.3 suggest that Chinese commercial banks experienced an average of 6.3% annual productivity growth rate (Geometric mean<sup>2</sup> TFPC - 1) during year 1998 to year 2007, a total of 73% (1998–2007 TFPC - 1) for the period. Productivity increase is mainly the result of a 7.6% per year of technology progress (93.3% for the period). The geometric mean of TEC which show the “catching - up effect” is negative at -0.2% per year (- 10.4% for the period). This negative behavior of TEC is mainly due to the poor results of the “catching-up effect” from year 2001 to year 2004. By decomposing the index TEC into PTEC and SEC, we could see that the decrease of SEC has more effect on the decline of TEC than PTEC.

From the FIGURE 3.1, it is clear that the movement of TFPC follows the evolutions of TECP. Improvement of the technological best practice offsets the negative “catching-up” effect. From the FIGURE 3.2, the movement of TEC is similar evolutions of SEC. SEC has stranger effect for the trend of TEC than PTEC.

<sup>1</sup>Recall that:  $TFPC = TEC \times TECP = PTEC \times SEC \times TECP$

<sup>2</sup>The values of 1998–2007 indexes are obtained by using geometric mean to the ninth power.

FIGURE 2.1: Movement of TEC, TECP and TFPC.

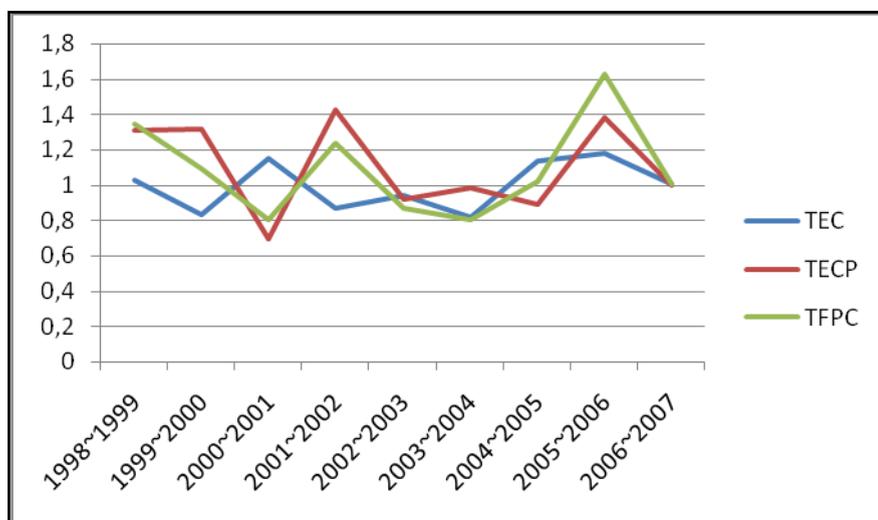


FIGURE 2.2: Movement of TEC, PTEC and SEC.

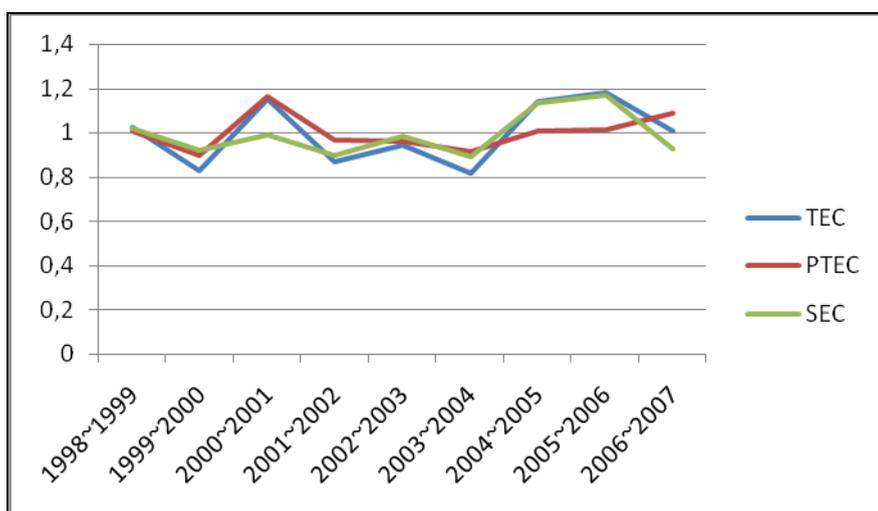
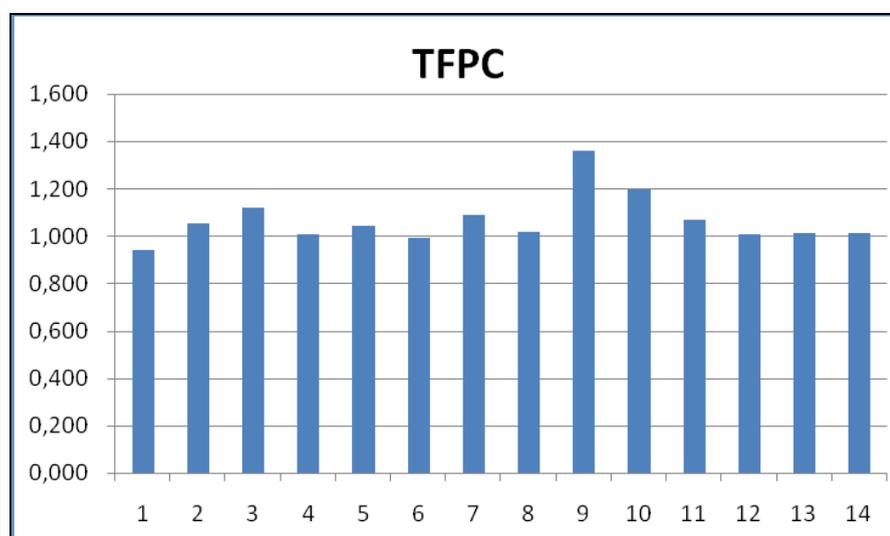


TABLE 3.4 shows productivity scores by different banks. Except the Industrial and Commercial Bank of China Ltd and China CITIC Bank Corporation Ltd, all other Chinese commercial banks have positive productivity growth ( $TFPC > 1$ ) regardless of bank size. The mainly reason for this positive result is thanks to the technological progress ( $TECP > 1$ ). Other than the China CITIC Bank Corporation Ltd and Industrial Bank Co., Ltd, other 12 Chinese commercial banks show the technological improvement ( $TECP > 1$ ). The Agricultural Bank of China,

TABLE 2.4: Malmquist Index Summary of Banks Means

No.	Bank	TEC	TECP	PTEC	SEC	TFPC
1	The Industrial and Commercial Bank of China	0,934	1,010	1,000	0,934	0,943
2	The Agricultural Bank of China	1,005	1,047	1,005	1,000	1,052
3	Bank of China Co., Ltd	0,976	1,150	1,045	0,934	1,122
4	China Construction Bank Corporation	0,974	1,033	1,026	0,949	1,006
5	Bank of Communications Co., Ltd	0,971	1,075	0,955	1,017	1,044
6	China CITIC Bank Corporation Ltd	0,993	0,998	0,984	1,009	0,991
7	China Everbright Bank Co., Ltd	0,975	1,116	0,978	0,997	1,088
8	Hua Xia Bank Co., Ltd	0,995	1,023	1,000	0,995	1,018
9	China Minsheng Banking Corporation	1,025	1,329	1,000	1,025	1,362
10	Guangdong Development Bank Co., Ltd	1,018	1,172	1,013	1,005	1,194
11	Shenzhen Development Bank Co., Ltd	0,968	1,102	1,000	0,968	1,067
12	China Merchants Bank Co., Ltd	0,961	1,050	0,959	1,002	1,009
13	Industrial Bank Co., Ltd	1,034	0,997	1,031	1,002	1,010
14	Shanghai Pudong Development Bank	1,008	1,003	1,005	1,002	1,010
Geometric mean		0,988	1,076	1,000	0,988	1,061

FIGURE 2.3: Productivity score of banks.



the China Minsheng Banking Corporation, the Guangdong Development Bank Co., Ltd, the Industrial Bank Co., Ltd and the Shanghai Pudong Development Bank Co., Ltd have TEC bigger than 1, which represent these banks have best practice. While other banks (whose  $TEC < 1$ ) practice close to the efficient production frontier.

The China Minsheng Banking Corporation experiences the highest productivity (36.2% average annual) and has the best technological change (32.9% average annual) for the period. While the Industrial and Commercial Bank of China Ltd, as one of the “big 4” banks in China, has the lowest productivity because of the bad scale efficiency change.

## 2.7 Regression analysis

The purpose of the total factor productivity change analysis is not only to make value measurement, but also to reveal the determinants of the TFPC. Bank managers could pay more attention to improve these determinants, and ultimately enhance the TFPC of banks. In order to well understand the efficiency change of the Chinese banking industry, I continued my researches. I conducted regression analysis to disclose the interior regularity of the Chinese banking industry.

### 2.7.1 Marco-approach regression model

Dependent variable is Total factor productivity change index. Five independent variables are GDP growth rate, inflation rate, M2<sup>3</sup> and HHI index of loan and HHI index<sup>4</sup> of deposit.

Macro-approach regression model is shown as below:

$$TFPC_t = \alpha_1 + \alpha_2 \times GDP_t + \alpha_3 \times CPI_t + \alpha_4 \times M2_t + \alpha_5 \times MCL_t + \alpha_6 \times MCD_t + \epsilon_t \quad (2.11)$$

Where  $TFPC_t$  is annual total factor productivity change for year t,  $GDP_t$  represents GDP growth rate for year t,  $INF_t$  denotes consumer price index for year t,

<sup>3</sup>M2 is used to quantify the amount of money in circulation and explain different economic monetary conditions.

<sup>4</sup>HHI is Herfindahl-Hirschman Index which represents market competition. It is defined as the sum of the squares of the market shares of all firms within the industry. Here, I calculated HHI for the loan market and deposit market respectively of the banking industry.

$M2_t$  is M2 money supply growth rate for year t,  $MCL_t$  and  $MCD_t$  expresses HHI of loan and HHI of deposit respectively for year t.

I used STATA software to perform regression analysis. The results of Macro-approach model are as below:

FIGURE 2.4: Results of Macro- approach model

Source	SS	df	MS			
Model	.504590516	5	.100918103	Number of obs =	9	
Residual	.095814361	3	.03193812	F( 5, 3) =	3.16	
Total	.600404877	8	.07505061	Prob > F =	0.1863	
				R-squared =	0.8404	
				Adj R-squared =	0.5744	
				Root MSE =	.17871	

tfpc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
gdp	15.9939	7.145235	2.24	0.111	-6.745426	38.73323
INF	-.2079508	.0632414	-3.29	0.046	-.4092132	-.0066884
M2	-7.261977	6.350754	-1.14	0.336	-27.47291	12.94896
MCL	-3.595731	7.379248	-0.49	0.659	-27.07979	19.88833
MCD	.1401269	15.01931	0.01	0.993	-47.65802	47.93828
_cons	1.252437	2.423464	0.52	0.641	-6.460106	8.96498

So, the standardized regression equation is<sup>5</sup>:

$$TFPC = 1.277896GDP - 1.521989INF - 0.5727074M2 - 0.3773177MCL + 0.0105845MCD \quad (2.12)$$

High GDP growth rate indicates a sound macro-economic environment which facilitates banks' operation and encourages banks' innovation. From my macro regression analysis, the beta value of GDP is 1.277896, and statistic t-test is significant. Results show that GDP growth rate have remarkable positive influence on commercial banks' TFPC. Certain level of GDP growth could improve the efficiency of Chinese banking industry.

Inflation has been a double-edge sword. It leads not only higher costs but also higher income. The treatment of revaluation gains on the fixed assets and trade investment of bank would affect the impact of inflation for banks' operation result. From my macro regression analysis, the beta value of inflation is -1.521989, and

<sup>5</sup>For the test of significant: result of INF variable is significant beyond the 5% level, and result of GDP variable is significant beyond the 10% level.

statistic t-test is significant. Inflation has remarkable negative influence on Chinese commercial banks' TFPC. Chinese banks could change their financial structure of asset and liability to benefit from inflation, such as increasing their noninterest bearing liabilities or decreasing their noninterest assets.

Moreover, market competition index of deposit have positive influence on commercial banks' TFPC. While M2 growth rate and market competition index of loan have negative influence on commercial banks' TFPC. The statistic t-test for these three variables is not significant.

Chinese banking industry need a stable and sustainable macroeconomic environment. China's policy makers should pay attention to retain appropriate level of GDP growth rate and inflation rate. Bank managers should be concerned about internal management of banks: for instance, modifying asset allocation, making good service innovation, attracting more deposit, reducing non-performance loans and etc.

## 2.8 Conclusion of the Chapter 2

Applying a non-parametric Malquist TFP index method, this paper attempts to investigate the efficiency change of the Chinese banking industry during the time period of year 1998 to year 2007. The performance of banks is crucial for the whole economy, and many researchers conduct Malquist TFP index method to analyze performance of banking industry. Malquist TFP index is a method for identifying productivity difference between firms over time. Moreover, it is one of the best methods to analyze the banks with multi-inputs and multi-outputs. In order to realize this objective, I use Malmquist TFP index, TEC , TECP , and two decomposed components PTEC and SEC<sup>6</sup> to measure the productivity difference between 14 Chinese commercial banks for the time period 1998 to 2007.

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<sup>6</sup>Recall that: TEC = the change of the technical efficiency, TECP = technical change in the production technology, PTEC = the change of the pure technical efficiency, SEC = the change of the scale efficiency

Comparing the results over the period of 1998–2007, the highest productivity growth was from 2005 to 2006. The productivity decreased during the period 2002–2004. These 14 Chinese commercial banks that we considered in this paper experienced average of 6.3% annual productivity growth rate during 1998–2007. Table 3.4 shows that 12 of 14 banks have TECP bigger than 1, while only 5 of the 14 banks have TEC bigger than 1. Therefore Technology progress (PTEC) is the main reason for the improvement of productivity (Malmquist TFP index), although the technical efficiency change is not so good. Generally speaking, via computers, screen-based trading and the widely use of automated teller machines (ATMS), the technological improvement could have helped banks increase income and reduce cost.

Looking at different banks over the period 1998–2007, we can conclude that the Chinese commercial banks have been able to experience technological progress and productivity improvement. The Industrial and Commercial Bank of China Ltd, the Agricultural Bank of China, the Bank of China Co., Ltd and the China Construction Bank Corporation are the four biggest commercial banks in China. However, the results of my analysis indicate that these biggest banks do not have the best performance. Based on the table 3, 3 of the “big 4” banks have SEC smaller than 1. The “big 4” banks’ geometric mean of SEC is smaller than the joint-stock commercial banks’ geometric mean of SEC, even though “big 4” banks have larger scale. Consequently, bigger scale did not help four big banks improve their scale efficiency. The poor internal management, low quality of service, huge non-performing loans and government intervention are probably the main reason of the scale inefficiency in the Chinese banking industry especially for the “big 4” banks. Generally, the 10 joint-stock commercial banks have better performance of the scale efficiency change than “big 4” banks. The China Minsheng Banking Corporation and Guangdong Development Bank Co., Ltd have for instance the top two highest productivity progresses.

For the regression analysis, a sound macro-economic environment and a well internal structured banking system is important for the Chinese commercial banks. Chinese government should keep the appropriate level of GDP growth rate, design good monetary and banking policy, and control the inflation. Bank managers need

to continue optimizing their bank structure and internal operational processes.

# Chapter 3

## Foreign Bank Investment In Emerging Countries: a theoretical model

### 3.1 Introduction to Chapter 3

In recent years, many emerging countries have introduced reforms of their financial industries, ranging from encouraging the emergence of new private banks to opening access to Merger and Acquisition (M&A) activity involving domestic banks. However, allowing more competition in the financial industry is a complex issue since it involves structural reforms in the domestic financial sector and has implications for macroeconomic stability.

The processes of development and liberalization have allowed foreign banks to increase their presence in emerging countries by opening representative offices, new branches, or sub-branches, through the acquisition of minority ownership stakes in domestic banks, or by setting up new local incorporations. The entry of foreign banks has provoked structural changes in the emerging banking markets and is forcing domestic banks to become more competitive. In this paper, we assess these effects.

The specialist literature argues that foreign bank entrants into emerging markets improve the efficiency and performance of the acquired institutions, and more generally enhance local financial stability. However, foreign bank entry can also have a negative effect on emerging markets. It can result in “cream skimming”, in the sense that reputable foreign banks are able to attract high profile clients from the domestic banks. This effect is prompting action by national authorities to limit or control foreign entry. To what extent are these actions justified? In which cases does the “cream-skimming” effect outweigh the advantages expected from foreign bank entry? This paper addresses these questions applying a theoretical model.

We focus on the cases where domestic rules limit foreign entry to new branches and minority shareholdings and limited management involvement of foreign banks in domestic banks. We analyze how foreign banks expand in emerging banking markets through these three different entry modes, and whether minority foreign ownership improves the efficiency of the domestic banks. We focus particularly on the case of entry by a M&A between a local bank (local banks) and a foreign bank. In contrast to establishment of a new bank branch, M&A activity can indeed provide opportunities for cooperation between the partners, can accelerate the diffusion of more efficient management practices from the foreign to the domestic partner(s), and can allow access soft information for the foreign bank.

Section 3.2 reviews the literature on M&A activities in the banking industry, and changes in banks’ efficiency change follow a M&A. Section 3.3 presents the assumptions and the first results of a theoretical model analyzing three entry modes of entry of a foreign bank. This theoretical model shows that, if the credit market initially is not covered, foreign bank entry always increases total distributed credit. If the cream-skimming effect is not too strong, it will be positive also for the domestic banking sector. If entry is via M&A activity with a domestic bank(s), the effect on the distribution of credit and the profit of the banking industry will be positive. However, there are some negative effects associated with these positive ones. A reduced number of domestic shareholders (or a decreasing share of domestic ownership in the capital of domestic banks) decreases their aggregated profit and the possibility of control of the domestic banking industry by domestic managers. Section 3.4 analyzes the regulatory rules that might be introduced by a domestic authority in order to impose appropriate limitations on entry. We find

that if foreign bank entry is by establishment of a new subsidiary, and if the foreign bank has a sufficiently good access to international money markets resources, the positive effects dominate the negative effects for the domestic sector. We also find that limiting the share of the foreign bank in the capital of the domestic bank can be more or less justified according to the balance struck by the domestic authorities between the wealth of the initial and future shareholders in the domestic banks. Section 3.5 provides a discussion and conclusion.

## **3.2 M&A in the banking industry, and foreign bank entry in developing countries**

### **3.2.1 M&A activities in the banking industry**

M&As are one of the most important ways to finance services developments. They correspond to the purchase of whole companies or the shares of companies by another company (Ahern. and Weston, 2007). They frequently form part of a growth strategy (Yang and Hyland, 2006).

From the beginning of the 19<sup>th</sup> century, various waves of M&As have contributed to progressive changes in the topography of the banking industry. According to Li (2003), in the 1950s decade, some 1,000 M&As occurred in the financial industry, with a total value of around \$U.S.50 billion. In subsequent decades, the number of M&As in the banking industry continued to increase: for instance, in 1995 there were 4100 M&A activities in the banking sector, and in 1996 this number was 4,200. After 1997, M&As in the banking industry continued to grow in the U.S. and in Europe, Asia, and Latin America.

At the end of the last century, M&A activities in the financial industry began to take a new form, and especially in the banking industry. The trend is now towards M&As involving banks in different countries, either developed or emerging. These new types of M&A are having an impact on both the banking industry and also on the global economy. Globalization is stimulating the growth of international

companies which need more financial services. Many banks have been involved in M&A activities in order to expand their scales of operation, increase their capital, and improve their competitive power and ability to withstand risk. In the most recent years, the deregulation of markets and the globalization of economies have had a major effect on banks' M&A activity, and the 2007-2008 crisis showed that M&A was a strategy that might allow survival during the financial crisis.

### **3.2.1.1 M&A activities in the banking industry of developed countries**

The most recent wave of M&A activity in the banking industry began in the early 1990s and has continued to the present time, continuously fueled by new local or generalized financial crises. The movement began in the U.S. and spread to the rest of the world. The U.S. banking industry deployed M&A activity on a large scale to maintain their dominance throughout the world. For example, in 1998, Citicorp and Travelers Group merged to form Citigroup which became the biggest financial service company at that time; First Chicago NBD Corp. merged to form Bank One Corp, the then fifth biggest bank in U.S.; the 3<sup>rd</sup> ranked U.S. bank - NationsBank Corp.- and the fourth US bank - BankAmerica Corp.- merged to form the Bank of America Corp. which became the second largest U.S. Bank.

European countries were spurred by the U.S. M&A banking industry wave. For instance: in 1998, Deutsche Bank bought Bankers Trust making it the largest financial institution in the world at that time. Spain, France, Switzerland, Finland and other European countries embarked on M&A activities in their banking industries. M&A activity in the European banking industry enabled European countries to be more internationally competitive.

Santillàn-Salgado (2005) points out that the U.S. banking industry suffered a dramatic compacting process that reduced the number of banks by half; while Europe experienced a less profound, but intense reduction in the number of banking institutions. Hagendorff, Collins and Keasey (2007) analyze this trend in U.S., Italy and Germany, and the relationship between changes in regulation and M&A activities in these countries from the end of the 1990s.

### **3.2.1.2 M&A activities in the banking industries of developing countries**

Driven by a spate of M&A activities between foreign developed countries' institutions and developing countries' banks, foreign investment increased in the emerging market banking sectors since in the second half of the 1900s (Soussa, 2004). There are six main determinants of banks' foreign direct investment in emerging market economies: "(1) shifts in regulatory opportunity and environment; (2) increased economic integration between home and host countries; (3) information costs; (4) profit opportunities; (5) factors relevant to specific institutions; and (6) factors relevant to the home markets of acquiring institutions" (Soussa, 2004). All these motivations have been at play in the last decade. Using firm-level data for five East Asian countries over the period 1981-2001, Aguiar and Gopinath (2005) observe that the liquidity crunch increased foreign investment in the form of M&A activity in emerging markets. Kamaly (2007) points out that, for developing countries, the degree of market openness has a significant effect on M&A activity but that depreciation in the domestic exchange rate positively affects M&A activity, and high levels of stock market activities may reduce M&A activity.

## **3.2.2 Bank efficiency**

### **3.2.2.1 Bank efficiency in developing countries**

In developing countries, foreign banks seem to operate more efficiently than domestic banks. Thus, the new entrants improve the efficiency not only of the domestic banks but also of the whole banking industry. Analysis of the Colombian case in the late 1990s shows that the entry of foreign banks in the capital of domestic banks improved domestic bank behavior by enhancing operative efficiency and competition, although these improvements came at the expense of losses in loan market for the domestic banks (Barajas, Steiner, and Salazar, 1999). Farnoux, Lanteri, and Schmidt (2004), in a study of Poland, show that foreign banks conducted M&As with Polish banks which played a key role in banking system restructuring, created an efficient banking system, and improved the efficiency of the Polish banking sector. Coppel and Davies (2003) analyzed foreign participation in the banking sectors of East Asian economies and find that in spite of "the presence of

foreign banks in East Asia is low compared with the emerging market economies of Latin America and Eastern Europe". At the same time, the level of foreign involvement in the banking industry has increased, foreign entry has strengthened institutional and governance arrangements in the banking sector, facilitated the transfer of technology, and promoted financial development.

### **3.2.2.2 Some negative impact of foreign bank entry in developing countries**

Claessens, Demirfüç-Kunt, and Huizinga (2000) show that foreign banks in developing countries tend to have higher profitability and interest margins than domestic banks. This situation is unacceptable in the long run since it leaves the domestic banks with greater involvement in less profitable operations than the foreign entrants which choose only the more profitable ventures. Foreign bank entry can force the domestic market to start operating more efficiently by increasing competition. In the best cases, this stronger competition increases the number of competitors and services, and decreases their respective prices which increases customer satisfaction and consumers' welfare.

However, the entry of foreign banks can have several negative impacts for developing countries. Claessens, Demirfüç-Kunt, and Huizinga (2001) provide evidence that, for most countries, larger foreign ownership of banks is associated with reduced domestic bank profitability and lower margins among domestic banks. The relaxation of restrictions on foreign bank entry can be counter-productive for the development of the domestic financial system. Given the experience of some countries and the likely development of Chinese banking, Bonin and Huang (2002) observe that, in most cases, foreign banks compete with domestic banks for profitable corporate clients and wealthy retail clients. In the long run, high-profile profitable clients obtain full access to international opportunities through the service of foreign banks while the opportunities of other clients do not improve. In addition, although domestic banks have informational advantages and well established client relationships, foreign banks can attract these clients with competitive pricing.

Clarke, Cull, Martinez Peria (2006) combine the responses from a survey of about 3000 enterprises in 35 developing and transition economies with data on foreign bank participation, and estimate that the latter can reduce access to credit, especially for some sectors of the economy such as small and medium-sized enterprises (SMEs). They show further that reduced access to credit for these firms can have a considerable negative impact on the overall economy in many developing countries. Analyzing the entry of foreign banks to India during the 1990s, Gormley (2007) finds that, on entry, foreign banks financed only a small set of very profitable firms. In India, firms on average were 8 percentage points less likely to obtain a loan after foreign bank entry, and foreign bank entry led to a systematic drop in domestic bank loans. They observe also that, although there are many potential benefits from foreign bank entry, information asymmetries may prevent firms in developing countries from realizing these benefits. For all these reasons, policymakers should fine-tune their market liberalization policies.

Detragiache, Tressel, and Gupta (2008) propose a theoretical model to show that foreign bank entry results in a cream-skimming effect which increases overall operating costs and lowers aggregate welfare; they suggest that domestic banks are better than foreign banks at monitoring soft information, and show that foreign bank entry benefits only the more transparent firms leaving other firms either better off or worse off. Similarly, Lensink, Meesters, Naaborg (2008) conduct stochastic frontier analysis to 2,095 commercial banks in 105 countries for the years 1998-2003, and show that foreign ownership has a negative effect on bank efficiency and that domestic banks may have informational advantages relative to foreign banks.

These results provide a contrasting vision of the effects of foreign banks entry to the domestic banking market of emerging countries. Below we analyze these contrasts within a micro-founded framework that includes different entry conditions. The model integrates two aspects discussed in the M&A literature on the banking industry in developing countries. First, entry of foreign banks improves management methods and practices and opens the way for the international market to fund a part of domestic loans. Second, the cooperation between domestic and foreign teams enables diffusion of soft information previously available only

to the domestic banks. Also, in an uncovered loan market, it integrates the indirect effects exerted by foreign banks on economic activity through an increase in deposits generated by traditional lending. We find that if foreign bank entry is via the creation of a new subsidiary, the positive effects dominate the bad negative effects if the foreign bank has a sufficiently good access to international money market resources. We find also that the limitation imposed on the shares of foreign banks in the capital of domestic banks depends on the balance struck by the domestic authorities between the wealth of the initial and future shareholders in the domestic banks.

### **3.3 The analytical model**

Our benchmark model depicts banking industry interactions before foreign bank entry to the domestic market. We then analyze the consequences of the entry of three modes of entry for a single foreign bank: establishing a new branch (subsection 3.3.2), taking a minority share in a large traditional bank (subsection 3.3.3), and taking minority shares in smaller specialized banks (subsection 3.3.4). In each case, we analyze the stationary equilibrium of the banking industry, and consider the conditions under which entry provides advantages to each partner.

#### **3.3.1 The benchmark model**

The domestic banking industry initially includes by two categories of banks: a large traditional State-Owned-Bank (SOB) with branches throughout the country, long operating experience, and very close contacts and relations with its clients; and  $m$  small specialized Joint-Stock-Banks (JSBs) with branches in certain regions of the country, that provide specialized services and products and have shorter operating experience (with  $m \gg 1$ ).

All domestic banks provide financial intermediation services in the form of loans and deposits. The banks' profits are the difference between the gross return on the loans and the different financial and management costs to the banks are submitted. These profits depend on the bank size, their financial and managerial efficiency

and their interactions. They depend also on the nature of the demand for loans.

We suppose that there are two categories of unitary loans: high category loans have a low level of risk/large expected returns and normal loans have a higher level of risk/smaller expected returns. All banks are able to recognize the category of a given loan. The markets of high category loans is driven by demand and always covered. In this segment,  $y_s$  borrowers choose to borrow from the SOB and  $y_j$  from each JSB. Their chosen bank recognizes and accepts high category loans. Borrowers of good loans are served first by the banks which complement their offer of credit by selecting a part of the available demand for normal loans. While high category loans are all served, only a fraction of the demand for normal loans is exhausted.

### 3.3.1.1 The individual determinants of banks profits

The profits made by the banks on normal loans depends on three factors:

(i) While all banks have the same ability to recognize high category loans all things being equal, their level of “soft information” determines their “financial efficiency” and the level of the returns they can expect from a normal loan. Given its long operating experience, its large number of branches and its capacity for observation, the SOB has an advantage over the JSBs related to the identification of good loans in the category of normal loans.

(ii) “managerial efficiency”, *i.e.* the capacity to save human, material, and immaterial inputs in the search for opportunities, in the selection, and in the overall management of loans. This cost component introduces an advantage for JSBs whose management practices are rationalized, with less and more efficient employees and up-to-date technologies.

(iii) “state of affairs”, which is a partly exogenous factor depending on business cycle and technological shocks. It is also partly endogenous to the banking industry. The stimulating effect of an autonomous increase in loans generates new deposits, saves refinancing costs for the banks, and attracts new business. The result is that,

in a non-covered market, an autonomous increase in loans increases the volume of activity, generates new business, eases observation of loans, increases their returns, and decreases their risk. The resulting strategic complementarities between banks can generate cross-positive or negative effects between the decisions of the SOB and JSBs.

To simplify the model we represent the effect (i) as a receipt advantage for the SOB and (ii) as a cost advantage for the JSBs. The effect (iii) is represented by its positive influence on the receipts of both categories of banks.

### 3.3.1.2 The benchmark case

If  $x_s$  and  $x_j$  represent respectively the amounts of unitary normal loans distributed respectively by the SOB and JSBs, and  $y_s$  and  $y_j$  present the given numbers of high category loans administrated by each category of banks,  $x_s$  and  $x_j$  maximize respectively the profits of SOB and JSBs given by the expressions (3.1) and (3.2):

$$\pi_s(x_s) = (\alpha_s A^e + \bar{\alpha}_s)(f_s x_s + y_s) - \frac{1}{t_s}(x_s + y_s)^2 \quad (3.1)$$

$$\pi_j(x_j) = (\alpha_j A^e + \bar{\alpha}_j)(f_j x_j + y_j) - \frac{1}{t_j}(x_j + y_j)^2 \quad (3.2)$$

where:

- $f_s$ , ( $0 \leq f_s < 1$ ) and  $f_j$ , ( $0 \leq f_j < 1$ ), with  $f_s \geq f_j$ , represent the financial efficiency components of the receipts of the two categories of banks on normal loans,
- $t_s$ , ( $0 \leq t_s < 1$ ) and  $t_j$ , ( $0 \leq t_j < 1$ ), with  $t_s \leq t_j$ , represent the technological efficiency components of the costs to the two categories of banks,
- $A^e$  figures the expected endogenous component of the level of activity determined by the total amount of loans distributed by the banking industry,
- $\alpha_s$  and  $\alpha_j$  ( $0 < \alpha_j < \alpha_s < 1$ ) express the weight of strategic complementarities among banks on deposits and the observation of new opportunities for loans. The size effect (JSBs have a small number of branches when compared to the SOB)

explains the difference in the magnitudes of these parameters.

-  $\bar{\alpha}_s$  and  $\bar{\alpha}_j$  ( $0 < \bar{\alpha}_j < \alpha_s$ ) are positive and constant parameters reflecting the size effect when there are no strategic complementarity effects.

The effective value  $A$  of  $A^e$  is given by (3.3):

$$A = (x_s + y_s) + m(x_j + y_j) \quad (3.3)$$

### 3.3.1.3 Stationary equilibrium in the benchmark case

A stationary equilibrium is a triplet  $(A^*, x_s^*, x_j^*)$  with two properties:

- The number of normal loans  $(x_s^*, x_j^*)$  funded by each category of bank solves equations (3.1) and (3.2) given an expected level of activity  $A^e = A^*$ ,
- The effective level of activity  $A$  given by expression (3.3) is perfectly expected, *i.e.*  $A = A^*$

Using the simplified notations  $b = f_s t_s \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j > 0$  and  $b' = f_s t_s \alpha_s + m f_j t_j \alpha_j > 0$ , we can then deduce Lemma 3.1

**Lemma 3.1.** *When  $b' < 2$ , there exists one single stationary equilibrium for the benchmark model, such that  $A^* = b/(2 - b)$ ,  $x_s^* = \frac{1}{2} f_s t_s (\frac{b}{2-b'} \alpha_s + \bar{\alpha}_s) - y_s$  and  $x_j^* = \frac{1}{2} f_j t_j (\frac{b}{2-b'} \alpha_j + \bar{\alpha}_j) - y_j$ . This equilibrium is stable under the same condition  $b' < 2$ .*

*Proof:* see Appendix A.

The condition  $b' < 2$  can be commented. The terms  $\alpha_s$  and  $m\alpha_j$  capture the direct induced effect of the activity of all banks on the activity of a single category of bank. In the same way that it is not reasonable to suppose that this direct induced effect on the SOB could be bigger than 1, it is also not reasonable to suppose that the induced effect of the activity of all banks on the activity of all JSB could be

bigger than 1. Otherwise, bank activity could increase exponentially, and without limits, from an initial autonomous impulse: in this case, there is obviously no stationary equilibrium. Supposing that  $\alpha_s$  and  $m\alpha_j$  are smaller than 1 is then the same as supposing that the credit multiplier is a finite number. Condition  $b < 2$  then introduces no unusual restrictions in the conditions of existence and stability of a stationary equilibrium in the banking system.

Static comparative analysis of the stationary equilibrium values of variables  $\{A^*, x_s^*, x_j^*\}$  confirms these intuitions. While each category of bank increases its distribution of loans and its profits through an increase in its financial and technological efficiency, improvements to the efficiency of each category of bank provides cross-positive effects on the other category. Given that the loans distributed by each category of bank have an indirect positive effect on all banks, an increase in the efficiency of one category of bank has two effects:

- a direct positive effect only on the returns for the category of bank that experiences it;
- an indirect positive effect on the returns of all banks, as a result of an improvement to the “state of affairs”.

We can summarize these observations in the following proposition:

**Proposition 3.2.** *When it does not change the distribution of high quality loans among banks, all improvements in financial and technological efficiency in one category of bank increases the level of activity and the profits of both categories of banks. In general, it also increases the market share of the bank(s) experiencing efficiency improvement.*

*Proof:* see Appendix A.

Due to the uncovered nature of the normal loan market, an improvement in efficiency in one category of banks generates absolute positive effects on all banks. In relative terms, the effects of bank(s) with improved efficiency is to increase its

(*resp.* increase their) market share(s) unless the new activity generated by its efficiency improvement is oriented exclusively toward other banks.<sup>1</sup>

The benchmark model and its equilibrium properties are now be used to analyze three modes of foreign bank entry. We then introduce a Foreign Bank (FB) wanting to penetrate the market through three alternative modes. The first is the creation a new subsidiary. The second consists of buying a minority share in the SOB capital. The third consists of minority shares in the capital of the JSBs. Domestic rules are supposed to prevent the FB from acquiring majority shareholdings: which is why the FB cannot acquire or control even a small local bank.

### **3.3.2 Foreign bank entry through creation of a new subsidiary**

If the FB creates a subsidiary, its technology contrasts with the technology of the local banks. Three main differences have been observed:

- the FB has a greater management efficiency than the domestic banks,
- the FB has few local deposits and more generally, its level of activity is less dependent on the state of affairs; this low sensitivity to local conditions is however compensated by its greater access to the international money market,
- the FB has low levels of soft information, which reduces its ability to identify good loans and to screen normal loans.

The cream skinning effect applies to the FB: high category borrowers prefer to be served by foreign banks than by the domestic banks. However, due to its lack of “soft information” the FB only recognizes as good projects a proportion  $k$  of these loans. The remainder is funded by the domestic bank as in the benchmark

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<sup>1</sup>for instance, if those who receive credits from Bank 1 which efficiency has increased make deposits near Bank 2 followed by new loans distributed by Bank 2 to agents who make deposits to Bank 2 or 3... In this case, despite the direct effect of the improvement of bank 1 efficiency has only a positive effect on Bank 1, all successive indirect effects increase the profits of other banks, and can finally result in a decrease of the share of market of Bank 1.

case. The profit of the FB is then determined by the amount of normal loans  $x_{b1}$  maximizing (3.4):

$$\pi_{b1}(x_{b1}) = \bar{\alpha}_b [f_b x_{b1} + k(y_s + m y_j)] - \frac{1}{t_b} [x_{b1} + k(y_s + m y_j)]^2 \quad (3.4)$$

where:

- $k$  ( $0 \leq k < 1$ ) represents the cream skimming effect. If there is no cream skimming effect,  $k = 0$ ; and if there is a sizeable cream skimming effect, the value of  $k$  will be very close to 1.
- $f_b$ , with ( $0 \leq f_b < f_j < 1$ ) with  $f_b < f_j$ , represents the size/financial efficiency components of the receipts of the FB respectively for normal loans and for high quality loans,
- $t_b$  with  $t_j \leq t_b$ , represents the technological efficiency component of the costs of the FB,
- $\bar{\alpha}_b$  with ( $0 < \bar{\alpha}_s < \bar{\alpha}_b$ ), is a positive constant capturing the conditions faced by the foreign bank on the international money market.

In this case, the levels of normal loans  $x_{s1}$  and  $x_{j1}$  funded respectively by the SOB and the JSBs are determined as the values maximizing equations (3.5) to (3.7):

$$\pi_s(x_{s1}) = (\alpha_s A^e + \bar{\alpha}_s) [f_s x_{s1} + (1 - k)y_s] - \frac{1}{t_s} [x_{s1} + (1 - k)y_s]^2 \quad (3.5)$$

$$\pi_j(x_{j1}) = (\alpha_j A^e + \bar{\alpha}_j) [f_j x_{j1} + (1 - k)y_j] - \frac{1}{t_j} [x_{j1} + (1 - k)y_j]^2 \quad (3.6)$$

If we suppose that the financial flows generated by the new entrant only diffuse in the domestic country, the effective value  $A_1$  of  $A^e$  is now given by (3.7):

$$A_1 = (x_{s1} + y_s) + m(x_{j1} + y_j) + x_{b1} \quad (3.7)$$

The equilibrium in this new economy is a vector  $(x_{s1^*}, x_{j1^*}, x_{b1^*}, A_1^*)$ , solving equations (3.4) to (3.7). We can then prove lemma (3.3):

**Lemma 3.3.** *When  $b' < 2$ , there exists one single stable stationary equilibrium for the “subsidiary model”, such that  $A_1 = \frac{b+f_b t_b \bar{\alpha}_b}{2-b'}$ ,  $x_{b1} = \frac{1}{2} f_b t_b \bar{\alpha}_b - k(y_s + m y_j)$ ,  $x_{s1} = \frac{1}{2} f_s t_s (\frac{b+f_{b1} t_b \bar{\alpha}_b}{2-b'} \alpha_s + \bar{\alpha}_s) - (1-k)y_s$  and  $x_{j1} = \frac{1}{2} f_j t_j (\frac{b+f_{b1} t_b \bar{\alpha}_b}{2-b'} \alpha_j + \bar{\alpha}_j) - (1-k)y_j$ .*

*Proof:* see Appendix B.

The activity generated by the subsidiary of the foreign bank then tends to modify the level of activity of the domestic banks and the equilibrium of the bank industry. The conditions of existence and stability of this equilibrium however are determined only by the interactions between domestic banks. This result is a consequence of the independence of the foreign bank’s returns on domestic conditions. The foreign bank diffuses (good and bad) indirect effects on the other banks but not, directly or indirectly, on its own activity.

From lemma (3.3), we then deduce proposition (3.4)

**Proposition 3.4.** *Under the conditions of lemma 3.3, the entry of a foreign bank by creating a local subsidiary has the following effects:*

- (i) *when the multiplier effect dominates the cream skimming effect, the profits of the domestic banks improve,*
- (ii) *when the cream skimming effect dominates the multiplier effect, the profits of the domestic banks decrease.*

*Proof:* see Appendix B.

From this result, we can deduce that, when long term effects are neglected, this mode of entry is not always a pure advantage for domestic banks. In particular, if the cream skimming effect is important and the multiplier effect is average, foreign bank entry could both increase the level of activity and cause the situation of local banks to deteriorate. This case is obviously relevant when the normal loans market is close to being covered.

### 3.3.3 Foreign bank entry through M&A activity with the SOB

We next examine the second strategy for the foreign bank entry which is to buy a minority share in the SOB capital. We suppose that this share gives to the entrant a fraction  $\lambda$  ( $0 < \lambda < 1$ ) of the capital and of the profits of the new joint-venture. Other changes are associated with this M&A on the demand and supply side of the loans market:

- there is a moderate cream skimming effect: a fraction of the high quality loans previously directed to the JSBs now prefers the new joint-venture integrating the foreign bank,
- the soft information gained from the SOB allows the joint-venture to identify those high quality loans,
- the management efficiency of the joint venture improves the level before the M&A: it now consists of the technological efficiency of the SOB in the benchmark model and the technological efficiency of the FB in the case of subsidiary creation.

In this case, the levels of normal loans  $x_{sb}$  and  $x_{j2}$  funded respectively by the joint venture SOB/FB and the JSBs are then determined as the value maximizing equations (3.8) to (3.9):

$$\pi_{sb}(x_{sb}) = (\alpha_s A^e + \bar{\alpha}_s) [f_s x_{sb} + y_s + k' m y_j] - \frac{1}{t_{sb}} (x_{sb} + y_s + k' m y_j)^2 \quad (3.8)$$

$$\pi_{j2}(x_{j2}) = (\alpha_j A^e + \bar{\alpha}_j) [f_j x_{j2} + (1 - k') y_j] - \frac{1}{t_j} (x_{j2} + (1 - k') y_j)^2 \quad (3.9)$$

where:

- $k'$  ( $0 < k' < 1$ ) represents the proportion of high quality loans leaving the JSBs to join the joint venture SOB/FB,
- $t_{sb}$  presents the technological efficiency component of the costs of the joint venture SOB/FB, with  $t_s < t_{sb} < t_b$ .

The effective value  $A_2$  of  $A^e$  is now given by (3.10):

$$A_2 = (x_{sb} + y_s) + m(x_{j2} + y_j) \quad (3.10)$$

The profits of the shareholders in the new joint venture are determined by the profits of domestic shareholders  $\pi_{s2} = (1 - \lambda)\pi_{sb}(x_{sb})$  and the profits of foreign shareholders  $\pi_{b2} = \lambda\pi_{sb}(x_{sb})$ . If we write  $b'' = f_s t_{sb} \alpha_s + m f_j t_j \alpha_j$ , we can formulate the following lemma:

**Lemma 3.5.** *When  $b'' < 2$ , there exists one single stationary equilibrium for the M&A SOB model, such that  $A_2 = \frac{f_s t_{sb} \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j}{2 - b''}$ ,  $x_{sb} = \frac{1}{2} f_s t_{sb} \left[ \frac{f_s t_{sb} \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j}{2 - b''} \alpha_s + \bar{\alpha}_s \right] - (y_s + k' m y_j)$  and  $x_{j2} = \frac{1}{2} f_j t_j \left[ \frac{f_s t_{sb} \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j}{2 - b''} \alpha_j + \bar{\alpha}_j \right] - (1 - k') y_j$ . This equilibrium is globally stable if  $b'' < 2$ .*

*Proof:* see Appendix C.

In relation to Lemma 3, note that this kind of entry increases the level of stationary equilibrium of the banking industry (still measured in terms of total distributed loans) but also renders its global stability slightly more restrictive.

From lemma 3.5, we can deduce proposition 3.6:

**Proposition 3.6.** *Under the conditions of lemma 3.5,*

- (i) *the M&A is advantageous for the SOB's domestic share-holders if the cream skimming effect and the improvements to technological efficiency from the joint venture are sufficient to compensate retention of a part of the profits by the foreign shareholders in the FB,*
- (ii) *the M&A is advantageous for both categories of banks (is "Pareto-optimal") when there are large improvements in management efficiency for the new joint venture and smaller cream skimming effects.*

*Proof:* see Appendix C.

In this case, the SOB improves management efficiency. This improvement generates indirect positive effects for both categories of banks. The reputation effect

generated by the entry of foreign shareholders in the capital of the SOB also involves a cream-skimming effect from JSBs to the SOB. Simultaneously, the entry of new foreign shareholders in the capital of the SOB decreases the profit share of the initial domestic shareholders.

When there is a large improvement in SOB management efficiency and smaller cream skimming effect, the indirect effect generated by the M&A is able to compensate the cream-skimming effect by the profits to the JSBs: this explains the second part of the Proposition.

### 3.3.4 Foreign banks entry through acquisition of JSBs shares

In this case, the FB chooses to acquire shares in the JSBs. These shares represent a minority shareholding and the FB has to invest in all JSBs to have the same amount of investment as if it took a share in the SOB. We suppose that these shares give a fraction  $\lambda'$  ( $0 < \lambda' \ll 1$ ) of the capital and of the profits of the new joint-ventures between the JSBs and the entrant. Other changes are associated with this M&A from the demand and supply side of the market of loans:

- there is a moderate cream skimming effect: a fraction of the high quality loans previously directed to the SOB now prefers the new joint-ventures integrating the foreign bank <sup>2</sup>,
- soft information acquired from the JSBs allows the joint-venture without effort, to recognize the high quality loans,
- the management efficiency of the joint venture improves from its level before the M&A: it is now mid-way between the technological efficiency of the JSBs in the benchmark model and the technological efficiency of the FB in the case of subsidiary creation.

The levels of normal loans  $x_{s3}$  and  $x_{jb}$  funded respectively by the SOB and each JSB/FB joint-venture are then determined as the value maximizing equations (3.11)

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<sup>2</sup>One can presume that this effect is however larger than in the case of M&A activity between the FB and the SOB, since the new joint-ventures tend to mate “good reputation” partners and to keep away the poorly reputed SOB.

to (3.12):

$$\pi_{s3}(x_{s3}) = (\alpha_s A^e + \bar{\alpha}_s) [f_s x_{s3} + (1 - k'')y_s] - \frac{1}{t_s} [x_{s3} + (1 - k'')y_s]^2 \quad (3.11)$$

$$\pi_{jb}(x_{jb}) = (\alpha_j A^e + \bar{\alpha}_j) [f_j x_{jb} + y_j + k''y_s/m] - \frac{1}{t_{jb}} [x_{jb} + y_j + k''y_s/m]^2 \quad (3.12)$$

where:

- $k''$  ( $0 < k'' < 1$ ) represents the proportion of high quality loans leaving the SOB in favor of a joint venture JSBs/FB,
- $t_{jb}$ , ( $t_j < t_{jb} < t_b$ ), figures the management efficiency component of the costs of a joint venture JSBs/FB.

The effective value  $A_3$  of  $A^e$  is now given by (3.13):

$$A_3 = (x_{s3} + y_s) + m(x_{jb} + y_j) \quad (3.13)$$

The profits of the shareholders of the new joint venture are determined as the profits of domestic shareholders  $\pi_{j3} = (1 - \lambda')\pi_{jb}(x_{jb})$  and the profits of foreign shareholders  $\pi_{b3} = \lambda'\pi_{jb}(x_{jb}) - C$  where  $c(m, y_s + my_j)$  is the transaction costs generated by the number of different joint-ventures the foreign bank has to coordinate and make compatible, given that JSBs are only in competition on the covered segment of the high level loans. The more highly dispersed the FB investment, the higher will be these transaction costs. Another component of these costs is the number of high category loans. The higher their number, the higher will be the transaction costs since the competition - the reason to coordinate JSBs - is limited to high category loans. Specification (3.14) captures the nature of these costs which disappear when there is only one JSB and no high level loans:

$$C = c(m - 1)(y_s + my_j) \quad (3.14)$$

Note  $b''' = f_s t_s \alpha_s - m f_j t_{jb} \alpha_j$ . We can then prove the following lemma:

**Lemma 3.7.** *When  $f_s t_s \alpha_s + m f_j t_{jb} \alpha_j < 2$ , there is one single stationary equilibrium for the benchmark model, such that  $A_3 = \frac{f_s t_s \bar{\alpha}_s + m f_j t_{jb} \bar{\alpha}_j}{2 - b''}$ . Then, the amounts of standard loans are respectively  $x_{s3} = \frac{1}{2} f_s t_s \left[ \frac{f_s t_s \bar{\alpha}_s + m f_j t_{jb} \bar{\alpha}_j}{2 - b''} \alpha_s + \bar{\alpha}_s \right] - (1 - k'') y_s$  and  $x_{j3} = \frac{1}{2} f_j t_{jb} \left[ \frac{f_s t_s \bar{\alpha}_s + m f_j t_{jb} \bar{\alpha}_j}{2 - b''} \alpha_j + \bar{\alpha}_j \right] - (y_j + k'' y_s / m)$ . This stationary equilibrium is globally stable when  $b''' < 2$ .*

*Proof:* see Appendix D.

Note that the cost  $C$  has no role in the number of equilibrium loans but only in the profits of the foreign shareholders in the JV, since this cost does not include standard loans which are the only loans that vary according the organization of the banking industry. Note also that the equilibrium number of loans again increases compared to the number corresponding to the benchmark case. As in the previous case, the value of  $b'''$  also increases, which makes the stability of the equilibrium conditions slightly more restrictive

From lemma 3.7, we then deduce proposition 3.8:

**Proposition 3.8.** *Under the conditions of lemma 3.7,*

- (i) *the M&A is advantageous for the JSBs domestic shareholders when the cream-skimming effect and/or the improvements in technological efficiency of the joint ventures are sufficient to compensate for the FB's retention of a part of the profits,*
- (ii) *the M&A is advantageous for the FB when the number of the JSBs is not too large,*
- (iii) *the M&A is advantageous for the two categories of banks when there are large improvements in technological efficiency in the new joint venture and smaller cream-skimming effects.*

This result differs from Proposition 3, in two ways. Qualitatively, the cream-skimming effect  $k''$  is probably larger than  $k'$ : this difference generates a bigger change in the competition conditions from the benchmark case to this one than from the benchmark case to the case of an entry by M&A activity between the FB

and the SOB. Transaction costs create another barrier to the development of such entry. It would be unreasonable to suppose that the FB can find a good solution to distributing its investment across too large a number of domestic banks, without any possibility of controlling their management.

### **3.4 Should economic and financial authorities regulate foreign banks entry?**

As pointed out in the section 3.3, the entry of foreign banks has different global and redistributive effects on the economy and the banking industry. When the normal loans market is not covered, all improvements to management and/or financial efficiency have positive effects on the whole economy and the banking industry. The redistributive effects are more questionable. When the foreign bank creates a new subsidiary, it is necessary to investigate whether the cream-skimming effect is compensated by the indirect stimulating effect associated with the activity generated by the new subsidiary. In the cases of entry of the foreign bank through M&A, the trade-off is more difficult to analyze. Propositions 3.6 and 3.8 show that this kind of entry generates two negative components. The first is that increasing the share of foreign banks in the capital of domestic banks decreases the profits of domestic shareholders and as a consequence, the motivation of the domestic partners in the banking industry. The second is a more classic argument: the cream-skimming effect from one category of banks to the other one generates redistributive effects among domestic banks and their relative shareholders. These two effects can compensate or not for the good direct and indirect effects generated by the M&A: they improve the management efficiency of the new joint-venture and they provide new and safer credits for the economy, which has indirect positive effects.

Emerging countries such as China and India, have defined specific rules to control the entry of foreign banks. For instance, they have introduced floor limits for initial foreign investment and ceiling limits on maximum foreign share in domestic bank in M&As or new subsidiaries. This section evaluates the efficiency of these limitations. We begin with the case of entry by creating a new subsidiary, and

then examine the cases of M&A with SOB or JSBs. We introduce some simplifications in the parameters of the model, none of them changes fundamentally our conclusions but simplifies how to achieve them.

We introduce the following simplifying assumptions:

- the two types of domestic banks initially have the same total number of high category loans  $y_s = my_j$
- the foreign bank induces the same cream skimming effect, whatever the style of entry it chooses, *i.e.*,  $k = k' = k''$
- $\bar{\alpha}_s = m\bar{\alpha}_j$  and  $\alpha_s = m\alpha_j$ , *i.e.* the relative size of each bank and the relative indirect effect of an increase in the distribution of credit on the return of each bank are proportional.
- the indirect effect of increased distribution of credit on the returns of each bank which grows at an increased rate is linearized. We then use the approximation  $A_1\alpha_j \simeq A^*\alpha_j + \alpha_b d_1$  with  $d_1 > 0$  and linearize the indirect effect of the entry of foreign bank in  $\lambda$  when there the foreign bank conducts a M&A activity with domestic banks, using the approximations  $\bar{\alpha}_j + A_2\alpha_j \simeq \bar{\alpha}_j + A^*\alpha_j + \lambda d_2 = Q + \lambda d_2$  and  $\bar{\alpha}_j + A_3\alpha_j \simeq Q + \lambda' d_3$  with  $d_2 > d_3 > 0$  and  $Q = \bar{\alpha}_j + A^*\alpha_j$ .<sup>3</sup>

These four working assumptions simplify how we write the profits in each situation. They reduce the difference between the subset of the SOBs and the subset of the JSBs to three important features: the advantage of SOBs related to “financial efficiency” (soft information), the advantage of JSBs related to technological efficiency, and the relative number / size of each type of bank. However, we suppose

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<sup>3</sup>These simplification apparently underestimates this indirect effect when the increase of the distribution of credit is large. However, as with large changes in the volume of credit, the market could come close to the level where all the demand of credit is served, the quality of all new distribution of credit decreases and our initial evaluation of the indirect effect becomes too generous. For this reason, we think that this linear form is almost reasonable, and even still overestimate the indirect effect when  $\lambda$  comes close to 1.  $d_2$  is chosen larger than  $d_3$  because, since the financial efficiency of SOB is bigger that the financial efficiency of JOBs ( $f_s \geq f_j$ ), and given that foreign bank considers the same level of foreign investment  $\lambda = \lambda'$ , when the foreign bank conducts a M&A activity with the SOB and with the JSBs, the numerator of  $A_2$  increases more than the numerator of  $A_3$  and the denominator of  $A_2$  decreases more than the denominator of  $A_3$ .

that the two categories of banks exert cross symmetric effects. In order to adapt the model to the comparative statics analysis we make, we now introduce variability in the efficiency improvement in domestic banks resulting from a merger between the domestic and foreign banks. This refinement allows us to extend the analysis of M&A, to different levels of participation of foreign banks in the capital of domestic banks. We then suppose that in case of a M&A, there is an increasing relation between the size of the foreign bank minority share and the improvements in the efficiency of the new joint-venture: the larger the minority foreign share the greater the efficiency improvements after M&A activity.

The detailed calculus derivation for equations of domestic banks' profits before and after entering into emerging banking market with the simplification, please see Appendix G.

### 3.4.1 How to regulate the creation of new subsidiaries by foreign banks?

Under the previous assumptions, we can to compare the domestic banks' total profit in the benchmark case, and after the creation of a subsidiary by the new foreign entrant. Proposition 3.9 formulates the result of this comparison:

**Proposition 3.9.** *Whatever the values of the parameters, when a foreign bank realizes an entry through the creation of a new subsidiary, there exists a minimal level of involvement in the international markets of this bank below which entry decreases the profits of the domestic banks and above which entry increases the profit of the domestic banks.*

*Proof:* see Appendix E.

If a foreign bank creates a subsidiary, the bank must have adequate possibilities to access resources and support in the international financial market. This result can be explained quite easily. All foreign entries generate a cream-skimming effect which immediately decreases the domestic banks' profits. From a given level of

activity of the subsidiary, since the credit market is not covered, the indirect positive effect generated by the distribution of new credits increases the level of activity and the profits of the domestic banks. Obviously, this result applies to emerging countries, with a banking industry that is not fully efficient and with a not fully credit market since the terms of the trade-off have their origins in these two characteristics of emerging banking industries.

### 3.4.2 The case of M&A activity with a SOB

We apply our “welfare” criterion, using  $r$  to denote the actualization rate necessary to calculate the present value of future profits. Given our simplifying assumptions, and if we consider that the horizon of a bank’s life goes to banks to infinity, the criterion can be expressed as shown below for a M&A with the SOB:

$$\begin{aligned}
\Pi_{SOB} = & (1 - \delta)\{(1 - \lambda)m^2(Q + \lambda d_2) \\
& [(1 - f_s)(1 + k)y_j + \frac{f_s^2(t_s + \lambda n)}{4}(Q + \lambda d_2)] \\
& + m(Q + \lambda d_2)[(1 - f_j)(1 - k)y_j + \frac{f_j^2 t_j}{4}(Q + \lambda d_2)]\} \\
& + \delta\{m^2(Q + \lambda d_2)[(1 - f_s)(1 + k)y_j + \frac{f_s^2(t_s + \lambda n)}{4}(Q + \lambda d_2)] \\
& + m(Q + \lambda d_2)[(1 - f_j)(1 - k)y_j + \frac{f_j^2 t_j}{4}(Q + \lambda d_2)]\}/r
\end{aligned} \tag{3.15}$$

The first term, weighted with  $(1 - \delta)$  corresponds to the profits of the domestic shareholders in the two categories of banks after the M&A activity and the second term, beginning with  $\delta$  is the present value of the future profits of those two same banks.

Expression 3.15 is a degree 4 equation in  $\lambda$  which has the following simplified form:

$$\Pi_{SOB} = (1 - \delta)[(1 - \lambda)\pi_{sb}(\lambda^3) + \pi_{j2}(\lambda^2)] + \delta[\pi_{sb}(\lambda^3) + \pi_{j2}(\lambda^2)]/r$$

The expression is defined for values of  $\lambda$  comprised between 0 and 1. The dominant term  $(1 - \delta)(1 - \lambda)\pi_{sb}(\lambda^3)$  ultimately moves negatively when  $\lambda$  goes to 1. The other terms move positively when  $\lambda$  goes from 0 to 1, which makes ambiguous the resulting variation of the (3.15) in the range of variation of  $\lambda$ . It is then more difficult for the domestic authorities to determine a value of  $\lambda$  maximizing the index (3.15)<sup>4</sup>. When the authority chooses small values for  $\delta$ , *i.e.*, considers that the bank profit is the dominant criterion, it has no reason to restrict the amount of shares acquired by the foreign bank. In contrast, when the level of the domestic shareholders profits that matters, then there is no reason to restrict these shares. It is only by mitigating the two terms, *i.e.* with intermediate values of  $\delta$ , that we obtain an interior solution in  $\lambda$ . Numerical simulations involving different ranges of the variation of  $\delta$  (see *Appendix 6*) illustrate this result. We then can formulate the following proposition:

**Proposition 3.10.** *When the objective of the economic and financial regulation authority is to maximize the wealth of the initial domestic banks shareholders, it has no interest in limiting the share of capital of foreign banks in a M&A with the SOB. However, such a limitation would be justified if the authority considers that the wealth of the future domestic shareholders also matters.*

*Proof:* see [Appendix F](#).

### 3.4.3 The case of M&A activity with a JOB

This case is quite similar to the case of a M&A with the SOB. We use the same parameter  $\delta$  to weight the two component of the welfare index which continue to integrate  $(1 - \delta)\%$  of the domestic shareholders profit after M&A activity and  $\delta\%$  of the present value of future profits of the two categories of banks. Thus total

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<sup>4</sup>Our simplifications, in particular in concerning the link between the management efficiency improvement and the form of the indirect effect have no influence on this ambiguous result which is due to well identified reasons.

welfare of domestic banking industry for a M&A with the JSBs is as below:

$$\begin{aligned}
\Pi_{JSB} = & (1 - \delta)\{m^2(Q + \lambda'd_3)[(1 - f_s)(1 - k)y_j + \frac{f_s^2 t_s}{4}(Q + \lambda'd_3)] \\
& + (1 - \lambda')m(Q + \lambda'd_3)[(1 - f_j)(1 + k)y_j + \frac{f_j^2(t_j + \lambda'n)}{4}(Q + \lambda'd_3)] \\
& + \delta\{m^2(Q + \lambda'd_3)[(1 - f_s)(1 - k)y_j + \frac{f_s^2 t_s}{4}(Q + \lambda'd_3)] \\
& + m(Q + \lambda'd_3) \times [(1 - f_j)(1 + k)y_j + \frac{f_j^2(t_j + \lambda'n)}{4}]\}/r
\end{aligned} \tag{3.16}$$

which also provides a degree 4 equation in  $\lambda'$  with a similar form to the previous one:

$$\Pi_{JSB} = (1 - \delta)[\pi_{s3}(\lambda'^2) + (1 - \lambda')\pi_{jb}(\lambda'^3)] + \delta[\pi_{s3}(\lambda'^2) + \pi_{jb}(\lambda'^3)]/r$$

In this case, we have the same causes, same effects, the same numerical simulations and the same observations were made in this case. We can then formulate (without any redundant proof) formulate the proposition 3.11

**Proposition 3.11.** *When the objective of the economic and financial regulation authority is to maximize the wealth of the initial domestic banks shareholders, it has no interest in limiting the share of the foreign bank's in a M&A with JSBs. However, this limitation would be justified if the authority considers that the wealth of the future domestic shareholders also matters.*

### 3.5 Further researches and conclusion of Chapter 3

This chapter has contributed to analyze of the complex effect of foreign bank entry on domestic banking industry. I studied three entry modes: (1) creation of

a new subsidiary, (2) the M&A with a State Owned Bank (large bank), and (3) M&A activity with Joint Stock Banks (small banks). When the standard quality loans market is not fully covered by the domestic banks, we find that the entry of foreign banks can improve the “state of affairs”, thereby compensating the cream-skimming effect on the domestic banks, and ultimately increasing the level of activity and/or profits for a part of the domestic banking industry. The model considered the conditions under which domestic bank shareholders increase their profits after an entry mode corresponding to cases (2) and (3).

According to our theoretical model, in order for the domestic bank profits are maintained in the foreign new subsidiary case, the domestic authority should set up minimum initial foreign capital investment restrictions for foreign banks as  $\bar{\alpha}_b$ . For the cases of M&A with SOB and M&A with JSBs, the domestic authority must set up the best level of foreign ownership  $\lambda^*$  and  $\lambda^{**}$  respectively in order to maintain the profitability of domestic banking industry.

Our results are interesting for both parties and for different modes of entry. They show that not all modes of entry are positive if we consider the domestic banking industry as a whole. Future analyses will focus on the endogenous strategy of the foreign entrant.

## Chapter 4

# Foreign Bank Entry on Domestic Banking Industry in Emerging Countries: an empirical model analysis

### 4.1 Introduction to Chapter 4

In recent years, many emerging countries have promoted financial industry reforms. These reforms range from encouraging the emergence of new private banks, to open the access of foreign banks to M&A activity involving domestic banks. However, opening to competition of the financial industry is a complex issue as it is closely related to structural reforms in domestic financial sector with planned and actual implications on macro-economic stability.

As a joint consequence of development and liberalization, international trade and financial services has become more and more important. Many banking institutions also become international in order to facilitate international capital flow and international financial service. Foreign banks have increased their presence in emerging countries by opening representative office or new branches, sub-branches, by acquiring minority ownership stakes of domestic banks, or by setting up new local incorporations. With entering of foreign banks, the emerging banking markets

have been subjected to structural changes and domestic banks need to improve their ability to face with more competition. So, it is crucial to assess these kinds of modifications.

This chapter examines the foreign entry effect on 6 Asian emerging countries by using an empirical model. We aim to provide systematic analyses of how foreign bank entry has affected Asian banking industry. To do this, we use bank-level accounting data of China, India, Indonesia, Korea, Philippines and Thailand for the 1998 - 2011 period. We find that M&A activities have positive effect on profitability of domestic banks. Another interesting finding of this article is that the level of foreign investment in domestic banks is more important than whether foreign bank conduct M&A activities with domestic banks. Moreover, foreign banks have stronger influence for countries with foreign entry restrictions than countries without foreign entry restrictions. Foreign bank entry has both direct effect on current year and one-year lag effect for domestic banking industry. However, foreign direct effects are stronger than foreign one-year lag effect.

Section 4.2 reviews the literature on M&A activities in the banking industry, banks' efficiency change after M&A activities and financial revolution of 6 Asian countries. Section 4.3 presents a data set of 86 banks from 6 Asian countries, empirical analyses and results. Section 4.4 displays comments and conclusion.

## **4.2 Literature Review**

### **4.2.1 Asian banking industries**

Asian countries have conducted crucial regulatory changes in their banking industries since the Asian financial crisis. Although there are big differences between these reforms in each country, all Asian countries moved obstacles for facilitating foreign banks entries. The reform of foreign entry limitation is one of the central elements of the Asian restructuring plans. Based on the analysis of Sasidaran and Ramkishan (2010), we could separate Asian countries into 2 groups according to their rules of governing foreign equity limits in the domestic banking sector: the

enthusiastic liberalizers (Indonesia, Korea, Thailand and Philipines) and the cautious liberalizers (China and India).

#### (1) China

According to the development process of the current Chinese banking industry, there are three stages: the formation and development period (from 1949 to 1978), the reform and development period (from 1978 to 2008) and the period of adjustment and opportunities (from 2009 to now). Since joining the World Trade Organization (WTO) on January 1, 2002, China has continuously enforced the so-called open door policy in the Chinese banking industry. All restrictions for foreign banks were cancelled in 2007.

Not like most of the other Asian economies undertook more aggressive domestic liberalization, the restructure of Chinese financial sector is primarily driven by obligations since China entry into WTO. Therefore the penetration level of foreign banks in China remains very small and Chinese government enforces complicated foreign bank regulatory requirements. Based on the legal requirement of Chinese banking industry (Regulations for the Administration of Foreign funded banks), the maximum share a single foreign investor may take in a local bank was 20 percent and the overall maximum multiple foreign shareholding is set at 25 percent. The Chinese government also set up the minimum asset requirement for foreign banks: such as foreign bank needs a higher assets requirement for establishing a foreign branch than a foreign subsidiary or foreign joint venture bank. Foreign branches not allowed to do retail business in China while foreign subsidiaries are eligible to do so. In reality foreign banks are encouraged to have local incorporation in China according to the regulation we mentioned above. Those foreign banks that do not do so will not be allowed to accept deposits of less than one million RMB.

#### (2) India

Since early 1990s, India started its financial liberalization process gradually. Indian financial environment was more liberal than in China. Generally speaking

concerning the banking operation, Indian government treats no discriminatory between domestic banks and foreign banks. Even in some cases Indian government supported more favorably to foreign banks than to domestic banks. In the Indian banking industry, foreign banks can undertake almost all banking activities no matter retail banking or wholesale banking business. The Indian government also widened the presence of foreign banks in its banking industry by allowing them to establish foreign branches or 100 percent wholly owned subsidiary. Moreover, foreign equity ownership changed from 49 percent (before the Asian Financial Crisis) to 74 percent.

### (3) Philippine

Since the Asian Financial Crisis Philippines has undergone a substantial restructuring of its banking system. Like the others Asian countries, Philippines government modified its general banking act to facilitate the entry of foreign banks. Before the crisis, Philippines implemented a tight restriction for foreign banks, for instance, a higher set of minimum capital requirements, liquidity cover on foreign currency liabilities, a cap on loans to real estate and regulations on derivatives trading and etc. After the crisis the Central Bank of the Philippines (BSP) signed the General Banking Law (2000) to amend the old General Banking Act. The new General Banking Act meets the challenges of globalization and provides additional safeguard for its banking industry by improving prudential and regulatory standards and enhancing the supervisory capabilities.

According to the old Foreign bank Liberalization Act of 1994, Philippines only allowed foreign bank entry through one of the following entry modes: (1) acquire, purchase or own up to 60 percent of the stock of an existing domestic bank, (2) invest in up to 60 percent of the voting stock of a new banking subsidiary incorporated in the Philippines, or (3) establish a branch with full banking authority (has a sunset provision for 5 years and only limited to 10 foreign banks). The new act encourages the liberalization of foreign banks by enlarging the time limit of the third entry mode to 7 years. However, the act points out that the share of foreign majority-owned banks shall not exceed 30 percent of the total resources or asset of the banking system.

(4) Indonesia

Being strongly hit by the Asian financial crisis, Indonesia conducted its financial sector revolution as an enthusiastic liberalizer. It was very active in taking a comprehensive financial restructure. In 1998 the Indonesian Bank Restructuring Agency (IBRA) was set up by Indonesian government in order to solve the problems in the domestic banking sector. The aim of the IBRA is to address the issue of non-performing loans in domestic banking industry and bad effect of the Asian financial crisis. Moreover, the Indonesian government also made some important regulatory changes in its financial sector. One of the most significant changes is that Indonesian government removed some restrictions on foreign participation in its domestic banking industry. Under the New Banking Law which is issued in the November of 1998, foreign banks could take over Indonesian banks and invest in unlisted and listed banks, foreign non-bank institutions is allowed to purchase Indonesian banks. The New Banking Law also removed the restrictions on the expansion of branches of foreign joint venture banks.

(5) Korea

During the post-crisis restructuring process, Korea government removed all the regulatory obstacles to encourage the entry of foreign banks. The shock of Asian financial crisis made the Korea government realize that it is important to maintain the level of foreign participation in order to assist the recapitalization and enhance domestic banks' efficiency. So, Korea government encouraged foreign investment by shifting financial obstacles.

Before the crisis, the limit of foreign equity ownership was 49 percent. After the crisis, Financial Supervisory Commission of Korea removed this restriction and allowed foreign bank ownership up to 100%. Once foreign ownership stakes exceed to 10, 25 and 33 percent up to 100 percent, foreign bank needs to be approved by Financial Supervisory Commission of Korea.

(6) Thailand

Similar with the other aggressive liberalizer, Thailand conducted financial regulatory reform after the Asian financial crisis by allowing 100 percent foreign ownership of the domestic financial institutions for a 10 year period, after which the foreign banks will be allowed to buy additional shares only if their shares below 49 percent of total equity. In 2004 the Financial Sector Master Plan allows foreign banks to apply for two types of licenses: (1) a foreign bank as a subsidiary enjoys the same scope of business as a commercial bank, and could open 1 branch within Bangkok and 3 branches elsewhere in Thailand; (2) foreign bank could apply for a full foreign branch and enjoys the same scope of business as a commercial bank, however is not allowed to open any branches.

## **4.2.2 The impact of foreign bank on domestic banking industry**

Generally speaking, foreign bank entry can affect competition level of domestic banking industry, influence the efficiency of domestic banks, and have an impact on the stability of domestic banking system. Foreign bank entry has both positive effect and negative effect for domestic banking industry. When foreign banks increase their presence in domestic market, they push pressure on domestic banks to conduct certain revolutions, for example: reducing costs, providing more various products and service, becoming more efficient, using more advanced techniques, learning modern practices from foreign banks and etc. Foreign bank entry has competition effect which means that more competition leads to lower income and profits, and higher efficiency. However, the entry of foreign bank also has “cream skimming” effect for domestic banks, for instance having experience in international transaction, attracting clients of domestic banks, providing better products and services, having better access to international financial market and etc. Therefore domestic banks could have lower income and profits.

### **4.2.2.1 Against of foreign entry**

Goldberg, Gerard Dages and Kinney (2000) also mention that there are 3 primary arguments against opening domestic financial system to foreign ownership: (1)

increase in foreign-owned financial institutions will decrease the stability of domestic financial industry; (2) foreign institutions have “cream skimming” effect by attracting high level clients from domestic banks; (3) complex financial institutions in domestic financial industry will increase the multiple challenges to supervision.

Claessens, Demirfüç-Kunt and Huizinga (2001) analyze extent and effect of foreign bank presence in domestic market by using 7900 banks from 80 countries for the 1988-1995 period. They observe foreign banks have higher profit than domestic banks in developing countries and point out that foreign entry for developing countries is associated with a reduction in profitability and margin for domestic banks.

Uiboupin (2004) estimates foreign bank entry on bank performance in the Central and Eastern European countries and point out that foreign entry increases competition in the host country and has negative effect on domestic banks’ profitability, revenues and non-interest income. Hellmann, Murdock and Stiglitz (2000) present that if foreign bank entry harms the franchise value of domestic banks, they will facilitate prudent investment (take on greater risks).

#### **4.2.2.2 Favor of foreign entry**

Goldberg, Gerard Dages and Kinney (2000) mention that there are 3 primary arguments in favor of opening domestic financial sectors to foreign ownership: (1) foreign entry diversifies the capital, increases the amount of funding, supports the supply of domestic credit and increases the stability of available lending; (2) it can also improve the quality, pricing and availability of financial products and services; (3) it can finally improve financial system infrastructure which includes accounting and transparency, financial regulation and increased presence of supporting agents such as auditors and rating agencies.

Clarke, Cull, D’Amato and Molinari (1999) conduct analysis for Argentine in mid-1990s and find that foreign bank entry is associated with heightened competition in the domestic banking industry and increased domestic banks’ efficiency. Demirguc-Kunt, Levine and Min (1998) analyze for a large sample of countries

over the period 1988-1995, and find that foreign bank participation lowers the incidence of local banking crisis and accelerates overall economic growth by boosting domestic banking efficiency.

Hermes and Lensink (2001) redo the same analysis of Claessens, Demirfüç-Kunt and Huizinga (2001) for less developed countries (LDCs). They find foreign entry leads to an increasement in domestic banks' income, profits and cost. They also substantiate an inverted U-shaped relationship between foreign entry and domestic performance which indicates the cost and profits reduce only when foreign entry has reached a certain minimum level.

### **4.3 Data and the empirical model**

We use information from the financial statement of domestic commercial banks. The data come from the Thomson One data base. Banks included roughly account for 80% of the total asset of banks in each countries. All data in Thomson One data base derived from well-known Thomson Financial sources, including SDC Platinum, Edgar filings, I/B/E/S and Worldscope and many more. This is a comprehensive data base that allows cross-country comparisons. The data are compiled by Thomson One mostly from the balance sheets, income statements and applicable notes from banks' annual reports.

We compile a data set covering 86 banks from 6 countries (China, India, Indonesia, Korea, Philippines and Thailand) for the 1998 - 2011 period. This data set includes all important developing Asian countries. Table 5.1 below summarizes the total number of banks available in Thomson One for each country and restrictions of foreign equity ownership for each country.

TABLE 4.1: Summary of the total number of banks available in “Thomson One” and restrictions of foreign equity ownership

Country	No. banks	Pre-crisis Foreign Ownership	Post-crisis Foreign Ownership
China	15	Not available	1 bank 20% and more banks 25%
India	23	49%	74%
Philippine	11	60%	60%
Indonesia	20	49%	100%
Korea	7	49%	100%
Thailand	10	25%	100%

### 4.3.1 Empirical model

The empirical model we used is based on the theoretical model of Chapter 4<sup>1</sup>:

$$I_{ijt} = \alpha_0 + \alpha_1 F_{ijt} + \alpha_2 B_{ijt} + \alpha_3 C_{jt} + \varepsilon_{ijt} \quad (4.1)$$

Where  $I_{ijt}$  is the dependent variable (bank’s profitability) for domestic bank  $i$  in county  $j$  at time  $t$ ;  $F_{ijt}$  are foreign bank M&A activities with domestic bank  $i$  in county  $j$  at time  $t$  (i.e., shares of foreign investment in domestic banks and whether foreign bank conduct M&A activities with domestic bank);  $B_{ijt}$  are bank variables for domestic bank  $i$  in county  $j$  at time  $t$ ;  $C_{jt}$  are country variables for county  $j$  at time  $t$ . Furthermore,  $\alpha_0$  is a constant;  $\alpha_1$ ,  $\alpha_2$  and  $\alpha_3$  are coefficients; and  $\varepsilon_{ijt}$  is an error term. All regressions include country and time-specific fixed effects.

#### 4.3.1.1 Dependent variable

Dependent variable represents the profitability of domestic banks. From the bank’s income statement and balance sheet, we get the following accounting identity:

1. NI/TA (Net income / Total asset):

Net income to total asset ratio is the accounting values of a bank’s net income over its total asset. This ratio provides a standard for evaluating

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<sup>1</sup> $\pi_s(x_s) = (\alpha_s A^e + \bar{\alpha}_s)(f_s x_s + y_s) - \frac{1}{t_s}(x_s + y_s)^2$

how efficiently financial management employs the money invested in the bank's assets. It measures how efficiently profits are being generated from the total assets employed.

2. NM/TA (Net interest margin / Total Asset):

Net interest income to total asset ratio is the accounting values of a bank's net interest income over its total asset. This ratio measures the difference between the interest income generated by banks and the amount of interest paid out to their lenders (deposits), relative to the amount of their total assets.

3. NII/TA (Non-interest income / Total asset):

Non-interest income to total asset ratio is the accounting values of a bank's non-interest income over its total asset. Besides traditional lending activities, banks also engage in some other non-lending activities, for instance investment banking, securities activities (for example, securities underwriting, brokering, dealing and etc), insurance activities (for example, insurance writing and selling), and real estate activities. This ratio captures banks' profitability in non-lending activities.

4. NIE/TA (Non-interest expense/ Total asset):

Non-interest expense to total asset ratio is the accounting values of a bank's non-interest expense over its total asset. Non-interest expense presents the normal operating expense associated with the daily operation of a bank. Generally speaking, non-interest expense includes salaries and benefits, expense of premises and fixed assets, and other non-interest expense.

5. LLP/TA (Loan loss provision / Total asset):

Loan loss provision represents a non-cash expense for banks to account for future losses on loan defaults. It measures the actual provisioning for bad debts over total assets. The differences of this ratio may reflect the difference in banks' customer mix; for instance banks focus on large corporations or concentrate on consumer loans. Moreover, it also shows the banks' ability to screen bad credit risk and banks' willingness to provision for bad risks.

### 4.3.1.2 Independent variables

- Foreign bank variables: The first independent variable is the foreign bank variable. It presents foreign banks' presence in domestic banking industry. We define this variable as following:
  1.  $F_1$ :  
Shares of foreign investment in domestic banks: This article only considers foreign banks use M&A activities to entry into domestic market. This variable represents the percentage of foreign bank asset in domestic banks' asset. This variable captures actual foreign banks' presence and foreign influence of domestic banks.
  2.  $F_2$ :  
This variable shows whether foreign bank conduct M&A activities with domestic bank: This variable is a dummy variable, if foreign bank conducts M&A activities with domestic bank, the value of this dummy variable is 1; if not, the value of this dummy variable is 0.
- Domestic bank variables: Domestic bank variables represent the financial structure of domestic banks. From the bank's balance sheet, we get the following accounting identity:
  1. L/D (Loan / Deposit):  
Loan to deposit ratio is the accounting values of a bank's total loans over its total deposits. It is a commonly used statistic for assessing a bank's liquidity.
  2. E/TA (Equity / Total Asset):  
This variable is the value of equity divided by the value of total asset for each bank. This ratio indicates the bank's leverage, the amount of liabilities used to finance bank.
- Domestic countries variables: Domestic countries variables presents the "macro environment" components of each countries. We define this variable as following:
  1. GDP rate:  
It presents the annual GDP growth rate for each country over estimated periods.

2. Inflation:

It presents the annual inflation rate for each country over estimated periods.

### 4.3.2 Results of empirical model

#### 4.3.2.1 Results for all 6 countries

First of all, we conducted analyses for all 6 countries. All regression models consider both the country fixed effect and time fixed effect. According to Drukker (2003) and Wooldridge (2002), we also conduct tests for panel-level heteroskedasticity (Likelihood-ratio test) and autocorrelation (Wooldridge test).

The estimation results (see TABLE 5.2), indicate that foreign bank entry (F1 and F2) is significantly associated with an increasement in domestic bank net margin (column 3), non-interest income ratio (column 5 and 6), non-interest expense ratio (column 7 and 8) and loan loss provision ratio (column 9 and 10). We do not see a significant association of net income ratio with foreign entry.

We interpret these results to mean that foreign bank entry is associate with greater efficiency in the domestic banking industry. Positive effect of net margin represents foreign bank entry force domestic banks can improve their efficiency in traditional lending activities. High non-interest income and high non-interest expense reflect that foreign bank entry enable domestic banks to enlarge their non-lending activities. Since foreign bank entry has stronger positive effect for non-interest income than for non-interest expense; the net non-interest profit is higher according to foreign bank entry effect. We also find that the foreign share variable (F1) has stronger effect of these four dependent variables than foreign dummy variable (F2). Therefore, we interpret that for these six Asian developing countries, the level of foreign bank penetration is more important than whether foreign bank conducted M&A activities with domestic banks.

High level of loan loss provision presents foreign bank entry promoted the changes in the regulatory environment in these six countries. After Asian financial crisis,

many Asian central banks and supervisory authorities tightened their prudential supervision in order to ensure their banks could bear further risk. Therefore, along with foreign bank entry, Asian banks become more conservative and move closer to international norms.

For example, in 2002 China conducted a broader convergence with international practice; the loan classification rules for specific reserves were mandated. And since 2005 Chinese banks have been required to set aside general reserves of at least 1% of loans outstanding. In 2005 India has raised its benchmark general provision level for standard loan from 0.25% to 0.4%; in 2006 it has increased the required reserve level for performing personal loans, residential housing loans, capital market-related and commercial real estate loans from 0.4% to 1%; moreover in 2007 it further raised provision for personal loans and capital market-related and commercial real estate loans from 1% to 2%, and increased provisioning requirements for banks' exposure to systemically important non-deposit-taking non-banking finance companies from 0.4% to 2%. Philippines adopted new accounting standards in 2005 which results a higher level of reserve ration than before. Indonesia adopted a prudential loan classification scheme with five grades in 1998, and in 2005 it enforced a tighter definition of these grades. Similarly, Korea also conducted tightened provision norms step by step. For instance, in Korea the general reserve requirement for corporate loan was raised from 0.5% in 1999 to 0.7% in 2005, and then to 0.85% in 2007. Thailand also significantly increased the minimum loan loss provision in 1998, and in 2006 it further tightened provisioning standards.

Turning to other control variables, we see that Equity/Total Asset ratio has positive relationship with net income, net margin, non-interest income and non-interest expense. For a bank, the non-interest expenses include almost all operating and overhead expense, for example operation and maintenance of facilities, equipments, furniture and vehicles, employee benefits, unemployment tax and etc. Based on our results, if a bank's Equity/Total Asset ratio increases, it will has slight positive effect for bank's non-interest expenses. Loan/Deposit ratio has positive relation with net margin ratio and non-interest expense ratio. If bank uses more of it deposits to make a loan, the net margin increases. And because bank makes more

loans, the non-interest expense increases.

GDP growth rate is positively related to the net income ratio which interprets that an increase in economic activity has positive effect of banks' overall profitability. Because the economic boom increases people's demand more serve of bank; and due to high demand for banks, bank could have a higher level of overall profit. The inflation presents a significant negative relationship with net income, non-interest activities and loan loss provision which is coincident with the reality.

TABLE 4.2: Analysis results for all 6 countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	NI/TA	NI/TA	NM/TA	NM/TA	NII/TA	NII/TA	NIE/TA	NIE/TA	LLP/TA	LLP/TA
F1	0.146 (0.90)		0.413 (6.40)***		0.688 (4.65)***		0.420 (5.15)***		1.139 (4.34)***	
F2		0.018 (0.47)		0.032 (0.81)		0.254 (5.32)***		0.070 (2.87)***		0.310 (3.54)***
E/A	0.682 (13.02)***	0.674 (12.68)***	0.202 (5.59)***	0.192 (5.17)***	0.360 (8.97)***	0.355 (8.10)***	0.129 (7.83)***	0.116 (6.32)***	-0.114 (1.49)	-0.130 (1.57)
L/D	0.034 (1.32)	0.034 (1.30)	0.091 (4.48)***	0.082 (3.73)***	0.038 (1.37)	0.040 (1.36)	0.072 (4.70)***	0.071 (4.53)***	0.073 (1.31)	0.096 (1.53)
Rgdp	0.076 (2.87)***	0.082 (3.05)***	-0.019 (0.83)	-0.025 (1.06)	-0.010 (0.37)	-0.013 (0.49)	0.005 (0.35)	0.009 (0.66)	-0.008 (0.19)	-0.015 (0.32)
Inflation	-0.148 (3.90)***	-0.147 (3.86)***	0.019 (0.66)	0.013 (0.46)	-0.034 (0.97)	-0.029 (0.83)	-0.053 (3.12)***	-0.061 (3.42)***	-0.131 (1.95)*	-0.137 (1.89)*
Constant	1.973 (9.5)***	1.968 (9.4)***	-3.999 (26.8)***	-3.974 (25.9)***	-3.507 (18.4)***	-3.541 (17.5)***	-3.668 (38.5)***	-3.665 (36.6)***	-5.831 (15.9)***	-5.945 (14.4)***
Observations	700	700	558	558	702	702	730	730	628	628
No. of banks	86	86	81	81	85	85	86	86	85	85
TF Effect	117.2***	116.6***	38.4***	37.7***	55.9***	57.1***	60.4***	59.8***	41.2***	42.4***
CF Effect	63.7***	59.1***	886.6***	833.6***	574.2***	443.1***	998.4***	735.9***	112.8***	69.56***
Wooldridge test	16.3***	16.7***	55.1***	54.84***	23.1***	22.7***	10.13***	10.1***	27.73***	29.25***
LR test	493.6***	497.5***	615.7***	612.1***	746.4***	750.2***	416.2***	436.2***	335.2***	347.3***
Robust t-statistics in parentheses										
* significant at 10% level; ** significant at 5% level; *** significant at 1% level										
TF Effect is Time-fixed Effect; CF effect is Country-fixed Effect and LR test is Likelihood-ratio test.										

### 4.3.2.2 Results for countries with foreign entry restrictions

I also conduct analyses for countries with foreign entry restrictions which include China, India and Philippines (TABLE 5.3).

TABLE 4.3: Foreign entry restrictions in China, India and Philippines

Country	Foreign equity ownership
China	20% for single foreign investor 25% overall investment limit.
India	74% overall investment limit.
Philippines	60% overall investment limit.

The estimation results (See TABLE 5.4), indicate that foreign bank entry (F1 and F2) is significantly associated with an increasement in non-interest income ratio (column 6) and loan loss provision ratio (column 9 and 10). We do not see a significant association of net income, net margin, and non-interest expense with foreign entry.

We interpret these results indicate that foreign bank entry is associate with higher level of the domestic banks' non-interest income. Similar with the results for all 6 countries, we find that the foreign share variable (F1) has stronger effect of loan loss provision than foreign dummy variable (F2). Foreign dummy variable (F2) has effect for non-interest income, while foreign share variable (F1) does not have significant effect for this dependent variable. Therefore, we interpret that for these three countries with foreign restrictions, the level of foreign bank penetration is more important for loan loss provision than whether foreign bank conducted M&A activities with domestic banks; and whether foreign bank conducted M&A activities with domestic banks has important effect for the non-interest income of domestic banks.

Turning to others control variables, we see that Equity/Total Asset ratio has a positive relationship with net income, net margin, non-interest income and non-interest expense. Based on these results, if a bank's Equity/Total Asset ratio increases, it will have slight positive effect for bank's non-interest income and non-interest expenses. Since Equity/Total Asset ratio has strong positive effect for

bank's non-interest income than non-interest expense, we interpret this ratio has positive effect for bank's net non-interest income. Equity/Total Asset ratio has a negative relationship with loan loss provision. Loan/Deposit ratio has a positive relationship with net margin, non-interest income, and loan loss provision and it has negative relationship with net income and non-interest expense. If bank uses more of its deposits to make a loan, the net margin increases; it also has positive effect for non-interest income.

GDP growth rate is positively related to the non-interest income and loan loss provision which interpret that an increase in economic activity has positive effect on banks' non-interest activity and arises bank's cautious for the possibilities of bad loans. The result shows that inflation presents a significant negative relationship with non-interest income, non-interest expense and loan loss provision which is coincident with the reality. However, results also present that inflation has positive effect on bank's net margin, which is consistent with the research of Huybens and Smith (1999), and Demirguc-Kunt, Laeven and Levine R.(2003).

TABLE 4.4: Analysis results for all countries with foreign entry restrictions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	NI/TA	NI/TA	NM/TA	NM/TA	NII/TA	NII/TA	NIE/TA	NIE/TA	LLP/TA	LLP/TA
F1	0.365 (1.54)		0.134 (0.56)		0.569 (1.63)		0.107 (0.75)		1.996 (4.80)***	
F2		0.011 (0.22)		0.005 (0.09)		0.161 (2.14)**		0.040 (1.31)		0.431 (4.39)***
E/A	0.000 (.)	0.523 (7.89)***	0.118 (2.43)**	0.122 (2.61)***	0.298 (4.09)***	0.266 (3.64)***	0.016 (0.54)	0.015 (0.50)	-0.508 (5.27)***	-0.496 (5.34)***
L/D	0.000 (0.01)	-0.294 (3.03)***	0.148 (2.37)**	0.145 (2.40)**	0.084 (1.11)	0.104 (1.40)	-0.090 (1.75)*	-0.088 (1.71)*	0.090 (0.66)	0.132 (0.99)
Rgdp	0.000 (.)	-0.004 (0.11)	-0.049 (1.45)	-0.045 (1.31)	0.085 (2.47)**	0.082 (2.36)**	0.020 (1.21)	0.019 (1.19)	0.120 (2.00)**	0.095 (1.63)
Inflation	0.000 (.)	-0.057 (1.06)	0.164 (3.62)***	0.160 (3.57)***	-0.307 (4.84)***	-0.294 (4.66)***	-0.098 (3.38)***	-0.099 (3.39)***	-0.476 (6.03)***	-0.443 (5.27)***
Constan	t0.000 (.)	2.505 (5.39)***	-3.679 (11.72)***	-3.638 (11.89)***	-2.943 (7.17)***	-3.133 (7.60)***	-3.068 (13.84)***	-3.081 (13.74)***	-5.962 (8.73)***	-6.284 (9.31)***
Observations	384	384	285	285	362	362	386	386	342	342
No. of bank	49	49	47	47	48	48	49	49	48	48
TF Effect	***	***	***	***	***	***	***	***	***	***
CF Effect	***	***	***	***	***	***	***	***	***	***
Wooldridge test	**	**	***	***	***	***	***	***	***	***
LR test	***	***	***	***	***	***	***	***	***	***

Robust t-statistics in parentheses:

\* significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level

TF Effect is Time-fixed Effect; CF effect is Country-fixed Effect and LR test is Likelihood-ratio test.

### 4.3.2.3 Results for countries without foreign entry restrictions

Then, we conduct analyses for countries without foreign entry restrictions, which include Indonesia, Korea, and Thailand.

The estimation results (See TABLE 5.5), indicate that foreign bank entry (F1 and F2) is significantly associated with an increasement in domestic bank net margin (column 3), non-interest income ratio (column 5 and 6), non-interest expense ratio (column 7 and 8) and loan loss provision ratio (column 9). There is no significant association of net income ratio with foreign entry. These results are quite similar with our analysis for all 6 countries.

We could also see that foreign dummy variable (F2) has less or no effect than the foreign share variable (F1) on bank's net margin, non-interest activities and loan loss provision. Therefore, we interpret that for these three countries without foreign restrictions, the level of foreign bank penetration is more important than whether foreign bank conducted M&A activities with domestic banks. Because for these countries, even before the Asian Financial Crisis, there were some foreign banks had already entered into their domestic market.

Turning to other control variables, we find that Equity/Total Asset ratio has positive relationship with net income, non-interest income and non-interest expense. We also see that Loan/Deposit ratio has positive relation with net income, net margin, non-interest expense and loan loss provision. GDP growth rate is positively related to the net income ratio which interprets that an increase in economic activity has positive effect of banks' overall profitability. The inflation presents a significant negative relationship with net income ratio and non-interest expense which is coincident with the reality.

TABLE 4.5: Analysis results for countries without foreign entry restrictions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	NI/TA	NI/TA	NM/TA	NM/TA	NII/TA	NII/TA	NIE/TA	NIE/TA	LLP/TA	LLP/TA
F1	0.155 (0.71)		0.286 (3.59)***		0.782 (4.99)***		0.529 (4.68)***		1.025 (2.46)**	
F2		0.038 (0.45)		0.055 (1.00)		0.388 (7.29)***		0.121 (2.74)***		0.167 (1.33)
E/A	0.842 (9.74)***	0.848 (9.76)***	0.065 (1.04)	0.046 (0.72)	0.375 (7.79)***	0.415 (7.66)***	0.157 (4.94)***	0.151 (4.69)***	0.115 (0.90)	0.157 (1.18)
L/D	0.047 (1.67)*	0.045 (1.56)	0.089 (3.51)***	0.078 (2.92)***	0.040 (1.19)	0.041 (1.21)	0.069 (4.64)***	0.071 (4.70)**	0.115 (2.10)**	0.117 (1.97)**
Rgdp	0.149 (2.41)**	0.154 (2.46)**	-0.021 (0.61)	-0.027 (0.80)	0.009 (0.19)	0.034 (0.67)	-0.019 (0.56)	-0.016 (0.46)	0.005 (0.05)	0.028 (0.31)
Inflation	-0.204 (3.22)***	-0.198 (3.09)***	-0.007 (0.18)	-0.015 (0.39)	-0.010 (0.19)	-0.014 (0.25)	-0.057 (1.64)	-0.065 (1.79)*	-0.042 (0.45)	-0.046 (0.47)
Constant	2.53 (8.03)***	2.57 (8.1)***	-4.05 (28.2)***	-4.046 (28.7)***	-3.45 (13.29)***	-3.34 (12.6)***	-3.52 (23.22)***	-3.52 (23.01)***	-5.06 (10.5)***	-4.89 (9.66)**
Observations	316	316	273	273	340	340	344	344	286	286
No. of banks	37	37	34	34	37	37	37	37	37	37
TF Effect	***	***	***	***	***	***	***	***	***	***
CF Effect	***	***	***	***	***	***	***	***	***	***
Wooldridge test	***	***	***	***	***	***	***	***	***	***
LR test	***	***	***	***	***	***	***	***	***	***
Robust t-statistics in parentheses										
* significant at 10% level; ** significant at 5% level; *** significant at 1% level										
TF Effect is Time-fixed Effect; CF effect is Country-fixed Effect and LR test is Likelihood-ratio test.										

### **4.3.3 Results of empirical model for all 6 countries with lag effect**

#### **4.3.3.1 Results of all 6 countries with one-year lag data**

We conducted analyses for all 6 countries with one-year lag effect. This section we want to test whether foreign entry has continuous influence for domestic banking industry in the following year. Same as our former analyses, all regression models consider both the country fixed effect and time fixed effect. According to Drukker (2003) and Wooldridge (2002), we also conduct tests for panel-level heteroskedasticity (Likelihood-ratio test) and autocorrelation (Wooldridge test).

The estimation results (See TABLE 5.6), indicate that foreign bank entry (F1 and F2) is significantly associated with an increasement in domestic bank net margin (column 3), non-interest income ratio (column 5 and 6), non-interest expense ratio (column 7 and 8) and loan loss provision ratio (column 9 and 10). We do not see a significant association of net income ratio with foreign entry.

We interpret that these results show foreign bank entry is associate with greater lag efficiency in the domestic banking industry. Positive effect of net margin represents foreign bank entry force domestic banks improve their efficiency in traditional lending activities. High non-interest income and high non-interest expense reflect that foreign bank entry enable domestic banks to enlarge their non-lending activities. Since foreign bank entry has stronger positive effect for non-interest income than for non-interest expense; the net non-interest profit is higher thanks to foreign bank entry effect. We could also see that the foreign share variable (F1) has stronger effect of these four dependent variables than foreign dummy variable (F2). Therefore, we interpret that for these six Asian developing countries the level of foreign bank penetration is more important than whether foreign bank conducted M&A activities with domestic banks. These one-year lag effects are smaller than direct foreign entry effect.

Turning to other control variables, we find that Equity/Total Asset ratio has positive relationship with net income, net margin, non-interest income and loan loss provision. Loan/Deposit ratio has negative effect with net income and positive

relation with net margin ratio and non-interest expense ratio. If bank uses more of its deposits to make a loan, the net margin increases. Because bank makes more loans, the non-interest expense increases.

GDP growth rate is positively related to the non-interest income and loan loss provision. The inflation presents a significant negative relationship with non-interest activities and loan loss provision which is coincident with the reality and it has a negative effect with net margin.

TABLE 4.6: Analysis results for all 6 countries with one-year lag data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	NI/TA	NI/TA	NM/TA	NM/TA	NII/TA	NII/TA	NIE/TA	NIE/TA	LLP/TA	LLP/TA
F1	0.275 (1.59)		0.358 (4.33)***		0.620 (3.66)***		0.437 (5.35)***		0.788 (2.93)***	
F2		0.055 (1.25)		-0.004 (0.12)		0.229 (5.00)***		0.060 (2.48)**		0.293 (4.58)***
E/A	0.677 (12.96)***	0.670 (12.49)***	0.181 (4.97)***	0.196 (5.23)***	0.357 (9.25)***	0.347 (8.92)***	0.129 (7.44)***	0.111 (6.03)***	-0.073 (0.95)	-0.085 (1.15)
L/D	0.035 (1.36)	0.033 (1.26)	0.077 (3.70)***	0.085 (3.86)***	0.033 (1.21)	0.026 (0.91)	0.069 (4.27)***	0.064 (4.08)***	0.060 (1.06)	0.065 (1.09)
Rgdp	0.075 (2.84)***	0.078 (2.93)***	-0.028 (1.21)	-0.026 (1.11)	-0.015 (0.56)	-0.016 (0.59)	0.002 (0.15)	0.008 (0.59)	-0.019 (0.44)	-0.015 (0.35)
Inflation	-0.149 (3.90)***	-0.148 (3.90)***	0.022 (0.75)	0.010 (0.35)	-0.035 (1.03)	-0.030 (0.87)	-0.061 (3.55)***	-0.068 (3.81)***	-0.123 (1.86)*	-0.100 (1.53)
Constant	1.946 (9.38)***	1.954 (9.35)***	-4.014 (27.14)***	-3.961 (26.1)***	-3.496 (18.6)***	-3.480 (18.4)***	-3.653 (36.9)***	-3.633 (36.4)***	-5.695 (15.9)***	-5.785 (15.7)***
Observations	700	700	558	558	702	702	730	730	628	628
No. of banks	86	86	81	81	85	85	86	86	85	85
TF Effect	***	***	***	***	***	***	***	***	***	***
CF Effect	***	***	***	***	***	***	***	***	**	**
Wooldridge test	***	***	***	***	***	***	***	***	***	***
LR test	***	***	***	***	***	***	***	***	***	***

Robust t-statistics in parentheses

\* significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level

TF Effect is Time-fixed Effect; CF effect is Country-fixed Effect and LR test is Likelihood-ratio test.

### **4.3.3.2 Results for 3 countries with foreign entry restrictions with lag effect**

The estimation results (See TABLE 5.7), indicate that foreign bank entry (F1 and F2) is significantly associated with an increasement in loan loss provision ratio (column 9 and 10). We do not see a significant association of net income, net margin, non-interest income and non-interest expense with foreign entry.

We interpret that these results mean foreign bank entry is associate with higher level of the domestic bank's non-interest income. Similar with the results for all 6 countries, we could see that the foreign share variable (F1) has stronger effect of loan loss provision than foreign dummy variable (F2). Foreign dummy variable (F2) has effect for non-interest income, while foreign share variable (F1) does not have significant effect for this dependent variable. Therefore, we interpret that for these 3 countries with foreign restrictions, the level of foreign bank penetration is more important for loan loss provision than whether foreign bank conducted M&A activities with domestic banks; and whether foreign bank conducted M&A activities with domestic banks has important effect for the non-interest income of domestic banks. Moreover the results of one-year lag data have slightly stronger effect which means that foreign entry has lag effect for domestic countries with foreign restriction.

Turning to others control variables, we see that Equity/Total Asset ratio has positive relationship with net income, net margin, non-interest income and negative effect for loan loss provision. Loan/Deposit ratio has positive relation to net margin, and it has negative relationship with net income and non-interest expense.

GDP growth rate is positively related to the non-interest income and loan loss provision which interpret that an increase in economic activity has positive effect of banks' non-interest activity and arises bank's cautious for the possibilities of bad loan. The result shows that inflation presents a significant negative relationship with non-interest income, non-interest expense and loan loss provision which is coincident with the reality. However, the result also present that inflation has

positive effect of bank's net margin, which is consistent with the research of Huybens and Smith (1999), and Demirguc-Kunt, Laeven and Levine R.(2003).

TABLE 4.7: Analysis results for countries with foreign entry restrictions with one-year lag data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	NI/TA	NI/TA	NM/TA	NM/TA	NII/TA	NII/TA	NIE/TA	NIE/TA	LLP/TA	LLP/TA
F1	0.206 (0.75)		-0.056 (0.26)		0.454 (1.26)		0.152 (1.07)		2.020 (5.26)***	
F2		0.042 (0.80)		-0.041 (0.94)		0.097 (1.30)		0.040 (1.34)		0.430 (4.42)**
E/A	0.514 (7.66)***	0.508 (7.39)***	0.120 (2.55)**	0.140 (3.03)***	0.302 (4.11)***	0.285 (3.82)***	0.018 (0.61)	0.016 (0.53)	-0.526 (5.56)***	-0.515 (5.50)***
L/D	-0.355 (3.28)***	-0.356 (3.24)***	0.142 (2.30)**	0.138 (2.25)**	0.072 (0.95)	0.083 (1.09)	-0.090 (1.77)*	-0.088 (1.71)*	0.067 (0.48)	0.084 (0.62)
Rgdp	-0.006 (0.17)	-0.005 (0.16)	-0.045 (1.34)	-0.039 (1.13)	0.074 (2.11)**	0.074 (2.14)**	0.019 (1.19)	0.020 (1.22)	0.122 (2.07)**	0.108 (1.93)*
Inflation	-0.054 (0.98)	-0.055 (1.01)	0.162 (3.57)***	0.159 (3.54)***	-0.312 (4.91)***	-0.311 (4.89)***	-0.100 (3.46)***	-0.104 (3.61)***	-0.509 (7.06)***	-0.494 (6.89)***
Constant	2.717 (5.5)***	2.711 (5.37)***	-3.636 (11.7)***	-3.546 (11.59)***	-2.911 (6.99)***	-2.983 (7.13)***	-3.058 (13.8)***	-3.067 (13.7)***	-5.840 (8.45)***	-5.991 (8.7)***
Observations	384	384	285	285	362	362	386	386	342	342
No. of bank	49	49	47	47	48	48	49	49	48	48
TF Effect	***	***	***	***	***	***	***	***	***	***
CF Effect	***	***	***	***	***	***	***	***	***	***
Wooldridge test	**	**	***	***	***	***	***	***	***	***
LR test	***	***	***	***	***	***	***	***	***	***

Robust t-statistics in parentheses:

\* significant at 10% level; \*\* significant at 5% level; \*\*\* significant at 1% level

TF Effect is Time-fixed Effect; CF effect is Country-fixed Effect and LR test is Likelihood-ratio test.

### **4.3.3.3 Results for 3 countries without foreign entry restrictions with lag effect**

Then we conduct the analyses for countries without foreign entry restrictions, which include Indonesia, Korea, and Thailand by using one-year lag data.

The estimation results (See TABLE 5.8), indicate that foreign bank entry (F1 and F2) is significantly associated with an increasement in domestic bank net margin (column 3), non-interest income ratio (column 5 and 6), non-interest expense ratio (column 7 and 8) and loan loss provision ratio (column 9). We do not see a significant association of net income ratio with foreign entry. These results are quite similar with our analysis for all 6 countries.

We could also see that foreign dummy variable (F2) has less or no effect than the foreign share variable (F1) for bank's net margin, non-interest activities and loan loss provision. Therefore, we could interpret that for these Asian developing countries without foreign restrictions, the level of foreign bank penetration is more important than whether foreign bank conducted M&A activities with domestic banks. Because for these countries, even before the Asian financial crisis, there were some foreign banks had already entered into their domestic market. These one-year lag effects are slightly smaller than direct foreign entry effect except for net margin ratio.

Turning to other control variables, we see that Equity/Total Asset ratio has positive relationship with net income, non-interest income and non-interest expense. We also see that Loan/Deposit ratio has positive relation with net margin, non-interest expense and loan loss provision. GDP growth rate is positively related to the net income ratio which interprets that an increase in economic activity have positive effect of banks' overall profitability. The inflation presents a significant negative relationship with net income ratio which is coincident with the reality.

TABLE 4.8: Analysis results for all countries without foreign entry restrictions with one-year lag data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	NI/TA	NI/TA	NM/TA	NM/TA	NII/TA	NII/TA	NIE/TA	NIE/TA	LLP/TA	LLP/TA
F1	0.270 (1.18)		0.321 (3.44)***		0.627 (3.25)***		0.551 (4.50)***		0.156 (0.34)	
F2		0.007 (0.08)		0.065 (1.14)		0.288 (4.23)***		0.116 (2.26)**		0.004 (0.03)
E/A	0.843 (9.80)***	0.845 (9.74)***	0.043 (0.70)	0.041 (0.66)	0.385 (7.75)***	0.401 (7.51)***	0.160 (4.87)***	0.146 (4.44)***	0.120 (0.92)	0.134 (1.01)
L/D	0.047 (1.68)	0.045 (1.58)	0.081 (3.13)***	0.076 (2.80)***	0.026 (0.78)	0.008 (0.23)	0.064 (4.11)***	0.059 (3.95)***	0.101 (1.81)*	0.106 (1.79)*
Rgdp	0.147 (2.38)**	0.150 (2.43)**	-0.036 (1.04)	-0.029 (0.87)	0.003 (0.06)	0.011 (0.22)	-0.024 (0.73)	-0.020 (0.58)	-0.026 (0.29)	-0.017 (0.20)
Inflation	-0.204 (3.21)***	-0.199 (3.14)***	0.005 (0.12)	-0.009 (0.24)	0.005 (0.09)	-0.000 (0.01)	-0.057 (1.63)	-0.063 (1.74)*	-0.045 (0.46)	-0.048 (0.49)
Constant	2.519 (7.9)***	2.570 (8.1)***	-4.125 (28.8)***	-4.062 (29.14)***	-3.389 (13.04)***	-3.247 (12.39)***	-3.509 (22.6)***	-3.473 (22.6)***	-5.018 (10.3)***	-4.980 (10.1)***
Observations	316	316	273	273	340	340	344	344	286	286
No. of bank	37	37	34	34	37	37	37	37	37	37
TF Effect	***	***	***	***	***	***	***	***	***	***
CF Effect	***	***	***	***	***	***	***	***	**	**
Wooldridge test	***	***	***	***	***	***	***	***	***	***
LR test	***	***	***	***	***	***	***	***	***	***
Robust t-statistics in parentheses:										
* significant at 10% level; ** significant at 5% level; *** significant at 1% level										
TF Effect is Time-fixed Effect; CF effect is Country-fixed Effect and LR test is Likelihood-ratio test.										

### 4.3.4 Foreign bank entry’s lag effect on domestic countries

Based on our analyses, we find that foreign entry has continuous effect for the following year. No matter on current year or the following year, foreign entry always has positive effect for the profitability of domestic banks. TABLE 5.9 shows the increase or decrease of foreign entry’s lag effect comparing with the effect on current year. “-” signal means lag effect is less than foreign effect in the current year; and “+” signal means lag effect is stronger than foreign effect on current year. Except 4 “+” signals, 12 “-” signals prove that the general lag effect of foreign entry decreases in the following year.

Based on Table 5.3, there are 3 effects increase for non-interest expense ratio. Because non-interest activities include salaries and benefits, expense of premises and fixed assets, buildings and other non-interest expense, improvement on these activities need longer time after M&A activities. Therefore, the effect of foreign entry increased in the following year. There is another “+” signal of net-margin ratio for 3 countries without foreign restrictions. Since foreign banks had already entered into these 3 countries, foreign entry had less effect on current year.

All “-” signals prove that even though foreign entry has less influence for domestic banks in the following year, it still has positive influence for the whole domestic banking industry, which coincide with reality.

TABLE 4.9: The change of foreign entry effect on domestic countries

		NI/TA		NM/TA		NII/TA		NIE/TA		LLP/TA	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
All 6 countires	F1			-		-		+		-	
	F2						-		-		-
countries with restrictions	F1								+		
	F2					-					-
countries without restrictions	F1			+		-		+		-	
	F2						-		-		

## 4.4 Conclusion and Further researches for Chapter 4

This paper serves to demonstrate the impact of foreign banks entry on bank performance in six Asian developing countries. Our results indicate that foreign bank entry is associated with an increase in domestic banks' profitability. Our analyses show that for these six Asian developing countries, the level of foreign bank penetration is more important than whether foreign bank conducted M&A activities with domestic banks. Moreover, foreign banks have stronger influence for countries with foreign entry restrictions than countries without foreign entry restrictions. Foreign bank entry has both direct effect on current year and one-year lag effect in the following year for domestic banking industry. In general, foreign direct effects are stronger than foreign one-year lag effect.

Our analysis may be extended in to two directions. Firstly, it would be interesting to study the effect of foreign banks entry on others countries, not only developing countries but also developed countries. This requires the access to larger sample of bank data. If I could find access to the data base BankScope it would be helpful. Secondly, in this chapter, we have used macro - economic variables, bank variable and foreign entry variable. There are may be other variables we could use, such as banking market concentration ratio, or some index related with domestic supervision and so on. We leave these suggestions for further research.

# Conclusion

A l'aide de l'indice de productivité de Malquist, le chapitre 2 a appréhendé les frontières d'efficience des banques chinoises avant et après fusion et acquisitions, pour la période allant de l'année 1998 à l'année 2007. J'utilise l'indice de productivité de Malquist, mais aussi l'indice de changement de l'efficacité technique (TEC), l'indice de changement technique dans la technologie de production (TECP), et deux éléments résultats d'une décomposition du TECP, l'indice de changement de l'efficacité technique pure (PTEC) et l'indice de changement de l'efficacité d'échelle (SEC), pour mesurer la différence de productivité entre les 14 banques commerciales chinoises, de l'année 1998 à l'année 2007.

Les résultats de l'indice de productivité de Malquist TFP sur la période de 1998 à 2007 montrent que la croissance de la productivité a été la plus élevée de 2005 à 2006. La productivité a en revanche diminué de 2002 à 2004. Les 14 banques commerciales chinoises que nous avons analysées dans ce chapitre ont connu en moyenne un taux de croissance annuel de la productivité de 6,3 % de 1998 à 2007. Les résultats montrent que 12 de ces 14 banques ont un TECP plus grand que 1, alors que seulement 5 des 14 banques ont un TEC plus grand que 1. Les améliorations technologiques (PTEC) sont la principale raison de l'amélioration de la productivité (l'indice de productivité de Malmquist). L'informatisation, l'informatisation de la communication la généralisation des guichets automatiques bancaires (GAB), pourraient avoir aidé ces banques à accroître leur revenu et réduire leurs coûts.

En considérant les banques chinoises de 1998 à 2007, il apparaît que les banques commerciales ont intégré des améliorations technologiques et obtenu des résultats en termes de productivité. *Industrial and Commercial Bank of China*

*Ltd, the Agricultural Bank of China, the Bank of China Co., Ltd et the China Construction Bank Corporation* sont les quatre plus grandes banques commerciales en Chine. Les résultats de mon étude indiquent que ces grandes banques n'ont pas les meilleures performances. Ils montrent que les 4 grandes banques ont un SEC inférieur à 1. La moyenne géométrique du SEC de 4 grandes banques est plus petit que celui des 10 autres banques commerciales, même si les 4 grandes banques ont une taille plus grande. Leur taille n'a donc pas aidé ces grandes banques à améliorer leur efficacité considérée en termes d'échelle.

La mauvaise gestion interne, la faible qualité du service, les prêts non performants et l'intervention du gouvernement sont probablement les principales raisons de l'inefficacité en termes d'échelle dans le secteur bancaire chinois en particulier pour les 4 grandes banques. Globalement, les 10 petites banques commerciales chinoises ont une meilleure performance que les 4 grandes banques. Par exemple, *China Minsheng Banking Corporation and Guangdong Development Bank Co., Ltd* présentent les meilleurs gains de productivité.

Les résultats de l'analyse de régression du chapitre 3 montrent qu'un environnement macro-économique sain et un système structuré interne de l'industrie bancaire sont très importants pour les banques commerciales chinoises. Si le taux de croissance du PIB se maintient, accompagné d'une bonne politique monétaire et bancaire, un contrôle de l'inflation, les directeurs de banque doivent donc poursuivre l'optimisation de la structure de leurs banques et améliorer encore les processus opérationnels internes.

Le chapitre 3 a contribué à analyser l'effet complexe de l'entrée des banques étrangères sur l'industrie bancaire domestique. J'ai étudié trois modes d'entrée des banques étrangères: (1) la création d'une nouvelle filiale, (2) la fusion-acquisition avec une banque publique (une grande banque générale), et (3) la fusion-acquisition avec des Joint Stock Banks (des petites banques spécialisées). Lorsque le marché des prêts standards n'est pas entièrement couvert par les banques domestiques, l'entrée des banques étrangères peut améliorer l'état des affaires, compensant ainsi l'effet d'écrémage sur les banques domestiques, et elle peut finalement augmenter le niveau d'activité et / ou les bénéfices de l'industrie bancaire domestique. Le

modèle a analysé les conditions dans lesquelles les actionnaires des banques domestiques augmentent leurs bénéfices après un mode d'entrée correspondant aux cas (2) et (3).

Selon les prédictions du modèle théorique, pour maintenir les bénéfices des banques domestiques dans le cas de création d'une nouvelle filiale de banque étrangère, l'autorité nationale devrait mettre en place des restrictions portant sur un investissement initial minimum de capitaux étrangers pour les banques étrangères. Pour les cas de fusions-acquisitions avec des grandes banques et de fusions-acquisitions avec les Joint-Stock Banks, l'autorité nationale devrait optimiser le niveau de la propriété étrangère, pour maintenir la rentabilité de l'industrie bancaire domestique.

Les résultats de chapitre 3 établissent les conditions d'une entrée profitable pour les deux partenaires (les banques domestiques et étrangères) dans le cadre de différents modes d'entrée. Ils montrent que tous les modes d'entrée peuvent s'avérer positifs si l'on considère le secteur bancaire national dans son ensemble. Les analyses ultérieures porteront sur l'endogénéisation de la stratégie de l'entrant étranger.

Le chapitre 4 a utilisé la base de données "Thomson One", montre l'impact de l'entrée des banques étrangères sur la performance des banques domestiques dans six pays en développement d'Asie, avant et après des opérations de fusions-acquisitions dans le secteur bancaire domestique. J'ai utilisé les données de la Chine, l'Inde, l'Indonésie, la Corée, les Philippines et la Thaïlande pour la période 1998-2011.

Le modèle de régression empirique proposé est basé sur le modèle théorique du chapitre 3. Les variables dépendantes représentent la rentabilité des banques domestiques. Les variables indépendantes sont des variables macro-économiques, des variables caractéristiques des banques domestiques et des variables d'entrée des banques étrangères. Les régressions examinent à la fois l'effet fixe du pays et l'effet fixe du temps. Suivant Drukker (2003) et Wooldridge (2002), j'ai fait également des tests d'hétéroscédasticité (test du rapport de vraisemblance) et

d'auto-corrélation (test Wooldridge).

Les résultats indiquent que l'entrée des banques étrangères est associée à une augmentation de la rentabilité des banques domestiques. Les analyses montrent que, pour ces six pays asiatiques en développement, le niveau de pénétration des banques étrangères est plus important. En outre, les banques étrangères ont une influence plus forte dans les pays où il y a des restrictions à l'entrée des banques étrangères que dans les pays sans restrictions à l'entrée des banques étrangers. L'entrée des banques étrangères présente à la fois un effet direct sur l'année en cours et un effet en décalage l'année suivante pour l'industrie bancaire domestique. En général, les effets directs de l'entrée des banques étrangers sont plus forts que l'effet en décalage.

Mon travail peut se prolonger dans le futur dans deux directions. Tout d'abord, il serait intéressant d'étudier l'effet de l'entrée des banques étrangères dans d'autres pays, pas seulement sur des pays en développement mais aussi des pays développés. Ce travail nécessiterait l'accès à un plus grand échantillon de données bancaires comme l'accès à la base de données *BankScope*. En second lieu, j'ai utilisé dans le dernier chapitre des variables macro-économiques, des variables relevant des caractéristiques des banques et des variables d'entrée des banques étrangers. D'autres variables sont peut-être utilisables, comme des ratios de concentration du marché bancaire, ou des indicateurs de supervision interne.

# Appendix A

## Proof of Lemma 1 and Proposition 1

### A.1 Proof of Lemma 1

From the first order conditions of equations (3.1) and (3.2), we deduce  $x_s = \frac{t_s f_s S}{2} - y_s$  and  $x_j = \frac{f_j f_j J}{2} - y_j$  where  $S = \bar{\alpha}_s + \alpha_s A^e$  and  $J = \bar{\alpha}_j + \alpha_j A^e$ . Given equation (3.3), we obtain  $A^* = b/(2 - b')$ . Given the positivity of  $b$ , the positivity of  $A^*$  is a consequence of the positivity of the denominator  $2 - b'$ , which defines the conditions of existence of a stationary value of  $A$ . We then deduce  $x_s^*$  and  $x_j^*$  by substituting the equilibrium value of  $A$  in equations (3.1) and (3.2). Equation (3.3) can be written as  $A^{t+1} = aA^t + b$  where  $a$  and  $b$  are constant deduced from the parameters of the model. The equilibrium  $A^*$  is then globally stable if  $-1 < a < 1$ . After substitutions, this condition can be rewritten as  $b' < 2$  ■

### A.2 Proof of Proposition 1

After some arithmetic and given the results of lemma 1, we obtain  $x_s^* = \frac{1}{2} f_s t_s \left[ \frac{(f_s t_s \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j)}{2 - f_s t_s \alpha_s - m f_j t_j \alpha_j} \alpha_s + \bar{\alpha}_s \right] - y_s$ ,  $x_j^* = \frac{1}{2} f_j t_j \left[ \frac{(f_s t_s \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j)}{2 - f_s t_s \alpha_s - m f_j t_j \alpha_j} \alpha_j + \bar{\alpha}_j \right] - y_j$ . We also obtain  $\pi_s^* = (\bar{\alpha}_s + \frac{f_s t_s \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j}{2 - f_s t_s \alpha_s - m f_j t_j \alpha_j} \alpha_s) \times [(1 - f_s) y_s + \frac{f_s^2 t_s}{4} (\bar{\alpha}_s + \frac{(f_s t_s \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j)}{2 - f_s t_s \alpha_s - m f_j t_j \alpha_j} \alpha_s)]$  and similarly  $\pi_j^* = (\bar{\alpha}_j + \frac{f_s t_s \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j}{2 - f_s t_s \alpha_s - m f_j t_j \alpha_j} \alpha_j) \times [(1 - f_j) y_j + \frac{f_j^2 t_j}{4} (\bar{\alpha}_j + \frac{(f_s t_s \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j)}{2 - f_s t_s \alpha_s - m f_j t_j \alpha_j} \alpha_j)]$ . We then can deduce the positivity of the derivatives of these four terms relatively to  $f_s$ ,  $f_j$ ,  $t_s$ , and  $t_j$ . The relative shares of the SOB and the JSBs markets can be written as

$\Delta = \frac{x_s^* + y_s}{x_j^* + y_j} = \frac{f_s f_s \alpha_s B + \bar{\alpha}_s}{f_j t_j \alpha_j B + \bar{\alpha}_j}$ , where  $B = \frac{b}{2-b'}$ . The derivative of  $\Delta$  with respect to  $f_s$  is  $N/D$  where  $D$  is always positive and after simplification  $N$  can be written as  $t_s \alpha_s B (t_j \alpha_j B + \bar{\alpha}_j) + f_s t_s \alpha_s B' \alpha_j - f_j t_j \alpha_j B' \bar{\alpha}_s$  where  $B' > 0$  is the derivative of  $B$  in  $f_s$ . We confirm that  $\alpha_s / \bar{\alpha}'_s \geq \alpha_j / \bar{\alpha}'_j$  is a sufficient condition for the positivity of  $N$ . More generally, if  $\alpha_s / \bar{\alpha}'_s$  is not so small compared to  $\alpha_j / \bar{\alpha}'_j$ ,  $N$  remains positive. Similar analysis can be made using the derivative of  $\Delta$  with respect to  $t_s$ . ■

# Appendix B

## Proof of Lemma 2 and Proposition 2

### B.1 Proof of Lemma 2

The first order condition of expression (3.4) provides the equation  $x_{b1} = \frac{t_b f_b}{2} - k(y_s + m y_j)$ . We then proceed as in the proof of lemma 1 to determine  $x_{s1}$  and  $x_{j1}$  from the first order conditions of equations (3.5) and (3.6). We then use (3.7) to calculate  $A_1$ . Given the positivity of the numerator, the positivity of  $A_1$  is still a consequence of the positivity of the denominator  $2 - b'$ , which defines the conditions of existence of a stationary value of  $A$ . We then by substitution can deduce  $x_{b1}$ ,  $x_{s1}$  and  $x_{j1}$ . Using the same method employed in the proof of lemma 3.1, we can easily verify the equilibrium  $A_1$  is then globally stable if  $b' < 2$  ■

### B.2 Proof of Proposition 2

The multiplier effect is represented by an improvement in the state of affairs  $A$  after entry of the foreign bank. The intensity of the cream skimming effect is defined by the amount of  $k$ . From lemma 3.3, the new state of affairs is  $A_1 = A^* + \frac{f_{b1} t_b \bar{\alpha}_b}{2 - b'}$ . The differences in the profits of the SOB and JSBs between the case of setting up new local foreign subsidiary and the benchmark case are shown in  $\pi_{s1} - \pi_s^* = (1 - f_s)(1 - k)y_s \frac{f_{b1} t_b \bar{\alpha}_b}{2 - b'} \alpha_s + \frac{f_s^2 t_s}{4} \frac{f_{b1} t_b \bar{\alpha}_b}{2 - b'} \alpha_s [\frac{f_{b1} t_b \bar{\alpha}_b}{2 - b'} \alpha_s + 2(\bar{\alpha}_s + A^* \alpha_s)] - k(1 - f_s)y_s(\bar{\alpha}_s + A^* \alpha_s)$ . The first and third components of this expression decrease when

$k$  increases (corresponding to an increases cream skimming effect). The bigger the value of  $\frac{f_{b1}t_b\bar{\alpha}_b}{2-b'}$  (multiplier effect), the greater the value of  $A_1$ , then the greater value of the first and second components in the above equation. If the multiplier effect dominates the “cream skimming” effect, the SOB’s profit will be bigger than in the benchmark model; if the “cream skimming” effect dominates the multiplier effect, the SOB’s profit will be smaller than in the benchmark model. The proof is the same for the part of proposition 2 concerning the evolution of JSBs’ profits

■

# Appendix C

## Proof of Lemma 3 and Proposition 3

### C.1 Proof of Lemma 3

The method already in use for the proofs of lemmas 1 and 2 provides the results of lemma 3 ■

### C.2 Proof of Proposition 3

The differences in the profits of the SOB between the case of foreign bank entry *via* M&A activity with the SOB and the benchmark case are shown as  $\pi_{s2} - \pi_s = (1 - \lambda)(\bar{\alpha}_s + A_2\alpha_s) \times [(1 - f_s)y_s + (1 - f_s)k'my_j + \frac{f_s^2 t_{sb}}{4}(\bar{\alpha}_s + A_2\alpha_s)] - (\bar{\alpha}_s + A^*\alpha_s) \times [(1 - f_s)y_s + \frac{f_s^2 t_s}{4}(\bar{\alpha}_s + A^*\alpha_s)]$  with  $A_2 = \frac{f_s t_{sb} \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j}{2 - b}$ . This expression increases with  $k'$  (positive cream skimming effect) but also, directly and through  $A_2$ , it increases with all improvements to the management efficiency  $t_{sb}$  for the joint venture, from the management efficiency of the SOB  $t_s$ . This difference decreases with all increases in foreign minority shareholding, as formulated in the lemma.

The profit differences for a given JSB between the case of foreign bank entry through M&A activity with SOB and the benchmark case are shown as  $\pi_{j2} - \pi_j^* = (\bar{\alpha}_j + A_2\alpha_j) \times [(1 - f_j)(1 - k')y_j + \frac{f_j^2 t_j}{4}(\bar{\alpha}_j + A_2\alpha_j)] - (\bar{\alpha}_j + A^*\alpha_j) \times [(1 - f_j)y_j + \frac{f_j^2 t_j}{4}(\bar{\alpha}_j + A^*\alpha_j)]$ . The difference depends indirectly (through  $A_2$ ) and positively on management efficiency  $t_{tb}$  improvements, the bigger value of  $A_2$ . It does not

depend on the size of the minority shareholding  $\lambda$ . But this expression decreases with all increases in  $k'$  (increase in cream skimming effect) ■

# Appendix D

## Proof of Lemma 4 and Proposition 4

### D.1 Proof of Lemma 4

See proofs of lemmas 1 to 3 ■

### D.2 Proof of Proposition 4

The profit differences for the SOB between the case of foreign bank entry through M&A activity involving the FB and the JSBs, and the benchmark case are shown as  $\pi_{s3} - \pi_s^* = (\bar{\alpha}_s + A_3\alpha_s) \times [(1 - f_s)(1 - k'')y_s + \frac{f_s^2 t_s}{4}(\bar{\alpha}_s + A_3\alpha_s)] - (\bar{\alpha}_s + A^*\alpha_s) \times [(1 - f_s)y_s + \frac{f_s^2 t_s}{4}(\bar{\alpha}_s + A^*\alpha_s)]$ . This expression decreases with the increases in  $k''$  (negative cream skimming effect). The greater the improvements in technological efficiency  $t_{jb}$ , the higher the value of  $A_3$ , the higher the value of the equation (positive multiplier effect).

Part (ii) of the Proposition is a consequence of the expression of the cost  $C$ .

The profit differences for JSBs between the case of foreign bank entry through M&A activity, between the FB and the JSBs and the benchmark case are shown

as  $\pi_{j3} - \pi_j^* = (1 - \lambda')(\bar{\alpha}_j + A_3\alpha_j) \times [(1 - f_j)(y_j + k''y_s/m) + \frac{f_j^2 t_{jb}}{4}(\bar{\alpha}_s + A_3\alpha_j)] - (\bar{\alpha}_j + A^*\alpha_j) \times [(1 - f_j)y_j + \frac{f_j^2 t_j}{4}(\bar{\alpha}_j + A^*\alpha_j)]$ .

In relation to profit changes for the JSBs, the greater the improvement to technological efficiency  $t_{jb}$ , the higher the value of  $A_3$ , the higher value of the equation (positive multiplier effect). Increases in foreign minority shareholding, result in decreased JSBs profit. So there is a negative minority foreign investment effect. Finally, the previous expression increases with an increase in  $k'$  (increased “cream skinning” effect). From these observation, we can deduce part (iii) of Proposition 4. ■

# Appendix E

## Proof of Proposition 5

### E.1 Proof of Proposition 5

We compare the profits of domestic banks before and after the creation of a new subsidiary by the foreign bank. As a consequence of Proposition 2,  $A_1 = A^* + \frac{f_b t_b \bar{\alpha}_b}{2 - b'}$ . We can then simply write  $\bar{\alpha}_j + A_1 \alpha_j = \bar{\alpha}_j + A^* \alpha_j + \bar{\alpha}_b d_1$  and express the difference as  $(\pi_{s1} + m\pi_{j1}) - (\pi_s^* + m\pi_j^*) = \bar{\alpha}_b d_1 [(m+1)m(\bar{\alpha}_j + A^* \alpha_j)] + \bar{\alpha}_b^2 d_1^2 (m+1)m + \bar{\alpha}_b d_1 [(1-k)y_j(m - mf_j + m^2 - m^2 f_s) + \frac{mf_j^2 t_j + m^2 f_s^2 t_s}{4}(\bar{\alpha}_j + A^* \alpha_j)] - mky_j(\bar{\alpha}_j + A^* \alpha_j)(m - mf_s + 1 - f_j)$ . The positivity of this expression is equivalent to the following inequality:  $\bar{\alpha}_b(m+1)(\bar{\alpha}_j + A^* \alpha_j) + \bar{\alpha}_b^2 d_1(m+1) + \bar{\alpha}_b [(1-k)y_j(1 - f_j + m - mf_s) + \frac{mf_s^2 t_s + f_j^2 t_j}{4}(\bar{\alpha}_j + A^* \alpha_j)] > ky_j(\bar{\alpha}_j + A^* \alpha_j)(m - mf_s + 1 - f_j)/d_1$ . We introduce the following simplifying assumptions:  $1 - f_j + m - mf_s = P$  and  $\bar{\alpha}_j + A^* \alpha_j = Q$ . Then,  $\bar{\alpha}_b^2 d_1(m+1) + \bar{\alpha}_b [(1-k)y_j(1 - f_j + m - mf_s) + (\frac{mf_s^2 t_s + f_j^2 t_j}{4} + m+1)Q] > ky_j(\bar{\alpha}_j + A^* \alpha_j)(m - mf_s + 1 - f_j)/d_1$ .

If we take the parameter  $\bar{\alpha}_b$ , as the control variable of the economic and financial authority, the left side of this condition takes the form of a quadratic expression with positive infinite limits. The roots of the associated equation are expressed as  $\bar{\alpha}_b = \frac{-[(1-k)y_j P + (\frac{mf_s^2 t_s + f_j^2 t_j}{4} + m+1)Q]}{2d_1(m+1)} \pm \frac{\sqrt{[(1-k)y_j P + (\frac{mf_s^2 t_s + f_j^2 t_j}{4} + m+1)Q]^2 + 4(m+1)ky_j P Q}}{2d_1(m+1)}$ . Because  $2d_1(m+1) > 0$ ,  $(1-k)y_j P + (\frac{mf_s^2 t_s + f_j^2 t_j}{4} + m+1)Q > 0$  and  $-ky_j P Q/d_1 < 0$ , the discriminant of the quadratic equation  $\Delta > 0$  and  $\frac{-[(1-k)y_j P + (\frac{mf_s^2 t_s + f_j^2 t_j}{4} + m+1)Q]}{2d_1(m+1)} < 0$ . This quadratic equation then has two distinct roots, one positive and one negative. The positive root determines the lowest value satisfying the positivity of

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the difference between the two profits. This positive root is then the lowest value admitted for  $\bar{\alpha}_b$  to make the creation of the subsidiary globally positive for the domestic banking sector ■

# Appendix F

## Simulation and Proof of Proposition 6

### F.1 Simulation

Examples of the evolution of the “welfare” index with different values of  $\delta$  in the case of M&A with the SOB

(1) With the following values of parameters:  $f_s = 0.6$ ,  $f_j = 0.5$ ,  $t_s = 0.5$ ,  $t_j = 0.6$ ,  $m = 10$ ,  $k = 0.3$ ,  $y_j = 2$ ,  $Q = 5$ ,  $d_2 = 0.05$ ,  $n = 0.2$ ,  $\delta = 0.45$  and  $r = 0.05$ , we obtain an interior solution  $\lambda_1^* = 0.8621$  (Figure F.1).

(2) With  $\delta = 0.5$  and keeping all other parameters unchanged, we obtain a constrained corner solution  $\lambda = 1$  and an unconstrained solution  $\lambda_2^* = 4.4655$  (Figure F.2).

(3) Given a value of  $\delta = 0.2$  and keeping all other parameters as the same value as before, we find that the constrained maximum of the “welfare” of domestic banking industry is at the point  $\lambda^* = 0$  and an unconstrained maximum for a negative value of  $\lambda'$  (Figure F.3).

## F.2 Proof of Proposition 6

Consider the welfare term given by the following expression:

$$\begin{aligned}
\Pi_{SOB} = & \\
(1 - \delta) & \left\{ (1 - \lambda)m^2(Q + \lambda d_2) \left[ (1 - f_s)(1 + k)y_j + \frac{f_s^2(t_s + \lambda n)}{4}(Q + \lambda d_2) \right] \right. \\
& + m(Q + \lambda d_2) \left[ (1 - f_j)(1 - k)y_j + \frac{f_j^2 t_j}{4}(Q + \lambda d_2) \right] \left. \right\} \\
& + \delta \left\{ m^2(Q + \lambda d_2) \left[ (1 - f_s)(1 + k)y_j + \frac{f_s^2(t_s + \lambda n)}{4}(Q + \lambda d_2) \right] \right. \\
& + m(Q + \lambda d_2) \left[ (1 - f_j)(1 - k)y_j + \frac{f_j^2 t_j}{4}(Q + \lambda d_2) \right] \left. \right\} / r
\end{aligned}$$

When  $\delta = 1$ , *i.e.* when only the wealth of the initial shareholders matters, only the two last terms are positive. Both increase with  $\lambda$ , which provides a corner solution  $\lambda^* = 1$ . When  $\delta = 0$ , *i.e.*, when only the wealth of the future domestic shareholders matters, only the two initial terms are positive. The second strictly increases with  $\lambda$ . The first can be or not monotonically decreasing when  $\lambda$  varies from 0 to 1, but in all cases ends-up vanishing for  $\lambda = 1$ . According to the relative weights of the first and the second terms, the welfare term increases monotonically (if the second term dominates), and decreases monotonically or reaches an interior maximum for a value of  $\lambda$  between 0 and 1 (if the first term dominates). The conclusions are the same if  $\delta$  is close to 0 ■.

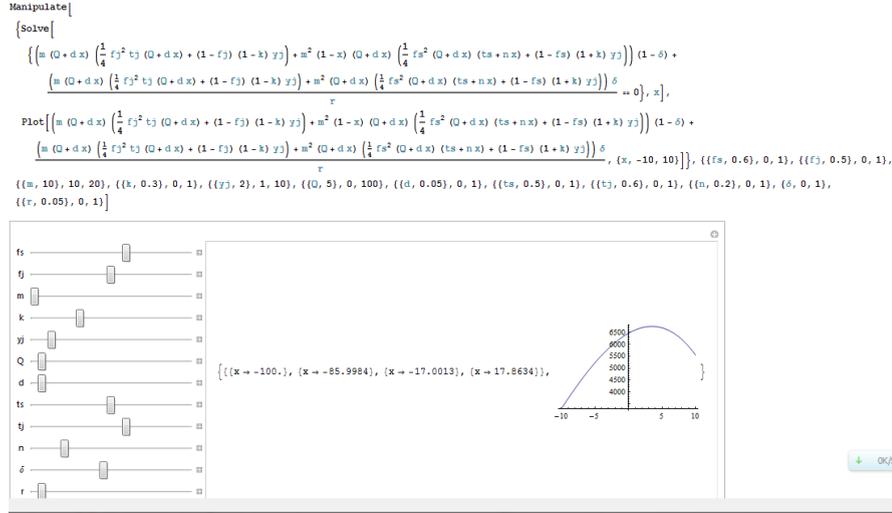


FIGURE F.1: An interior solution in  $\lambda^*$ .

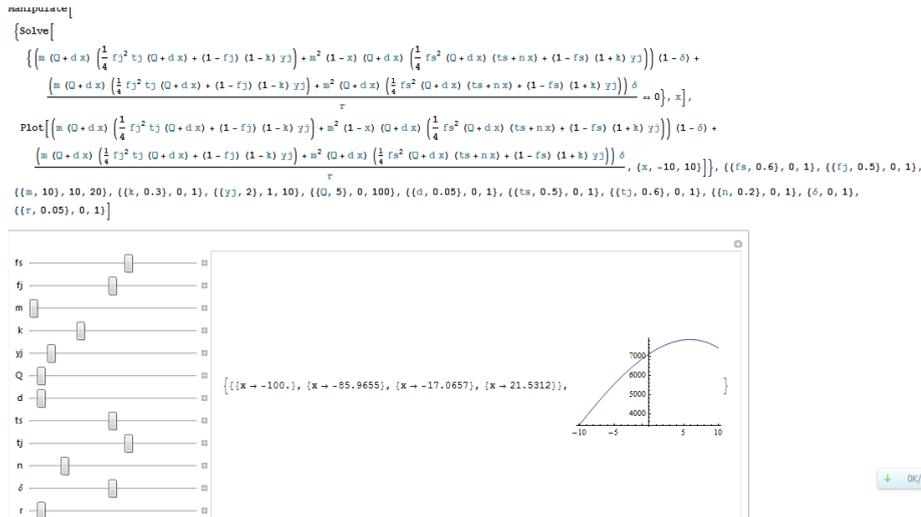


FIGURE F.2: A corner solution  $\lambda^* = 1$ .

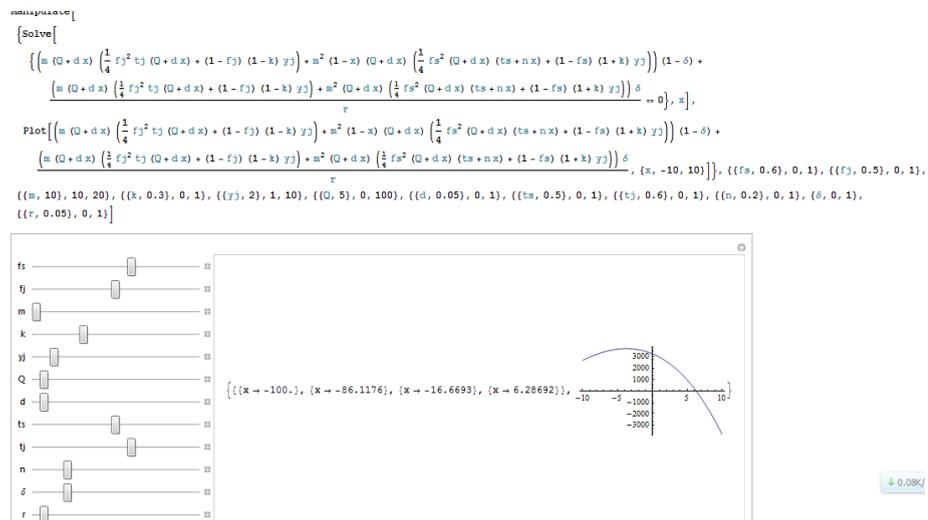


FIGURE F.3: The maximum level of total welfare of domestic banking industry is at the point of  $\lambda^* = 0$ .

# Appendix G

## Calculus derivation after the simplification

According to different profits level of our theoretical model, domestic banks would make a strategic selection between three entry modes we mentioned before.

Recall that the original equations of domestic banks' profits before and after entering into emerging banking market are as below:

### 1. Benchmark model

$$\pi_s^* = (\bar{\alpha}_s + A^* \alpha_s) \times \left[ (1 - f_s) y_s + \frac{f_s^2 t_s}{4} (\bar{\alpha}_s + A^* \alpha_s) \right]$$

$$m\pi_j^* = m(\bar{\alpha}_j + A^* \alpha_j) \times \left[ (1 - f_j) y_j + \frac{f_j^2 t_j}{4} (\bar{\alpha}_j + A^* \alpha_j) \right]$$

### 2. The profit of domestic banks if foreign bank creation of a new subsidiary.

$$\pi_{s1} = (\bar{\alpha}_s + A_1 \alpha_s) \times \left[ (1 - f_s)(1 - k) y_s + \frac{f_s^2 t_s}{4} (\bar{\alpha}_s + A_1 \alpha_s) \right]$$

$$m\pi_{j1} = m(\bar{\alpha}_j + A_1\alpha_j) \times [(1 - f_j)(1 - k)y_j + \frac{f_j^2 t_j}{4}(\bar{\alpha}_j + A_1\alpha_j)]$$

3. The profit of domestic banks if foreign bank conduct M&A activity with SOB.

$$\pi_{s2} = (1 - \lambda)(\bar{\alpha}_s + A_2\alpha_s) \times [(1 - f_s)y_s + (1 - f_s)k'my_j + \frac{f_s^2 t_{sb}}{4}(\bar{\alpha}_s + A_2\alpha_s)]$$

$$m\pi_{j2} = m(\bar{\alpha}_j + A_2\alpha_j) \times [(1 - f_j)(1 - k')y_j + \frac{f_j^2 t_j}{4}(\bar{\alpha}_j + A_2\alpha_j)]$$

4. The profit of domestic banks if foreign bank conduct M&A activity with JSBs.

$$\pi_{s3} = (\bar{\alpha}_s + A_3\alpha_s) \times [(1 - f_s)(1 - k'')y_s + \frac{f_s^2 t_s}{4}(\bar{\alpha}_s + A_3\alpha_s)]$$

$$m\pi_{j3} = m(1 - \lambda')(\bar{\alpha}_j + A_3\alpha_j) \times [(1 - f_j)(y_j + k''y_s/m) + \frac{f_j^2 t_{jb}}{4}(\bar{\alpha}_j + A_3\alpha_j)]$$

Then, we introduce the following simplifying assumptions:

- the two types of domestic banks initially have the same total number of high category loans  $y_s = my_j$ .
- the foreign bank induces the same cream skimming effect, whatever the style of entry it chooses, *i.e.*,  $k = k' = k''$ .
- $\bar{\alpha}_s = m\bar{\alpha}_j$  and  $\alpha_s = m\alpha_j$ , *i.e.* the relative size of each bank and the relative indirect effect of an increase in the distribution of credit on the return of each bank are proportional.

So, we rewrite equations of domestic banks' profits before and after entering into emerging banking market are as below:

1. Benchmark model

$$\pi_s^* = m^2(\bar{\alpha}_j + A^*\alpha_j) \times [(1 - f_s)y_j + \frac{f_s^2 t_s}{4}(\bar{\alpha}_j + A^*\alpha_j)]$$

$$m\pi_j^* = m(\bar{\alpha}_j + A^*\alpha_j) \times [(1 - f_j)y_j + \frac{f_j^2 t_j}{4}(\bar{\alpha}_j + A^*\alpha_j)]$$

2. The profit of domestic banks if foreign bank creation of a new subsidiary.

$$\pi_{s1} = m^2(\bar{\alpha}_j + A_1\alpha_j) \times [(1 - f_s)(1 - k)y_j + \frac{f_s^2 t_s}{4}(\bar{\alpha}_j + A_1\alpha_j)]$$

$$m\pi_{j1} = m(\bar{\alpha}_j + A_1\alpha_j) \times [(1 - f_j)(1 - k)y_j + \frac{f_j^2 t_j}{4}(\bar{\alpha}_j + A_1\alpha_j)]$$

3. The profit of domestic banks if foreign bank conduct M&A activity with SOB.

$$\pi_{s2} = (1 - \lambda)m^2(\bar{\alpha}_j + A_2\alpha_j) \times [(1 - f_s)(1 + k)y_j + \frac{f_s^2(t_s + \lambda n)}{4}(\bar{\alpha}_j + A_2\alpha_j)]$$

$$m\pi_{j2} = m(\bar{\alpha}_j + A_2\alpha_j) \times [(1 - f_j)(1 - k)y_j + \frac{f_j^2 t_j}{4}(\bar{\alpha}_j + A_2\alpha_j)]$$

4. The profit of domestic banks if foreign bank conduct M&A activity with JSBs.

$$\pi_{s3} = m^2(\bar{\alpha}_j + A_3\alpha_j) \times [(1 - f_s)(1 - k)y_j + \frac{f_s^2 t_s}{4}(\bar{\alpha}_j + A_3\alpha_j)]$$

$$m\pi_{j3} = m(1 - \lambda')(\bar{\alpha}_j + A_3\alpha_j) \times [(1 - f_j)(1 + k)y_j + \frac{f_j^2(t_j + \lambda'n)}{4}(\bar{\alpha}_j + A_3\alpha_j)]$$

Recall that the effective level of activity A are shown as below:

$$A^* = \frac{f_s t_s \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j}{2 - f_s t_s \alpha_s - m f_j t_j \alpha_j}$$

$$A_2 = \frac{f_s t_{sb} \bar{\alpha}_s + m f_j t_j \bar{\alpha}_j}{2 - f_s t_{sb} \alpha_s - m f_j t_j \alpha_j}$$

$$A_3 = \frac{f_s t_s \bar{\alpha}_s + m f_j t_{jb} \bar{\alpha}_j}{2 - f_s t_s \alpha_s - m f_j t_{jb} \alpha_j}$$

Then we rewrite the simplified version of the effective level of activity A as below:

$$A^* = m\bar{\alpha}_j \frac{f_s t_s + f_j t_j}{2 - m f_s t_s \alpha_j - m f_j t_j \alpha_j}$$

$$A_2 = m\bar{\alpha}_j \frac{(f_s t_s + f_j t_j) + f_s n}{2 - m f_s t_s \alpha_j - m f_j t_j \alpha_j - m f_s \alpha_j \lambda n}$$

$$A_3 = m\bar{\alpha}_j \frac{(f_s t_s + f_j t_j) + f_j \lambda' n}{2 - m f_s t_s \alpha_j - m f_j t_j \alpha_j - m f_j \alpha_j \lambda' n}$$

Compared  $A_2$  with  $A^*$ , the numerator of  $A_2$  increases by  $m\bar{\alpha}_j f_s \lambda n$  and the denominator of  $A_2$  decreases by  $m f_s \alpha_j \lambda n$ , then the value of  $A_2$  is greater than  $A^*$ . Similarly, compared  $A_3$  with  $A^*$ , the numerator of  $A_3$  increases by  $m\bar{\alpha}_j f_j \lambda' n$  and the denominator of  $A_3$  decreases by  $m f_j \alpha_j \lambda' n$ , then the value of  $A_3$  is also greater than  $A^*$ .

Because of our assumption for benchmark model that the financial efficiency of SOB is bigger than the financial efficiency of JOBs  $f_s \geq f_j$ , and here we suppose that foreign bank consider the same level of foreign investment  $\lambda = \lambda'$ , the numerator of  $A_2$  increases equal to or more than the numerator of  $A_3$  and the denominator of  $A_2$  decreases equal to more than the denominator of  $A_3$ . So we could get  $A_2 \geq A_3$ . If  $f_s = f_j$ ,  $A_2 = A_3$ ; and if  $f_s > f_j$ ,  $A_2 > A_3$ .

# References

- [1] Aguiar Mark and Gopinath Gita, 2005, “Fire-Sale Foreign Direct Investment and Liquidity Crises”, *Review of Economics and Statistics*, 87(3), pp. 439-52.
- [2] Ahern Kenneth R. and Weston J. Fred, 2007, “M&As: The Good, the Bad, and the Ugly”, *Journal of Applied Finance*, Vol. 17 Issue 1, p5-20, 16p
- [3] Alhadeff David A, 1954, *Monopoly and competition in banking*, the University of California Press, Berceley, CA
- [4] Akhavein Jalal D. , Berger Allen N. and Humphrey David B. , 1997, “The Effects of Megamergers on Efficiency and Prices: Evidence from a Bank Profit Function”, *Review of Industrial Organization* Vol. 12, Number 1, 95-139, DOI: 10.1023/A:1007760924829
- [5] Barajas Adolfo, Steiner Roberto, and Salazar Natalia, 1999, “Foreign investment in Colombia’s financial sector”, International Monetary Fund, Working Paper, WP/99/150.
- [6] Berger Allen N. and Humphrey David B., 1997, “Efficiency of financial institutions: International survey and directions for future research”, *European Journal of Operational Research*, Vol. 98, Issue 2, pp. 175-212

- [7] Bernanke Ben and Gertler Mark, 1990, "Financial fragility and economic performance", *The Quarterly Journal of Economics*, No. 105. PP 87-114.
- [8] Bonin John P. and Huang Yiping, 2002, "Foreign Entry into Chinese Banking: Does WTO Membership Threaten Domestic Banks?", *The World Economy*, Volume 25, Issue 8, pages 1077-1093.
- [9] Cavallo Laura and Rossi Stefania P. S. , 2001, "Scale and scope economies in the European banking systems", *Journal of Multinational Financial Management*, Vol. 11, Issues 4-5, pp. 515-531
- [10] Caves D.W., Christensen L.R. and Diewert W.E., 1982, "The Economic Theory of Index Numbers and Measurement of Input, Output and Productivity", *Econometrica*, 50, 1393-1414.
- [11] Charnes A. and Cooper W. W. and Rhodes E., 1978, "Measuring the efficiency of decision making units", *European Journal of Operational Research*, Vol. 2, Issue 6, pp. 429-444
- [12] Chen Xiaogang, Skully Michael and Brown Kym, 2005, "Banking efficiency in China: Application of DEA to pre- and post-deregulation eras: 1993-2000", *China Economic Review* 16 (2005) 229-245
- [13] Clarke George, Robert Cull, Laura D'Amato and Andrea Molinari, 1999, "On the Kindness of Strangers? The Impact of Foreign Entry on Domestic Banks in Argentina", *The World Bank*.
- [14] Coelli Tim J., 1996, "A Guide to DEAP Version 2.1: A Data Envelopment Analysis (Computer) Program", CEPA Working Paper 96/8, Department of Econometrics, University of New England, Armidale NSW Australia.

- [15] Coelli, T., Rao D.S.P. and Battase G.E., 1998, "An Introduction to Efficiency and Productivity Analysis", Boston, Kluwer Academic Publishers.
- [16] Commission of the European Communities, 2005, "Cross-border Consolidation in the EU financial sector", Commission Staff Working Document, Brussels.
- [17] Coppel J and Davies M, 2003, "Foreign participation in East Asia's banking sector", *Reserve Bank of Australia paper*.
- [18] Claessens Stijn, Demirfüç-Kunt Asli, and Huizinga Harry, 2001, "How does foreign entry affect domestic banking market", *Journal of Banking and Finance* 25 (2001) 891-911.
- [19] Clarke George R.G., Cull Robert, Maria Soledad Martinez Peria, 2006, "Foreign bank participation and access to credit across firms in developing countries", *Journal of Comparative Economics* 34 (2006) 774-795.
- [20] Demirguc-Kunt A., Levine R. and Min H.-C., 1998, "Opening to foreign banks : issues of stability, efficiency, and growth", *The implications of globalization of world financial markets*, p. 83-105
- [21] Demirguc-Kunt A., Laeven L., and Levine R., 2003, "The Impact of Bank Regulations, Concentration, and Institutions on Bank Margins", World Bank Policy Research Working Paper 3030
- [22] Detragiache Enrica, Tressel Th., and Gupta Poonam, 2008, "Foreign Banks in Poor Countries: Theory and Evidence", *The Journal of Finance*, Vol. LXIII, No. 5.
- [23] Drukker David M., 2003, "Testing for serial correlation in linear panel-data models", *Stata Journal* 3: 168-177.

- [24] Fare Rolf, Grifell-Tatje Emili, Grosskopf Shawna and Lovell C.A. Knox, 1997, "Biased Technical Change and the Malmquist Productivity Index", *Journal of Economics* 99(1), pp. 119-127
- [25] Farnoux Marc, Lanteri Marc, and Schmidt Jerome, 2004, "Foreign Direct Investment in the Polish Financial Sector", *Bank of France paper*.
- [26] Fiorentino Elisabetta, Karmann Alexander, Koetter Michael, 2006, "The cost efficiency of German banks: a comparison of SFA and DEA", Discussion Paper Series 2: Banking and Financial Studies No 10/2006
- [27] Fortin Mario and Leclerc André, 2007, "Should we abandon the intermediation approach for analyzing banking performance?", WP 07-01, Groupe de Recherche en Economie et Développement Internationa
- [28] Fu Xiaoqing and Heffernan Shelagh, 2007, "Cost X-efficiency in China's banking sector", *China Economic Review*, Vol. 18, Issue 1, pp. 35-53
- [29] Gelos, R. G. and Roldos, Jorge, 2004, "Consolidation and market structure in emerging market banking systems", *Emerging Markets Review*, Elsevier, vol. 5(1), pages 39-59, March.
- [30] Goldberg L., Gerard Dages B. and Kinney D., 2000, "Foreign and domestic bank participation in emmerging markets: Lessons from Mexico and Argentina", NBER Working Paper No.7714, <http://www.nber.org/papers/w7714>
- [31] Gormley Todd A., 2007, *Banking Competition in Developing Countries: Does Foreign Bank Entry Improve Credit Access?*
- [32] Hagendorff Jens, Collins Michael and Keasey Kevin, 2007, "Bank deregulation and acquisition activity: the cases of US, Italy and Germany", *Journal of*

---

*Financial Regulation and Compliance*, Vol. 15 Iss: 2, pp. 199-209.

[33] Havrylchyk Olena, 2006, "Efficiency of the Polish banking industry: Foreign versus domestic banks", *Journal of Banking and Finance*, Vol. 30, Issue 7, pp. 1975-1996

[34] Hellmann Thomas, Kevin Murdock and Joseph Stiglitz, 2000, "Liberalization, Moral Hazard in Banking and Prudential Regulation: Are Capital Requirements Enough?", *American Economic Review*, Vol. 90, No.1, pp. 147-165.

[35] Hermes N. and Lensink R., 2001, "The impact of foreign bank entry on domestic banking markets: a note", SOM research reports, 01E62

[36] Hulten Charles R., 2000, "Total factor productivity: A short biography", WP. 7471, National Bureau of Economic Research, Cambridge, MA 02138

[37] Huybens, E. and Smith, B, 1999, "Inflation, financial markets, and long-run real activity", *Journal of Monetary Economics* 43, 283-315.

[38] Isik Ihsan and Hassa M. Kabir, 2002, "Technical, scale and allocative efficiencies of Turkish banking industry", *Journal of Banking and Finance*, Vol. 26, Issue 4, pp. 719-766

[39] Isik Ihsan and Hassan M. Kabir, 2003, "Financial deregulation and total factor productivity change: An empirical study of Turkish commercial banks", *Journal of Banking and Finance*, Vol. 27, pp. 1455-1485

[40] Jesus Gustavo Garza-Garcia, 2010, "What influences net interest rate margins? Developed versus developing countries", *Banks and Bank Systems*, Volume 5, Issue 4

- [41] Kamaly Ahmed, 2007, "Trends and determinants of mergers and acquisitions in developing countries in the 1990s", *International research journal of finance and economics*, Issue 8.
- [42] Karafolas S. and Mantakas G., 1996, "A note on cost structure and economies of scale in Greek banking", *Journal of Banking and Finance*, Vol. 20, Issue 2, March 1996, pp. 377-387
- [43] Kenneth R. Ahern and J. Fred Weston, 2007, "M&As: The Good, the Bad, and the Ugly", *Journal of Applied Finance*, Vol. 17 Issue 1, P5-20, 16p
- [44] Kent Matthews, Jianguang Guo and Nina Zhang, 2007, "Non-Performing Loans and Productivity in Chinese Banks: 1997–2006", Cardiff Economics Working Papers
- [45] Kirikal Ly, 2004, "Stabilisation period and Malmquist Index of Productivity Change: An Empirical study of Estonian Banks", Papers of the 4th International Symposium of DEA: Data Envelopment Analysis and Performance Management, Birmingham, UK, 353-360.
- [46] Kraft, E., and Tirtiroglu, D., 1998, "Bank efficiency in Croatia: A stochastic frontier analysis", *Journal of Comparative Economics* 26, pp. 282-300.
- [47] Lensink Robert, Meesters Aljar, Naaborg Ilko, 2008, "Bank efficiency and foreign ownership: Do good institutions matter?", *Journal of Banking & Finance* 32 (2008) 834-844.
- [48] Li Fengying, 2003, "Discussion of International Banking M&A activities and the Challenges Chinese Banking Industry Will Face With".

- [49] Liu Zhixin and Liu Chen, 2004, "DFA analysis of the Chinese banks", the journal of quantitative and technical economics, Issue 4
- [50] Malmquist S, 1953, "Index Numbers and Indifference Curves", *Trabajos de Estadística*, 4, 1, 209-42
- [51] Matthias Köhler, 2010, "Transparency of regulation and cross-border bank mergers", ZEW Discussion Papers, No. 08-009
- [52] McKillop, D.G., Glass J.C., and Morikawa, Y., 1996, "The composite cost function and efficiency in giant Japanese banks", *Journal of Banking and Finance*, Vol. 20, pp. 1651-1671.
- [53] Monica Yang and Mary Anne Hyland, 2006, "Who Do Firms Imitate? A Multilevel Approach to Examining Sources of Imitation in the Choice of Mergers and Acquisitions", *Journal of Management*, Vol. 32 Issue 3, p381-399, 19p
- [54] PricewaterhouseCoopers, 2007, "Asia Banking Insights - Tackling the key issues in banking and capital markets in Asia", [http://www.pwc.com/en\\_GX/gx/banking-capital-markets/pdf/abi\\_final.pdf](http://www.pwc.com/en_GX/gx/banking-capital-markets/pdf/abi_final.pdf).
- [55] Santillán-Salgado Roberto J., (2005), "Global and Local Concentration Patterns in Banking An Analysis of the EU, the US and Mexico", *Latin American Business Review*, Vol. 6 Issue 1, p83, 31p.
- [56] Sasidaran Gopalan and Ramkishen S. Rajan, 2010, "Financial Sector De-Regulation in Emerging Asia: Focus on Foreign Bank Entry", *Journal of World Investment & Trade*, Vol. 11. P91
- [57] Sherman H. David, and Gold Franklin, 1985, "Bank branch operating efficiency : Evaluation with Data Envelopment Analysis", *Journal of Banking and*

Finance, Vol. 9, Issue 2, pp. 297-315

[58] Soussa Farouk, 2004, "A Note on Banking FDI in Emerging Markets: Literature Review and Evidence from M&A Data", Bank of England paper, London EC2R 8AH.

[59] Resti Andrea, 1997, "Evaluating the cost-efficiency of the Italian Banking System: What can be learned from the joint application of parametric and non-parametric techniques?", Journal of Banking and Finance 21, pp.221-250

[60] Roberto J. Santillan-Salgado, 2005, "Global and Local Concentration Patterns in Banking An Analysis of the EU, the US and Mexico", Latin American Business Review, Vol. 6 Issue 1, p83, 31p

[61] Thomas E. Copeland, J.Fred Weston and Kuldeep Shastri, 2007, "Financial Theory And Corporate Policy 4th edition", Prentice-Hall, Peking University Press

[62] Thomson Reurers, 2013, "Mergers & Acquisitions Review, Financial advisors, First nine months 2013",

*[http://dmi.thomsonreuters.com/Content/Files/3Q2013\\_Global\\_MA\\_Financial\\_Review.pdf](http://dmi.thomsonreuters.com/Content/Files/3Q2013_Global_MA_Financial_Review.pdf)*

[63] Uiboupin Janek, 2004, "Effects of foreign banks entry on bank performance in the CEE Countries", Working paper series, University of Tartu, Faculty of Economics and Business Administration ; 33

[64] Wei Yu and Wang Li, 2000, "Efficiency of Chinese Commercial Banks: A non-parametric analysis", Journal of financial research, Issue 3, 88-96

[65] Weston J.F., K. Chung, and J. Siu, 1990, "Takeover, Restructuring, and Corporate Governance 2nd edition", Prentice-Hall, Upper Saddle River, NY

- 
- [66] Wooldridge, J. M., 2002, “Econometric Analysis of Cross Section and Panel Data”, Cambridge, MA: MIT Press.
- [67] Wu Dong and Zhou Jianping, 2007, “SFA analysis of the ownership structure of Chinese commercial banks”, *Journal of financial research*, Issue 7A
- [68] Yang Daqiang and Zhang Aiwu, 2007, “Empirical analysis of cost efficiency and profit efficiency for Chinese commercial banks over the 1996 - 2005 period”, *Journal of financial research*, Issue 12, No. 330
- [69] Yang Monica and Hyland Mary Anne, (2006), “Added Who Do Firms Imitate? A Multilevel Approach to Examining Sources of Imitation in the Choice of Mergers and Acquisitions”, *Journal of Management*, Vol. 32 Issue 3, p381-399, 19p.
- [70] Yeh Quey-Jen, 1996, “The Application of Data Envelopment Analysis in Conjunction with Financial Ratios for Bank Performance Evaluation”, *The Journal of the Operational Research Society*, Vol. 47, No. 8, pp. 980-988
- [71] Zhang Jianhua, 2003, “Efficiency of the Chinese commercial bank by using DEA method and the empirical analysis over the 1997-2001 period”, *Journal of financial research*, Issue 3

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