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FINANCIAL INTEGRATION AND SCOPE EFFICIENCY POST GRAMM-LEACH-BLILEY

BY

YUAN YUAN

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree

Of

Doctor of Philosophy

In the Robinson College of Business

Of

Georgia State University

GEORGIA STATE UNIVERSITY
ROBINSON COLLEGE OF BUSINESS
2007

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ACCEPTANCE

This dissertation was prepared under the direction of the YUAN YUAN Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctoral of Philosophy in Business Administration in the Robinson College of Business of Georgia State University.

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LIST OF ABBREVIATIONS

BCAR	Best's Capital Adequacy Ratio
BHC	Bank Holding Company
BHCA	Bank Holding Company Act of 1956
BHCFR	Bank Holding Company Financial Report
CALL	Commercial Banks Call Report
CAPM	Capital Asset Pricing Model
CBs	Commercial Banks
CD	Certificate of Deposit
CEBA	Competitive Equality Banking Act of 1987
EU	European Union
FDIC	Federal Deposit Insurance Company
FDICIA	Federal Deposit Insurance Corporation Improvement Act of 1991
FEDSR	Federal Reserve Structure Report
FHC	Financial Holding Company
FRB	Federal Reserve Board
GAO	General Accounting Office
GLB	Gramm-Leach-Bliley Act of 1999
GSA	Glass-Steagall Act of 1933
GSGA	Garn-St. Germain Act of 1982
LOMA	Life Office Management Association
M&As	Merge and Acquisitions
NAIC	National Association of Insurance Commissioners
NAICS	North American Industry Classification System
NBA	National Banking Act of 1864
NICHR	National Information Center Hierarchy Report
NPW	Net Premium Written
OCC	Office of the Comptroller of the Currency
OTS	Office of Thrift Supervision
PHS	Policy Holder Surplus
P-B	Pulley and Braunstein (1992) composite model
RBC	Risk Based Capital
ROA	Return on Assets
ROE	Return on Equity
SBs	Thrift Saving Banks
SIC	Standard Industrial Classification
SLHC	Saving and Loan Holding Company
SLHCA	Savings and Loan Holding Company Act of 1967
TFR	Thrift Financial Report
THCFR	Thrift Holding Company Structure Report

ABSTRACT

FINANCIAL INTEGRATION AND SCOPE EFFICIENCY
POST GRAMM-LEACH-BLILEY

By

YUAN YUAN

July26, 2007

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Major Department: Risk Management & Insurance

The enactment of the Gramm-Leach-Bliley Act of 1999 promised the most fundamental reform to be made in U.S. financial services regulation in more than half a century. The Gramm-Leach-Bliley Act (GLB) removed barriers that forced separation between commercial banks, investment banks, and insurance companies; and it allowed subsidiaries of banks or insurance companies to engage in a broad range of financial activities that were not permitted for banks or insurers themselves. Few doubted the potential for GLB to have a profound impact on financial service providers and on the financial market. However, there is a striking lack of empirical research on the effects of diversification by financial firms. The first goal of this dissertation is to identify domestic "assurbanks" (insurers owning banks) and "bancassurers" (banks owning insurers) and to identify the unique subsidiaries of financial services companies licensed as commercial banks, thrifts, or insurance companies in the U.S. We construct a unique dataset that links the banking and insurance regulatory datasets. A second objective is to investigate the effects of integrating the banking and insurance sectors of the U.S. economy. We evaluate the market structure and operating performance of financial institutions in the integrated banking and insurance industry. Gains from exploiting scope economies and product mix efficiencies are

often cited as motives for financial institution integration. A third objective is to estimate efficiency effects from the economies of scope across the two formally separate sectors by estimating multi-product costs, revenue, and profit functions. The final objective is to test whether scope economies exist for firms that jointly produce financial products across multiple sectors and to explain the variation of scope economy estimations.

The empirical evidence suggests that both domestic assurbanks and bancassurers are large in size and count for a significant portion of the banking and insurance market share. These firms are also more diversified in terms of their traditional products with a focus on personal line products. Large bancassurers appear more interested in investing in small-size life and property-liability subsidiaries. Large assurbanks are more interested in acquiring small-size thrifts. Banks prefer to affiliate with life insurance more than property-liability insurance, and insurers are more likely to affiliate with thrift saving banks than to affiliate with commercial banks. Diversified firms have higher profitability in their traditional lines of business. Bancassurers perform well in the insurance business, but most assurbanks lose money in their banking division. The scope economy results; investigating consumption complementarities suggests that a significant number of cost scope diseconomies, revenue scope economies, and weak profit scope economies exist in the post-GLB U.S. integrated banking and insurance sectors. The scope economies are variant among firms, and certain firm characteristics (size, business portfolio, geographic diversification, product mix and diversification, insurance distribution system, and X-efficiency) are the determinants of scope economies.

CHAPTER 1

INTRODUCTION AND MOTIVATION

When the landmark financial service reform legislation, the Financial Service Modernization Act[1] (known as the Gramm-Leach-Bliley Act), was passed in 1999, it was viewed as the culmination of years of effort to reform the U.S. financial service industry and the most significant legislation in decades to affect the financial service industry. GLB repealed the 66-year old Glass-Steagall Act (GSA) of 1933[2] and eliminated the restrictions on affiliation between commercial banks and investment banks. GLB substantially modified the 43-year old Bank Holding Company Act (BHCA) of 1956[3] and removed barriers which forced separation between commercial banks and insurance companies. It allowed subsidiaries of bank holding companies, insurance companies, investment banks, and other types of financial institutions to engage in a broad range of financial activities that were not permitted before.

The potential for GLB to have a profound impact on financial services providers were great, and as the end of 2003—under the GLB Act—more than 600 companies operated as Financial Holding Companies (FHC), which represented 78 percent of the total assets of all Bank Holding Companies (BHC). In addition, more than 1,300 FHCs/BHCs became engaged in insurance agency or underwriting activities under the Act. In addition, by the end of 2003, more than 2,500 insurance companies (either through agents or through risk bearing underwriters) were affiliated with commercial banks and thrift institutions.[4] Today, financial service consumers can choose from a broadening array of financial tools and from companies either

[1] Pub. L. 106-102, 113 Stat. 1338 (1999).
[2] Pub. L. 66, 48 Stat. 162 (1933).
[3] Ch. 240, 70 Stat. 133 (1956).
[4] BHC Statutory Financial Report (multiple years); Federal Reserve Report to Congress, 2003

aiming to serve their multiple needs or companies specializing in one or two types of financial products. Thus, looking at GLB on a superficial level, given the changes that had already taken place, it appears to have produced radical changes in the insurance and banking industries.

When GLB passed, it was expected to spur waves of cross-sector mergers (M&As). However, massive cross-sector M&As did not occur. Instead, banks bought specialized securities firms and acquired insurance agencies and brokerages rather than acquiring insurance underwriting companies as had been predicted. Banks now control some of the largest insurance brokerages companies. Insurance companies applied for new thrift charters instead of commercial bank charters. After GLB, some firms even chose to de-converge. In 2002, Citigroup spun off the property/casualty insurance unit of Travelers, and St. Paul Companies bought the insurance unit from Citigroup in 2003. Later in 2005, Citigroup announced it was selling Travelers Life & Annuity to MetLife. The different activities of financial institutions following GLB and the effects we observed in the market raise important policy and research questions on the motivations and consequences of integration and the optimal structure of the financial services industry.

Some of the U.S. financial regulations have resulted mainly from historical circumstance while others have been designed to attain certain policy objectives. For instance, prior to the 1920s, the free banking approach was dominant in U.S. banking. Commercial banks were explicitly permitted to engage in security activities until the 1929 stock market. It was argued that abuse in the securities activities of commercial banks was the primary catalyst behind the banking industry collapse. The subsequent 1933 Banking Act established a wall between commercial banking and investment banking after the failure of 11,000 banks. For the past century, the insurance industry has opposed bank entry into the insurance business. They feared

that banks would enjoy unfair competitive advantages since national banks were regulated federally while insurers were subject to varying state regulations regarding capital and licensing requirements. Hence, prior to the enactment of GLB, U.S. financial services were statutorily fragmented into three broad sectors: banking, insurance, and securities.

There have been several historical arguments against U.S. financial services industry reform. Consumer advocates feared that financial conglomeration would have negative implications for consumers. For example, they warned that using just one provider would weaken customer's power to negotiate and could jeopardize people's life savings if handled by inadequately trained salespersons. Thus, one-stop shopping would cost consumers more than it would save them. Consumer advocates also pointed out the risks of privacy information abuse. In order to exploit conglomeration synergistic gains, sharing customer information and databases was expected. It was feared that affiliates would share customer information inappropriately and without informed consent. If consumers were not provided with some form of protection, they could be subjected to a heightened risk of unwanted solicitation, credit fraud, and identity theft. Their concerns were triggered by the loss of existing privacy legislation. For example, the Fair Credit Reporting Act of 1997[5] allowed affiliates to share information and gave the consumer the right to "opt-out" of cross-selling arrangements.

Over time, the financial industry headed towards consolidation. Such convergence was spurred by the changes that had been taking place in the market since the 1980s, including advancing technology, financial innovations, increased competition, changing customer's needs, financial globalization, and deregulation in other industrialized countries. Financial services institutions wanted to offer a broad array of financial products and services. The products of banks, insurers and security firms could no longer be functionally separated. The existing

[5] 15 U.S.C. §§ 6806.

regulatory structure needed to be changed as the traditional lines that separated these segments had been crossed due to the development of new financial products.[6] The country advanced financial reform in spite of the lack of financial modernization legislation. The Office of the Comptroller of Currency (OCC) began to explore the possible expansions of bank insurance power.[7] The Office of Thrift Supervision (OTS) liberally granted thrift charters so that entities could enlarge their financial service offerings. In addition, industry leaders moved forward on their own. The merger of Travelers and Citicorp in 1998 increased the pressure on Congress to pass the financial services modernization act.[8] The anti-affiliation laws were eventually repealed by GLB in 1999. Privacy advocates successfully petitioned Congress for limits on the use of nonpublic personal information. Such curbs on the use of this nonpublic personal information are built into the GLB Act.[9]

A debate exists among researchers about the motives for diversification. According to the theoretical justifications for diversification, the existence of certain imperfections in the product or capital markets is one set of explanations for a diversification strategy. Diversified production can provide various potential benefits, such as a reduction in transaction costs (Coase, 1937), the creation of internal capital markets (Stein, 1997), the expansion of the managerial skills of managers (Milbourn, Boot, and Thakor, 1999), the increase in operating efficiency through economies of scope and scale (Teece, 1980), the concentration of market power (Villalonga, 2000), the increase in debt capacity (Lewellen, 1971), and the decrease of expected taxes

[6] For example, variable rate annuities incorporate features of both insurance and investment products.
[7] For example, based on Section 92 of the National Banking Act, OCC Interpretive Letter 366 (1986) stated that national banks may sell insurance to customers residing outside small towns where their main offices or branches were located.
[8] Citicorp and Travelers Group publicly announced their merger on the morning of April 6, 1998. The combined company was named Citigroup ("Citicorp, Travelers Group to merger," *Dow Jones Newswires*, 6 April 1998 at 7:03 a.m.).
[9] The privacy provisions of GLB are located in Title V (the Financial Privacy Law). See 15 U.S.C. §§ 6801-6827 (2000).

(Flannery, Houston, and Venkataraman, 1993). An alternative explanation assumes conflicts of interest between managers and shareholders, where managers choose to diversify out of a self-interest to increase their compensation (Jensen and Murphy, 1990), power and prestige (Jensen, 1986). Diversifying make their positions more secure as they make investments using their specialized skills (Shleifer and Vishny, 1990a, b); diversifying reduces the risk of their personal investment portfolios by reducing risk for the firm since the managers cannot reduce their own risk by diversifying their portfolios (Amihud and Lev, 1981).

Proponents of financial integration claim that it provides discipline to corporate management, helps corporations restructure more efficiently than stock markets, allows economies of scale and scope, and promotes financial stability and economic development. Proponents argue that earnings diversification can lower the cost of capital and raise the debt capacity of the firm. Internal capital markets are said to be less prone to information asymmetries and other market imperfections than external markets (Williamson, 1970; Gertner, Scharfstein, and Stein, 1994). Opponents question the theorized cost advantages, and they believe that conflicts of interest between managers and shareholders, as well as, conflicts in market power concentration may lead to lower efficiency.

Economic and finance theories have discussed the potential effects of diversifying consolidation, and there exists extensive literature exploring the impact of diversifying transactions by non-financial firms on firm value (e.g., Lang and Stulz, 1994; Berger and Ofek, 1995; Servaes, 1996; Campa and Kedia, 2002; Chevalier, 1999; Hyland and Diltz, 2002; Villalonga, 2004) and on productive efficiency (e.g., Lichtenberg and Siegel, 1987; Lichtenberg, 1992; Maksimovic and Phillips, 2001, 2002; Schoar, 2002).

However, there is a significant lack of empirical research on the effects of diversification by financial firms. Carow (2001a) and Johnston and Madura (2000) found an increase in the stock prices of both the acquirer and the target; they noted gains to banks, insurers, and brokerage firms in response to the Citicorp–Travelers merger, which joined a commercial bank with an insurer, both of which also conducted securities underwriting. Cybo-Ottone and Murgia (2000) found significant market value gains associated with M&As between banks and insurers in Europe. The remaining available research of financial integration, however, has mostly focused on "within-sector" diversification, e.g., providing deposits and loans by a commercial bank (Berger, Humphrey, and Pulley, 1996) or providing property-liability and life insurance products within an insurance group (Berger, Cummins, Weiss, and Zi, 2000). Seven years after the passage of GLB, the specific ways in which GLB has affected the U.S. financial system are still widely open to question. There is still no comprehensive study analyzing the effect of GLB or one investigating the post-GLB market structure and the performance of financial institutions manufacturing multiple financial products.

One of the important elements in the current debate is the effect integration has on the efficiency of financial institutions. The purpose of this dissertation is to provide the first set of evidence to inform this debate. In this research, we estimate economies of scope of the cross-sector integration in the post-GLB U.S. financial services industry across costs, revenue and profit measures. Gains from exploiting scope economies and product mix efficiencies are often cited as motives for financial institution integration. Scope efficiency gains can be created by sharing such physical inputs as computers, furniture, or offices; employing common information systems, distribution systems, advertisement departments, or investment departments; reusing managerial expertise; obtaining external capital by issuing securities in larger sizes; providing

consumption complementarities ("one-stop shopping" convenience) to customers. However, scope diseconomies may also arise at the same time because of higher administration and coordination expenses, organizational diseconomies, cross-subsidization in internal capital markets, or they may arise because of the loss of specialized expertise for customers needing tailored products.

Since the 1990s, substantial research has been devoted to measuring the productive efficiency of financial institutions, particularly in commercial banks. Literally hundred of studies have been conducted to estimate various measures of efficiency of financial institutions located in more than two-dozen countries.[10] However, there is little research on the efficiency effects of integrating providers of different categories of financial services into universal-type organizations. The little evidence that exists is extrapolated either from scope efficiency within one sector of the financial industry, e.g., the commercial banking (Berger, Hanweck, and Humphrey, 1987; Berger, Hancock, and Humphrey, 1993; Berger, Humphrey, and Pulley, 1996) or the insurance industry (Grace and Timme, 1992; Berger, Cummins, Weiss, and Zi, 2000), or from simulations of risk diversification benefits of diversifying integration in the absence of any synergistic gains (Kwast, 1989; Boyd, Graham and Hewitt, 1993; Whalen, 1999b; Allen and Jagtiani, 2000; Lown, Osler, Strahan, and Sufi, 2000). To the best of our knowledge, this research is the first to evaluate the costs, revenue and profit scope economies resulting from cross-sector integration in the post-GLB U.S. financial service industry.

We utilize a two-stage econometric method to investigate economies of scope. The analysis proceeds as follows. We first estimate costs, revenue, and profit scope economy scores using econometric functions. Then, in the second stage, the scores from the first stage are

[10] Berger and Humphrey (1997) critically reviewed more than 130 studies and summarized empirical efficiency estimates of financial institutions in 21 countries.

regressed upon a set of variables describing firm characteristics and environments.[11] The second stage regression allows us to test whether scope economies exist for firms that jointly produced financial products across multiple sectors and allows us to explain the variation of scope economy estimations.

A likely reason empirical research on the integration of the banking and insurance sectors is so scarce is because the regulatory data sets available to study this issue are product specific, and there is no convenient way to identify companies affiliated with one another across sectors. Thus, the first effort in our study is to construct a unique dataset which links the insurance regulatory data sets available from the National Association of Insurance Commissioners (NAIC) with the bank regulatory data sets from the Federal Reserve Board (FRB), the Federal Deposit Insurance Company (FDIC), and the Office of Thrift Supervision (OTS). The combined data set exists for of all financial conglomerates (bancassurers and assurbanks), specialist banks, and specialist insurers in the U.S. banking and insurance industry during the years 2003, 2004, and 2005. In addition, the existence of the combined data set will facilitate academic research to document the economic outcomes of combining formerly separate sectors of the financial service industry.

This dissertation is organized as follows: Chapter 2 discusses the history of U.S. financial integration and reviews GLB and its effects on the U.S. banking and insurance industries. Chapter 3 reviews the literature and research on GLB and U.S. financial market integration. Chapter 4 describes the construction of the dataset. In Chapter 5, we identify the relevant firms in both the banking and insurance markets. Chapters 6 and 7 present the market analysis and

[11] The two-stage procedure used literature explaining the differences in efficiency. Bank studies include Aly *et al*. (1990), Berger *et al*. (1993), Pi and Timme (1993), Kwan and Eisenbeis (1995), Mester (1996), and Berger and Hannan (1998). Thrift institution studies include Cebenoyan *et al*. (1993a, 1993b), Mester (1993), and Hermalin and Wallace (1994). Insurance firm studies include Garder and Grace (1993), Berger *et al*. (2000), and Cummins *et al*. (2003).

discuss the results. Chapter 8 discusses the concept of scope economies and reviews the prior research relevant to the U.S. financial services industry. In Chapter 9, we develop the testable hypotheses. Chapter 10 explains the estimation methodologies and the data set used and outlines the estimation of inputs, outputs, and prices. Chapter 11 reports the scope economies estimation results and discusses the regression results. Chapter 12 offers conclusions.

CHAPTER 2

HISTORY OF U.S. FINANCIAL INTEGRATION AND GLB ACT

Prior to 1999, U.S. financial services were statutorily separated into three broad sectors: banking, insurance, and securities. The securities sector was one area of the financial services industry that exhibited significant crossover with banks. The Glass-Steagall Act of 1933 established a wall between commercial banking and investment banking after the failure of 11,000 commercial banks. The 1933 Act prohibited banks from principally engaging in underwriting securities. However, in 1986 the FRB eased these restrictions by raising the limits of bank-ineligible securities activities to less than 5 percent of BHC's total revenue. The revenue limit was raised to 10 percent in 1989 and to 25 percent in 1996. These securities subsidiaries are called "Section 20 companies."

Unlike affiliations between banks and securities companies, affiliations between banks and insurance companies have been highly restricted since the early 1900s. GLB totally lifted barriers which restricted competition across financial sectors. Because of the lack of data for security firms relevant to insurance and banking, this dissertation focuses on the integration across U.S. banking and insurance sectors. In this section, we investigate the background and regulatory history of financial service integration in the U.S. banking and insurance sectors. We trace how banks became involved in insurance activities and how insurers have expanded their traditional business to offer banking products.

2.1. DEFINITION OF BANCASSURANCE AND ASSURBANKING

A *financial conglomerate* is commonly defined as any group of companies under common management control that provides services, predominantly in two or more of the three major

financial services sectors.[12] In this dissertation, we differentiate between bank-initiated and insurer-initiated financial conglomerates and, therefore, define bancassurance and assurbanking as follows: *Bancassurance* is the process of a bank selling insurance products manufactured by insurance subsidiaries that are owned by the bank, either through its own distribution channels or through outside agents. *Assurbanking* is the process of an insurance company selling banking products manufactured by banking subsidiaries that are owned by the insurer. Instead of focusing on distribution and cross-selling, our definition focuses on the manufacturing of cross-sector financial service product, and encompasses integration of production, management, and controlling rights.

Thus, we differentiate from other studies that have defined the integration of banking and insurance in other ways. For example, *financial integration* has been defined as a financial service group participating in more than one of the major sectors of the financial service industry (e.g., commercial banking, insurance underwriting, investment banking) either in-house or in separately capitalized subsidiaries of the group.[13] *Diversification* of a financial company occurs when a financial institution expands beyond its traditional or existing business to new business activities, either in its primary financial sector (concentric diversification) or in other financial sectors (conglomerate diversification).[14] In contrast, *universal banking* is the term commonly used to refer to diversified bank institutions in the European Union (EU) that manufacture and distribute diversified cross-sector financial services.[15]

[12] Skipper and Kwon (2007), p. 656.
[13] Financial integration can also be referred as "financial conglomeration" or "conglomerate diversification."
[14] In the literature, "diversification" often refers to geographical diversification, horizontal diversification, vertical integration, concentric diversification, business diversification, or conglomerate diversification.
[15] Unlike universal banks in the other EU countries, German universal banks are allowed to hold equity stakes in both financial and non-financial firms (Vander Vennet, 2002).

2.2. INSURANCE INVOLVEMENT IN BANKING PRE-GLB

Insurance companies have been highly constrained in their ability to penetrate the banking market compared to the access of their banking counterparts. In the early 1900s, in New York (and some other states), policies restricted the ability of insurance companies to invest in common stocks. Insurance companies were required to divest themselves of bank stocks and were prohibited from acting as underwriters for securities or engaging in securities syndications. In competition with banks, insurance companies in the 1950s began entering the home mortgage market and made loans to corporations. In the 1960s, a series of M&As occurred in the insurance industry, which sometimes involved non-insurance businesses, including banks and thrifts. In response, the National Association of Insurance Commissioners (NAIC) approved a model insurance holding company statue, designed to impose restrictions on companies intending to acquire insurers and to target companies insurers intended to acquire. The model statue was subsequently adopted by most states. Under the model statue, the state regulator had the power to oversee the activities of an insurance holding company and its non-insurance subsidiaries.

Prior to GLB, in an effort to meet bank competition, insurers found ways around the Bank Holding Company Act (BHCA) prohibition of affiliating banking and insurance activities. The most popular strategy involved insurers acquiring unitary thrift holding companies, non-bank banks, and limited purpose trust companies. The Savings and Loan Holding Company Act (SLHCA) of 1967[16] provided that a company owning only a single thrift institution was a unitary thrift holding company and was not subject to any restrictions on other activities undertaken. Therefore, an insurance company or its holding company could legally purchase a single thrift. A second strategy allowing insurers to enter banking was to operate non-bank banks. The BHCA of 1956 defined a bank as an institution that "both accepted demand deposits and made commercial

[16] Pub. L. 90-255, 82 Stat. 5 (1968).

loans." Insurance companies exploited this definition by establishing a non-bank bank that either accepted saving deposits but not demand deposits, or one that made consumer loans but not commercial loans.[17] A third strategy was to establish a limited purpose trust company, which was not considered a bank if it accepted only trust funds (not demand deposits) and did not offer FDIC insurance on these deposits.

2.3. BANK INVOLVEMENT IN INSURANCE PRE-GLB

From a historical perspective, BHCs, national banks, state-chartered banks and thrift saving banks have long possessed federal permission to engage in a range of insurance activities.[18] In this section, we review the regulation and legislation on BHCs, national banks, state banks, and thrifts, respectively.

In 1916, Congress amended the National Banking Act (NBA) of 1864.[19] Section 92 of NBA prescribed the legislative scheme for giving national banks the authority to sell insurance. National banks were empowered to locate and sell insurance in any place with a population of no more than 5,000 – the famous "place of 5,000" provision. During the era of the Great Depression, banking and securities activities were separated, and affiliations between commercial banks and securities companies were prohibited by the Glass-Steagall Act of 1933.[20] For BHCs, Section 4(c)(8) of the Bank Holding Company Act (BHCA) of 1956[21] permitted BHCs to engage in activities of a "financial, fiduciary or insurance nature," which included

[17] In 1987, the Competitive Equality Banking Act (CEBA), Pub. L. 100-86, 101 Stat. 552 (1987), redefined "bank" to include any institution with FDIC deposit insurance. However, CEBA grandfathered non-bank banks existing before March 5, 1987, also known as CEBA banks.

[18] The banking industry has a dual chartering system and is regulated at both the state and federal levels. The National Banking Act of 1864 provides for a system of banks to be chartered by the federal or state governments. State chartered banks may conduct business under the mandates of state law. Nationally chartered banks are empowered to engage in a specific set of activities under the National Banking Act. Their parent holding companies are regulated under the BHCA by the Federal Reserve Board. The BHCs and their non-banking subsidiaries business (such as finance and mortgage companies), before GLB, were also limited to those closely related to banking.

[19] Ch. 106, 13 Stat. 99 (1864).

[20] The Glass-Steagall Act of 1933 prohibited banks from being principally engaged in underwriting securities.

[21] Ch. 240, 70 Stat. 133 (1956).

insurance agency activities. However, the Federal Reserve Board (FRB) still did not approve the general insurance underwriting for BHCs during 1950 to 1970.

In 1971, the FRB first promulgated the list of permissible non-banking activities for BHCs, including permissible insurance activities in what was known as Regulation Y. However, a decade later, Congress passed the Garn-St. Germain Act (GSGA) of 1982[22] that rolled back Regulation Y and prohibited BHCs from providing insurance as principal underwriters, agents or brokers, with the following exemptions: BHCs could underwrite and sell credit life insurance, credit accident and health insurance, and mortgage related insurance; BHCs could act as agent or broker for property insurance on loan collateral; BHCs could sell general insurance in towns of less than 5,000 inhabitants; small BHCs with total assets of less than $50 million could engage in any insurance agency activities, except for annuities and life insurance sales; and BHCs engaging in insurance agency activities engaged in before 1982 were allowed to continue.[23] Under Regulation K, BHCs were permitted to underwrite or sell any type of insurance overseas without restriction and were also allowed to own foreign insurance companies.[24]

National banks, which are chartered by the Office of the Comptroller of the Currency (OCC), could be owned by a BHC and could exercise the powers contained in the National Banking Act and the regulations promulgated by the OCC. There are two sources of authority for national banks to engage in insurance activities: Section 24 of the National Banking Act and the "place of 5,000" exception in Section 92 of the National Banking Act. Section 24 did not permit national banks to engage in insurance agency or underwriting business in general. However, the

[22] Pub. L. 97-320, 96 Stat. 1469 (1982).
[23] The Garn-St. Germain Act of 1982 grandfathered insurance agency activities specifically engaged in before May 1, 1982, with strict limitation. Insurance agency activities specifically engaged in before January 1, 1971, were fully grandfathered without limitation of product type or geographic location. However, this grandfather privilege was not transferable.
[24] The FRB intended to improve the international competitiveness of U.S. banking organizations by expanding permissible activities abroad and by reducing regulatory burden associated with the conduct of such activities. BHCs, therefore, could establish offshore subsidiaries to engage in insurance abroad.

OCC recognized exceptions to this general rule and approved the underwriting and selling of title insurance, credit related insurance,[25] and mortgage guaranty reinsurance, as well as acted as an agent in the sale of municipal bond insurance, mortgage reinsurance, and crop insurance. Since 1986, the OCC expanded national banks' insurance powers under the "place of 5,000" exception in Section 92 by allowing national banks or their branches, located in any place with a population of 5000 or less, to sell insurance to their customers located anywhere in the nation.

State banks are chartered by individual states, and the ability of state banks to diversify into the insurance industry varies by state. For years, a number of states allowed their state banks to provide insurance services to their customers. For example, South Dakota and Delaware led the way in authorizing insurance activities for banks chartered in their states. In 1991, the Federal Deposit Insurance Corporation Improvement Act (FDICIA)[26] limited the activities of any FDIC-insured state-chartered banks acting as a principal to those activities permissible for national banks. However, state-chartered banks could still engage in agency activities authorized by state-chartered authorities. Other insurance activities could be authorized under FDICIA if permitted under state law. FDICIA specifically prohibited state banks from underwriting insurance except to the extent permitted for national banks and grandfathered underwriting activities. By the end of 1998, 40 states allowed state banks to operate insurance agencies, increasing from 22 states in 1995.

The Office of Thrift Supervision (OTS) is the regulatory supervisor of federally chartered saving banks and federal and state-chartered saving associations and their holding companies.[27] Since the 1970s, insurance selling has been a pre-approved activity for thrift institutions. Under

[25] These products included credit life, health and accident insurance, mortgage life and disability insurance. National banks were allowed to sell crop insurance through insurance agencies without geographic restriction.
[26] Pub. L. 102-242, 105 Stat. 2236 (1991).
[27] Saving institutions include saving banks and saving associations, and throughout this dissertation we refer to them as saving institutions or thrift saving banks.

federal law, thrifts may engage in non-thrift activities through their service corporation subsidiaries. Multiple savings and loan holding companies[28] were generally limited in their non-thrift activities, but they were permitted to engage in insurance agency business. However, a unitary savings and loan holding company and its non-thrift subsidiaries were not restricted with respect to the activities they could engage in. Thus, unitary savings and loan holding companies could legally own insurance companies (either agents or risk-bearing underwriters). By purchasing one, and only one, thrift institution, insurance companies could obtain a license with the OTS as a unitary savings and loan holding company.

In summary, insurance companies in the U.S. have historically had a difficult time offering a wide range of banking products prior to the passage of GLB. Banks, however, could act as agents or brokers selling insurance products but were severely limited in what they could do as far as underwriting insurance products. Given regulations prohibiting most banks from producing insurance prior to GLB, some U.S. banks attempted to enter the insurance business by designing new products, which incorporated insurance features. These insurance-like products included, for example, municipal bond guarantee insurance, which was allowed by the OCC in 1985, and the CD (certificate of deposit) annuity introduced by several small banks, which permitted the annuitization of an amount deposited into a CD.

2.4. GRAMM-LEACH-BLILEY ACT OF 1999

On November 12, 1999, President Clinton signed into law the Gramm-Leach-Bliley Act. The law allowed banks of all sizes to be able to offer their customers a wide range of financial products and services manufactured by the same financial service conglomerate. In addition, other types of financial companies – insurance and securities companies, or even, financial

[28] A multiple savings and loan holding company controls directly or indirectly two or more federally or state-chartered thrift institutions insured by FDIC.

technology companies were able to more readily form into a single financial operation. Numerous financial products across sectors were now permitted to be manufactured under one roof.

2.4.1. IMPACT ON BANKS ENTERING INSURANCE

GLB provides two vehicles to allow financial institutions to engage in new types of financial activities or to affiliate with other financial companies: financial holding companies (FHCs) and financial subsidiaries. FHCs, the more flexible of the two possibilities, may engage in new activities that are financial in nature, including banking, merchant banking, securities, insurance underwriting or agency through a holding company affiliate regulated by the Federal Reserve Board. BHCs can apply and elect to be FHCs and then conduct all activities permitted under GLB and BHCA. These activities must be 1) financial in nature or incidental to such financial activity or 2) complementary to a financial activity and present no substantial risk to the safety or soundness of the financial institutions or the financial system. As of March 11, 2000, the date GLB went into effect, the FRB announced the list of the first 117 FHCs.[29]

GLB provides banks with the alternative of using a subsidiary rather than an FHC as the vehicle for conducting new financial activities. A financial subsidiary, which can engage in most of the newly-authorized activities, must be a direct subsidiary of a bank. The most important difference between the FHC and the financial subsidiary is that the latter is prohibited from engaging in certain financial activities as a "principal." Therefore, there is no requirement that a bank organization has to be part of an FHC to engage in new activities (except for prohibited activities[30]) through a financial subsidiary. Under GLB, neither a national bank nor its subsidiaries may underwrite insurance unless underwriting was permitted by the OCC rulings

[29] Federal Reserve Board statistic release.
[30] The prohibited activities are insurance underwriting and annuity issuance, real estate development or investment, and merchant banking.

before January 1, 1999. National banks may still act as an insurance agent in offices of the national bank located in a place of less than 5,000 inhabitants. In general, state banks are prohibited by the FDICIA from engaging in insurance underwriting even if permitted under state law, except to the extent that the activity is permitted for national banks. The new insurance underwriting restrictions for national banks in GLB also restrict the underwriting ability of state banks. A state bank may also own a subsidiary that engages in activities comparable to those permitted by GLB for the financial subsidiaries of national banks.[31]

The GLB Act substantially expands the ability of a bank to affiliate with any financial institution, such as an insurance company or a security firm. However, with limited exceptions, GLB withholds the longstanding prohibition on a bank affiliating with commercial companies. Recognizing that thrift institutions have become much more like banks, GLB also prohibits a commercial company from affiliating with a thrift institution and specifically acquiring a thrift institution through the "unitary thrift holding company" vehicle.[32]

2.4.2. IMPACT ON INSURERS ENTERING BANKING

An insurance company and its holding company may take advantage of GLB and apply to become an FHC so that it may begin manufacturing banking products. If an insurance company elects to become an FHC, it may continue to engage in all prior lawful non-banking activities in which it was engaging as of September 30, 1999. In addition, insurance companies still have the option to expand into the banking industry through the vehicle of saving and loan holding companies (SLHC). Following GLB, the OTS ruled that SLHCs are eligible under GLB

[31] A grandfather provision allows state banks to retain their existing subsidiaries, which may or may not qualify as a financial subsidiaries, and to continue to engage in activities lawfully conducted before the enactment of GLB.
[32] GLB grandfathers any commercial company that was a unitary thrift holding company as of May 4, 1999 or had an application pending at the OTS to become a unitary thrift holding company as of that date.

to engage in the same list of financial activities permissible for FHCs.[33] SLHCs generally are subject to revenue and other restrictions applicable to BHCs and have to abide by conditions imposed by the Federal Reserve on FHCs.

Since the passage of GLB, the majority of insurers that have entered the banking sector have done so by using SLHCs instead of FHCs. By 2005, more than 40 insurers were approved by the OTS as SLHCs and engaged in banking business through their thrift subsidiaries.[34] Only one insurance company, MetLife, chose to become an FHC and own a small commercial bank. The most likely reason for this is the regulatory burden. FHCs and commercial banks are regulated by various regulators. For example, federally chartered commercial banks are regulated by the OCC; state chartered commercial banks are regulated by the state banking regulatory authorities; insured commercial banks are also monitored by FDIC, and FHCs are regulated by the Federal Reserve. However, the only regulator for thrifts and SLHCs is the OTS. In addition, thrifts have much more freedom in establishing branches and offices nationwide. Thrifts may do business in any state in the nation without restrictions. In order to expand business to other states, commercial banks have to meet different requirements imposed by different states, e.g., branch restrictions.

Another aspect of GLB, which facilitates insurance companies' entry into banking via an FHC, is the provision permitting mutual insurance companies to re-domesticate to another state for the purpose of converting to a stock company. An insurance company organized in a mutual organizational form may wish to convert to a stock company form to obtain access to equity capital and related financing alternatives (convertible debentures, warrants, or preferred stock) from the capital market. These financial alternatives are necessary to expand the financial

[33] *Federal Register*, November 8, 2001 issue.
[34] Thrift Holding Company Structure Report. For example: State Farm owned Sate Farm Bank; Allstate owned Allstate Bank; American International Group owned AIG Federal Saving Bank.

activities under the new powers (Viswanathan and Cummins, 2003; Butler, Cui, and Whitman, 2000; Cagle, Lippert, and Moore 1996). Such demutualization can also provide enhanced corporate structure flexibility and make it possible for mutual insurance companies to affiliate with other financial institutions. GLB eases the process of converting the status of a company by permitting a mutual insurance company to easily re-domesticate to a state with laws favorable for conversion to the stock company form of ownership.

CHAPTER 3

LITERATURE REVIEW

The available research on U.S. financial integration has been limited and mostly focused on the immediate wealth effects of GLB and on the potential efficiency effects developed from simulations. Using event-study methodology, Carow (2001a) and Johnston and Madura (2000) investigated the 1999 merger of Citicorp with Travelers, which signaled impending financial modernization, and found positive market value gains for the merged entity, life insurers, large banks, and brokerage firms. Carow and Heron (2002) examined the capital market reaction to GLB and found that only insurance and investment companies were predicted to benefit from GLB. Carow (2001b) focused on how a reduction in the insurance industry's barriers to bank entry affected the market value of firms in the insurance and banking industry. His evidence suggested that insurance companies experienced a significant reduction in wealth surrounding the OCC and Supreme Court rulings[35] while bank stock prices did not change significantly. However, Mamun, Hassan, and Maroney (2005a) and Neale and Peterson (2005) suggested that the main winners from GLB were property-liability insurers followed by life insurers, and larger insurance companies benefited more from GLB than others.

The results of wealth effects on the banking industry are mixed. Akhigbe and Whyte (2001) also found positive valuation effects of GLB on the banking industry. Hendershott, Lee and Tompkins (2002), on the other hand, did not find significant wealth effect of GLB on banks. A recent study by Mamun, Hassan and Maroney (2005b) found the impact of GLB on the

[35] The OCC granted national banks the right to sell fixed-rate annuities on April 4, 1985, and variable-rate annuities on February 12, 1990. Based on Section 92 of the NBA, on August 13, 1986, the OCC ruled that a national bank or its branch located in a place of 5,000 or less population may sell insurance products to its customers located anywhere. The 1995 Supreme Court case (NationBank vs. VALIC) and 1996 Supreme Court case (Barnett Bank vs. FL Insurance Commissioner) upheld the OCC rulings and brought this segment of regulatory change to completion.

banking industry, including welfare gains by the banking industry and decreased exposures to systematic risks after passage of GLB.

A second series of papers attempted to estimate the potential efficiency gains of consolidation. For example, Berger (2000) and Saunders and Walter (1994) argued that allowing universal banking would enhance the efficiency of the financial service industry, without increasing the risks to the financial system stability. Cummins, Tennyson, and Weiss (1999) examined the relationship between diversifying M&As, efficiency, and scale economies in the U.S. life insurance industry over 1988-1995. They found that diversifying M&As *within* the life insurance industry had a beneficial effect on efficiency.[36] Berger, Cummins, Weiss, and Zi (2000) investigated economies of scope in the U.S. insurance industry by studying diversified and specialist insurers for the period 1988-1992 and found cost scope economies and revenue scope diseconomies, as a result of providing life insurance and property-liability insurance jointly. Berger, Hancock, and Humphrey (1993) showed that joint production was more efficient for banks in limited branching and statewide branching regulatory environments, and specialization was more efficient for others in unit banking regulatory environments. Berger, Humphrey, and Pulley (1996) found little or no revenue scope efficiency between deposits and loans in term of charging customers for joint consumption benefits.

Although a number of studies have been done across products *within* a sector, only a handful of studies exist, which investigate the *cross-industry* integration of the U.S. financial service industry and which investigate financial conglomerations. Two exceptions are papers by Berger (2000) and Malkonen (2004), which theoretically analyzed the efficiency and competitive implications of financial conglomeration. Berger (2000) suggested that integration across financial service industries increased the potential for efficiency gains and that integration also

[36] Also see Gardner and Grace (1993), Cummins and Zi (1998).

may bring greater revenue efficiency gains than cost efficiency gains with most of the gains coming from the benefits of risk diversification. Malkonen (2004) conducted a study on financial conglomeration driven by cost-efficiency gains and suggested that conglomeration triggers competition in the credit market and increases profits in insurance. His model showed that cost-efficiency gains were fully passed to consumers and aggregate risk in the financial markets was reduced, suggesting lower capital requirements for financial conglomerates.

Meanwhile, there is a significant lack of empirical research on the effects of diversification by financial firms. Since affiliation across industries was prohibited prior to GLB, research in this area has only progressed using simulated data. Boyd, Graham and Hewitt (1993) examined the effect of BHC mergers with non-bank financial firms. Using simulated data, they found that BHC mergers with life and property/casualty insurance companies reduced risk. Wall, Reichert and Mohanty (1993) focused on the question of whether deregulating commercial bank activities would affect a banks' riskiness by examining the portfolio effects of combining bank activities with non-bank financial activities. Their results suggested that portfolios, along with certain industries in which banks have been seeking to remove barriers to growth, offer significant opportunities for increasing return while lowering risk. Reichert and Wall (2000) updated and extended the earlier empirical analysis by Wall *et al*. (1993) and suggested that efficient diversification may change over time, perhaps due to certain factors, such as the macroeconomic environments or advancing technologies. Allen and Jagtiani (2000) created a synthetic financial conglomerate consisting of one bank, one securities firm, and one insurance company. They showed lower overall risk but higher systematic risk in the banking industry because of integration.

Whalen (1999a, 1999b) examined the overseas insurance activities and securities activities of U.S. BHCs for the period from 1987 to 1997.[37] Whalen found that average returns on both foreign insurance and securities activities were higher than traditional banking activities and that the combination of insurance and securities business in banks can noticeably improve a bank's risk and return opportunities. He concluded that overseas insurance and securities activities reduced risk for U.S. banks.

However, to our knowledge, there has been no empirical study available investigating *cross-sector* integration in the U.S. financial industry. Only a handful of studies provide some mixed evidence on universal banking in the European Union. Cybo-Ottone and Murgia (2000) studied M&As between banks and insurers in Europe and found that many of the events increased combined value. Lang and Welzel (1998) found scope economies for small German banks; Allen and Rai (1996) found very small scope economies of universal banking in the EU; Vander Vennet (2002) showed limited evidence of scope economies of banking in the EU and no consistent evidence of expansion path subadditivity.

[37] U.S. BHCs are allowed to be involved in insurance and securities activities overseas by Federal Reserve Regulation K. They are required to report separately on foreign bank activities with the Federal Reserve.

CHAPTER 4

CONSTRUCTION OF THE BANKING/INSURANCE DATABASE

The regulatory data sets in the U.S. covering financial service firms are product specific, with no convenient way to identify affiliations among companies across different product lines (i.e., bancassurers and assurbanks). Thus, one of the main efforts in this dissertation is to construct a linking variable that allows us to match the unique company identifiers between the insurance and bank regulatory data sets.

The data come from a variety of sources. The variable we develop links the unique company identifiers in the National Association of Insurance Commissioners (NAIC) insurance data sets together with the identifiers in the Bank Holding Company Financial Report (BHCFR), the Commercial Banks Call Report (CALL), and the Thrift Financial Report (TFR). These four data sets contain financial and domicile information for almost all insurance companies, BHCs, FHCs, commercial banks, and thrifts operating in the United States for our research period over 2003 – 2005.[38]

To construct the linking variable, we first identify the list of insurance companies affiliated with banks, if any, by using key word searches on the Federal Reserve Structure Report (FEDSR) and the Thrift Holding Company Structure Report (THCFR), and by using self-reported answers to queries posed by insurance regulators as part of the annual oversight process as reported on the General Interrogatories page of each company's annual regulatory statements. With supplementary information from the National Information Center Hierarchy Report (NICHR), we can tie the BHCFR, TFR and CALL to FEDSR and THCFR by the core linkage

[38] These datasets might miss some types of insurers or banks. For example, single-state insurers are not required to report to the NAIC although some do; prior 2005 state-chartered commercial banks that were not insured by the FDIC were not required to file CALL reports, but since 2005 all commercial banks are insured by FDIC.

code assigned by the FRB. In the final step, we match the banking data to the insurance regulatory data manually using company name, location and other domicile information required to perform the merge.

Firms under common ownership in the combined data set are aggregated to the group level. We aggregate separately the data of each group's life, property-liability, commercial banks, and saving bank subsidiaries to obtain the divisional totals. A firm is treated as a single producer with up to four business divisions – life insurance division, property-liability insurance division, commercial banking division, and thrift division. We eliminate inactive firms with zero or negative total assets, liabilities, or net worth. Insurance companies with zero premium income and banks with zero deposits are not viable business entities and, therefore, are also deleted. After these deletions, the data sets have 90 joint producers, 1,346 insurance specialists, and 7,261 bank specialists for the year 2003. Since almost all joint producers are large, in this study we focus on large financial institutions licensed as insurers or banks in the U.S. We then further excluded joint producers with less than $1 billion total assets, banks with less than $1 billion total assets, and insurers with less than $600 million total assets from the data sample. The final data sample consists of 88 joint producers, 204 insurance specialists, and 461 bank specialists for the year 2003. These firms include 182 life insurers, 191 property-liability insurers, 437 commercial banks, and 185 thrifts. The firms included account for about 98 percent life insurance industry assets, 94 percent property-liability insurance assets, 88 percent commercial banks assets, and 81 percent thrifts assets.[39]

[39] The data shows the similar figures over the three year period 2003 – 2005. For example, the original data contains 90, 86 and 87 joint producers, 1346, 1401 and 1412 insurance specialists, 7261, 7110 and 7046 bank specialists for the year 2003, 2004 and 2005, respectively. The final data sample statistics are shown in Table 16.

CHAPTER 5

ASSURBANKS AND BANCASSURERS: WHO ARE THEY?

In this section, we identify the major assurbanks and bancassurers in the post-GLB U.S. financial industry and present summary statistics regarding their operations. Table 1 presents a summary of assurbanks and bancassurers over the period 2003 – 2005. The statistical pattern seen in Table 1 is similar and stable over the three year period.[40]

5.1. ASSURBANKS

By the end of 2003, 44 insurance groups had banking operations and were classified as "assurbanks." Table 2 Panel A lists the ten largest assurbanks for the year 2003 in terms of asset size. MetLife, with $12.1 million net loss from its banking businesses, was the only insurer to elect to be organized as an FHC under the GLB Act. By the end of 2003, 33 assurbanks utilized the SLHC vehicle to enter into the banking market. The remaining assurbanks, grandfathered by various exemption provisions, owned either non-bank banks or trust companies. Among the top 10 assurbanks, only AIG, ING, and Nationwide had net income gains from their banking activities, with all others reporting losses in their banking subsidiaries. Of the 44 assurbanks included in the study, 24 out of the 44 had net income gains from banking activities with an average of 12.4 percent total net income earned from banking business (Table 1) while almost half earned less than 3 percent profit from banking activities (median 2.3 percent).

ING Direct is a thrift subsidiary of ING Group. Its successful banking operation in the U.S. makes it stand out from the others. Opened for business in September 2000, ING Direct has become the country's largest internet-based bank and the fourth-largest thrift bank. As a

[40] The market structure and performance analysis results are similar over the three year period, therefore in this chapter and next two chapters the analysis is presented for the year 2003.

standalone thrift division of the Dutch financial service conglomerate, ING Direct USA does not cross-sell with its affiliates. It is a direct-to-the-customer operation, an internet-based savings bank. There are no branches, no ATMs, and also no fees, no minimum deposits. Only a limited number of products are offered: savings accounts, a few certificates of deposit, and a handful of mutual funds. The simplicity of the model allows them to operate at very low cost. In some parts of the business, they operate at one-sixth the cost of a conventional bank. Targeting the homogeneous customers is part of their strategy to keep cost down. Low costs mean that ING Direct can offer relatively high interest rates on deposits, which in turn attract potential customers. Although ING Direct is an example of a conglomeration, it is one which affiliates with various financial institutions but shows no effort to integrate. Instead, their standalone, simple, straight forward business model creates their success.

5.2. BANCASSURERS

From the enactment date of GLB to the end of 2003, more than 630 BHCs have converted to FHC status in the banking industry. Although the number of FHCs was much smaller than the number of BHCs, these FHCs controlled 78 percent of all commercial banking assets as of the first quarter of 2003.[41] For the year 2003, 44 top tier FHCs/BHCs[42] reported general insurance underwriting business and 1,251 top tier FHCs/BHCs reported insurance agency business (with or without insurance underwriting) in their regulatory financial report. Table 2 Panel B lists the top 10 banking groups in terms of total insurance underwriting income. Not surprisingly, Citigroup is at the top of the list. It is interesting to note that even though Citigroup spun off its property-liability segment in 2002 and its life segment in 2005, 7.04 percent of its net income for 2003 was generated from its insurance businesses in the year 2003. Unlike the largest 10

[41] Federal Reserve Board Report to Congress, 2003.
[42] Top tier FHCs/BHCs are defined as FHCs or BHCs without parent holding companies, and lower tier FHCs/BHCs are those owned by top tier FHCs/BHCs.

assurbanks, all the top 10 bancassurers reported gains in their insurance underwriting subsidiaries in 2003.

Table 1 shows that bancassurers average 19.5 percent of total group net income from insurance underwriting, but half average less than 3 percent. As fee income has become a more important source of revenue for banks, these banking groups average 8.09 percent non-interest income from insurance agency and underwriting income (median 3.99 percent). In addition to insurance underwriting, many banking groups sell insurance products through agencies they own. We identify 1,251 FHCs/BHCs that conduct insurance business only as agents. For banks acting as agents only, their insurance agency business accounts for 5.6 percent of their total non-interest income (median 1.72 percent). For the thrift sector, only 9 thrifts took advantage of the OTS rules allowing insurance underwriting subsidiaries without becoming an FHC. Except for Washington Mutual Bank Group, these thrifts are much smaller in size and have inconsequential effects on the thrift industry. Therefore we do not discuss them here separately.

CHAPTER 6

THE INSURANCE INDUSTRY IN INTEGRATION

In this section, we analyze the post-GLB U.S. insurance and banking industries from the aspects of industry structure and firm performance. Individual insurers are divided into three groups: *Non-affiliated insurance companie*s (those without any affiliation with banks either through direct control or through holding companies to which they belong); a*ssurbanking-affiliated insurance companies*[43] (insurers affiliated with banks by either directly owning banks or through their insurance holding companies); b*ancassurance-affiliated insurance companies*[44] (those directly owned by banks or owned through their insurance holding companies owned by banks); and b*ank-affiliated insurance companies* (referring either to assurbanking-affiliated or bancassurance-affiliated insurance companies.

6.1. MARKET STRUCTURE – DISTRIBUTION AND SIZE OF FIRMS

As reported in Table 3, our data sample contains 36 assurbanking-affiliated life insurance companies, 36 bancassurance-affiliated life insurance companies, and 110 non-affiliated life insurance companies for the year 2003. These assurbanking-affiliated life insurance companies represented 19.8 percent of the life insurers in number, but accounted for 57.7 percent of total assets, 51.6 percent of premiums written, and 53.4 percent of net income. Representing 19.8 percent of the life insurance companies, the bancassurance-affiliated life insurers accounted for only 7.3 percent of total assets, 7.0 percent of premiums written, and 9.8 percent of net income. The 60.4 percent non-affiliated life insurers took the remaining one-third life insurance market share.

[43] In other words, assurbanking-affiliated insurance companies are insurance subsidiaries of assurbanks.
[44] In other words, bancassurance-affiliated insurance companies are insurance subsidiaries of bancassurers.

Table 3.1 shows the distribution of property-liability insurers. In 2003, 25 assurbanking-affiliated property-liability insurance companies represented 13.1 percent of the firms in number and approximately one-third of industry assets, premiums written and profits. The 22 bancassurance-affiliated property-liability insurers held 3.5 percent property-liability industry assets. The remaining 144 non-affiliated property-liability insurers controlled an approximate two-thirds share of the industry assets, premiums written, and net income. This pattern suggests that banks appear less interested in the property-liability sector compared with the life sector, and support the argument that banks are more likely to begin their insurance business in the life sector (Carow, 2001b).

Table 4 and 4.1 show the average firm size in terms of total assets, premiums written, and net income. Assurbanking-affiliated life and property-liability insurers were significantly larger than non-affiliated and bancassurance-affiliated insurers regardless of the metric used. Bancassurance-affiliated life and property-liability insurers were the smallest, but the average bancassurance-affiliated life insurer was not statistically different from the average non-affiliated life insurers in terms of total assets and net income.

6.2. FIRM PERFORMANCE

In this section, we first discuss the insurer's A.M. Best Strength Rating, the business geographic patterns, and the product mix and diversifications. We then explore the operating performance of the three insurer groups' (non-affiliated, assurbanking-affiliated, and bancassurance-affiliated) by conducting profitability, leverage, and liquidity tests.

6.2.1. A.M. BEST RATINGS

A.M. Best's Financial Strength Rating is an independent rating based on a comprehensive quantitative and qualitative evaluation of an insurance company's balance sheet strength,

operating performance, and business profile. Best's ratings scale areas follows: A++, A+ (Superior); A, A- (Excellent); B++, B+ (Very Good); B, B- (Fair); C++, C+ (Marginal); C, C- (Weak); D (Poor); E (Under Regulatory Supervision); F (In Liquidation); S (Rating Suspended).[45] Table 5 Panel A shows that 83 percent of assurbanking-affiliated life insurers had A.M. Best ratings of A- or higher, compared with 58 percent of bancassurance-affiliated life insurers and 68 percent of non-affiliated life insurers. For property-liability insurers, 89 percent of assurbanking-affiliated property-liability insurers, 62 percent of bancassurance-affiliated property-liability insurers, and 78 percent of non-affiliated property-liability insurers had A.M. Best ratings of A- or higher (Table 5 Panel B). Thus, insurance companies that have banking subsidiaries tend to have higher ratings than those owned by banks or non-affiliated insurers.

6.2.2. GEOGRAPHIC DIVERSIFICATION

We now examine insurers' business geographic patterns by calculating the number of states in which they are licensed. We can interpret from Table 6 that, on average, assurbanking-affiliated insurers were more geographically diversified. For example, half of assurbanking-affiliated life insurers obtained licenses and conducted business in 48 and more states, and similarly half of assurbanking-affiliated property-liability insurers were licensed and conducted business in 45 or more states. Bancassurance-affiliated life insurers were the least geographically diversified compared with non-affiliated and assurbanking-affiliated in 2003.

6.2.3. PRODUCT MIX AND DIVERSIFICATION

We then examine insurers' product mix and diversifications. We categorize life insurance products as individual life, individual annuity, credit life, group life, group annuity, and accident & health insurance; we categorize the property-liability products as personal property, personal

[45] Best's Key Rating Guide, 2004 Edition.

liability, commercial property, and commercial liability.[46] Table 7 Panel A demonstrates that bank-affiliated life insurers were more interested in personal products, especially individual annuities and credit life compared with non-affiliated life insurers. This evidence suggests that affiliation with banks plays an important role in developing a business portfolio because of banks' business in selling annuities and credit life insurance. Bank-affiliated life insurers accounted for approximately one-third of each product line in number, but their premium income share was more than 60 percent of each sub-market except for accident & health insurance. For the property-liability sector, the pattern is that bank-affiliated property-liability insurers were more interested in personal products than commercial products. Bank-affiliated property-liability insurance companies represented no more than one-fourth of each property-liability product market in number, but accounted for about 50 percent of the personal products underwriting and one-third of commercial products underwriting (Table 7.1).

Since we know bank-affiliated insurance companies are more diversified across industries, it is interesting to ask whether they are also more diversified on their traditional products within the insurance sector. Some studies have suggested efficiency gains and economies of scale and scope in U.S. insurance industry.[47] Such efficiency gains may prompt these *within-industry* diversified insurers to extend to the banking industry. The results support this hypothesis. Table 8 shows the products Herfindahl Index for life and property-liability insurers.[48] Table 8 Panel A and Panel B show that compared with specialized insurers, bank-

[46] Leverty (2005), Cummins and Phillips (2005), Cummins *et al.* (2003), Berger *et al.* (2000). Table 15 lists the detail product and line of business definitions.

[47] For the life insurance industry only, see: Cummins and Zi (1998), Cummins, Tennyson, and Weiss (1999), Cummins and Weiss (2000), Segal (2003). For the property-liability industry only, see: Cummins and Weiss (1993). For the life and property-liability insurance, see: Berger, Cummins, Weiss, and Zi (2000), Cummins, Weiss, and Zi (2003).

[48] The product Herfindahl Index for an insurer producing *n* types of products is measured as (P1^2 + P2^2 + …+ Pn^2) / (P1 + P2 + … + Pn)^2, where P*i* is the *i*th product net premium written. Insurance products include property-liability insurance (personal short-tail lines, personal long-tail lines, commercial short-tail lines, and

affiliated insurance companies were more diversified within both life and property-liability insurance markets.

6.2.4. OVERALL PERFORMANCE – ROA, ROE

We use the widely accepted measures return on assets (ROA) and return on equity (ROE), to compare insurers' overall performance. The results in Table 9 suggest that in the life insurance sector, assurbanking-affiliated insurers had significantly higher ROE. Among the three insurance groups, ROA was not statistically significant. In the property-liability sector, interestingly, bancassurance-affiliated insurers, on average, had the highest ROA and ROE, and the difference is significant. Assurbanking-affiliated property insurers had significantly higher ROA and ROE than the non-affiliated. Generally, bank-affiliated insurers had better overall profitability than non-affiliated insurers in the year 2003.

6.2.5. PROFITABILITY TEST

In this section, we compare the profitability of life insurers using accounting measures of profitability widely used in the industry and commonly accepted by regulators:

(1) Total Benefits Paid as a percentage of Net Premiums Written -- Total benefits paid include death benefits, matured endowments, annuity benefits, accident and health benefits, disability and surrender benefits, and other miscellaneous benefits.

(2) Commissions and Expenses Incurred as a percentage of Net Premiums Written -- Commissions and expenses include payments on both direct and assumed business, general insurance expenses, insurance taxes, licenses and fees, increase in loading and other miscellaneous expenses, and exclude commissions and expense allowances received on reinsurance ceded.

(3) Net Operating Gain (after taxes) as a percentage of Total Assets -- Total assets are the mean of current and prior year admitted assets; and this ratio measures insurance earnings in relation to the company's total asset base.

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commercial long-tail lines) and life insurance (individual life insurance, individual annuity, group life insurance, group annuity, and accident and health insurance). The property-liability insurer products and lines of business definitions are listed in Table 15.

(4) Yield on Invested Assets – The ratio of annual net investment income divided by investment assets. Investment assets are the mean of current and prior year cash and invested assets plus accrued investment income minus borrowed money.

Table 10.1 Panel A shows that bank-affiliated life insurance companies performed better in terms of insurance expense ratio and net operating gains to assets. Bank-owned life insurers had significantly lower investment yield. However, they had a higher benefit incurred ratio than non-affiliated life insurers. Assurbanking-affiliated life insurers had a significantly higher investment yield. The difference on the benefits paid as a percentage of net premiums written was not statistically significant among the life insurers.

For property-liability insurers, we compare five profitability measures:

(1) Loss Ratio -- The ratio of incurred losses and loss adjustment expenses to Net Premiums Earned. This ratio measures the company's underlying profitability or loss experience on its total book of business.

(2) Expense Ratio -- The ratio of underwriting expenses (including commissions) to Net Premiums Written. This ratio measures the company's operational efficiency in underwriting its book of business.

(3) Combined Ratio -- This ratio is the sum of the Loss Ratio and Expense Ratio. It measures a company's overall underwriting profitability. A combined ratio of less than one indicates the company has reported an underwriting profit.

(4) Yield on Invested Assets -- The ratio of annual net investment income divided by the mean of cash and net invested assets. This ratio measures the average return on a company's invested assets, before capital gains or losses and income taxes.

(5) Return on Policyholders' Surplus (PHS) -- This ratio measures a company's efficiency in utilizing its surplus on a total return basis. "Return" is calculated as the overall after-tax profit from underwriting and investment activity, including unrealized capital gains.

Table 10.1 Panel B summarizes the profitability tests for property-liability insurers. It shows that bank-affiliated property-liability insurance companies had a significantly lower loss ratio compared with non-affiliated property-liability insurers. Although their expense ratio was higher, it was offset by the lower loss ratio and led to lower combined ratios. Similar to

assurbanking-affiliated life insurers, assurbanking-affiliated property-liability insurers had the best investment earnings with an average investment yield of 4.6 percent. The ratio of return on PHS indicated that bank-affiliated property-liability insurers, including both assurbanking-affiliated and bancassurance-affiliated, were more efficient in utilizing their surplus on a total return basis.

6.2.6. LEVERAGE TEST

Following industry accepted measures of leverage, we compare the following life insurers' operating leverage measures:

(1) Net Premium Written to Capital and Surplus -- This ratio reflects the leverage of the company's current volume of net business in relation to its capital and surplus after reinsurance assumed and ceded. This test measures the company's exposure to pricing errors in its current book of business.

(2) Best's Capital Adequacy Ratio (BCAR) -- The BCAR compares an insurer's adjusted surplus relative to the required capital necessary to support its operating and investment risks.[49]

(3) Capital and Surplus to Liability -- This test measures the relationship of capital and surplus to the company's unpaid obligations after reinsurance assumed and ceded. It reflects the extent to which the company has levered its capital and surplus base. On an individual company basis, this ratio will vary due to differences in product mix, balance sheet quality, and spread of insurance risk.

(4) Reinsurance Leverage Ratio -- The relationship of total reserves ceded plus commissions and expenses due on reinsurance ceded plus other refunds due or recoverable from reinsurers to total capital and surplus.

Table 10.2 Panel A shows that the ratio of NPW to surplus was statistically lower for bancassurance-affiliated life insurers than for bancassurance-affiliated and non-affiliated life insurers in 2003. About 50 percent of assurbanking-affiliated and non-affiliated life insurers had "strong balance sheet" BCARs (median 174 percent, 163 percent, respectively), while

[49] Life insurers with a BCAR score of more than 100 percent are considered to have "adequate" balance sheet strength, and firms with a BCAR score of more than 175 percent are believed to have a "very strong" balance sheet. Risk Based Capital ratio is also shown, which shows the consistent results with BCAR.

bancassurance-affiliated life insurers had much more secure BCARs (median 194 percent). The evidence suggests that bank-owned life insurers were more securely capitalized. This argument can also be supported by the capital-to-liability ratio where we see that bancassurance-affiliated life insurers had significantly higher capital-to-liability ratios compared with assurbanking-affiliated and non-affiliated life insurers. The results of the reinsurance leverage ratio test suggest that bank-affiliated life insurers used less reinsurance than non-affiliated life insurers. In sum, assurbanking-affiliated life insurers carried the highest leverage ratio, and bancassurance-affiliated life insurers were significantly less levered than non-affiliated insurers at the end of 2003.

For property-liability insurers we look at the following industry accepted measures of leverage:

(1) Net Premium Written to Policyholders' Surplus -- This ratio measures an insurer's net retained premium in relation to its surplus and the company's exposure to pricing errors in its current book of business.

(2) Net Leverage Ratio -- This ratio equals the sum of an insurer's Net Premiums Written to Policyholders' Surplus Ratio and the Net Liabilities to Policyholders' Surplus Ratio. It measures the combination of a company's net exposure to pricing errors in its current book of business and errors of estimation in its net liabilities after reinsurance, in relation to policyholders' surplus.

(3) Gross Leverage Ratio -- This ratio equals the sum of Net Leverage and Ceded Reinsurance Leverage.[50] It measures a company's gross exposure to pricing errors in the current book of business, to errors of estimating its liabilities, and exposure to its reinsurers.

(4) Best's Capital Adequacy Ratio (BCAR) -- The BCAR compares an insurer's adjusted surplus relative to the required capital necessary to support its operating and investment risks.[51]

[50] Ceded Reinsurance Leverage is calculated as reinsurance recoverable, ceded balances payable and ceded premiums written, less funds held, divided by policyholders' surplus.

[51] Property-Liability insurers are deemed to have "adequate" balance sheet strength if they generate a BCAR score of over 100 percent, and deemed to have "very strong" balance sheet strength if generating a BCAR score over 200 percent.

Table 10.2 Panel B shows that bancassurance-affiliated property-liability insurers had the lowest NPW to PHS ratio. But the difference among insurers was not significant. The bank-affiliated property-liability insurers presented lower net leverage ratio and gross leverage ratio than non-affiliated insurers, but the gross leverage ratio was not significantly different between bank-affiliated and non-affiliated property-liability insurers. On average, all the property-liability insurers had "very strong balance sheet strength" with higher than 200 percent BCAR. However, the average BCAR for bancassurance-affiliated property-liability insurers was about 50 percent higher than the average BCAR for assurbanking-affiliated and non-affiliated insurers. In sum, non-affiliated property-liability insurers were more levered than the bank-affiliated ones, and assurbanking-affiliated property-liability insurers were more levered than the bancassurance-affiliated in 2003.

6.2.7. LIQUIDITY TEST

We calculate four liquidity ratios for life insurers:

(1) Quick Liquidity Ratio -- The ratio of unaffiliated quick assets to liabilities.[52] This test measures the proportion of liabilities covered by cash and quickly convertible investments. It indicates a company's ability to meet its maturing obligations without requiring the sale of long-term investments or the borrowing of money.

(2) Current Liquidity Ratio -- The ratio of unaffiliated invested assets to liabilities, excluding mortgages and real estate. It measures the proportion of liabilities covered by cash, and it measures unaffiliated investment assets holdings.

(3) Operating Cash Flow to Total Assets -- Operating cash flow is the change in cash and invested assets attributable to net underwriting and net investment income after policyholder dividends and federal income taxes. It measures a company's ability to meet current obligations through the internal generation of funds from insurance operations. Negative balances typically indicate unprofitable underwriting results or low yielding assets.

(4) Non-Investment Grade Bonds to Capital -- This test measures exposure to non-investment grade bonds as a percentage of capital and surplus. Generally, non-

[52] Quick assets include 80 percent of unaffiliated common stock, cash, short-term investments, Government bonds maturing in five years or less and all other bonds (excluding affiliates) maturing in one year or less.

investment grade bonds carry higher default and liquidity risks. The designation as non-investment grade utilizes the bond quality classifications, which coincide with different bond ratings assigned by major credit rating agencies.

Table 10.3 Panel A consistently shows that bancassurance-affiliated life insurers had higher liquidity ratios but lower operating cash flows than their non-affiliated and assurbanking-affiliated counterparts at the year-end 2003. In addition, they invested the least in non-investment grade bonds. Non-affiliated life insurers had the lowest quick and current liquidity ratios and the difference was significant.

The liquidity ratios used for property-liability insurers are similar to those used for life insurers: the quick liquidity, current liquidity, operating cash flow ratio, and ratio of non-investment grade bonds to PHS. Table 10.3 Panel B shows similar liquidity rations between property-liability insurers and life insurance companies. Bancassurance-affiliated property-liability insurers had significantly higher liquidity ratios but lower operating cash flows than non-affiliated and assurbanking-affiliated property-liability insurers, and they invested the least in non-investment grade bonds. Non-affiliated property-liability insurers had the lowest quick and current liquidity ratios, and they invested the most in the non-investment grade bonds. The evidence suggests that insurance subsidiaries of assurbanks and bancassurers retained more costly liquid and short-term assets, and showed prudence on settling their outstanding liabilities.

CHAPTER 7

THE BANKING INDUSTRY IN INTEGRATION

The GLB Act generally creates three main types of banks in terms of cross-industry integration. *Non-affiliated Commercial Banks (CBs)* are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. *Bancassurance-affiliated Commercial Banks (CBs)*[53] are those affiliated with insurance companies by directly holding insurers or through their FHCs/BHCs, which own insurance companies. *Assurbanking-affiliated Commercial Banks (CBs)*[54] are those directly owned by insurers or owned through their FHCs/BHCs, which are owned by insurers. *Insurer-affiliated Commercial Banks (CBs)* refer to either assurbanking-affiliated or bancassurance-affiliated commercial banks. Similarly, in the thrift savings industry, there are *Non-affiliated Saving Banks (SBs)*, *Bancassurance-affiliated Saving Banks (SBs)*, *Assurbanking-affiliated Saving Banks (SBs)*, and *Insurer-affiliated Saving Banks (SBs).*

We identify 110 FHCs/BHCs reporting insurance underwriting income in their required financial reports to the Federal Reserve Board. However, some of the bancassurers have only in-house insurance underwriting, such as credit-related insurance and mortgage-related insurance. Some of these bancassurers have insurance subsidiaries not filing reports with the NAIC, such as title insurance companies, captive insurance companies, and single state insurers.[55] In addition, according to Regulation K, banks are allowed to own insurance subsidiaries overseas, which are not required to file with the NAIC if are not involved in domestic business. Thus, in this section,

[53] In other words, bancassurance-affiliated commercial banks are the banking subsidiaries of bancassurers.
[54] In other words, assurbanking-affiliated commercial banks are the banking subsidiaries of assurbanks.
[55] For example, Banknorth Group owned Northgroup Captive Insurance Inc., and First Merchants Corporation owned Indiana Title Insurance Company.

we present statistics for the insurer-affiliated CBs or SBs that have insurer affiliates filing with the NAIC. The non-affiliated CBs or SBs include banks subsidiaries of those FHCs/BHCs, which report insurance underwriting income to the FRB but have no insurance subsidiaries filing with the NAIC.

By analyzing the business profile of these FHCs/BHCs (bancassurers with no insurance subsidiaries), we find that the insurance business they conducted mainly supported their banking business or just appeared to be by-products supporting the banking operations, such as credit related insurance and mortgage insurance. Because these banks are different from bancassurers with full line insurance subsidiaries,[56] we classify them as non-affiliated commercial banks with insurance underwriting business reported. The assurbanking-affiliated CBs are all small trust banks or grandfathered non-bank banks. Since they are small in size and no more than 10 in number, we merge these banks to bancassurance-affiliated CBs. Hence, we have the following structure for CBs:

Commercial Banks (CBs):

- Bancassurance-affiliated CBs
- Non-affiliated CBs
    - Non-affiliated INS CBs --- with insurance underwriting
    - Non-affiliated NOINS CBs --- without insurance underwriting

7.1. MARKET STRUCTURE – DISTRIBUTION AND SIZE OF FIRMS

The data sample contains 48 bancassurance-affiliated CBs, 46 non-affiliated INS CBs, and 343 non-affiliated NOINS CBs for the year 2003. Table 11 shows that bancassurance-affiliated CBs represented 11 percent of the commercial banks in number, but they accounted for over half of

[56] In 2003, 44 FHCs/BHCs with general insurance underwriter subsidiaries are identified and included in our data.

the total assets, deposits, and net income of the market. Non-affiliated INS CBs were 10.5 percent of the commercial banks in number and about 20 percent of market total assets, deposits, and net income. So, important players in the commercial banking industry have been involved in the insurance underwriting business through either in-house production or manufacturing affiliates. The remaining non-affiliated NOINS CBs represented the majority of the commercial banking market in number (78.5 percent), but they accounted for only one-fourth market share in terms of total assets, deposits, and net income.

In the thrift sector, 39 assurbanking-affiliated SBs, 14 bancassurance-affiliated SBs, and 132 non-affiliated SBs were identified. Similar to the commercial banking sector, bancassurance-affiliated SBs were 7.6 percent of the thrift saving market in number and accounted for a 29.1 percent share of the total assets, 27.6 percent of deposits, and 33.4 percent of net income (Table 11.1). Assurbanking-affiliated SBs were 21.1 percent of the thrifts in number, 5 percent of the total assets, 6.3 percent of deposits, and 2.7 percent of net income. Non-affiliated SBs represented the remaining 71.4 percent of thrifts in number and approximately two-thirds of industry total assets, deposits, and net income.

Table 12 and 12.1 show the average bank size in terms of total assets, deposits, and net income. Table 12 shows a pattern that on average bancassurance-affiliated CBs were significantly larger than non-affiliated ones regardless of the metric used. However, the variance on firm size was higher among bancassurance-affiliated CBs than non-affiliated INS CBs.[57] The firm size disparity in the thrift industry is shown in Table 12.1. We can see a significant firm size difference: assurbanking-affiliated SBs are significantly smaller than bancassurance-affiliated SBs and non-affiliated SBs. Although bancassurance-affiliated SBs on average were the largest

[57] Our data sample contains large banks with at least $1 billion assets, which include the large wholesales banks, e.g., Bank of America, JP Morgan Chase, Wells Fargo. These giant banks are kept in the data sample in the univariate analysis, but are excluded in the later scope efficiency analysis.

among SBs, the size difference is not statistically significant. Because of the super large thrifts in the data, e.g., Washington Mutual, Golden West Financial, the variance on firm size is much higher among bancassurance-affiliated SBs. The evidence suggests that large commercial and saving banks are more likely to affiliate with full line insurance companies, and insurance companies are more likely to extend their traditional business to banks through relative small-size thrifts.

7.2. FIRM PERFORMANCE

7.2.1. PORTFOLIO OF BANKING PRODUCTS

The traditional banking products are deposits on the liability side of the balance sheet and loans on the asset side. We compare three banking product measures: total deposits, interest bearing deposits, and total loans and leases. Total deposits include deposits and savings accounts that either require interest payments or are not allowed to pay interest. Interest bearing deposits include only those requiring interest payments, such as savings accounts and time deposits. Total loans and leases include loans to individuals, commercial and industrial loans, and all other loans and leases. Table 13 Panel A shows the average total deposits, interest bearing deposits and total loan and lease. To control for size effects they are scaled by assets. The evidence indicates that non-affiliated NOINS CBs had more deposits than non-affiliated INS CBs and bancassurance-affiliated CBs. And non-affiliated INS CBs had more deposits than bancassurance-affiliated CBs. The differences were statistically significant. On the asset side, bancassurance-affiliated CBs had statistically less loan portfolios than non-affiliated CBs. Non-affiliated NOINS CBs in turn had significantly more loan portfolios than bancassurance-affiliated CBs.

In the thrift sector, Table 13 Panel B shows that non-affiliated SBs had significantly more deposits compared with assurbanking-affiliated and bancassurance-affiliated SBs. On the asset

side, assurbanking-affiliated SBs had statistically less loans portfolios than other SBs. Loan portfolio differences between bancassurance-affiliated SBs and non-affiliated SBs were not statistically significant. The evidence suggests that, on average, CBs and SBs without insurance business had more deposits and loans than those with insurance business or affiliates in 2003.

7.2.2. INTEREST INCOME AND NON-INTEREST INCOME

In this section, we compare the interest income, non-interest income, and ratio of non-interest income to interest income between banks. Interest income is the main source of revenue for banks and includes interest and fee income on loans, income from lease financing receivables, interest income on balances due from depository institutions, interest and dividend income on securities, and other interest income. Non-interest income comes from fiduciary activities, service charges on deposit accounts, investment banking, advisory, brokerage, and underwriting fees and commissions. To control for the size effect, we scale the interest income and non-interest income by total asset. Table 13.1 Panel A indicates that, on average, bancassurance-affiliated CBs had significantly higher interest income and non-interest income than non-affiliated CBs. We then calculate the ratio of non-interest income to interest income. The results show that both the mean and median measure presented the same trend, and the measures indicate that bancassurance-affiliated CBs conducted significantly more non-interest related business than non-affiliated CBs.

The evidence in the thrift saving industry is shown in Table 13.1 Panel B. Assurbanking-affiliated SBs had the lowest interest income, but the highest non-interest income was seen in the thrift saving sector. The interest income of the non-affiliated and the bancassurance-affiliated were not statistically different. The interest thing is that non-affiliated SBs had a significantly higher ratio of non-interest income to interest income than both bancassurance-affiliated and

assurbanking-affiliated SBs. It suggests that for non-interest income generating business, bank-affiliated saving banks were involved less in the non-insurance related business.

7.2.3. OVERALL PERFORMANCE – ROA, ROE, AND NET OPERATING INCOME TO ASSETS

We follow the widely accepted measures, return on assets (ROA), return on equity (ROE), and net operating income to assets ratio to compare banks' overall performance. In the commercial banking sector, those affiliating with insurers or conducting limited insurance underwriting business had consistently higher ROA, ROE, and net operating income to assets ratios than those without any insurance business (Table 14 Panel A). The evidence in thrift saving sector is different: on average assurbanking-affiliated saving banks performed worse in 2003 than the other two SBs groups (Table 14 Panel B), even showing negative average ROE and showing net operating losses. This evidence suggests that although assurbanking-affiliated SBs had profitable interest business (discussed next), their lower non-interest related return still couldn't be offset and, as a result, it contributed to their lower overall return.

7.2.4. INTEREST MARGIN AND NON-INTEREST MARGIN

The interest margin and non-interest margin measure the profitability of banks and are two important ratios in evaluating banks' performance and conditions. Interest margin is defined as the dollar difference between interest income and interest expense as a percentage of earning assets. Similarly, the non-interest margin is defined as the dollar difference between non-interest income and non-interest expense as a percentage of earning assets. Table 14.1 Panel A indicates that, on average, bancassurance-affiliated CBs had significantly higher interest and non-interest margins than non-affiliated CBs. And non-affiliated INS CBs had significantly higher non-interest margins but lower interest margins than non-affiliated NOINS CBs. The evidence in the thrift saving industry is different. Table 14.1 Panel B shows that bancassurance-affiliated SBs

had the highest interest margins and assurbanking-affiliated SBs had the lowest interest and non-interest margins among thrift institutions. However, all three thrifts groups showed negative non-interest margins on average in 2003.

7.2.5. RBC RATIO, LOAN TO DEPOSIT RATIO, AND NET CHARGE-OFF TO LOAN RATIO

In this section, we compare three key ratios highly monitored by bank regulators. These are the risk-based capital (RBC) ratio, the loan to deposit (LTD) ratio, and the net charge-offs to loan ratio. Bank capital performs several important functions. The FDIC Rules and Regulations, Part 325 Appendix A - Statement of Policy on Risk-Based Capital, establish a risk adjusted capital framework; they are used in the examination and supervisory process of the bank. The risk-based framework includes a definition of capital for risk-based capital purposes, a system for calculating risk-weighted assets by assigning assets and off-balance sheet items to broad risk categories, and a minimum supervisory ratio of risk-based capital to risk-weighted assets, which is the risk-based capital ratio.[58] Table 14.2 Panel A and B show RBC ratios for the commercial banking sector and the thrift sector, respectively. In the commercial banking industry, bancassurance-affiliated CBs had significantly higher RBC ratios than non-affiliated CBs. In the thrifts, the evidence is different: assurbanking-affiliated SBs had the highest RBC ratios. Bancassurance-affiliated SBs had the lower RBC ratios than non-affiliated SBs, but the difference was not significant. Incorporating the evidence discussed in Chapter 6, these results indicate that commercial banking and insurance subsidiaries of bancassurers presented higher RBC ratios in the banking and insurance industry. Thrift subsidiaries of assurbanks showed the

[58] Risk-based capital standard serves as a useful tool for assessing banks' capital adequacy ; it is considered a capital measure that is more explicitly and systematically sensitive to the risk profiles of individual banks. Under the risk-based framework, a bank's qualifying total capital base consists of two types of capital elements, "core capital elements" (Tier 1) and "supplementary capital elements" (Tier 2). To qualify as an element of Tier 1 or Tier 2 capital, a capital instrument should not contain or be subject to any conditions, covenants, terms, restrictions, or provisions that are inconsistent with safe and sound banking practices. Total risk-based capital is the sum of Tier 1 capital and Tier 2 capital.

highest RBC ratios in the thrift saving industry, and insurance subsidiaries of assurbanks presented market average RBC ratios in the insurance industry.

The loan to deposit (LTD) ratio is used as a measure of liquidity in banking sector; it often receives the most attention. The LTD ratio, measured as the value of a bank's gross outstanding loans divided by total deposits, indicates the percentage of a bank's loans funded through deposits. An upswing in the LTD may indicate that a bank has less of a cushion to fund its growth and to protect itself against a sudden recall of its funding, especially a bank that relies on deposits to fund growth. The evidence in Table 14.2 Panel A shows that non-affiliated NOINS CBs' had the lowest LTD ratio suggesting that they had higher liquidity than those commercial banks with insurance business or affiliated with insurers. In the thrift saving sector, bancassurance-affiliated SBs showed the lowest liquidity level and non-affiliated SBs had lower liquidity levels than assurbanking-affiliated SBs, but the difference was not statistically significant (Table 14.2 Panel B).

Charge-offs are loans written off as uncollectable by the banks and are loans recognized as losses. Charge-offs are measured on a net basis and are calculated as loans charged off as losses minus recoveries on loans preciously charged off. The net charge-off ratio is calculated as net loan charge-offs divided by the total loans.[59] Table 14.2 Panel A shows that bancassurance-affiliated CBs had statistically higher loan charge-off ratios than non-affiliated INS CBs, and non-affiliated INS CBs had higher loan charge-off ratios than non-affiliated NOINS CBs. This suggests that commercial banks affiliated with insurers had higher losses on default loans than those with in-house insurance business. And commercial banks with in-house insurance

[59] A similar measure of bank's performance on loan is the allowance for loan losses, which was originally referred to as the "reserve for bad debts," and is a valuation reserve established and maintained by charges against the bank's operating income. As a valuation reserve, it is an estimate of uncollectible amounts that is used to reduce the book value of loans and leases to the amount that is expected to be collected ("Allowance to Loan and Lease Loss," OCC, 1998). We calculate the loan allowance ratio of a bank and find similar evidence as the loan charge-off ratio.

underwriting business had higher losses on default loans than those without any insurance affiliates or insurance underwriting business. For savings banks, Table 14.2 Panel B presents similar evidence. Insurance-affiliated SBs (including bancassurance-affiliated and assurbanking-affiliated) had significantly higher loan charge-off ratios than non-affiliated SBs.

CHAPTER 8

SCOPE ECONOMIES IN FINANCIAL SERVICES:

A SURVEY OF THE EVIDENCE

Financial services integration is broadly defined as a financial service group's participation in more than one of the major sectors of the financial service industry either in-house or through separately capitalized subsidiaries. In this dissertation, we further classify financial service integration as being either *within-sector* integration or *cross-sector* integration. Within-sector integration involves offering multiple financial products within the same sector of the financial industry. Cross-sector integration involves offering a broad range of financial products in two or more sectors of the financial industry.[60] We specifically focus on cross-sector integration and refer to financial services cross-sector integration as "financial integration" in short.

One of the important elements in the current debate is the effect integration has on the efficiency of financial institutions. The most commonly quoted source of potential gains from cross-sector integration is the exploitation of scope economies (Herring and Santomero, 1990; Saunders and Walter, 1994; Calomiris, 1998; Berger, 2000; Yeager, Yeager and Harshman, 2004). The scope efficiency gains can be created, for example, by providing customers the consumption complementarities ("one-stop shopping" convenience); sharing such physical inputs as computers, furniture, or offices; employing common information systems, distribution systems, or services department; reusing managerial expertise; obtaining external capital by issuing securities in larger sizes. However, scope diseconomies may also arise at the same time because of organizational diseconomies, higher administration and coordination expenses,

[60] Within-sector integration occurs when, for example, a commercial bank expands its banking business by acquiring another commercial bank, or an insurance holding company owning only life insurance subsidiaries acquires a property-liability insurance company. Cross-sector integration occurs when, for example, a bank holding company launches an insurance subsidiary, or an insurance group offers banking products through its banking subsidiaries.

principal-agent conflicts, cross-subsidization in internal capital markets, or losing specialization expertise when customers need specially tailored products. Therefore, it is particularly important to evaluate scope and product mix efficiencies of financial conglomerates (e.g., bancassurers and assurbanks).

The remainder of this dissertation investigates scope economies of the cross-sector integration in the post-GLB U.S. insurance and banking industries across costs, revenue and profit measures. This chapter briefly reviews the concept of scope economies and discusses the prior literature concerning cost scope economies, revenue scope economies, and profit scope economies in the financial services industries.

8.1. COST SCOPE ECONOMIES

Cost scope economies refer to the reduction of the average total production costs through the production of a wider variety of goods or services. For cross-sector integration, cost scope economies may be realized from the sharing of physical inputs such as computers, software, furniture, or offices; reusing managerial expertise and experience; raising external capital at lower costs because of reduced risks; and employing common service functions, such as distribution, advertisement, or investment. One of the most desirable things about joint production is that commercial bank and insurer integration may lower total costs by cross-selling and by using a joint customer database and using information at a lower cost.[61] However, cost scope diseconomies may also arise from the integration because of higher coordination and administrative costs, and organizational diseconomies may arise when producing or distributing a broad range of products.

[61] Jappelli and Pagano (2002) showed that by using a common information system or reusing gathered information, integrated financial institutions can diminish the adverse selection problem and reduce their default rate in credit markets. Mester, Nakamura and Renault (2002) offered empirical evidence showing that information gathered from different financial services gave an advantage to institutions that combined these services over other lending institutions.

Some studies exist estimating the cost scope efficiencies of providing multiple products within a single financial institution. These studies evaluate cost scope economies of within-sector products (e.g., commercial loans and consumer loans) rather than cross-sector products (e.g., commercial loans and life insurance policies). Within the U.S. banking sector, the evidence was mixed and most studies found no substantial evidence of cost scope economies in commercial banks or in savings and loans (e.g., Mester, 1987, 1993; Berger and Humphrey, 1991; Pulley and Humphrey, 1993; Ferrier, *et al*., 1993; Jagtiani, Nathan, and Sick, 1995; and Rogers, 1998).[62] Two papers found evidence of cost scope diseconomies arising from the coordination and administrative costs of banks offering a broad range of products (Cebenoyan, 1990; Winton, 1999). As for the evidence in Europe, Cavallo and Rossi (2001) examined six EU countries and found consistent cost scope economies at all production levels, suggesting that cost scope economies can increase as banks move towards the universal banking model. Valverde and Fernandez (2005) examined Spanish banks and found significant cost scope economies when incorporating off-balance sheet business.

Within the insurance sector, Grace and Timme (1992) found no significant cost scope economies for the largest 423 U.S. life insurance companies. Berger, Cummins, Weiss, and Zi (2000) focused on both the U.S. life and property-liability insurance sectors for the period 1988-1992 and found cost scope economies for firms in all size quartiles when those firms jointly offered life and property-liability insurance. A more recent paper by Cummins, Weiss, and Zi (2003) extended Berger *et al*. (2000) and found no evidence of cost scope efficiencies for firms offering both life and property-liability insurance in the U.S. insurance sector during the period 1993-1997.

[62] See: Berger, Hanweck, and Humphrey (1987), Hunter, Timme, and Yang (1990), Goldberg *et al*., (1991), Noulas, Miller, and Ray (1993).

In addition, Kellner and Mathewson (1983) found cost scope economies in the Canadian life industry. Khaled, Adams, and Pickford (2001) concluded that small and medium-sized New Zealand life insurance companies experienced cost scope diseconomies while the large-sized companies had neither economies nor diseconomies of scope. Hirao and Inoue (2004) found statistically significant cost scope economies for Japanese property-liability insurers, and Toivanen (1997) showed modest cost scope economies in the Finnish non-life insurance industry. Though these economy studies exist, scope studies in the financial services industry are limited, with the available research providing unconvincing evidence.

Although studies have investigated scope economies across lines of business within the same sector of the U.S. financial services industry, no evidence exists on whether scope economies exist for offering a wider variety of products across different sectors of the industry. To our knowledge, no empirical study investigates the scope efficiencies of financial conglomerates in the U.S., and only a handful of studies provide evidence on scope economies of financial conglomerates in the EU, with mixed results. Lang and Welzel (1998) found mostly diseconomies of producing loans and investment-oriented services within German universal banks, and they found cost scope economies only for small German banks. By searching for complementarities between loans and investment-related products offered by universal banks, Allen and Rai (1996) showed small scope economies for EU universal banking. Vander Vennet (2002) found limited evidence of cost scope economies of universal banks in Europe.

8.2. REVENUE SCOPE ECONOMIES

Scope economies in revenue refer to the increases of total revenue resulting from the production of different categories of services or products. Revenue scope economies may occur because of consumption complementarities, otherwise called the demand super-additivity. By offering "one-

stop shopping" convenience, financial conglomerates can reduce consumers' search and transactions costs. Furthermore, some customers may be willing to pay more for the convenience of "supermarket" shopping for their banking and insurance needs. Demand side scope efficiency gains may also arise by cross-selling a broad range of financial products or integrating distribution systems. Reputation recognition can also lead to revenue scope economies when the integration or consolidation associates itself with a strong brand name, which customers recognize and prefer. By diversifying across products, financial conglomerates may lower their risk if net cash flows are negatively correlated. In this sense, conglomerates may realize revenue scope economies by charging higher prices because of their lower bankruptcy and financial distress costs. In addition, financial integration may also provide firms with market power in pricing.

However, the existence of revenue scope diseconomies cannot be dismissed, especially if the integration creates or enhances conflicts of interest. The conglomerate form of organization can create internal capital markets, which may somehow worsen inefficient cross-subsidies and investment inefficiencies arising from managerial agency problems (e.g., Jensen, 1993; Lamont, 1997; Shin and Stulz, 1998). Scharfstein and Stein (2000) reported inefficient cross-subsidies in internal capital markets, which are often "socialist" in nature, whereby weaker divisions receive subsidies from stronger ones. Thus, the failure of a subsidiary may endanger the other subsidiaries and even the group as a whole.

Mester (1992b) argued that the market would view problems in one subsidiary as signaling problems in other subsidiaries and emphasized that BHCs have tended to rescue their failing affiliates. In a financial conglomerate, catastrophic losses of one business line (e.g., property-liability insurance) could be subsidized by other business lines (e.g., commercial

banking). Thus, commercial banking customers would worry about their savings and change to unaffiliated banks. In this case, revenue scope diseconomies are more likely to occur. Revenue scope diseconomies may also arise if specialists from different types of financial services have better knowledge and expertise in their areas and can provide better-tailored products for customers, and, thereby, charge higher prices than joint producers.

There exists little research investigating revenue scope efficiency effects of financial services integration. The studies that do exist, again, are based on within-sector data (e.g., banking or insurance), and the results are inconclusive. Berger, Humphrey, and Pulley (1996) and Noulas, Miller, and Ray (1993) found little or no evidence of revenue scope efficiency for providing deposits and loans. In addition, both studies showed non-increasing revenue for charging customers for joint consumption benefits. Berger, Cummins, Weiss, and Zi (2000) found revenue scope diseconomies from providing life insurance and property-liability insurance products by integrated insurers. However, using a more sophisticated estimation technique, a more recent research by Cummins, Weiss, and Zi (2003) found weak evidence of revenue scope economies in the U.S. insurance industry.

8.3. PROFIT SCOPE ECONOMIES

Profit scope economies generally refer to increased profits from producing a broader range of products. Profit scope economies simultaneously consider both costs and revenues and, therefore, reflect differences in product or service quality, which may not be measurable by considering cost or revenue scope efficiency in isolation. For example, customers show their preference for “one-stop shopping” by paying more for such consumption convenience, which leads to revenue scope economies. However, financial conglomerates may incur additional expenses in offering one-stop shopping convenience to their customers that leads to cost scope

diseconomies. So, revenue scope economies or cost scope diseconomies alone cannot explain the net scope efficiency gain/loss from integrating different categories of financial products. In this sense, profit scope economies dominate the more commonly used concept of cost and revenue scope economies since estimation of profit scope economies incorporates both cost and revenue efficiency effects.

Studies of profit scope efficiencies generally do not find consistent benefits of either joint production or specialization either within the banking or the insurance industry. Studies typically find that joint production was more efficient for some firms and specialization was more efficient for others (Berger, Hancock, and Humphrey, 1993; Berger, Cummins, Weiss, and Zi, 2000; Cummins, Weiss, and Zi, 2003). Few studies analyzing profit efficiencies have found meaningful profit scope economies among traditional deposit and loan outputs (Humphrey and Pulley, 1997; Rogers, 1998). Vander Vennet (1999, 2002) studied universal banks in Europe and showed that universal banks typically had both higher revenue and higher profitability than specialized banks. Vander Vennet (1996) suggested that EU universal banks appear to be more profit efficient than non-universal banks. Valverde and Fernandez (2005) examined Spanish banks and found significant profit scope economies when the banks incorporated off-balance sheet business.

CHAPTER 9

HYPOTHESES DEVELOPMENT

In this section, we develop the testable hypotheses regarding scope economies in financial services. Some studies investigated valuation effects of regulation or deregulation in the financial services industry, and most of the results suggest that regulations destroy value while deregulation creates value. For example, Rajan (1996) and Benston (1996) showed that the Glass-Steagall Act had limited financial institutions' ability to pursue economies of scope, and Mamun *et al*. (2005a, 2005b) suggested GLB had provided welfare gains to banks and insurance companies. Although GLB largely eliminates the barriers and restrictions on affiliations across financial sectors, it does not necessarily follow that financial "supermarkets" will become dominant in the U.S. financial service industry. Furthermore, we observe the coexistence of conglomeration and specialization business strategies by U.S. banks and insurance companies. Whether scope efficiency benefits exist for either joint or specialized production remains an open question for cross-industry financial conglomeration in the U.S. These suggest the first two general hypotheses regarding the existence of scope economies, stated in null form as follows:

> **Hypothesis 1:** Neither scope economies nor diseconomies exist in the post-GLB integrated banking and insurance industries.
>
> **Hypothesis 2:** Economies of scope are invariant among financial conglomerates jointly producing banking and insurance products.

As we discuss in Chapter 8, economies of scope can arise from variety cost complementarities and/or revenue complementarities. Firm-specific characteristics, e.g., firm size, product mix, distribution network, and regulatory regime, may affect those complementarities and then contribute to assorted scope economies or diseconomies. Some

banks or insurers could be in a better position to benefit from the diversified manufacturing. We then formulate the following specific hypotheses to address the question of which types of banks and insurers are more likely to realize economies of scope through cross-industry financial integration.

Firm size is regarded as an important factor in the financial institution literature. Akhigbe and Whyte (2001) and Barth *et al*. (2000) found that large banks benefited more from the passage of GLB than small banks. In addition, there is a consensus that firm size may be associated with greater or lesser scope economies, and it is typically found that large banks or insurance companies could exploit higher scope economies than small ones (Berger, Humphrey, and Pulley, 1996; Milbourn, Boot, and Thakor, 1999; Berger, *et al.*, 2000; Cummins, Weiss, and Zi, 2003). Financial conglomerates jointly producing banking and insurance products may gain a competitive advantage through implicit government guarantees if they are large enough and if they are considered "too big to fail." These large conglomerates may also gain a reputational advantage if consumers perceive that the implicit guarantees reduce potential losses. The implicit guarantees may also allow them to borrow funds at lower costs (Kane, 1995, 1999; Carow, 2001a). Cost scope economies may exist on a small scale, from sharing some inputs or sharing fixed resources such as computers or offices, but for larger conglomerates these cost scope economy gains could be exhausted or offset by coordination or management diseconomies. Nevertheless, large scale may be needed to generate revenue scope economies from consumption complementarities because of the need to maintain a large distribution network. The third null hypothesis is stated as follows:

> **Hypothesis 3:** Larger financial conglomerates are more likely to exploit economies of scope in jointly producing banking and insurance products.

The two primary product segments of the insurance sector are life-health insurance and property-liability insurance. The business opportunities offered by GLB may benefit some lines of insurance business more than others. Carow (2001a) found that life insurance companies benefited more from the passage of GLB than did property-liability insurers. A GAO (1990) study, along with a study conducted by Saunders and Walter (1994), concluded that synergistic gains are greater for the combination of banks and life insurers than for the combination of banks and property-casualty insurers. Given regulations precluding banks from manufacturing insurance, U.S. banks have been engaging in the insurance business through the selling of annuities and through the selling of credit and mortgage-related insurance, and they have long entered distribution alliances with insurance companies. Since life insurance products have more similarities with banking products or since they can function as complementarities to banking products, banks are more interested in life insurance products than property-liability products (Johnston and Madura, 2000). The evidence found in Chapter 6 supports this inference – bank-owned insurers accounted for 7.3 percent life insurance industry assets but only 3 percent property-liability industry assets. Carow (2001b) found that life insurance companies received more intense competition from banks than did property-liability insurers.[63]

A majority of banks has been offering annuities and credit related life and health insurance to their customers for a long time. A 1996 Life Office Management Association survey of banks and thrifts involved in insurance distribution showed that banks were most likely to sell annuities followed by term life and whole life, and were least likely to distribute property-liability products. As a result, many banks and thrift institutions have accumulated significant experience distributing life insurance. Hence, banks could gain greater scope economies when

[63] The combination of banks and life insurers may also benefit from risk reduction. Using simulated data, Boyd and Graham (1988) and Brewer et al. (1988) document reduced coefficients of variation and reduced bankruptcy risk for bank-life insurance combination.

combining with life insurers than property-liability insurers. The fourth null hypothesis is stated as follows:

> **Hypothesis 4:** Economies of scope are more likely to occur in jointly producing life and banking products than in jointly producing property-liability and banking products.

In addition, economies that arise from marketing, distribution, administration, and other functions could be more prevalent in the retail product lines than in the commercial lines. The primary argument in favor of this position is that marketing, distribution, administration, and other functions tend to be more homogeneous in the retail lines and more heterogeneous in the commercial lines. Retail customers may be willing to pay more for such one-stop shopping convenience, however, commercial customers face relatively trivial search or transaction costs and prefer tailored products for their banking or insurance needs. These arguments suggest the following null hypothesis in relation to the product portfolio:

> **Hypothesis 5:** Economies of scope are more likely to occur in the retail financial product lines than in the commercial lines.

A sixth hypothesis has to do with distribution systems, which may have an effect on the level of scope economies. Although a consolidated bank and insurer may lower total costs or increase expected revenue by cross-selling, scope economies may vary with distribution systems. Insurers using vertically integrated distribution systems distribute their products through exclusive agents, direct marketing (by company employees), or mass marketing (mail and/or mass media advertising). Insurers using horizontally integrated distribution systems distribute through brokers or independent agents who sell the products of multiple insurers.[64]

Banks are expected to sell their insurance affiliates' products through their branches or offices. Banks affiliated with vertically integrated insurers can reuse insurers' relatively large investments in advertising and marketing, which more likely create cost scope economies.

[64] Kim, Mayers , and Smith (1996) had further discussions of the choice of insurance distribution system.

However, revenue scope economies may be less likely in the affiliation between banks and vertically integrated insurers because such affiliations may increase competition and conflicts within the group, which is especially serious when bank-sold insurance products are similar to the insurance products offered by their insurer affiliates, especially annuities.[65] In this sense, insurers using horizontal distribution systems may be in a better position to gain revenue scope economies when affiliating with banks. Berger, Cummins, and Weiss (1997) found that vertically integrated distributors are more likely to realize both cost and revenue scope economies in the life insurance industry. However, Cummins, Weiss, and Zi (2003) did not find evidence that scope economies were more likely for insurers using vertically integrated distributions than those using horizontal distribution systems. These arguments inform the next hypothesis:

> **Hypothesis 6:** Economies of scope are more likely to be present for the combination of banks and insurers using vertically integrated distributions than for the combination of banks and insurers using horizontally integrated distributions.

Since efficient managers are already outperforming their competitors, with the ability to achieve high levels of X-efficiency, they can use and extend their managerial talent, experience, and expertise into the conglomeration. Thus, they can better realize economies of scope, yielding a positive relationship between efficiency and scope economies. X-efficiencies capture individual firm's deviations from the efficiency frontier. For example, the revenue X-efficiency refers to how close a firm's actual revenues are to the revenues of a best-practice firm producing the same outputs.[66] The last hypothesis is as follows:

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[65] Banks and thrift institutions made about 15 percent of individual annuity sales in 1999 and about 23 percent in 2003 (The Financial Services Fact Book 2005).

[66] Consistent with the original definition of Leibenstein (1966), Berger (1993) defined cost X-efficiency as the ratio of the minimum costs that could have been expended to produce a given outputs bundle to the actual costs expended, and varies between 0 and 1. We follow Berger (1993) and define revenue X-efficiency and profit X-efficiency as the ratio of the actual revenue or profit earned to the maximum revenue or profits that could have been earned to produce a given outputs bundle.

Hypothesis 7: X-efficient firms are more likely to enjoy economies of scope in the joint production of banking and insurance products.

CHAPTER 10

METHODOLOGY AND DATA

This section describes the data, the two-stage econometric method utilized and the estimation of outputs, inputs, and prices.

10.1. ECONOMETRIC APPROACH

The translog functional form, first proposed by Christensen, Jorgenson, and Lau (1973), has been employed to estimate cost functions in a number of scope economy studies. However, this functional form does not allow for zero production of any product and, therefore, is not ideal for scope economy estimation. Some studies attempted to circumvent this problem by estimating the translog function at some close-to-zero output value (e.g., Benston, Berger, Hanweck, Humphrey, 1983; Gilligan, Simirlock, and Marshall, 1984; Murray and White, 1983; Mester, 1987; and Berger, Hanweck, and Humphrey, 1987). Unfortunately, these efforts have proved unsatisfactory since the translog was not well behaved around zero and scope economy estimation was sensitive to the value chosen (Berger, Hanweck, and Humphrey, 1987). More recently, researchers have introduced Box-Cox transformations into the conventional translog functions (Box and Cox, 1964; and Cebenoyan, 1990).[67] Again, the results were still unsatisfactory as the Box-Cox parameters were found close to the translog function parameters (Pulley and Humphrey, 1993).

In this dissertation, we use the composite cost function first proposed by Pulley and Braunstein (1992). The composite function not only allows zero output for some products but

[67] Using Box-Cox transformation in outputs, the hybrid translog function substitutes lnQ_i with $(Q^{\lambda}_i -1)/\lambda$.

also negative values for the dependent variable. Thus, this functional form is attractive for the scope economies analysis, especially for estimating profit scope efficiencies.[68]

10.1.1. FUNCTION FORM

The composite Pulley and Braunstein (P-B) model combines a quadratic structure for outputs and a log-quadratic specification for input prices. It is given by:

$$C = [\alpha_0 + \sum \alpha_i q_i + (1/2)\sum\sum \alpha_{ij} q_i q_j + \sum\sum \delta_{ik} q_i \ln r_k] \cdot \exp[\beta_0 + \sum \beta_k \ln r_k + (1/2)\sum\sum \beta_{kl} \ln r_k \ln r_l + \sum\sum \mu_{ik} q_i \ln r_k] + \varepsilon \quad (1)$$

where C is total costs; q_i is the ith output, i=1,…,n; r_k is the kth input price, k=1,…,m; α, β, δ, μ are coefficient vectors to be estimated; ε denotes a random error term. The theoretical requirement that the cost function be homogeneous of degree one in input prices is met by imposing the following restrictions (Brown, Caves and Christensen, 1979):[69]

$$\sum_k \beta_k = 1 \text{ and } \sum_l \beta_{kl} = \sum_k \beta_{lk} = 0 \ (k, l = 1,\ldots,\text{m})$$

$$\sum_k \delta_{ik} = 0 \ (k = 1,\ldots,\text{m})$$

The symmetry restriction implies $\alpha_{ij} = \alpha_{ji}$ and $\beta_{kl} = \beta_{lk}$. The constant terms β_0 and the interaction term $\sum\sum \mu_{ik} q_i \ln r_k$ are omitted because of the technical difficulty in estimating both constant terms and both interaction terms simultaneously (Pulley and Braunstein, 1992; McKillop *et al*., 1996; and Berger *et al*., 2000).[70] Hence, the P-B composite model used is specified as

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[68] This type of model has been used to estimate economies of scope in banking (e.g., Pulley and Humphrey, 1993; McKillop, Glass, and Morikawa, 1996; Berger, Humphrey, and Pulley, 1996; Humphrey and Pulley, 1997) and in insurance (e.g., Berger *et al*., 2000; Hirao and Inoue, 2004).

[69] The function must exhibit homogeneity of degree one in input prices to be a well-behaved cost function. That is a doubling of all input prices exactly doubles costs. Linear homogeneity, a necessary condition for the cost function, is not necessary for the alternative revenue and profit functions.

70 The original P-B model has two constant terms, α_0 and β_0, and two interaction terms, $\sum\sum \mu_{ik} q_i \ln r_k$ and $\sum\sum \delta_{ik} q_i \ln r_k$. Technically, they cannot be simultaneously estimated. P-B (1992) and other literature recommended retaining one in the final model.

$$C = [\alpha_0 + \sum \alpha_i q_i + (1/2)\sum\sum \alpha_{ij} q_i q_j + \sum\sum \delta_{ik} q_i \ln r_k] \cdot \exp[\sum \beta_k \ln r_k + (1/2)\sum\sum \beta_{kl} \ln r_k \ln r_l] + \varepsilon \quad (2)$$

Consistent with the literature, we adopt a modified version of the composite cost function form by normalizing the dependent variable and the output and input variables as follows:

$$\frac{C}{r_m} = [\alpha_0 + \sum \alpha_i y_i + (1/2)\sum\sum \alpha_{ij} y_i y_j + \sum\sum \delta_{ik} y_i \ln s_k] \cdot \exp[\sum \beta_k \ln s_k + (1/2)\sum\sum \beta_{kl} \ln s_k \ln s_l] + \varepsilon \quad (3)$$

In this normalized composite function, the dependent variable is normalized by the price of the last input (r_m). Output terms are scaled by the sample mean ($y_i = q_i$ /mean(q_i)) and input prices are normalized by the last input price ($s_k = r_i / r_m$). The normalization of output quantities by the sample mean helps reduce scale bias in estimation and the normalization by the last input price imposes linear homogeneity in the input prices, a necessary condition for the empirical cost function to be consistent with production theory.

The revenue and profit functions estimated in our study are identical to the composite cost function, (2) and (3), except that the dependent variable, cost, is replaced by revenue and profit respectively.[71] Thus, revenue functions are

$$R = [\alpha_0 + \sum \alpha_i q_i + (1/2)\sum\sum \alpha_{ij} q_i q_j + \sum\sum \delta_{ik} q_i \ln r_k] \cdot \exp[\sum \beta_k \ln r_k + (1/2)\sum\sum \beta_{kl} \ln r_k \ln r_l] + \varepsilon \quad (4)$$

[71] Following Berger *et al*. (2000), we use the same form and independent variables for the cost, revenue, and profit functions to avoid the impact of specification differences on the cost, revenue, and profit scope economies estimations. Although linear homogeneity is not necessary for the revenue and profit functions, we impose the same normalization to avoid the specification differences effects. In addition, output prices generally move with input prices, so we assume that if all input prices double, output prices would approximately double, as would profits and revenues.

Furthermore, these are also called alternative revenue and profit efficiency functions. Standard profit efficiency takes output prices to be exogenous, and the alternative profit efficiency takes output quantities to be exogenous. It is called the alternative profit function because it includes output quantities rather than output prices. The alternative profit efficiency concept is used primarily because output prices and quality are difficult to measure accurately for banks and because output quantities are relatively fixed in the short-run and cannot respond quickly to changing prices as is assumed in the use of standard profit efficiency (Berger and Mester, 1997, 2003).

$$\frac{R}{r_m} = [\alpha_0 + \sum \alpha_i y_i + (1/2)\sum\sum \alpha_{ij} y_i y_j + \sum\sum \delta_{ik} y_i \ln s_k] \cdot \exp[\sum \beta_k \ln s_k + (1/2)\sum\sum \beta_{kl} \ln s_k \ln s_l] + \varepsilon \quad (5)$$

and profit functions are

$$P = [\alpha_0 + \sum \alpha_i q_i + (1/2)\sum\sum \alpha_{ij} q_i q_j + \sum\sum \delta_{ik} q_i \ln r_k] \cdot \exp[\sum \beta_k \ln r_k + (1/2)\sum\sum \beta_{kl} \ln r_k \ln r_l] + \varepsilon \quad (6)$$

$$\frac{P}{r_m} = [\alpha_0 + \sum \alpha_i y_i + (1/2)\sum\sum \alpha_{ij} y_i y_j + \sum\sum \delta_{ik} y_i \ln s_k] \cdot \exp[\sum \beta_k \ln s_k + (1/2)\sum\sum \beta_{kl} \ln s_k \ln s_l] + \varepsilon \quad (7)$$

where R is the revenue; P is the profit. The modified composite cost, revenue, and profit functions are estimated by non-linear least squares.

10.1.2. MEASUREMENT OF ECONOMIES OF SCOPE

Cost economies of scope (*CSCOPE*) are measured as the percentage of costs that firms could save by producing multiple products jointly instead of producing each product separately in specialist firms (Panzar and Willig, 1975, 1981). The traditional measure of *CSCOPE* (specified as $CSCOPE^T$) in the case of a firm producing two products Q_1 and Q_2 is given by

$$CSCOPE^T = \frac{C(q_1, 0; r) + C(0, q_2; r) - C(q_1, q_2; r)}{C(q_1, q_2; r)} \quad (8)$$

Where $C(\ .\ )$ is a continuous cost function estimated for conglomerates only;[72] q_1 and q_2 are output level of the two products; and r refers to the input price vector. Cost scope economies are believed to be present if $CSCOPE^T > 0$, and diseconomies are present if $CSCOPE^T < 0$. Since data on specialist firms were generally not available, this measure was acceptable and widely used in literature. Recently, this traditional measurement by Panzar and Willig (1981) was

[72] The traditional approach to estimating scope economies of financial institutions is to use a single continuous cost function that is estimated only for joint producers but is assumed to apply to specialists as well. This is usually necessitated by an absence of data on specialist firms.

criticized by some researchers. Panzar and Willig assumed that both specialist firms and conglomerates produced financial products with the same technology, and they operated at the same production frontier. They estimated a single cost function using the conglomerates data only and applied this to both specialists and conglomerates. However, the assumption was hard to justify, as it was quite possible that the joint producers used different technologies than the specialists, especially when the market segment served was different.

To fix these problems, an alternative measure of scope economies has been developed by Berger, Cummins, Weiss and Zi (2000), who suggested that cost, revenue, or profit functions should be estimated separately for specialist firms and joint producers. This approach is feasible only when data are available on both diversified and specialized firms. Fortunately, this is the case for our data sample. Thus, we adopt this alternative approach for our estimation. This approach gives the measure of cost scope economies when producing two product categories, Q_1 and Q_2, as

$$CSCOPE = \frac{C_{S1}(q_1;r_1) + C_{S2}(q_2;r_2) - C_{J1}(q_1;r_1) - C_{J2}(q_2;r_2)}{C_{J1}(q_1;r_1) + C_{J2}(q_2;r_2)} \qquad (9)$$

where $C_{S1}(q_1;\ r_1)$ is the cost function for the specialist firm $S1$ producing Q_1; $C_{S2}(q_2;\ r_2)$ is the cost function for the specialist firm $S2$ producing Q_2; $C_{J1}(q_1\ ;\ r_1)$ is the cost function for the division $J1$ (producing Q_1 only) of conglomerates; $C_{J2}(q_2\ ;\ r_2)$ is the cost function for the division $J2$ (producing Q_2 only) of conglomerates. Cost scope economies are believed to be present if $CSCOPE > 0$, and diseconomies are present if $CSCOPE < 0$.

Revenue and profit scope economies are generally measured as the percentage increase in revenue or profit when different categories of products are provided jointly instead of being provided separately. The revenue scope economies score (*RSCOPE*) is given by

$$RSCOPE = \frac{R_{J1}(q_1;r_1) + R_{J2}(q_2;r_2) - R_{S1}(q_1;r_1) - R_{S2}(q_2;r_2)}{R_{J1}(q_1;r_1) + R_{J2}(q_2;r_2)} \tag{10}$$

and profit scope economies score (*PSCOPE*) is

$$PSCOPE = \frac{P_{J1}(q_1;r_1) + P_{J2}(q_2;r_2) - P_{S1}(q_1;r_1) - P_{S2}(q_2;r_2)}{P_{J1}(q_1;r_1) + P_{J2}(q_2;r_2)} \tag{11}$$

where $R_{S1}(\ .\ )$, $R_{S2}(\ .\ )$, and $P_{S1}(\ .\ )$, $P_{S2}(\ .\ )$ are revenue and profit functions for specialist firms *S*1 and *S*2 respectively; $R_{J1}(\ .\ )$, $R_{J2}(\ .\ )$, and $P_{J1}(\ .\ )$, $P_{J2}(\ .\ )$ are revenue and profit functions for divisions *J*1 and *J*2 of conglomerates,. Similarly, revenue or profit scope economies are believed to be present if *RSCOPE*> 0 or *PSCOPE*> 0, and scope diseconomies are present if *RSCOPE*< 0 or *PSCOPE*< 0.

10.2. DATA

The data screening and selection process is discussed in Chapter 4. The data sample used contains 260 observations of diversified firm jointly producing banking and insurance products, 613 insurance specialist observations (offering insurance products only) and 1,450 bank specialist observations (offering banking products only) over the three year period 2003 – 2005. Table 16 shows the statistics of the data sample. The number of firms is further disaggregated by sectors and product lines. The firms included in the data sample accounts for 98 percent of life insurance industry assets, 94 percent of property-liability insurance assets, 88 percent of commercial banks assets, and 81 percent of thrifts assets.

10.3. ESTIMATION OF OUTPUTS, INPUTS, AND PRICES

Like other service industries, it is difficult to define what financial institutions produce and how the services are priced. This section briefly discusses the measurement of outputs, inputs, and prices for insurance companies and banks, respectively. Table 17 summarizes the output and input measures.

10.3.1. OUTPUTS AND PRICES

Three alternative methods have been used in the literature to measure outputs in the financial services industry – the asset (financial intermediation) approach (Sealey and Lindley, 1977), the user-cost approach (Donovan, 1978), and the value-added (production) approach (Berger and Humphrey, 1992). The asset approach considers financial institutions as intermediaries that borrow funds from depositors and then lend the money to borrowers. The user-cost approach determines whether a financial product is an input or output by comparing its contribution to the firm's revenue. If its return on assets exceeds the opportunity cost of funds, then the product is treated as an output, otherwise, it is considered as an input. The value-added approach treats all asset and liability categories as having both output and input characteristics (Berger and Humphrey, 1992; Pulley and Braunstein, 1992; Pulley and Humphrey, 1993; Berger *et al*., 2000; Cummins *et al*., 2003). Those categories having significant value added are considered important outputs, and others are treated as inputs, intermediate products, or unimportant outputs.

10.3.1.1. INSURANCE OUTPUTS AND PRICES

The literature has evolved over time and the value-added approach is believed to be the most appropriate approach to measure the outputs of the insurance industry (Leverty, 2005).[73] Consistent with the recent literature on insurance efficiency (e.g., Cummins and Zi, 1998; Berger *et al*., 2000; Cummins and Weiss, 2001; Cummins, Weiss, and Zi, 2003; Greene and Segal, 2004), we identify three principal services provided by insurance companies: risk pooling and risk-bearing, real financial services, and financial intermediation. The actuarial, underwriting, claim settlement, and associated expenses incurred in operating risk pools are the main

[73] Leverty (2005) surveyed the production approach in defining and measuring P&L insurer's outputs and discussed the issues in measuring the efficiency of P&L insurers.

components of value added related to risk-pooling and risk-bearing. In life insurance, real financial services include personal financial planning, pension counseling, and commercial benefit plan administration. In property-liability insurance, risk surveys, coverage program design, and consulting on policy deductibles and limits are the major real services related to insured losses. For financial intermediation, interest credited to life insurance policies and premium discounts applied to property-liability insurance policies represent the value added of the insurers' intermediation function.

PROPERTY-LIABILITY INSURANCE. For property-liability insurers, the present value of real losses incurred ($PV(L)$) is used as a output proxy (Berger, Cummins, and Weiss, 1997; Berger, Cummins, Weiss, and Zi, 2000; Cummins, Weiss, and Zi, 2003). Losses incurred are generally defined as the total losses that are expected to be paid by insurers for providing insurance coverage arising from business written during the previous year; specifically they are calculated as the sum of losses paid plus the net change in loss reserves. They are good representations of risk-pooling and risk-bearing services since this service functions by collecting funds from individuals in the pool and then redistributing those funds to those who incur losses. Losses incurred are also good proxies for real services provided by the insurer. We calculate the present value to reflect claim settlement lags that may have a significant impact on certain product lines, e.g., liability insurance vs. auto physical damage insurance. Following the insurance literature, we define four output lines of business: personal short-tail lines, personal long-tail lines, commercial short-tail lines, and commercial long-tail lines. Table 15 provides a list of outputs and lines of business definition.

We estimate the proportion of losses incurred from any accident year t that is paid in year $t+j$ using the Taylor separation method (Taylor, 2000), and we estimate industry aggregate claim

data obtained from Schedule P of the A.M. Best Rating Guide (2003, 2004, and 2005). Then the expected loss payouts of the company are discounted using interest rate data for U.S. Treasury yield curves obtained from the Federal Reserve Board.

The output of intermediation functions is measured by the annual average real invested assets, which is computed as an average of the beginning and end-of-year invested assets (Berger, Cummins, and Weiss, 1997; Berger *et al*., 2000; Cummins, Weiss, and Zi, 1999, 2003; Cummins and Weiss, 2001).

The prices of the four categories of property-liability insurance outputs are computed as $p_i = [P_i - PV(L_i)] / PV(L_i)$, ($i$ = 1,…, 4), where p_i refers to the price of output i; P_i refers to the total premium earned for the output i; and $PV(L_i)$ is the present value of losses incurred for output i. For the price of the intermediary output, we use the expected rate of return on the insurer's invested assets, including the expected returns on both the stocks and other invested assets in the insurer's investment portfolio. Because the expected return on other invested assets, such as bonds and notes, is typically close to their actual return, the rate of return on other invested assets in the portfolio is represented by the ratio of actual investment income (minus dividends on stocks) to insurer's total holdings of other investment assets. For stocks, the expected rate of return is calculated as the cost of equity capital using 3-Factor Fama-French CAPM with Ibbotson Associates industry beta (SIC categories 6331).[74] Finally, the expected portfolio rate of return is determined as a weighted average of the stocks and other investment asset returns with each proportion weighted in the investment portfolio.

Because of the sample size limitation (146 observations of conglomerate property-liability subsidiaries), we use three aggregate insurance outputs for property-liability insurers:

[74] Industry betas are from Ibbotson Associates Cost of Capital Yearbook, 2004, 2005, and 2006. Standard Industrial Classification system (SIC) categories can be found at www.census.gov.

(1) personal lines combining personal short-tail and long-tail products; (2) commercial lines combining commercial short-tail and long-tail products; (3) intermediary output (invested assets).

LIFE INSURANCE. Because of the specific limitations in information reported by life insurers, the present value of benefits incurred for life insurers is not available. Following accepted practice, e.g., Yuengert (1993), Cummins, Tennyson, and Weiss (1999), Berger, Cummins, Weiss, and Zi (2000), Cummins, Weiss, and Zi (2003), we use incurred benefits (payments received by policyholders in a year) plus additions to reserves as a proxy of life insurance outputs. Incurred benefits are suitable for measuring the risk-pooling and risk-sharing functions because they reflect the amount of funds pooled and redistributed by life insurers to policyholders for insured events. Increases in reserves are similar to bank deposits and represent the funds received by insurers but not needed for benefit payments and expenses. The funds backing the reserves are invested by insurers in financial instruments. Thus, additions to reserves should be a good output measure for the intermediation function. In addition, both are highly correlated with the real services provided by life insurers, such as personal financial planning and commercial benefit plan management. Consistent with the literature, we define five business lines: personal life insurance, personal annuities, group life insurance, group annuities, and accident and health insurance. Because of the small sample size (210 conglomerate life insurance subsidiary observations), we use three aggregate outputs for life insurers: (1) life insurance including personal and group life insurance; (2) annuities including personal and group annuities; (3) accident and health insurance.

The prices of the life insurance outputs are computed by the function $p_i = [P_i + I_i - (L_i + W_i)] / (L_i + W_i)$, ($i$ = 1,…, 5), where p_i is the price of output i; P_i refers to the total premium

earned for the output *i*; and I_i is the allocated investment income for output *i*;[75] L_i represents the incurred benefits for output *i*; and W_i is the additions to reserves for output line *i*.

10.3.1.2. BANKING OUTPUTS AND PRICES

Consistent with most of the recent literature on bank efficiencies, we measure bank outputs using the intermediation approach. The definition and measurement of banking outputs and prices are simpler and easier compared with insurance. The services provided by banks are traditional financial services (on-balance sheet), new financial services (on-balance sheet), and off-balance sheet (OBS) activities. The traditional financial services include deposits (demand, time and savings) and loans (real estate, commercial, installment), and those services continue to represent the majority of the bank business (Berger *et al*., 1992; Berger *et al*., 1997; Pulley and Humphrey, 1993; Pulley and Braunstein, 1992; and Kashyap, Rajan, and Stein, 2002). As noted by Stiroh (2000), fee-based services and off-balance sheet activities have been recognized as a growing category of bank assets and have accounted for a substantial portion of bank revenues. These activities are especially concentrated in large institutions and failure to account for them may lead to incorrect conclusions.[76] New financial services, including portfolio management, mutual or pension fund distributions, and safekeeping services, are expected to reduce risk (Gallo, Apilado, and Kolari, 1996), enhance scale economies and produce cross-selling synergy (Kane, 1995; Golter, 1996). The major off-balance sheet activities are loan commitments (lines of credit

[75] Life insurers are required to report allocated investment income by product lines in their NAIC regulatory statement, which is not required for property-liability insurers.

[76] Mester (1992a) did not find complementarities between loans and off-balance sheet securitization; while Rogers (1998) found significant but small complementarities between traditional output and "new financial services." Jagtiani and Khanthavit (1996) and Clark and Siems (2002) found complementarities when considering a wide range of off-balance sheet activities jointly although they vanished as bank size increased. Valverde and Fernandez (2005) examined Spanish banks and found that OBS business introduced both cost and profit scope economies compared to a narrow (traditional) definition of output mix.

and credit cards), credit derivatives, letters of credit, and loan originations, sales, and servicing (Jagtiani and Khanthavit, 1996; Clark and Siems, 2002; Rime and Stiroh, 2003).[77]

Following the literature, we identify three categories of outputs – consumer loans, business loans, and other assets.[78] The first output, consumer loans, involves intermediation and loan services and is calculated as the sum of the dollar value of residential loans, credit card loans and other installment loans. The second output, business loans, includes the dollar value of real estate loans, commercial and industrial loans, farm loans and other loans and leases. The price of loans is defined as total interest and fee earnings on loans divided by the quantity of loans. The last output, other assets, includes a bank's new financial services and off-balance sheet business and reflects another important source of bank revenue. It is defined as the sum dollar value of securities and trading assets held by banks and OBS activities. The OBS activities are calculated as the risk-weighted (based on Basle Accord risk weights) amounts of unused commitments, letters of credit, derivatives and other OBS items.[79] The price for "other assets" is obtained as the sum of the total interests and non-interest earnings on these assets divided by the total dollar value of "other assets."

10.3.2. INPUTS AND PRICES

Unlike output definitions, there is a general agreement in the literature regarding the measurement of inputs in the financial service industry.

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[77] Also see DeYoung (1994), Hunter and Timme (1995), Jagtiani, Nathan, and Sick (1995), Berger, Humphrey, and Pulley (1996), Hughes and Mester (1998).

[78] It would be ideal if the bank outputs were disaggregated into more categories, e.g., commercial and industrial loans, real estate loans, installment loans to individuals. However, because of the trade-off between the degree of aggregation for outputs and the degree of freedom, our data cannot afford to lose the degree of freedom since the data have a small number of conglomerate observations.

[79] The Basle Accord risk weights indicates that the OBS items have approximately the same perceived credit risk and the same origination, monitoring, and control costs as loans. Since the correct risk weights specified by the RBC requirements vary according to maturity, type of contracts, and other characteristics, we assume the risk weights are 100 percent for letters of credit, 50 percent for unused loan commitments, and 10 percent for derivatives and all the other OBS items (Jagtiani and Khanthavit, 1996; Berger and Mester, 1997; and Berger and DeYoung, 2001).

10.3.2.1. INSURANCE INPUTS AND PRICES

The inputs of property-liability and life insurers are very similar. Since they are similarly defined, this section presents the inputs and prices discussion for both life and property-liability insurers. Generally, the inputs to insurance fall into four principal categories – home office administrative labor, agent labor, material and physical capital, and financial equity and debt capital.

Since insurers are not required to report detail information about the number of employees and quantity of materials used in business, we impute them from the dollar value of related expenses reported in their regulatory statements divided by the price. The price of the home office labor is obtained from average weekly wage rates for life insurers (SIC categories 6311 or NAICS categories 524113) [80] and property-liability insurers (SIC categories 6331 or NAICS categories 524126) in their domicile state available from the U.S. Department of Labor. Similarly, the price of agent labor is defined as the premium-weighted average weekly wage rates for insurance agents (SIC categories 6411 or NAICS code 524210) in states where the insurer operates. The weight is the proportion of the insurer's direct business written in each state. The price of the materials and business services is defined as the U.S. Department of Labor average weekly wage rates for business services. We use the national index consistent with materials being available for the same price nationwide.

The quantity of home office labor is defined as $Q_{HL} = \frac{E_{HL}}{w_{HL}}$, where E_{HL} denotes the dollar expenditures on home office labor and w_{HL} refers to the price of home office labor. The dollar expenditure on home office labor is defined as the sum of salaries, payroll taxes, and employee

[80] North America Industry Classification System (NAICS) and Standard Industrial Classification (SIC) categories can be found at www.census.gov.

welfare reported in insurer's regulatory statements. Similarly, the quantity of agent labor is specified as $Q_{AL} = \frac{E_{AL}}{w_{AL}}$, where E_{AL} is the dollar expenditures on agent labor and w_{AL} refers to the price of agent labor. The dollar expenditure on agent labor is defined as the sum of net commissions, brokerage fees and allowance to agents. The quantity of material and physical capital is defined as the dollar value of net premises and fixed assets available in insurer's regulatory report; the price of physical capital is obtained as occupancy and fixed asset expenditures divided by the quantity of physical capital.

In addition to labor and physical inputs, we include two proxies for the financial capital: equity capital and debt capital. Financial equity capital plays an important role in reducing the insolvency risk[81] and is viewed as one of the important inputs as conveyed in the literature (e.g., Berger, Cummins, and Weiss, 1997; Hughes and Mester, 1998; and Hughes, Mester, and Moon, 2001). An insurer's financial equity capital is defined as the statutory policyholders surplus measured as the average of beginning and end-of-year equity capital. To measure the price of financial equity capital, we use the estimated cost of equity capital using 3-Factor Fama-French CAPM with industry specific beta obtained from Ibbotson Associates Cost of Capital Yearbook.[82]

The debt capital of insurers is defined as the funds borrowed from policyholders. These funds are comprised of loss reserves and unearned premiums reserves. The price of policyholder supplied debt capital is calculated as total expected investment income minus expected investment income attributed to equity capital divided by average debt capital. The expected

[81] The insurance pricing theory predicts that insurers have optimal capital structures and insurance product price is inversely related to insurers' default risk (Cummins and Sommer, 1996; Cummins and Danzon, 1997).
[82] Cummins and Weiss (2001) proposed a book-value approach, which assumed that insurers held equity portfolios with a market beta coefficient of 1.0; and, therefore, they use a constant cost of equity across all insurers in the industry. It was calculated on the average 90-day Treasury Bill rate plus the long-term average market risk premium (1926 to the end of year t) on large company stocks from Ibbotson Associates.

investment income attributed to equity capital is calculated as the expected rate of investment return multiplied by average equity capital (Cummins and Weiss, 2001).

10.3.2.2. BANKING INPUTS AND PRICES

Similar to the inputs for insurance companies, the four inputs for banks (both commercial banks and thrift saving institutions) are widely recognized as deposits, labor, physical capital, and purchased funds (e.g., Berger, Dick, Goldberg, and White, 2005; Berger and Mester, 2003; Berger and DeYoung, 2001; Berger and Humphrey, 1992; Berger, Humphrey, and Pulley, 1996; and Hughes, Mester, and Moon, 2001).

The first input, deposits, includes demand deposits, time and saving deposits. The quantity of deposits is directly measured as the total dollar value of demand deposits, time and saving deposit liabilities of the bank. The price of deposits is calculated as total interest expense on the deposits divided by the quantity of deposits. The quantity of labor is defined as the number of employees reported in the bank's regulatory report, and the price of labor is calculated as the salary, wage and welfare per employee. The quantity of physical capital is defined by the dollar value of net premises and fixed assets available in the bank's regulatory report, and the price of physical capital is obtained as occupancy and fixed asset expenditures divided by the quantity of physical capital. Since purchased funds require very small amounts of physical inputs like labor and capital, they are treated as financial inputs to the intermediation process, which include federal funds purchased, large CDs, foreign deposits, demand notes, and other liabilities for borrowed money. The price of purchased funds is calculated as interest paid on these funds divided by the total dollar value of these funds, which is the quantity of purchased funds.

CHAPTER 11

EMPIRICAL RESULTS

This section reports the empirical results of the scope economies analysis for U.S. financial institutions jointly producing banking and insurance products. We first evaluate the cost, revenue, and profit scope economies by estimating the composite cost, revenue, and profit functions. Then, the second-stage regression results are discussed.

11.1. SCOPE ECONOMY ESTIMATES

It is well recognized that specialist firms and diversified firms may operate at different production frontiers due to different business strategies and technologies. We estimate cost, revenue, and profit functions for specialist and diversified firms, respectively. A total of 24 functions is estimated: two types of firms (specialists and diversified) by four sectors (life insurance, property-liability insurance, commercial banking, and thrifts) by three types of functions (cost, revenue, and profit). Tables 18, 19, 20 and 21 show the descriptive statistics of the variables used in the function estimation for commercial banks, thrift saving banks, life insurers, and property-liability insurers, respectively. Panel A is the summary of the statistics for the diversified firms, Panel B is for the specialist firms, and Panel C shows the statistics for all firms in the sample. We use non-linear least square estimation to estimate the composite functions. The estimated functions well fit the sample and show good overall fitness.

Scope economy estimates for the joint producers (bancassurers and assurbanks) are obtained by applying the scope economy formulas for each of them with the coefficients estimated from the composite functions. Scope economy estimates for the specialists are obtained by simulating mergers of insurance specialists with bank specialists (Berger *et al.*,

2000). We use Cartesian product (also called direct product) to obtain the hypothetical financial conglomerates. The hypothetical financial conglomerates are created by merging every insurance specialist with every bank specialist in each given year. Thus, 298,185 synthetic joint producers are obtained.[83]

One common approach in inferring scope economies is to evaluate at a single point, e.g., the mean or median of the data. Nevertheless, this point estimation method has been criticized for its weak representation, as it may not provide a good approximation for the whole sample (Hirao and Inoue, 2004; and Berger *et al.*, 2000). We present our scope economy estimations in several different ways. The cost, revenue, and profit scope economies are evaluated, first, for all the firms in the sample, then, for the actual joint producers only, and, finally, for the synthetic financial conglomerates. The scope economy scores, then, are evaluated at three points, the 25th (Q1), 50th (median), and 75th (Q3) percentile of the data. For example, for the whole sample the scope economy scores are estimates at the first quartile, the median, and the third quartile of outputs quantities and inputs prices.

Table 22 summarizes the estimates of costs, revenue, and profit scope economy scores for all firms in the sample, the actual joint firms only, and the simulated joint firms only. Focusing first on cost scope economies, Panel A shows consistent negative cost scope economy estimates regardless of evaluation points or firms samples. The evidence indicates significant cost scope diseconomies on jointly producing banking and insurance products. For example, at median level of outputs and input prices, the data show cost scope diseconomies of 11.4 percent for all the firms, 24.1 percent for actual joint producers, and 26 percent for the hypothetical joint firms. The estimates at Q1 and Q3 suggest the same conclusion, and the cost scope diseconomies

[83] The Cartesian product approach considers all possible firm pairs and, therefore, can reduce the potential for bias resulting from arbitrarily excluding ex ante some firm combinations that might be associated with scope economies or diseconomies.

are statistically significant. Panel A also shows an inverse relationship between firm size and cost scope diseconomies. As discussed in Chapter 9, cost scope economies may exist on a small scale from sharing inputs or sharing fixed resources such as computers or offices, but such gains could be offset by coordination or management diseconomies and exhausted in larger scale. The relationship between scope economies and firm size will be further discussed in the regression analysis.

Panel B of Table 22 lists the revenue scope economies estimates. All the estimate scores are large in value and statistically significant at the 1 percent level. The positive revenue scope economy scores indicate revenue scope economies in joint production, suggesting that offering both banking and insurance products can generate higher sales revenue than producing the products separately in specialists firms. At median value, actual joint firms could realize revenue scope economies of 32.1 percent, and for specialist firms, revenue scope economies are predicted to be 38.8 percent. In terms of the pattern between revenue scope economies and firm size, Panel B indicates a positive relationship. The larger the firm size, the higher its revenue scope economies. It is not surprising to see that small size firms are less capable of benefiting from such production complementarities. As discussed earlier, large scale operations may be needed to generate revenue scope economies from consumption complementarities because of the need to maintain a large distribution network. In addition, this finding suggests that large firms are the most efficient in utilizing cross-selling and exploiting benefits from offering one-stop shopping convenience when providing banking and insurance products simultaneously.

Panel C of Table 22 provides the summary of profit scope economy score estimations. The data generally show significant profit scope economies for all firms in the sample, the actual joint firms only, and hypothetical joint firms only. However, profit scope economies are quite

small and less significant. For example, at sample median, actual joint producers could benefit from joint production by increasing 2 percent net income, and the specialists are predicted to increase 10 percent net income by conglomeration. Except for the estimates for actual joint producers at Q1, the profit scope economies are statistically significant. Similar to the revenue scope economies in Panel B, large firms show higher profit scope economies when producing both banking and insurance products. The profit scope economies increase from 2.6 percent at Q1, to 3.9 percent at median, to 7.6 percent at Q3 for all firms in the data.

The findings reject Hypothesis 1 and suggest that significant cost scope diseconomies, significant revenue scope economies, and weak profit scope economies exist in the post-GLB integrated banking and insurance industries. The evidence of cost scope diseconomies cannot support production complementarities and suggests that cost savings from sharing resources such as marketing systems, information databases, and offices do not offset the extra costs possibly incurred in joint production and conglomeration. The findings of revenue scope economies support consumption complementarities, which suggests that customers are willing to pay more for the convenient one-stop shopping; Demand side scope efficiency gains also arise by cross-selling. The findings of profit scope economies indicate that revenue scope economies dominate cost scope diseconomies on joint productions. This leads to the final net profit scope economies, which, however, are small.

Furthermore, the evidence of varied cost and revenue scope economies or diseconomies supports our contention that profit scope economies dominate the commonly used concept of cost or revenue scope economies. Neither the cost nor the revenue scope economies can explain net effects of integrating the banking and insurance manufacturing on financial conglomerate operations. Focusing on either cost or revenue economies may lead to misleading conclusions.

11.2. REGRESSION ANALYSIS

We next investigate which types of firms are more likely to benefit from conglomeration and how firm characteristics explain the scope economies difference among firms. The remainder of the dissertation is devoted to a regression analysis. It is the second stage analysis. The cost, revenue, and profit scope economy scores are regressed on a set of firm characteristic variables. The regression results discussed in this section reveal the effects of firm characteristics on economies of scope and test the hypotheses presented in Chapter 9. Observations with extreme scope economy scores, e.g., scope economy scores greater than 1 and less than -1, are excluded from the sample. The final sample used in the regression contains 214 joint producer observations.

Table 23 provides a summary of the descriptive statistics of regression variables. Table 24 shows the coefficient results for cost, revenue, and profit scope economy regressions. A truncated Tobit model is used since dependent variables are truncated at 1 and -1. The dependent variables are cost scope economy scores (function <1> and <4>), revenue scope economy scores (functions <2> and <5>), and profit scope economy scores (functions <3> and <6>). Two sets of regressions are estimated and compared. The only difference is the variables used to capture each firm's business portfolio and product mix. Functions <1>, <2>, and <3> use the total personal business share and overall firm categories, while functions <4>, <5>, and <6> further segregate personal business share into insurance personal business share and banking personal business share. Then, firms are grouped into nine sub-categories.

To test Hypothesis 3 that firm size is related on scope economies, we use the natural log of the gross total assets (LASSETGTA) to measure the size, which is a commonly used proxy in the literature. Gross total assets are defined as the sum of insurance division assets, bank division

assets, and allowance for loans and leases. The coefficient on LASSETGTA is negative in the cost regression and positive in both revenue and profit regressions. All these coefficients are statistically significant. These coefficient results are consistent with the findings in Table 3, with no controls for other factors. The coefficients suggest that large firms are more likely to benefit from revenue increases than cost savings when jointly producing banking and insurance products. They are more efficient in keeping large scale distribution networks which could generate significant revenue increases by cross-selling. Small firms are more likely to benefit from cost saving by sharing important or costly resources in conglomeration.

Hypothesis 4 and 5 are related with a firm's business portfolio and product mix effects on scope economies. Three business share variables are used. The total personal products share is defined as total personal business outputs (including insurance personal business and banking personal business)[84] divided by the firm's total business outputs (P_SHARE). The personal product share in the insurance division is measured as the personal insurance outputs divided by total insurance outputs (P_SHARE_INS).[85] The personal banking product share in the banking division is defined as the personal banking outputs divided by total banking outputs (P_SHARE_BK).[86]

We also include indicator variables designed to capture broad differences in the business strategies employed by the firms. Firms whose bank division assets are more than 75 percent of total group assets are defined as bancassurers (DV_BKASSUR). If bank division assets account

[84] Insurance personal business includes individual life or annuity insurance, private passenger auto physical damage insurance, and homeowner's insurance. Banking personal business includes consumer loans, credit cards and other installment loans, residence mortgage, and core deposits.
[85] Total insurance outputs include personal insurance outputs and commercial insurance outputs, such as group life or annuity insurance, inland marine, commercial auto insurance, and workers compensation.
[86] Total banking outputs include personal banking outputs and commercial banking outputs, such as commercial and industrial loans.

for less than 25 percent of group assets, the firms are categorized as assurbanks (DV_ASSURBK), and the remaining firms are conglomerates (DV_CONG).

Each of the three groups is further segregated by the range of business in which they engage. The DV_BKASSUR is segregated into three indicators: bancassurers participating in life insurance business only (BKASSUR_LH), bancassurers owning property-liability insurance subsidiaries only (BKASSUR_PC), and bancassurers participating in both the life and property-liability insurance business (BKASSUR_LHPC). The DV_ASSURBK is segregated into: assurbanks that operate commercial banks only (ASSURBK_CB), assurbanks owning thrift saving business only (ASSURBK_SB), and assurbanks owning both commercial banking and thrift saving businesses (ASSURBK_CBSB). Then, the DV_CONG is disaggregated into: conglomerates owning life insurance subsidiaries only (CONG_LH), conglomerates participating in the property-liability insurance business only (CONG_PC), and conglomerates doing both life and property-liability insurance business (CONG_LHPC). DV_CONG and CONG_LHPC are dropped because of the linearity.

As shown in Table 24, both the overall total personal product share variable, P_SHARE, and division personal product share variables, P_SHARE_INS and P_SHARE_B, have negative coefficients in the cost scope regression and positive coefficients in the revenue and profit scope regression. These results suggest that joint firms with an emphasis on the retail business are less likely to realize cost scope economies but more likely to benefit from revenue scope economies. In addition, such effects are mainly dominated by the insurance retail business, which tends to contribute more effects than the banking retail business. The effect on net profit scope economies is estimated to be positive and statistically significant, which supports Hypothesis 5. Economies of scope are more likely to occur in personal product lines than in commercial lines. This finding

suggests that retail banking and insurance products are more homogeneous and could be efficiently produced through cross-selling. In addition, the results also suggest that commercial customers may prefer expertise and tailored products to meet their banking and/or insurance needs. Firms with business portfolios highly weighted on commercial products appear unable to achieve significant revenue scope economies due to joint production.

As discussed in Chapter 9, life insurance products have more similarities to banking products than do property-liability insurance products, and higher economies of scope are expected to occur in the joint production of life and banking products than in the joint production of property-liability and banking products. The results in Table 24 show that the coefficient on BKASSUR_LHPC is positive and significant in the profit scope equation. This evidence suggests that bancassurers are profit scope efficient when participating in both the life and property-liability insurance business. The negative and significant coefficient on ASSURBK_CBSB in the profit scope equation suggests that assurbanks are profit scope inefficient when participating in both the commercial and thrift banking business. The coefficient on CONG_PC in the profit scope regression is positive and significant, suggesting that if the firm has balanced banking and insurance business, scope economies are more likely to occur when offering property-liability insurance products.

To control for the business diversifications, four variables are included: the insurance product Herfindahl index (PRODHHI), the banking product Herfindahl index (PRODHHI_B),[87]

[87] Herfindahl index (HHI) for a firm producing *n* types of products is measured as (Y1^2 + Y2^2 + …+ Yn^2) / (Y1 + Y2 + … + Yn)^2, where Y*i* is the *i*th product output. Insurance products include property-liability insurance (personal short-tail lines, personal long-tail lines, commercial short-tail lines, and commercial long-tail lines) and life insurance (individual life insurance, individual annuity, group life insurance, group annuity, and accident and health insurance). Banking products include residential real estate loans, commercial real estate loans, credit card and other installment loans, farm loans, commercial & industrial loans, other loans, demand deposits, and time and saving deposits.

the insurance division geographic business HHI (DPWHHI),[88] and the log of the number of domestic offices and branches in the banking division (LOFFDOM). The maximum possible value for the Herfindahl index of 1.0 indicates a single product manufacturing and, as such, higher index values indicate a decrease in product diversification. Table 24 shows that, the more products diversified in the insurance division, the more likely the firm is to exploit cost scope economies but the less likely it is to exploit revenue and profit scope economies. In addition, the more products diversified in the banking division, the more likely it is to realize cost and profit scope economies and the less likely it is to realize revenue scope economies. Only the insurance products diversification effects on net profit scope economies are statistically significant.

The insurance geographic business Herfindahl index and the number of bank offices and branches capture the effects of national or local operation strategies. The higher the insurance geographic diversification variable, DPWHHI, and the lower the number of bank offices, LOFFDOM, the less geographically diversified. The results show that both measures of geographical diversification have a consistent impact on scope economies. Joint firms with more geographically diversified insurance or banking businesses are less likely to exploit cost scope economies but are more likely to exploit revenue and profit scope economies, suggesting that national operations contribute to net profit scope economy gains. This finding is consistent with our earlier discussions. National operations are sufficient to large sales volumes and, therefore, contribute to revenue scope economies. However, on the cost side, national operations can be cost inefficient, and extra costs or expenses can contribute to cost scope diseconomies. The results show that national operations provide positive net effects on profitability.

[88] Herfindahl index for insurers operating in *m* states is measured as (Y1^2 + Y2^2 + …+ Ym^2) / (Y1 + Y2 + … + Ym)^2, where Y*i* is the direct premium written in the *i*th state.

We test the hypothesis regarding the insurance distribution systems using three dummy variables: insurance horizontal integrated distribution (DV_MKT_H = 1, if the insurance horizontal integrated distribution channels are used), insurance vertical integrated distribution (DV_MKT_V = 1, if insurance vertical integrated distribution channels are used), and both insurance horizontal and vertical distributions (DV_MKT_HV = 1, if both horizontal and vertical integrated distribution channels are used).[89] The final classification is omitted from the regression to avoid linearity. The coefficient on DV_MKT_V is positive, and the coefficient on DV_MKT_H is negative in the profit scope equation, suggesting that banks affiliated with vertically integrated insurers could benefit from reusing insurers' relatively large investments in advertising, marketing, and brand names and therefore enjoy profit scope economies. However, these two coefficients are not statistically significant in Table 24.

Some of the other variables included in the regressions also appear related to scope economies. The capital to asset ratio (C_TO_A) estimated coefficients suggest that a higher capital to asset ratio leads to cost scope diseconomies and revenue and profit scope economies. The results are consistent with low risk firms attracting more potential customers; however, holding additional equity capital can be costly.

The results in Table 24 also suggest that efficient companies are more likely to enjoy profit scope economies. This is evidenced by the estimated coefficients on the X-efficiency variables for each industry are positive and significant. This finding supports our last hypothesis. Since efficient managers are already outperforming their competitors with the ability to achieve high levels of X-efficiency, they can reuse and extend their managerial talent, experience, and expertise into the conglomeration. Thus, they can be better able to realize economies of scope,

[89] Vertical integrated distribution channels include exclusive/captive agents, direct response, internet, affinity group marketing, worksite marketing. Horizontal integrated distribution channels include independent agents, brokers, general agents, career agents, and banks.

yielding a positive relationship between efficiency and scope economies. Finally, two year-dummy variables are added to the control for any possible effects, and the coefficients are significant for both sets of regressions.

CHAPTER 12

SUMMARY AND CONCLUSIONS

The Gramm-Leach-Bliley Act of 1999 is a landmark financial services legislation, which promised the most fundamental reform in the U.S. financial services regulation in more than half a century. Few doubted the potential for GLB to have a profound impact on financial service providers and on the market. However, there is a striking lack of empirical research on the effects of diversification by financial firms. This dissertation presents an empirical analysis of the insurance and banking sectors of the economy in the post-Gramm-Leach-Bliley era. This dissertation has sought to contribute new evidence on scope efficiencies from the joint production of insurance and banking products after the passage of the GLB Act.

The dissertation first identifies domestic assurbanks and bancassurers, and all the unique subsidiaries of all financial service companies in the U.S. licensed as a commercial bank, thrift, or insurance company. The data come from a variety of sources. We construct a unique variable that links the banking and insurance regulatory datasets. The data sample contains 260 diversified firm observations (jointly producing banking and insurance products), 613 insurance specialist observations (offering insurance products only) and 1,450 bank specialist observations (offering banking products only) over the three year period 2003 – 2005. The data sample accounts for 98 percent of life insurance industry assets, 94 percent of property-liability insurance assets, 88 percent of commercial banks assets, and 81 percent of thrift savings banks assets.

Following the construction of the dataset, we next conduct a univariate analysis to investigate the effects of integrating the banking and insurance sectors in the U.S. We evaluate

the market structure, firm characteristics, and operating performance of financial institutions in the U.S. integrated banking and insurance industry. The empirical results suggest that both domestic "assurbanks" and "bancassurers" are large in size and account for significant portions of the insurance and banking industries. Large commercial or saving banks are more interested in small-size life and property-liability insurance companies, and large insurance companies are more likely to extend their traditional business into banking through small-size thrifts. Banks appear more interested in life insurance than property-liability insurers, and insurers prefer to affiliate with thrift saving banks than with commercial banks.

Insurance companies owning banking subsidiaries are more geographically diversified and have relatively higher A.M. Best ratings than insurance specialists and, therefore, they have presumably lower default risks. Joint producers are more engaged in personal lines than commercial lines of insurance and are more diversified in their traditional products. Joint firms have higher non-interest income than bank specialists even after controlling firm size effects. Firms jointly producing insurance and banking services have higher overall profitability in their traditional lines of business. Bancassurers perform well in the insurance business, but most assurbanks lose money in their banking division, evidenced by their negative interest and non-interest margins. Joint producers generally keep higher equity capital in the non-traditional business divisions, which is evidenced by higher RBC ratios and lower leverage ratios.

The next section of this dissertation examines the existence of scope economies in financial conglomerations. To do so, we utilize a two-stage procedure econometric method. The first stage consists of investigating cost, revenue, and profit scope economies for U.S. banks and insurers by estimating the composite costs, revenue, and profit composite functions. We then use the results to explain the variation of scope economy estimations and to examine the relationship

between scope economies and firm characteristics. The scope economy estimates are regressed upon a set of variables describing firm characteristics and environments.

The estimation results suggest that significant cost scope diseconomies, revenue scope economies, and weak profit scope economies exist in the post-GLB U.S. integrated banking and insurance industries. The evidence of cost scope diseconomies suggests that cost savings from sharing inputs cannot offset the extra costs possibly incurred in joint production and conglomeration. The findings of revenue scope economies support consumption complementarities, showing that customers may be willing to pay more for the convenience of one-stop shopping; the findings also suggest that demand side scope efficiency gains also arise by cross-selling. This finding further suggests that financial conglomerates may target consumers of financial services in different ways, such as offering higher quality products for which they charge a premium.

The findings of profit scope economies indicate that revenue scope economies dominate cost scope diseconomies for joint productions. That is, revenue scope efficiency gains can offset the cost scope efficiency losses and contribute to net profit scope efficiency gains. In addition, the findings of an inverse relationship between firm size and cost scope diseconomies and the positive relationship between firm size and revenue or profit scope economies indicate that scope economies are variant among different size firms, where small firms are more efficient in cost saving while large firms are efficient in maintaining large scale distribution networks and, thus, sales augments.

In the second stage, we use regression analysis to test the determinants of scope economies. We address the following research questions: Which types of firms are more likely to benefit from conglomeration? How do firm characteristics explain scope economies differences

among firms. The regression results suggest that large firms are associated with higher cost scope diseconomies and higher revenue or profit scope economies than small firms. This is consistent with the evidence from the first-stage scope economy estimations. Large firms are more likely to benefit from increased revenue than increased savings when jointly producing banking and insurance products.

Considering business portfolios and product mix, economies of scope are also found to be more likely to occur in personal product lines than in commercial lines. This finding suggests that retail banking and retail insurance products are more homogeneous and can be efficiently distributed through cross-selling, but commercial customers may prefer expertise and tailored products to meet their banking and insurance needs. Thus, firms with business portfolios highly weighted on commercial products struggle to achieve significant sales arising from joint production. Bancassurers focusing on their traditional banking business are found to be more profit scope efficient in conducting life and property-liability insurance business simultaneously, while assurbanks concentrating on insurance business are profit scope inefficient in engaging in both commercial and thrifts business.

Business diversifications also affect scope economies in joint production. The more products diversified in insurance, the more likely to exploit cost scope economies but the less likely to exploit revenue and profit scope economies. In addition, joint producers, which are more geographically diversified in both the insurance or banking business, are more likely to realize profit scope economy gains. The results show that national operations impose positive net effects on scope efficiencies, the significant profit scope economies. Then, the impact of insurance distribution systems are that banks affiliated with vertically integrated insurers show higher profit scope economies in joint production.

The other firm characteristics affecting scope economies include capital-to-assets ratio and X-efficiencies. The results suggest the more X-efficient a firm is, the more scope efficient; and firms with high capital-to-assets ratio present high profit scope economies.

After the passage of GLB, we did not observe the wave of cross-sector conglomerations, as expected in the U.S. banking and insurance industries. Banks and insurers showed their hesitation on exercising the new power granted by GLB. Our results further explain why U.S. banks and insurers have opted for integration at the marketing level rather than the production level. The cost scope economies on the supply side are not pervasive, and whether the magnitude of the revenue scope economies on the demand side is large enough to offset the cost increase, hinders cross-sector expansions.

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Table 1 Inusrance Underwriting Net Income / Total Net Income, Insurance Income / Non-interest Income

This table provides three years statistics summary for insurers with banking business (Assurbanks), banks with insurance underwriting business (Bancassurers), and banks with insurance agency business only. The statistics reported include the number of firms, the mean and median of the ratio of net insurance underwriting income to total net income, and the mean and median of the ratio of insurance income to non-interest income.

Panel A: 2003

	# Firms	% ins. underwriting net income		% ins. Income / non-interest income	
		Mean	Median	Mean	Median
Assurbanks	44	87.58%	97.74%	NA	NA
Bancassurers	44	19.50%	3.00%	8.09%	3.99%
Banks w/ ins. agency only	1251	NA	NA	5.60%	1.72%

Panel B: 2004

	# Firms	% ins. underwriting net income		% ins. Income / non-interest income	
		Mean	Median	Mean	Median
Assurbanks	41	89.27%	99.16%	NA	NA
Bancassurers	45	23.67%	2.94%	10.57%	5.60%
Banks w/ ins. agency only	1327	NA	NA	5.84%	1.80%

Panel C: 2005

	# Firms	% ins. underwriting net income		% ins. Income / non-interest income	
		Mean	Median	Mean	Median
Assurbanks	42	90.61%	99.28%	NA	NA
Bancassurers	45	24.93%	4.01%	10.09%	5.23%
Banks w/ ins. agency only	1331	NA	NA	5.91%	1.74%

Table 2 Top 10 Assurbanks and Bancassurers

This table lists the top 10 assurbanks and the top 10 bancassurers, their structure types, and some selected key operating information.

Panel A: Top 10 Assurbanks (in terms of Total Asset)

Assurbanks Name	Structure Type	Total Asset ($M)	Underwrit. Income ($M)	Underwrit. Net Income ($M)	Bank Interest Income ($M)	Bank Net Income ($M)	Total Net Income ($M)	% Bank Net Inc. to Total Net Inc.
AMERICAN INTRNL GRP	SLHC	370,656	52,613.6	6,370.9	31.9	7.6	6,378.4	0.12%
METLIFE, INC.	FHC	326,842	34,125.5	2,121.5	33.2	-12.1	2,109.4	-0.57%
PRUDENTIAL OF AMER	SLHC	245,757	19,902.5	1,122.7	42.2	-8.2	1,114.5	-0.74%
TIAA FAMILY OF CO	SLHC	154,415	8,973.1	1,314.1	0.5	-7.8	1,306.4	-0.59%
ING USA HOLDING CORP	SLHC	166,490	20,533.2	527.9	563.0	68.2	596.1	11.45%
STATE FARM IL	SLHC	148,548	48,899.9	2,835.8	299.7	-20.5	2,815.2	-0.730%
NEW YORK LIFE GRP	SLHC	138,694	14,955.9	864.1	0.3	-0.5	863.6	-0.06%
NATIONWIDE CORP	SLHC	136,052	25,198.8	1,763.7	0.5	3.3	1,767.0	0.19%
ALLSTATE CORPORATION	SLHC	121,354	33,543.9	3,618.1	27.5	-3.3	3,614.8	-0.09%
NORTHWESTERN MUT	SLHC	113,890	10,277.6	552.9	0.2	-2.3	550.5	-0.42%

Table 2 Panel B: Top 10 Bancassurers (in terms of Underwriting Income)

Bancassurers Name	Structure Type	Total Asset ($M)	Underwrit. Income ($M)	Underwrit. Net Income ($M)	Bank Interest Income ($M)	Total Net Income ($M)	%Underwrt. Net Inc. to Total Net Inc.	%Ins. Inc. to Non-interest Inc.
CITIGROUP INC.	FHC	1,264,032	2,550.0	1,256.0	57,047.0	17,853.0	7.04%	10.57%
COUNTRYWIDE FINANCIAL CORP	FHC	97,958	732.8	102.2	6,116.2	2,373.0	4.31%	20.40%
WELLS FARGO & COMPANY	FHC	387,798	233.0	579.0	19,418.0	6,202.0	9.34%	8.65%
BANK ONE CORPORATION	FHC	326,563	151.0	67.0	12,631.0	3,535.0	1.90%	5.95%
J.P. MORGAN CHASE & CO.	FHC	770,912	104.0	20.0	23,444.0	6,719.0	0.30%	1.38%
HSBC NORTH AMERICA INC.	FHC	125,950	72.3	9.3	4,592.8	996.9	0.93%	6.63%
BANK OF AMERICA CORP	FHC	736,487	69.2	74.8	31,056.3	10,810.5	0.69%	0.90%
CIBC DELAWARE HOLDINGS INC.	FHC	39,210	62.6	34.2	969.6	-93.1	NA	5.90%
WACHOVIA CORPORATION	FHC	401,032	60.0	33.0	15,080.0	4,264.0	0.77%	3.28%
NATIONAL CITY CORPORATION	FHC	113,933	55.6	16.9	5,978.8	2,117.1	0.80%	3.40%

Note: Assurbanks are insurers who sell banking products manufactured by their banking subsidiaries that are owned and controlled. Bancassurers are banks who sell insurance products, either through its own distribution channels or outside agents, manufactured by their insurance subsidiaries that are owned and controlled.

FHC: Financial Holding Co.

SLHC: Saving and Loan Holding Co.

NA: Total net income is negative

Table 3 Distribution of Firms by Num., Assets, Premiums, and Net Income (Life-Health Insurers)

This table provides the distribution and market share of Life-Health (L/H) Insurers in terms of number of firms, total asset, premium income (net premium earned), and net income.

	# Firms	% Firms	% Assets	%Premiums	% Net Income
ALL	182				
-- Non-affiliated	110	60.4%	35.0%	41.4%	36.8%
-- Affiliated	72	39.6%	65.0%	58.6%	63.2%
-- Assurbanking	36	19.8%	57.7%	51.6%	53.4%
-- Bancassurance	36	19.8%	7.3%	7.0%	9.8%

Non-affiliated L/H insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated L/H insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated L/H insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated L/H insurers refer to either Assurbanking-affiliated L/H insurers or Bancassurance-affiliated L/H insurers.

Figure 3.a

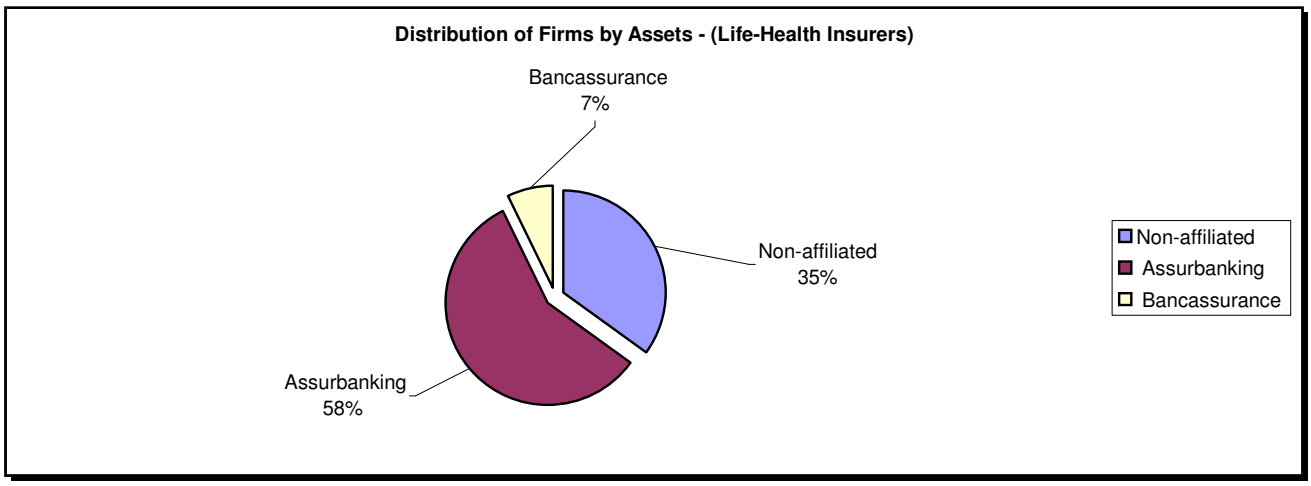

Figure 3.b

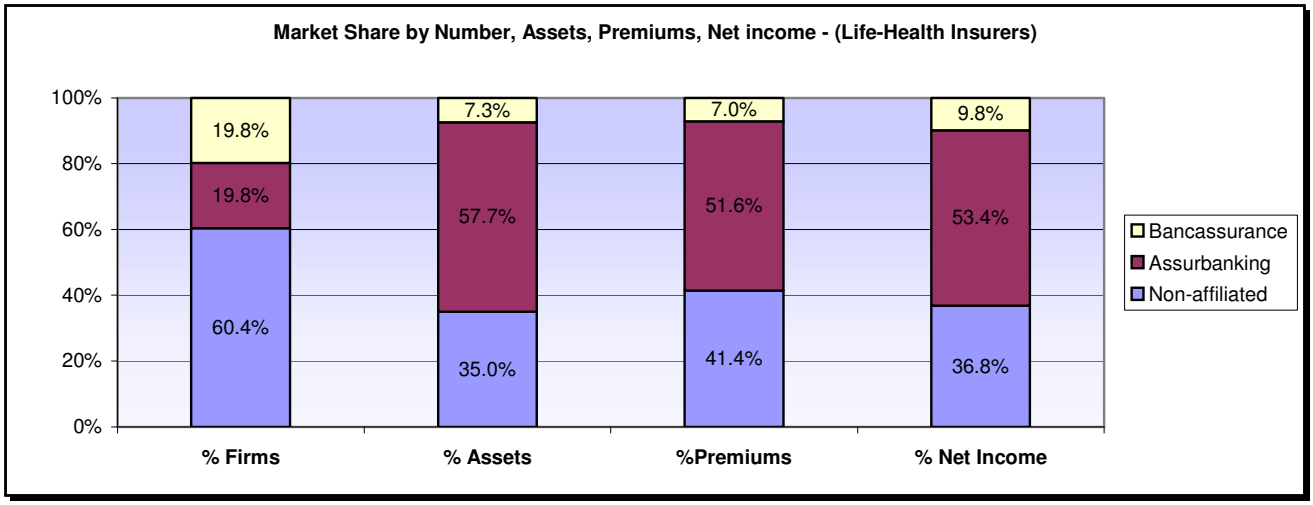

Table 3.1 Distribution of Firms by Num., Assets, Premiums, and Net Income (Property-Liability Insurers)

This table provides the distribution and market share of Property-Liability (P/L) Insurers in terms of number of firms, total asset, premium income (net premium earned), and net income.

	# Firms	% Firms	% Assets	%Premiums	% Net Income
ALL	191				
-- Non-affiliated	144	75.4%	65.7%	58.0%	66.7%
-- Affiliated	47	24.6%	34.3%	42.0%	33.3%
-- Assurbanking	25	13.1%	30.9%	39.1%	32.8%
-- Bancassurance	22	11.5%	3.5%	2.9%	0.4%

Non-affiliated P/L insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated P/L insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated P/L insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated P/L insurers refer to either Assurbanking-affiliated P/L insurers or Bancassurance-affiliated P/L insurers.

Figure 3.1.a

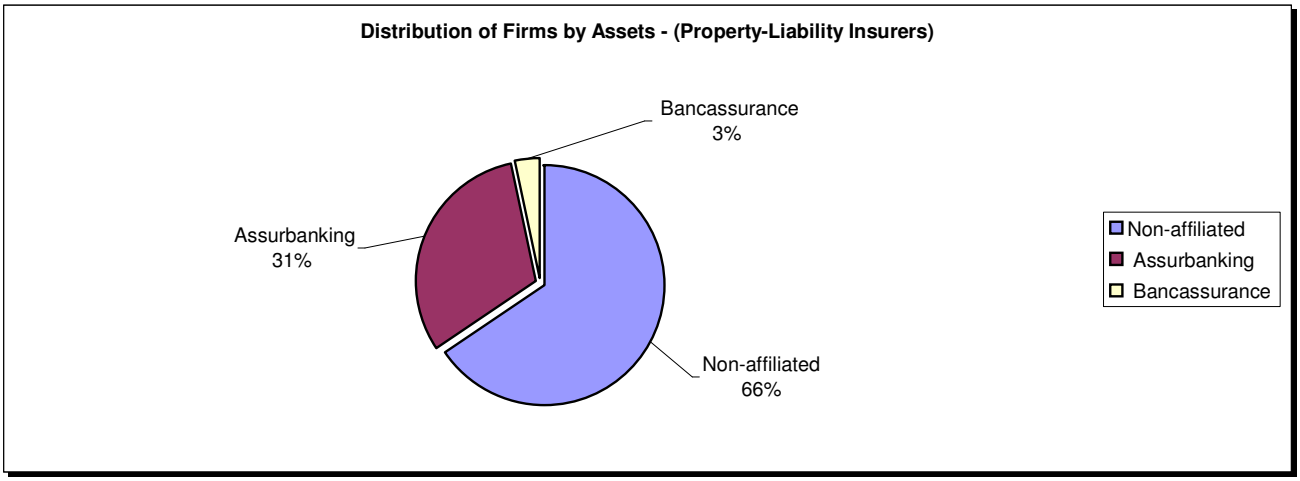

Figure 3.1.b

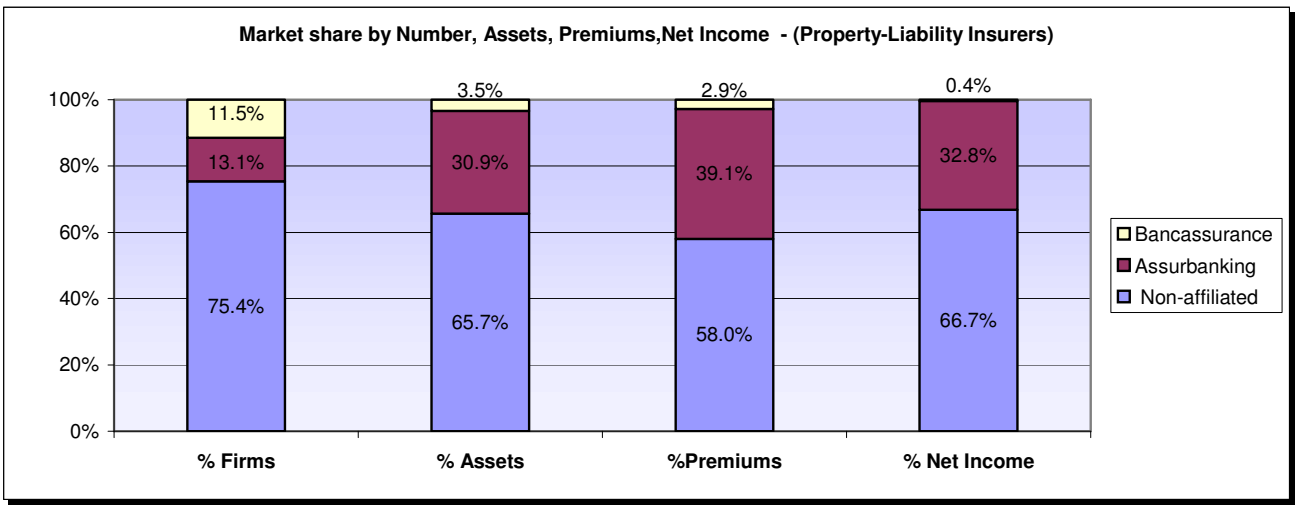

Table 4 Firm Size by Total Assets, Premiums, and Net Income -- (Life-Health Insurers)

This table provides average and median Life-Health (L/H) insurers' firm size in terms of total asset, premium income (net premium earned), and net income. The P-value of *t*-test is also provided.

	Mean ($ Million)			
	Non-Affi.	Affiliated	Assurbanking	Bancassurance
# Firms	110	72	36	36
Total Assets	11,164.46	34,530.79	61,317.55	7,744.03
Premium Income	1,685.11	3,978.30	7,003.38	953.22
Net Income	103.84	297.05	501.71	92.40

	Median ($ Million)			
	Non-Affi.	Affiliated	Assurbanking	Bancassurance
Total Assets	2,282.10	2,656.45	21,231.63	125.96
Premium Income	484.48	363.93	3,095.84	9.63
Net Income	21.68	32.28	273.51	1.82

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Total Assets	**0.00**	**0.00**	0.22	**0.00**
Premium Income	**0.00**	**0.00**	**0.09**	**0.00**
Net Income	**0.01**	**0.01**	0.41	**0.00**

Non-affiliated L/H insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated L/H insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated L/H insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated L/H insurers refer to either Assurbanking-affiliated L/H insurers or Bancassurance-affiliated L/H insurers.

Figure 4.a

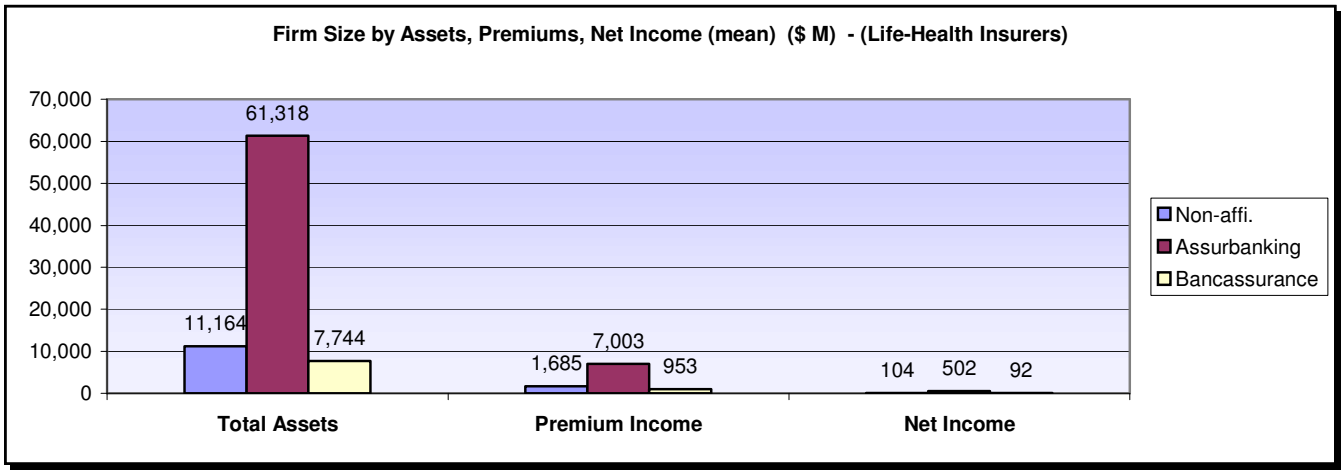

Figure 4.b

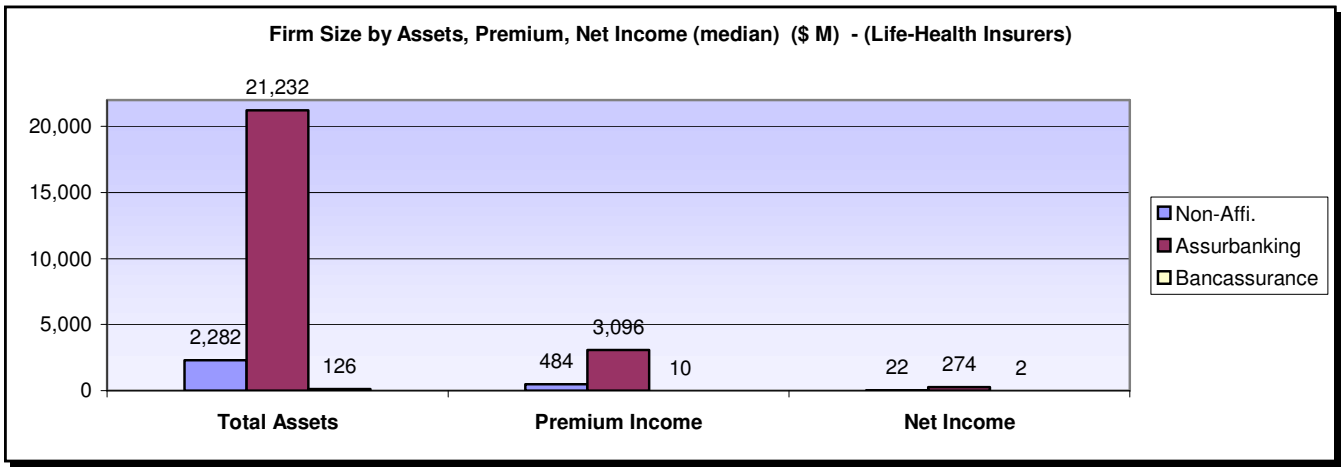

Table 4.1 Firm Size by Total Assets, Premiums, and Net Income -- (Property-Liability Insurers)

This table provides average and median Property-Liability (P/L) insurers' firm size in terms of total asset, premium income (net premium earned), and net income. The P-value of *t*-test is also provided.

	Mean ($ Million)			
	Non-Affi.	Affiliated	Assurbanking	Bancassurance
# Firms	144	47	25	22
Total Assets	5,131.53	9,077.07	15,344.38	1,955.13
Premium Income	1,336.28	3,273.66	5,733.38	478.52
Net Income	131.98	222.54	413.09	6.00

	Median ($ Million)			
	Non-Affi.	Affiliated	Assurbanking	Bancassurance
Total Assets	1,475.96	1,055.72	3,341.98	225.31
Premium Income	469.69	409.98	1,312.96	58.51
Net Income	22.68	36.11	59.69	8.87

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Total Assets	0.11	**0.04**	**0.02**	**0.01**
Premium Income	**0.06**	**0.03**	**0.01**	**0.01**
Net Income	0.22	**0.08**	**0.01**	**0.02**

Non-affiliated P/L insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated P/L insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated P/L insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated P/L insurers refer to either Assurbanking-affiliated P/L insurers or Bancassurance-affiliated P/L insurers.

Figure 4.1.a

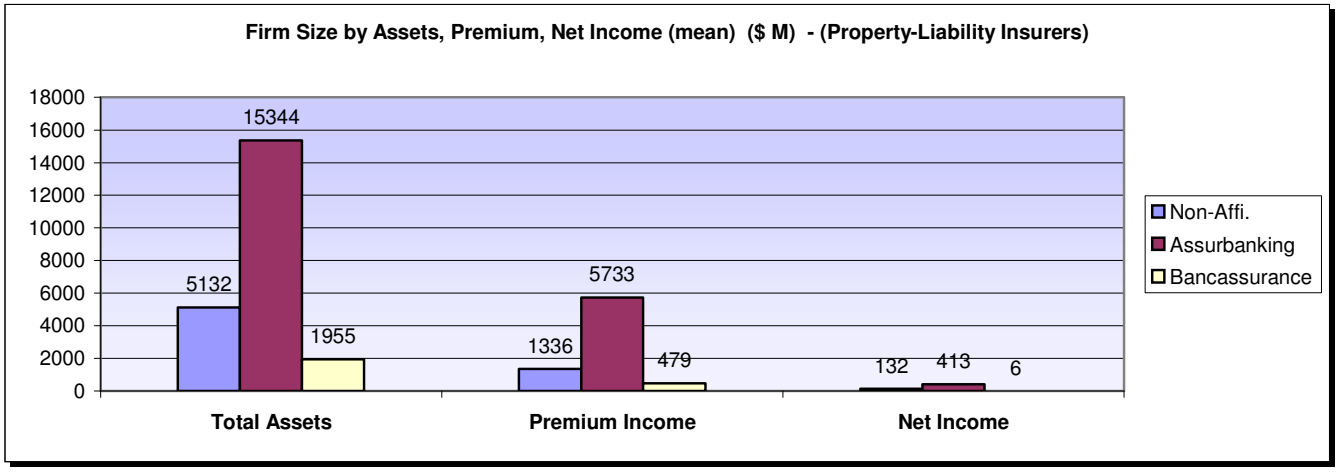

Figure 4.1.b

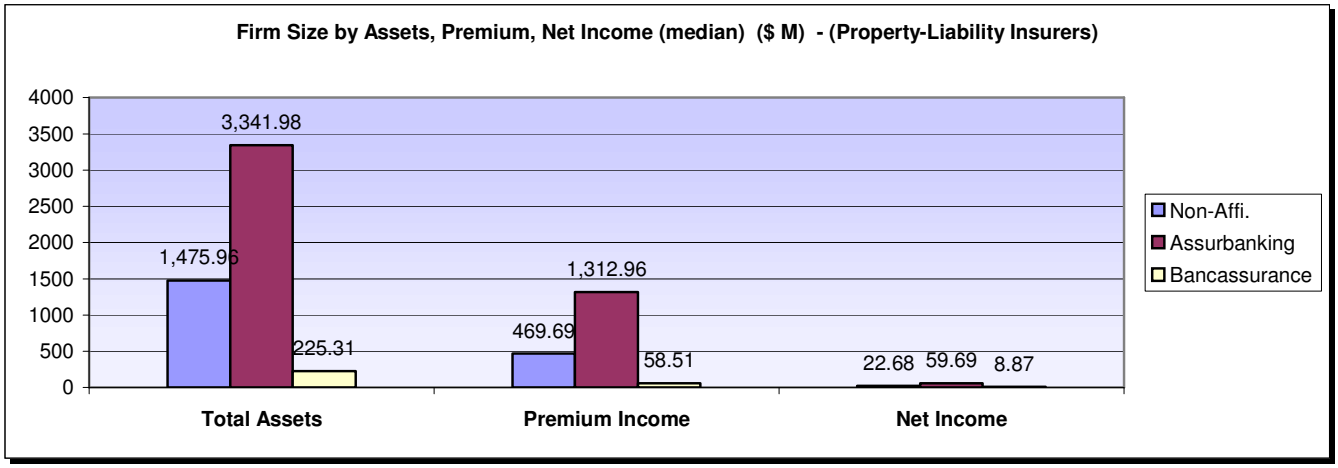

Table 5 A.M. Best Rating

This table provides A.M. Best Financial Strength Rating for insurers. A.M. Best's Financial Strength Rating is an independent opinion, based on a comprehensive quantitative and qualitative evaluation, of an insurance company's balance sheet strength, operating performance and business profile. Its rating scale and associated descriptions include: A++, A+ (Superior); A, A- (Excellent); B++, B+ (Very Good); B, B- (Fair); C++, C+ (Marginal); C, C- (Weak); D (Poor); NR (Not Rated). Since the A.M. Best Rating is assigned to individual firms not groups, the firms analyzed here are non-grouped life or property-liability insurers.

Panel A: Life-Health Insurers' A.M.Best Rating

	Non-Affi.	All Affi.	Assurbanking	Bancassurance
A++, A+ (Superior)	74	108	83	25
A, A- (Excellent)	177	70	47	23
B++, B+(Very Good)	46	12	4	8
B, B- (Fair)	13	4	0	4
<= C++ (Weak or Poor)	4	1	0	1
NR (Not Rated)	55	48	25	23
Total	369	243	159	84

Non-affiliated L/H insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated L/H insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated L/H insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated L/H insurers refer to either Assurbanking-affiliated L/H insurers or Bancassurance-affiliated L/H insurers.

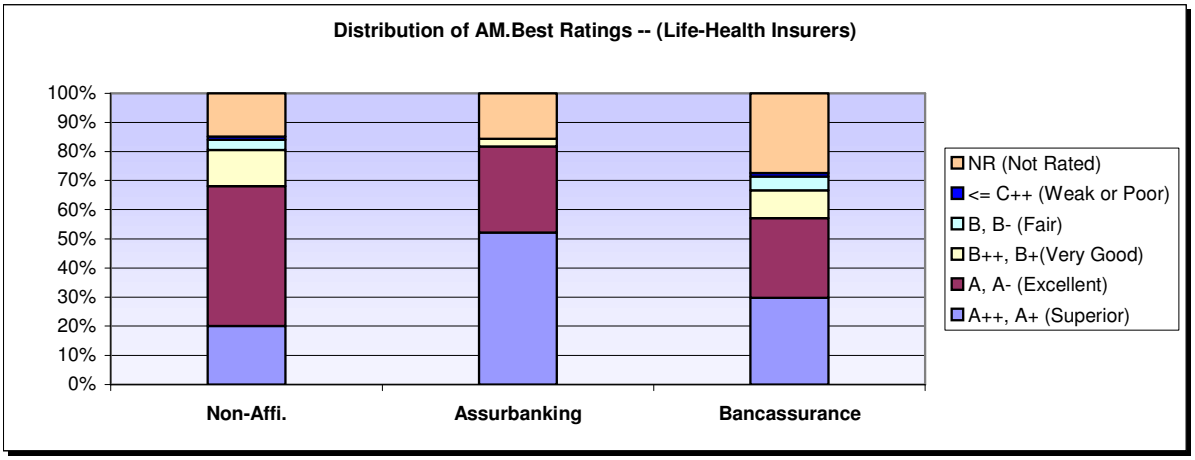

Table 5 Panel B: Property-Liability Insurers' A.M.Best Rating

	Non-Affi.	All Affi.	Assurbanking	Bancassurance
A++, A+ (Superior)	261	103	102	1
A, A- (Excellent)	491	203	161	42
B++, B+(Very Good)	53	16	13	3
B, B- (Fair)	47	3	1	2
<= C++ (Weak or Poor)	13	1	0	1
NR (Not Rated)	103	43	22	21
Total	968	369	299	70

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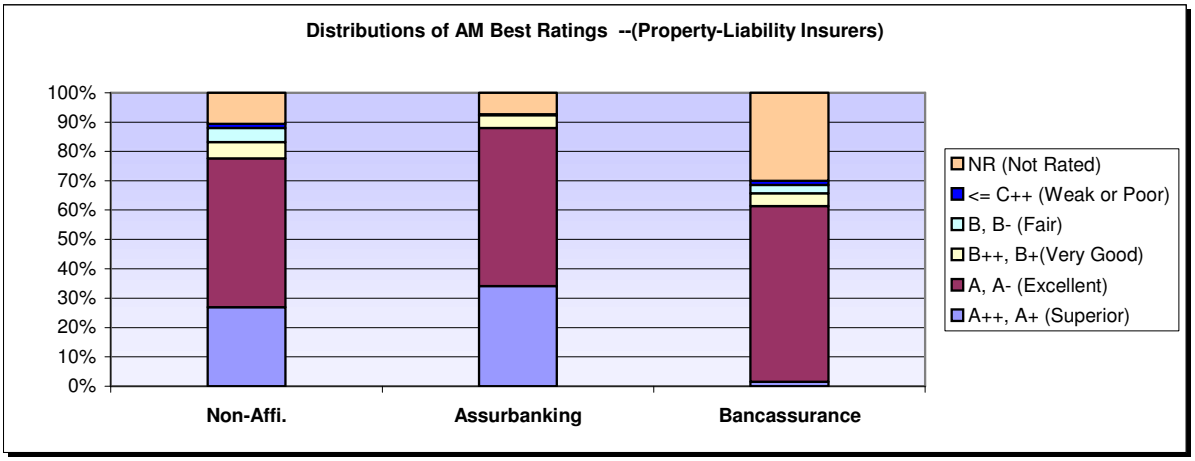

Table 6 Geographic Diversification: Number of States Insurers Licenced in.

This table shows insurers' geographic diversification. It reports the average and median number of states in the U.S. L/H and P/L insurers licenced in to do insurance business. The P-value of *t*-test is provided below.

Panel A: Life-Health Insurers' Geographic Diversification : Num. of States Insurers Licensed in.

	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Average Num. of States Licenced in	33	32	36	25
Median Num. of States Licenced in	47	47	48	24

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Average Num. of States Licenced in	0.25	**0.10**	**0.00**	**0.00**

Non-affiliated L/H insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated L/H insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated L/H insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated L/H insurers refer to either Assurbanking-affiliated L/H insurers or Bancassurance-affiliated L/H insurers.

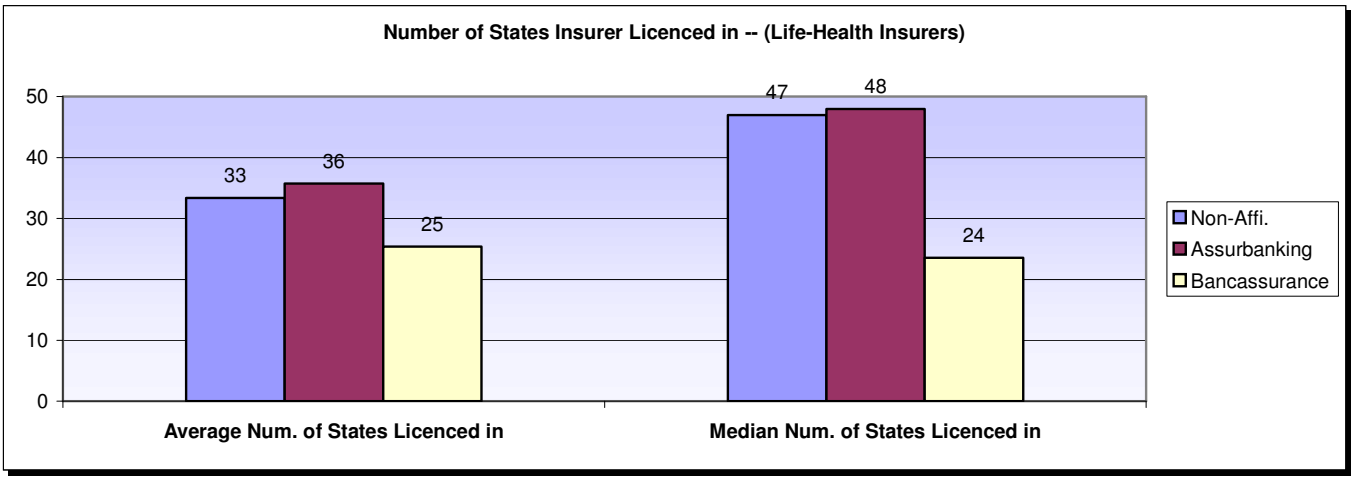

Table 6 Panel B: Property-Liability Insurers' Geographic Diversification : Num. of States Insurers Licensed in.

	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Average Num. of States Licenced in	27	41	44	33
Median Num. of States Licenced in	28	43	45	26

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Average Num. of States Licenced in	0.25	0.14	0.23	0.11

Non-affiliated P/L insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated P/L insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated P/L insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated P/L insurers refer to either Assurbanking-affiliated P/L insurers or Bancassurance-affiliated P/L insurers.

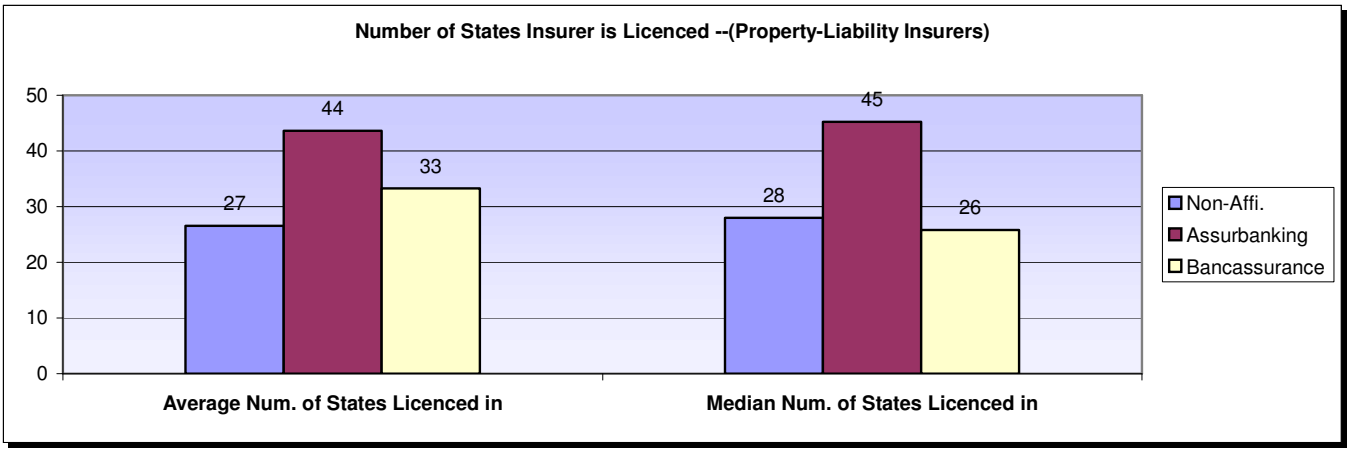

Table 7 Number of Affiliated vs. Non-Affiliated by Insurance Line -- (Life-Health Insurers)

This table examines the product mix of Life-Health (L/H) insurers. L/H insurance products are categorized as (1) individual life, (2) individual annuity, (3) credit life, (4) group life, (5) group annuity, and (6) accident & health insurance.

	Non-Affiliated				
Product Line	# Firms	# firms w/ business share >50%	% firm w/ share >50%	% Firms	Prem. Inc. ($M)
Individual Life	112	31	27.7%	93.3%	27,127.1
Individual Annuity	102	27	26.5%	85.0%	66,659.0
Credit Life	25	1	4.0%	20.8%	342.0
Group Life	102	1	1.0%	85.0%	8,988.1
Group Annuity	66	8	12.1%	55.0%	34,136.5
Accident & Health	106	28	26.4%	88.3%	64,949.7

	Affiliated				
Product Line	# Firms	# firms w/ business share >50%	% firm w/ share >50%	% Firms	Prem. Inc ($M)
Individual Life	57	16	28.1%	79.2%	68,767.0
Individual Annuity	50	15	30.0%	69.4%	93,352.0
Credit Life	28	4	14.3%	38.9%	507.6
Group Life	48	2	4.2%	66.7%	15,657.6
Group Annuity	31	2	6.5%	43.1%	68,448.1
Accident & Health	56	11	19.6%	77.8%	39,493.6

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Figure 7.a

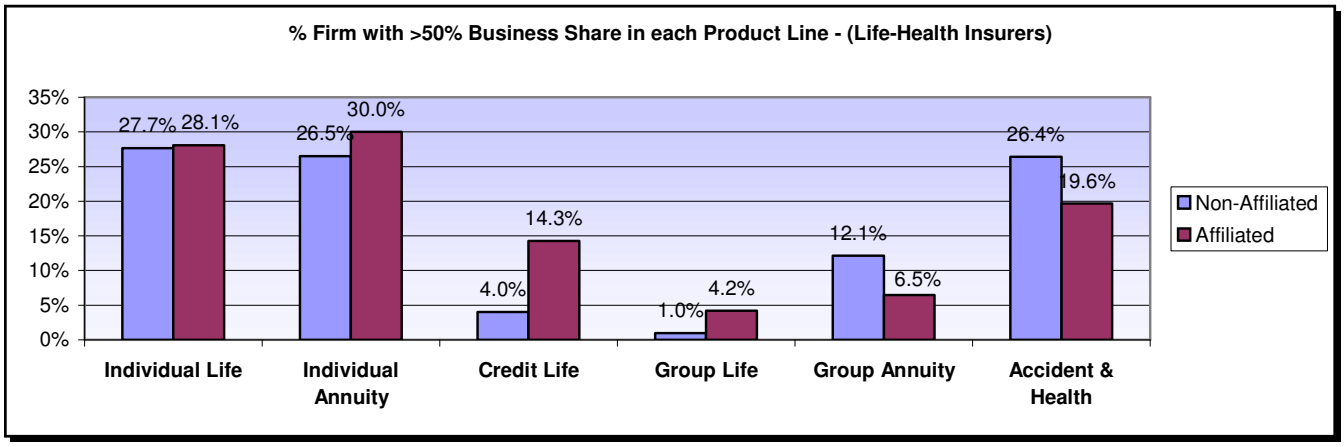

Figure 7.b

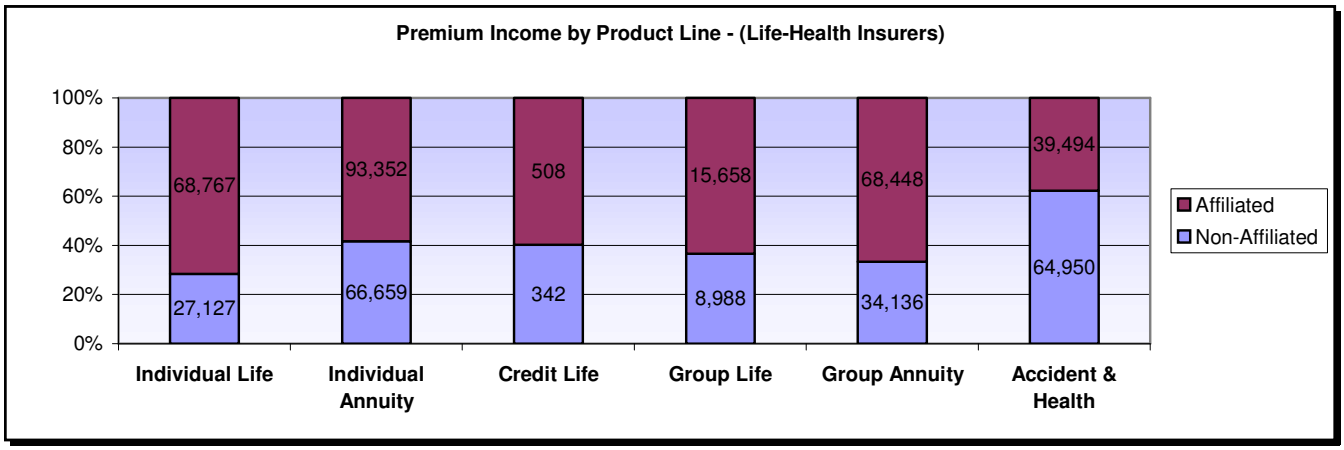

Table 7.1 Number of Affiliated vs. Non-Affiliated by Insurance Line (Property-Liability Insurers)

This table examines the product mix of Property-Liability (P/L) insurers. P/L insurance products are categorized as (1) personal property, (2) personal liability, (3) commercial property, and (4) commercial liability. Table 15 lists detail P/L products and lines of business definitions.

	Non-Affiliated				
Product Line	# Firms	# firms w/ business share >50%	% firm w/ share >50%	% Firms	Prem. Inc. ($M)
Personal Property	117	3	2.6%	73.6%	30857.9
Personal Liability	114	26	22.8%	71.7%	57650.1
Commercial Property	137	17	12.4%	86.2%	31575.3
Commercial Liability	149	88	59.1%	93.7%	92384.6

	Affiliated				
Product Line	# Firms	# firms w/ business share >50%	% firm w/ share >50%	% Firms	Prem. Inc ($M)
Personal Property	34	2	5.9%	72.3%	33887.7
Personal Liability	32	14	43.8%	68.1%	66375.4
Commercial Property	41	9	22.0%	87.2%	14774.0
Commercial Liability	36	10	27.8%	76.6%	39269.5

Non-affiliated P/L insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated P/L insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated P/L insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated P/L insurers refer to either Assurbanking-affiliated P/L insurers or Bancassurance-affiliated P/L insurers.

Figure 7.1.a

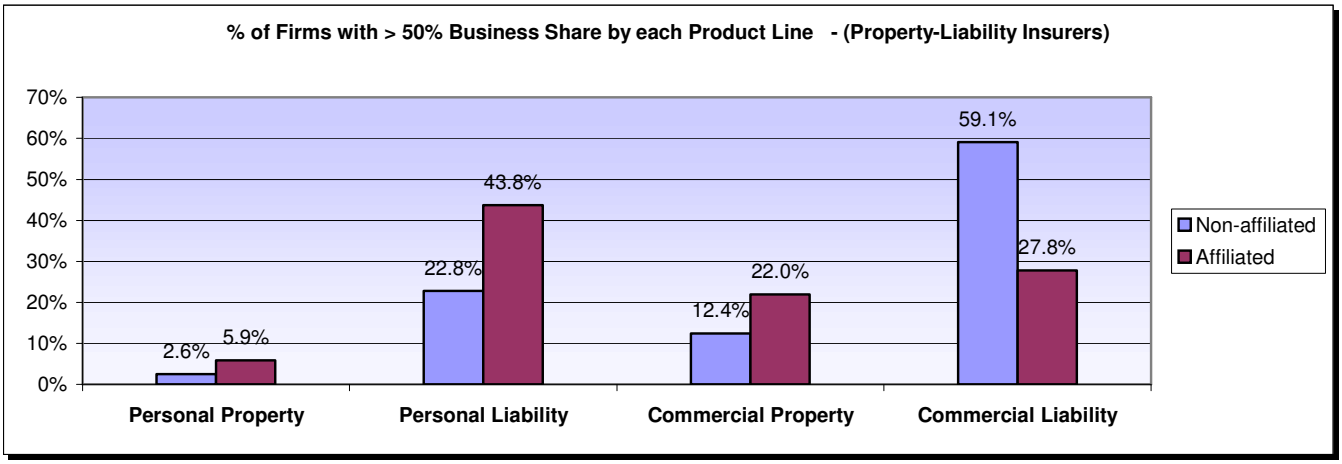

Figure 7.1.b

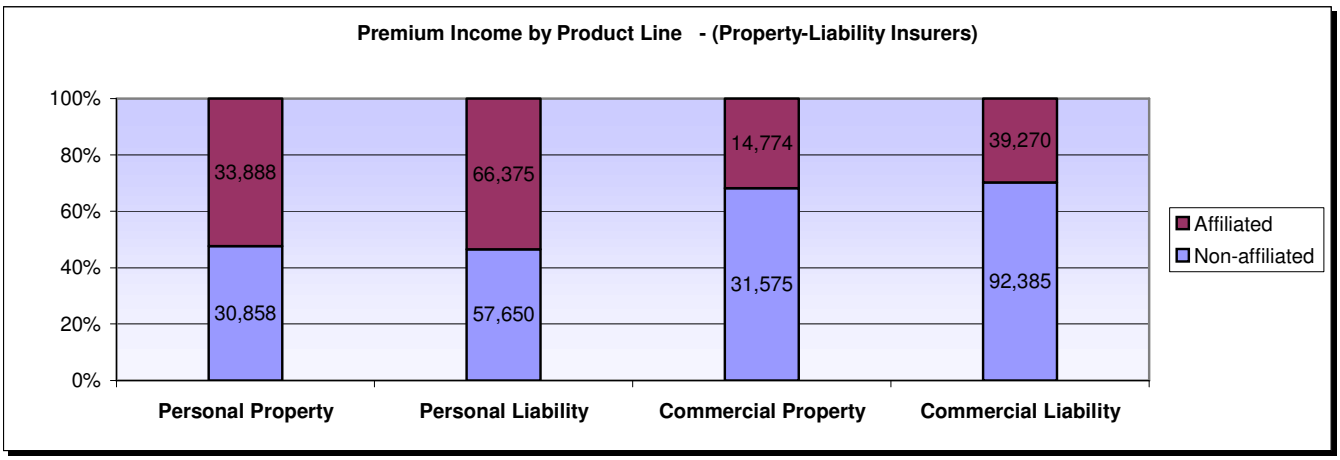

Table 8 Insurers Products Concentration Herfindahl Index (Focused vs. Multi-lines)

This table shows insurers products concentration level in insurance industry. The products concentration level was measured by herfindahl index, which approach to one when insurers are more focused producing. L/H insurance products are categorized as individual life, individual annuity, credit life, group life, group annuity, and accident & health insurance. P/L insurance products are categorized as personal property, personal liability, commercial property, and commercial liability.

Panel A: Life-Health Insurers Product Concentration Herfindahl Index (Focused vs. Multi-lines)

	Product Herfindahl Index			
	Non-Affi.	Affiliated	Assurbanking	Bancassurance
Mean	56.6%	58.1%	52.2%	65.5%
Median	52.8%	53.5%	47.5%	61.2%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Product Herfindahl Index	0.37	0.35	0.43	0.46

Figure 8.a

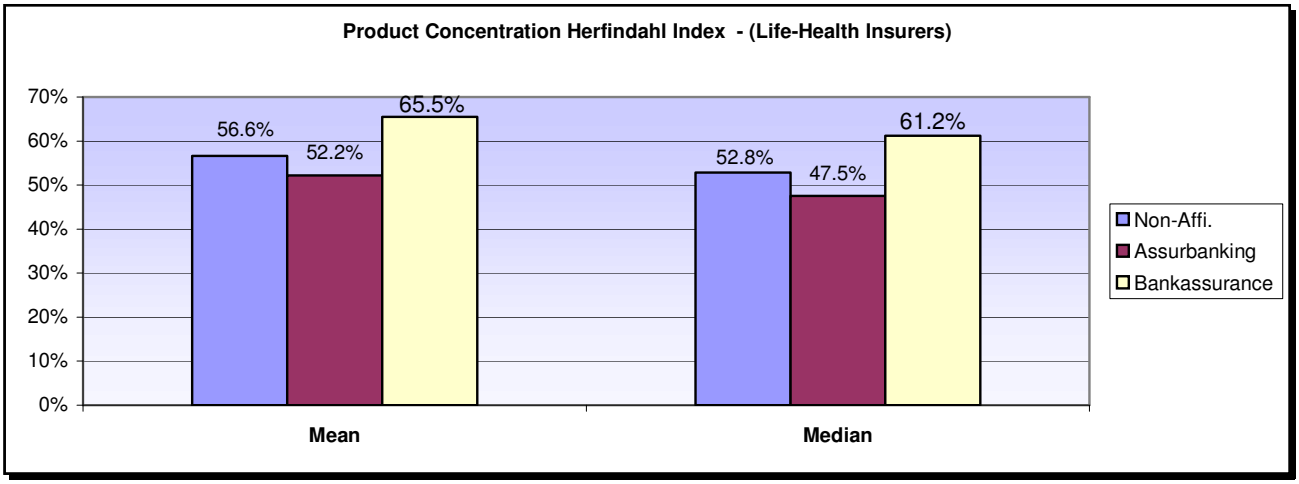

Table 8 Panel B: Property-Liability Insurers Product Concentration Herfindahl Index (Focused vs. Multi-lines)

	Product Herfindahl Index			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Mean	62.5%	58.8%	49.2%	69.8%
Median	51.7%	49.9%	43.6%	65.2%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Product Herfindahl Index	0.11	**0.00**	0.27	**0.01**

Figure 8.b

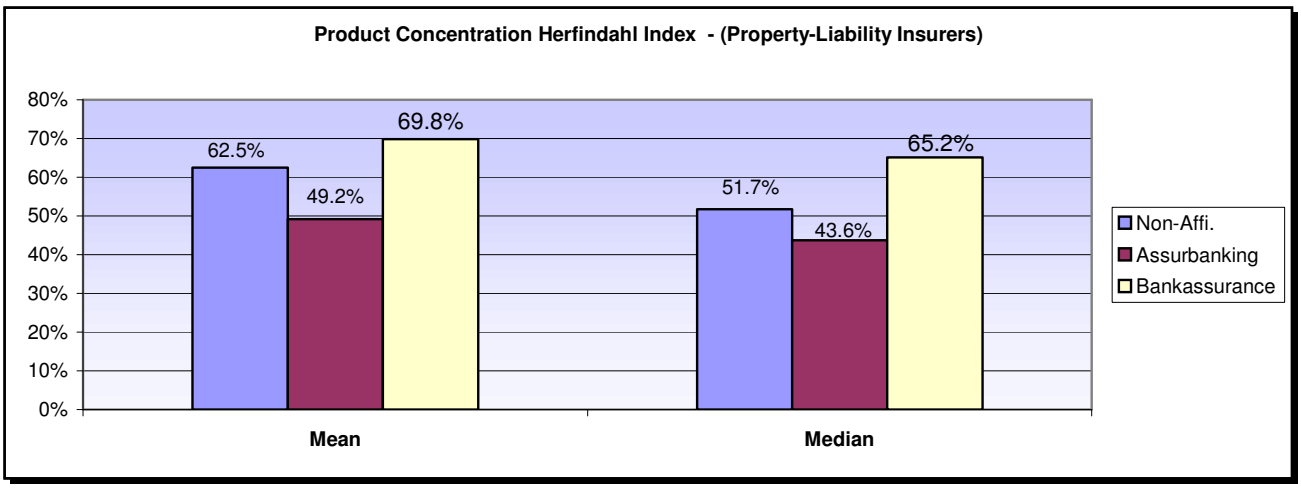

Table 9 Insurers Return on Asset (ROA), Return on Equity (ROE)

This table reports insurers' overall performance - Return on Asset (ROA), and Return on Equity (ROE). The P-value of *t*-test is provided below in both Panel A and Panel B.

Panel A: Life-Health Insurers ROA , ROE

	Mean (%)			
	Non-Affi.	Affiliated	Assurbanking	Bancassurance
ROA	1.4%	1.8%	1.3%	2.3%
ROE	6.6%	8.7%	13.4%	3.9%

	Median (%)			
	Non-Affi.	Affiliated	Assurbanking	Bancassurance
ROA	0.7%	0.8%	0.8%	0.7%
ROE	8.1%	8.3%	10.6%	5.9%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
ROA	0.23	0.48	0.16	0.17
ROE	0.19	**0.01**	0.18	**0.00**

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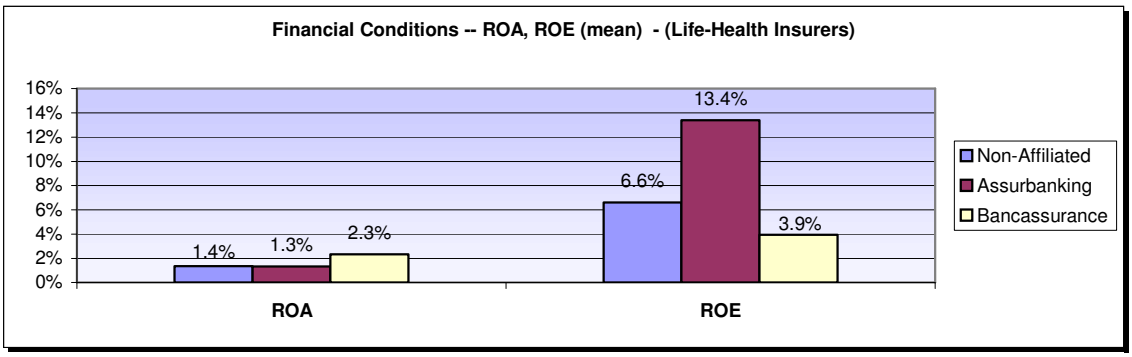

Table 9 Panel B: Property-Liability Insurers ROA , ROE

	Mean (%)			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
ROA	1.7%	5.8%	2.5%	9.7%
ROE	1.5%	10.5%	6.1%	15.5%

	Median (%)			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
ROA	1.9%	3.1%	2.7%	3.5%
ROE	5.6%	7.0%	6.3%	8.3%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
ROA	**0.01**	**0.08**	**0.02**	**0.03**
ROE	**0.00**	**0.03**	**0.01**	**0.05**

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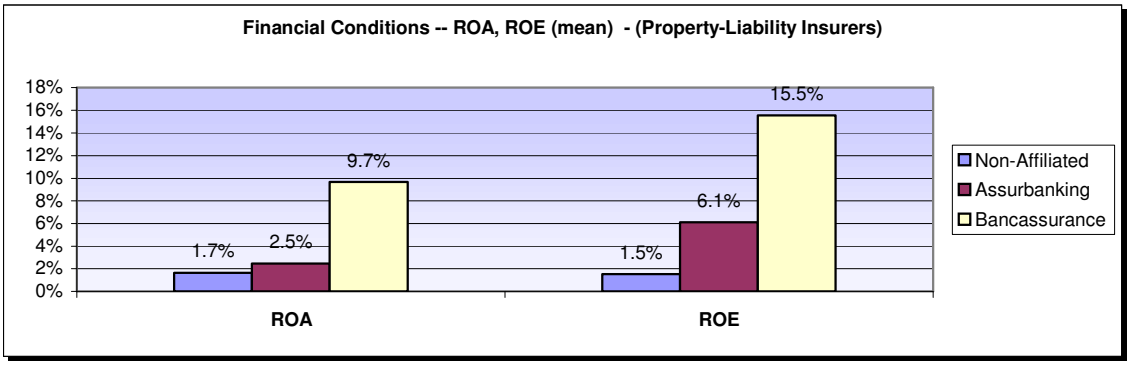

Table 10.1 Insurers Profitability Test

Panel A: Life-Health Insurers Profitability Test

This table provides results of the profitability test for Life-Health (L/H) insurers. Four profitability ratios are compared: (1) Total Benefits Paid as a percentage of Net Premiums Written -- Benefits paid include death benefits, matured endowments, annuity benefits, accident and health benefits, disability and surrender benefits, group conversions, coupons and payments on supplementary contracts, interest on policy or contract funds and other miscellaneous benefits. (2) Commissions and Expenses Incurred as a percentage of Net Premiums Written -- Commissions and expenses include payments on both direct and assumed business, general insurance expenses, insurance taxes, licenses and fees, increase in loading and other miscellaneous expenses, and exclude commissions and expense allowances received on reinsurance ceded. (3) Net Operating Gain (after taxes) as a percentage of Total Assets -- Total assets are the mean of current and prior year admitted assets and this test measures insurance earnings in relation to the company's total asset base. (4) Net investment income as a percent of invested assets -- Investment assets are the mean of cash and invested assets plus accrued investment income minus borrowed money.

	Mean			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Benefits Paid to NPW (%)	104.1%	104.9%	108.2%	98.8%
Comm and Expenses to NPW (%)	66.3%	35.1%	36.3%	33.0%
NOG to Total Assets (%)	1.8%	2.9%	2.4%	3.9%
Yield On Invested Assets (%)	5.4%	5.3%	5.5%	4.9%

	Median			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Benefits Paid to NPW (%)	64.5%	62.4%	64.5%	58.7%
Comm and Expenses to NPW (%)	26.5%	18.4%	18.1%	19.3%
NOG to Total Assets (%)	1.0%	1.0%	1.0%	1.1%
Yield On Invested Assets (%)	5.6%	5.6%	5.8%	5.0%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Benefits Paid to NPW (%)	0.48	0.41	0.40	0.35
Comm and Expenses to NPW (%)	**0.00**	**0.01**	**0.00**	0.38
NOG to Total Assets (%)	**0.02**	0.18	**0.01**	**0.05**
Yield On Invested Assets (%)	0.43	0.20	**0.04**	**0.01**

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Table 10.1 Panel B: Property-Liability Insurers Profitability Test

This table provides results of the profitability test for Property-Liability (P/L) insurers. Five profitability ratios are compared: (1) Loss Ratio -- The ratio of incurred losses and loss adjustment expenses to net premiums earned. This ratio measures the company's underlying profitability, or loss experience on its total book of business. (2) Expense Ratio -- The ratio of underwriting expenses (including commissions) to Net Premiums Written. This ratio measures the company's operational efficiency in underwriting its book of business. (3) Combined Ratio -- This ratio is the sum of the Loss Ratio and Expense Ratio. This ratio measures a company's overall underwriting profitability. (4) Yield on Invested Assets -- The ratio of annual net investment income divided by the mean of cash and net invested assets. This ratio measures the average return on a company's invested assets, before capital gains or losses and income taxes. (5) Return on Policyholders' Surplus (PHS) -- "Return" is calculated as the overall after-tax profitability from underwriting and investment activity, including unrealized capital gains. This ratio measures a company's efficiency in utilizing its surplus on a total return bas

	Mean			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Loss Ratio (%)	89.4%	73.0%	79.5%	51.5%
Expense Ratio (%)	41.2%	56.4%	57.4%	52.6%
Combined Ratio (%)	121.6%	111.4%	113.8%	103.1%
Yield on Invested Assets (%)	3.99%	4.60%	4.60%	4.57%
Return on PHS (%)	7.9%	13.2%	11.6%	20.0%

	Median			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Loss Ratio (%)	72.1%	68.8%	69.5%	56.7%
Expense Ratio (%)	27.4%	27.9%	27.6%	30.2%
Combined Ratio (%)	100.2%	96.3%	96.3%	96.4%
Yield on Invested Assets (%)	4.10%	4.30%	4.40%	3.70%
Return on PHS (%)	6.8%	7.5%	7.4%	8.6%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Loss Ratio (%)	**0.02**	0.14	**0.00**	**0.00**
Expense Ratio (%)	**0.08**	**0.10**	0.24	0.40
Combined Ratio (%)	0.15	0.24	0.18	0.31
Yield on Invested Assets (%)	**0.01**	**0.01**	0.14	0.48
Return on PHS (%)	**0.00**	**0.00**	**0.07**	0.15

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Table 10.2 Insurers Leverage Test

Panel A: Life-Health Insurers Leverage Test

This table shows the results of the leverage test for Life-Health (L/H) Insurers. Four leverage measures are compared: (1) Net Premium Written (NPW) to Capital and Surplus -- This reflects the leverage, after reinsurance assumed and ceded, of the company's current volume of net business in relation to its capital and surplus. (2) Best's Capital Adequacy Ratio -- The BCAR compares an insurer's adjusted surplus relative to the required capital necessary to support its operating and investment risks. (3) Capital and Surplus to Liability -- This test measures the relationship of capital and surplus to the company's unpaid obligations after reinsurance assumed and ceded. (4) Reinsurance Leverage Ratio --The relationship of total reserves ceded plus commissions and expenses due on reinsurance ceded plus other refunds due or recoverable from reinsurers to total capital and surplus.

	Mean			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
NPW to Capital and Surplus (%)	200%	181.66%	212.67%	122.86%
Best's Capital Adequacy Ratio (BCAR) (%)	224.64%	288.23%	207.05%	429.71%
RBC Ratio (%)	323.78%	374.11%	367.38%	415.40%
Capital and Surplus to Liability (%)	137.45%	184.93%	154.16%	243.50%
Reinsurance Leverage (%)	163.38%	113.96%	128.82%	80.10%

	Median			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
NPW to Capital and Surplus (%)	130%	130.00%	150.00%	50.00%
Best's Capital Adequacy Ratio (BCAR) (%)	163.00%	175.50%	174.00%	194.00%
RBC Ratio (%)	323.58%	748.28%	413.87%	904.93%
Capital and Surplus to Liability (%)	21.50%	23.40%	17.20%	85.80%
Reinsurance Leverage (%)	58.80%	22.85%	24.10%	20.90%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
NPW to Capital and Surplus (%)	0.22	0.31	**0.00**	**0.00**
Best's Capital Adequacy Ratio (BCAR) (%)	**0.02**	0.21	**0.00**	**0.00**
RBC Ratio (%)	**0.01**	**0.02**	**0.03**	**0.10**
Capital and Surplus to Liability (%)	**0.03**	0.28	**0.00**	**0.02**
Reinsurance Leverage (%)	**0.01**	**0.09**	**0.00**	**0.04**

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Table 10.2 Panel B: Property-Liability Insurers Leverage Test

This table provides the results of leverage test for Property-Liability (P/L) insurers. Four leverage ratios are compared: (1) Net Premium Written (NPW) to Policyholders' Surplus -- This ratio measures a company's net retained premium in relation to its surplus and exposure to pricing errors. (2) Net Leverage Ratio -- This represents the sum of a company's NPW to Policyholders' Surplus and Net Liabilities to Policyholders' Surplus. (3) Gross Leverage Ratio -- This represents the sum of Net Leverage and Ceded Reinsurance Leverage, which is calculated. (4) Best's Capital Adequacy Ratio (BCAR) -- The BCAR compares an insurer's adjusted surplus relative to the required capital necessary to support its operating and investment risks.

	Mean			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
NPW to Policyholders' Surplus (%)	102%	102%	104%	95%
Net Leverage (%)	392%	215%	208%	249%
Gross Leverage (%)	494%	385%	386%	381%
Best's Capital Adequacy Ratio (BCAR) (%)	201.25%	238.63%	227.20%	304.37%
RBC Ratio (%)	233.64%	279.00%	276.53%	308.54%

	Median			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
NPW to Policyholders' Surplus (%)	90%	100%	105%	60%
Net Leverage (%)	230%	150%	130%	170%
Gross Leverage (%)	290%	220%	220%	220%
Best's Capital Adequacy Ratio (BCAR) (%)	184.10%	187.70%	183.60%	216.50%
RBC Ratio (%)	267.75%	418.57%	343.36%	502.83%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
NPW to Policyholders' Surplus (%)	0.49	0.36	0.37	0.33
Net Leverage (%)	**0.05**	**0.05**	**0.10**	0.16
Gross Leverage (%)	0.21	0.22	0.21	0.48
Best's Capital Adequacy Ratio (BCAR) (%)	**0.00**	**0.00**	**0.01**	**0.03**
RBC Ratio (%)	0.19	0.19	0.29	0.44

Non-affiliated P/L insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated P/L insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated P/L insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated P/L insurers refer to either Assurbanking-affiliated P/L insurers or Bancassurance-affiliated P/L insurers.

Table 10.3 Insurers Liquidity Test

Panel A: Life-Health Insurers Leverage Test

This table provides the results of leverage test for Life-Health (L/H) insurers. Four leverage ratios are compared: (1) Quick Liquidity Ratio -- The ratio of unaffiliated quick assets to liabilities. Quick assets include cash, short-term investments, 80% of unaffiliated common stock, Government bonds maturing in five years or less and all other bonds (excluding affiliates) maturing in one year or less. (2) Current Liquidity Ratio – The ratio of unaffiliated invested assets, excluding mortgages and real estate, to liabilities. This test measures the proportion of liabilities covered by cash and unaffiliated investment assets holdings. (3) Operating Cash Flow to Total Assets – Operating cash flow is the change in cash and invested assets attributable to net underwriting and net investment income. This ratio measures a company's ability to meet current obligations through the internal generation of funds from insurance operations. (4) Non-Investment Grade Bonds to Capital – The designation as non-investment grade utilizes the bond quality classifications that coincide with different bond ratings assigned by major credit rating agencies. This test measures exposure to non-investment grade bonds as a percentage of capital

	Mean			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Quick Liquidity (%)	88.13%	116.55%	110.7%	129.34%
Current Liquidity (%)	191.63%	229.67%	212.2%	267.8%
Operating CF to Total Asset (%)	2.92%	4.54%	5.9%	2.0%
Non-Invest. Grade Bonds to Capital and Surplus (%)	41.2%	41%	44.8%	33.4%

	Median			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Quick Liquidity (%)	17.95%	15.20%	13.3%	23.00%
Current Liquidity (%)	105.90%	108.80%	103.3%	139.8%
Operating CF to Total Asset (%)	3.64%	2.75%	3.8%	0.5%
Non-Invest. Grade Bonds to Capital and Surplus (%)	30.4%	33%	39.6%	20.4%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Quick Liquidity (%)	**0.09**	0.18	**0.10**	0.31
Current Liquidity (%)	**0.04**	0.21	**0.01**	**0.08**
Operating CF to Total Asset (%)	0.11	**0.01**	0.34	**0.04**
Non-Invest. Grade Bonds to Capital and Surplus (%)	0.48	0.22	**0.09**	**0.03**

Non-affiliated L/H insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated L/H insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated L/H insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated L/H insurers refer to either Assurbanking-affiliated L/H insurers or Bancassurance-affiliated L/H insurers.

Table 10.3 Panel B: Property-Liability Insurers Liquidity Test

This table provides the results of leverage test for Property-Liability (P/L) insurers. The liquidity ratios used for P/L insurers are similar to those for L/H insurers: (1) Quick Liquidity Ratio -- The ratio of unaffiliated quick assets to liabilities. Quick assets are defined as the sum of cash, unaffiliated short-term investments, unaffiliated bonds maturing within one year, government bonds maturing within five years, and 80% of unaffiliated common stocks. (2) Current Liquidity Ratio – The ratio of unaffiliated invested assets, excluding mortgages and real estate, to liabilities. (3) Operating Cash Flow to Total Assets – Operating cash flow is the change in cash and invested assets attributable to net underwriting and net investment income after policyholder dividends and federal income taxes. This ratio measures a company's ability to meet current obligations through the internal generation of funds from insurance operations. (4) Non-Investment Grade Bonds to Capital – The designation as non-investment grade utilizes the bond quality classifications that coincide with different bond ratings assigned by major credit rating agencies. This test measures exposure to non-investment grade bonds as a percentage o

	Mean			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Quick Liquidity (%)	216.4%	293.8%	291.3%	306.3%
Current Liquidity (%)	325.6%	465.9%	470.5%	442.4%
Operating CF to Total Asset (%)	4.8%	3.8%	5.1%	3.8%
Non-Invest. Grade Bonds to Capital and Surplus (%)	7.0%	4.8%	5.2%	3.2%

	Median			
	Non-Affi.	All Affi.	Assurbanking	Bancassurance
Quick Liquidity (%)	54.1%	69.7%	63.6%	102.2%
Current Liquidity (%)	141.5%	225.3%	217.8%	242.0%
Operating CF to Total Asset (%)	5.2%	5.0%	5.2%	2.5%
Non-Invest. Grade Bonds to Capital and Surplus (%)	3.8%	2.9%	3.0%	1.2%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Quick Liquidity (%)	**0.00**	**0.00**	**0.04**	0.39
Current Liquidity (%)	**0.00**	**0.00**	**0.01**	0.30
Operating CF to Total Asset (%)	**0.02**	**0.02**	0.39	**0.03**
Non-Invest. Grade Bonds to Capital and Surplus (%)	**0.00**	**0.02**	**0.00**	**0.04**

Non-affiliated P/L insurers are those without any affiliation (either direct control or through holding companies they belong to) with banks. Assurbanking-affiliated P/L insurers are those directly owned by banks or owned through their holding companies, which are owned or controled by banks. Bancassurance-affiliated P/L insurers are those affiliated with banks by directly holding banks or through their holding companies, which own or control banks. Affiliated P/L insurers refer to either Assurbanking-affiliated P/L insurers or Bancassurance-affiliated P/L insurers.

Table 11 Distribution of Firms by Num., Assets, Deposits, and Net Income -- (Commercial Banks)

This table provides the distribution and market share of Commercial Banks (CBs) in terms of number of firms, total asset, total deposit, and net income.

	# firms	% Firms	% Assets	% Deposits	%Net Income
ALL	437				
-- Bancassurance	48	11.0%	57.6%	55.0%	57.1%
-- Non-Affiliated	389	89.0%	42.4%	45.0%	42.9%
- w/ ins.	46	10.5%	19.1%	19.9%	19.9%
- w/o ins.	343	78.5%	23.3%	25.1%	23.0%

Bancassurance-affiliated CBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Assurbanking-affiliated CBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Since the assurbanking-affiliated CBs are tiny in size and no more than 10 in number, we merge them to bancassurance-affiliated CBs. Non-affiliated CBs WITHOUT INS are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Non-affiliated CBs WITH INS are those without any affiliation with insurance companies, but underwriting such inhouse insurance products as credit related insurance, mortgage insurance.

Figure 11.a

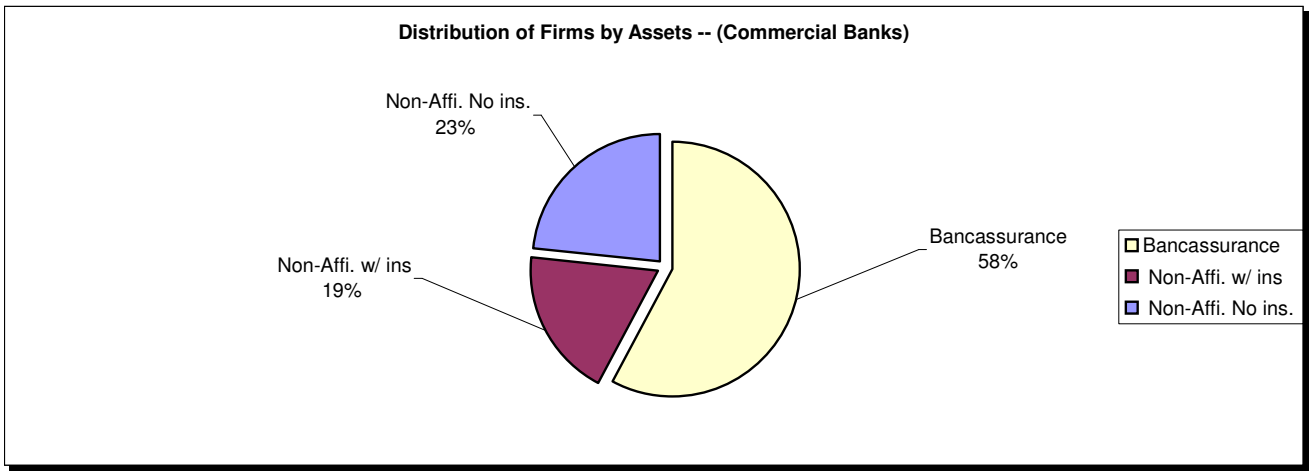

Figure 11.b

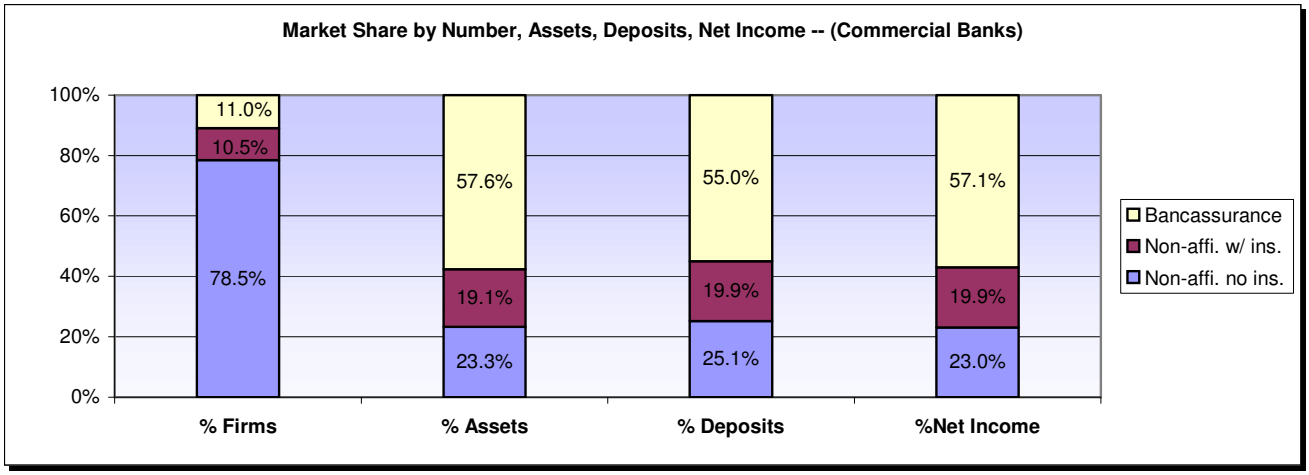

Table 11.1 Distribution of Firms by Num., Assets, Deposits, and Net Income -- (Thrift Saving Banks)

This table provides the distribution and market share of Thrift Saving Banks (SBs) in terms of number of firms, total asset, total deposit, and net income.

	# Firms	% Firms	% Assets	% Deposits	%Net Income
Final Data	185				
-- Affiliated	53	28.6%	34.1%	34.0%	36.1%
- Assurbanking	39	21.1%	5.0%	6.3%	2.7%
- Bancassurance	14	7.6%	29.1%	27.6%	33.4%
-- Non-Affiliated	132	71.4%	65.9%	66.0%	63.9%

Non-affiliated SBs are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Assurbanking-affiliated SBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Bancassurance-affiliated SBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Affiliated SBs refer to either Assurbanking-affiliated SBs or Bancassurance-affiliated SBs.

Figure 11.1.a

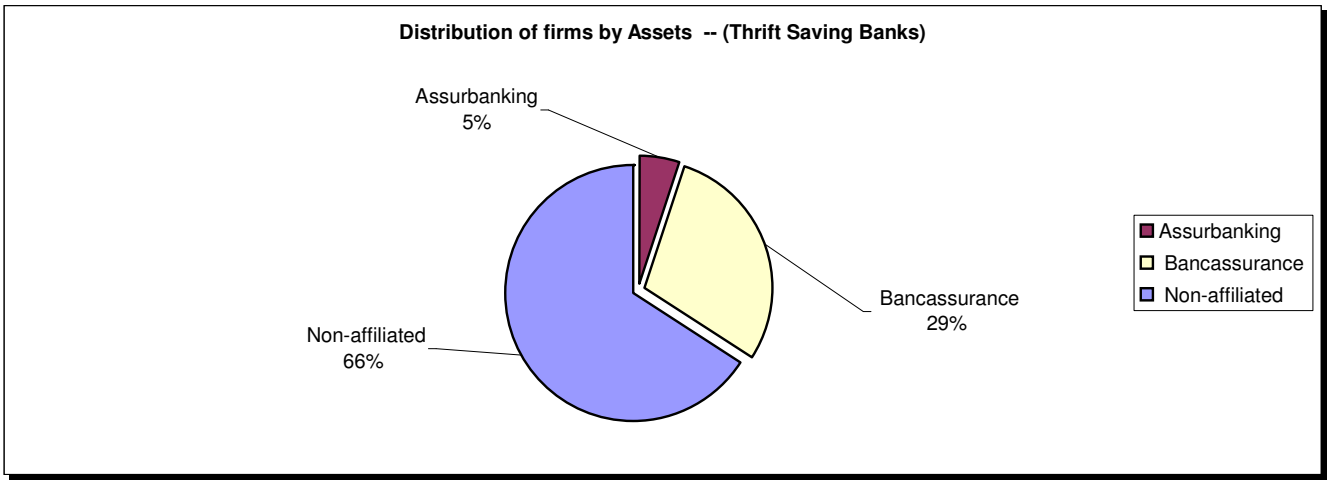

Figure 11.1.b

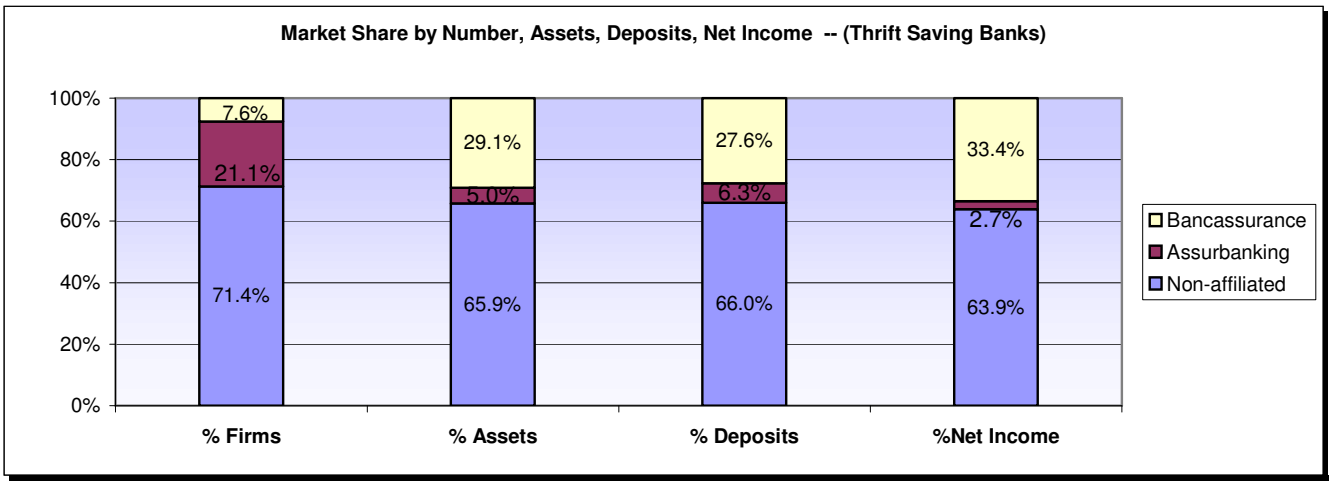

Table 12 Firm Size by Assets, Total Deposits, Net Income ($ M) -- (Commercial Banks)

This table provides average and median Commercial Banks' (CBs) firm size in terms of total asset, premium income (net premium earned), and net income. The P-value of *t*-test is also provided.

	Mean ($ Million)			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
# Firms	48	389	46	343
Total Assets	82,018.7	8,531.7	28,333.9	5,422.8
Total Deposits	49,757.7	5,764.2	18,743.9	3,726.4
Net Income	1,120.1	119.3	407.2	74.1

	Median ($Million)			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
Total Assets	4,213.1	2,210.1	11,689.0	1,974.2
Total Deposits	2,845.4	1,610.2	8,044.4	1,480.2
Net Income	58.3	26.1	121.4	23.2

	t - Test (P-value)			
	Bancass. ~ Non-affi.	Bancass. ~ Non-affi. w/ ins.	Bancass. ~ Non-affi. w/o ins.	Non-affi. w/ ins. ~ Non-affi. w/o ins.
Total Assets	**0.00**	**0.03**	**0.00**	**0.00**
Total Deposits	**0.00**	**0.03**	**0.00**	**0.00**
Net Income	**0.01**	**0.04**	**0.00**	**0.00**

Bancassurance-affiliated CBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Assurbanking-affiliated CBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Since the assurbanking-affiliated CBs are tiny in size and no more than 10 in number, we merge them to bancassurance-affiliated CBs. Non-affiliated CBs WITHOUT INS are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Non-affiliated CBs WITH INS are those without any affiliation with insurance companies, but underwriting such inhouse insurance products as credit related insurance, mortgage insurance.

Figure 12.a

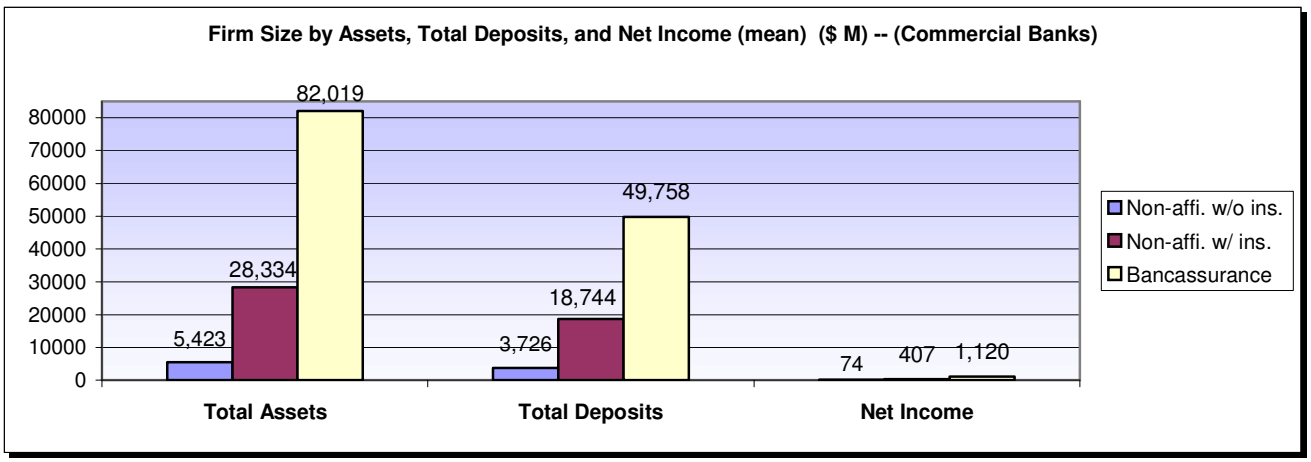

Figure 12.b

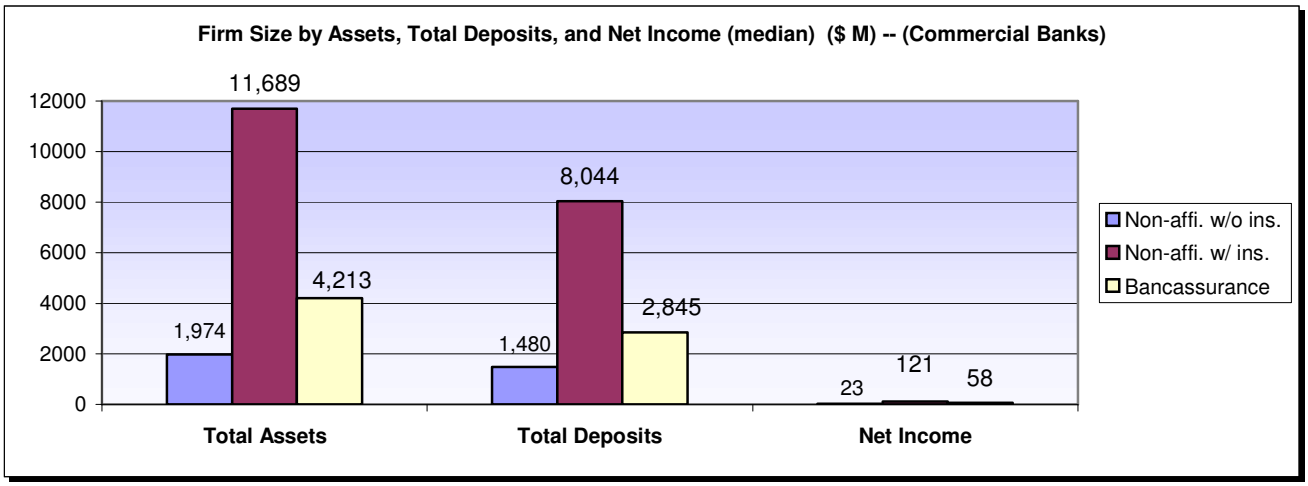

Table 12.1 Firm Size by Assets, Total Deposits, Net Income ($ M) -- (Thrift Saving Banks)

This table provides average and median Thrift Saving Banks' (SBs) firm size in terms of total asset, premium income (net premium earned), and net income. The P-value of *t*-test is also provided.

	Mean ($ Million)			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
# Firms	132	53	39	14
Total Assets	5,185.6	6,690.6	1,327.4	21,630.8
Total Deposits	3,165.5	4,058.9	1,028.6	12,500.5
Net Income	65.0	91.6	9.3	321.0

	Median ($Million)			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
Total Assets	2,191.2	179.1	94.8	1,259.0
Total Deposits	1,449.5	133.8	57.5	757.0
Net Income	22.2	0.9	0.2	27.9

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Total Assets	0.37	**0.00**	0.17	0.12
Total Deposits	0.37	**0.00**	0.17	0.12
Net Income	0.34	**0.00**	0.15	**0.10**

Non-affiliated SBs are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Assurbanking-affiliated SBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Bancassurance-affiliated SBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Affiliated SBs refer to either Assurbanking-affiliated SBs or Bancassurance-affiliated SBs.

Figure 12.1.a

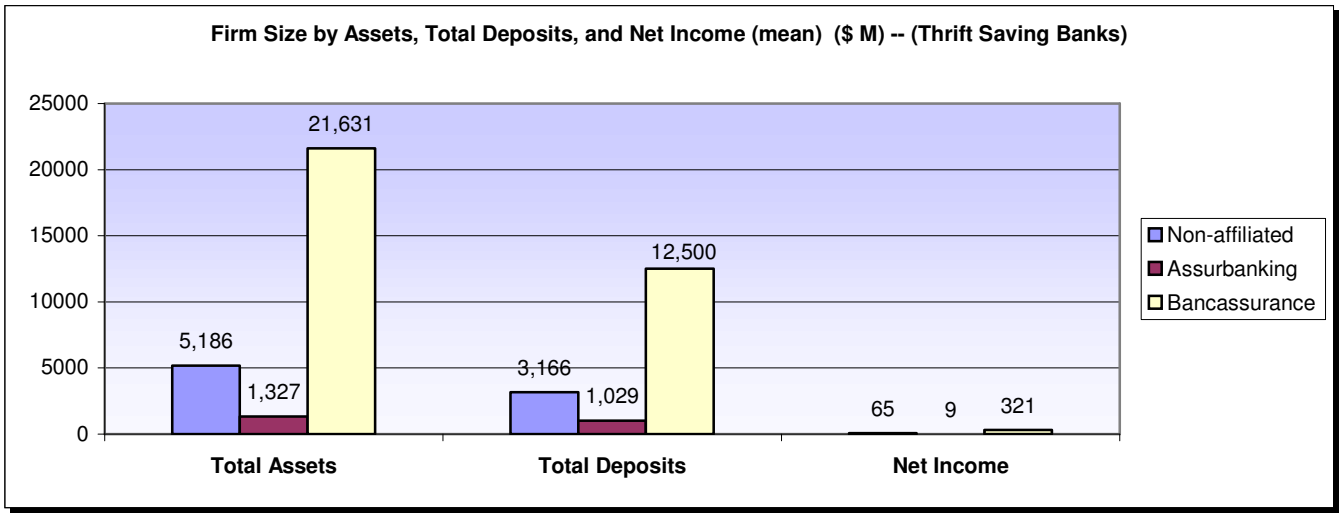

Figure 12.1.b

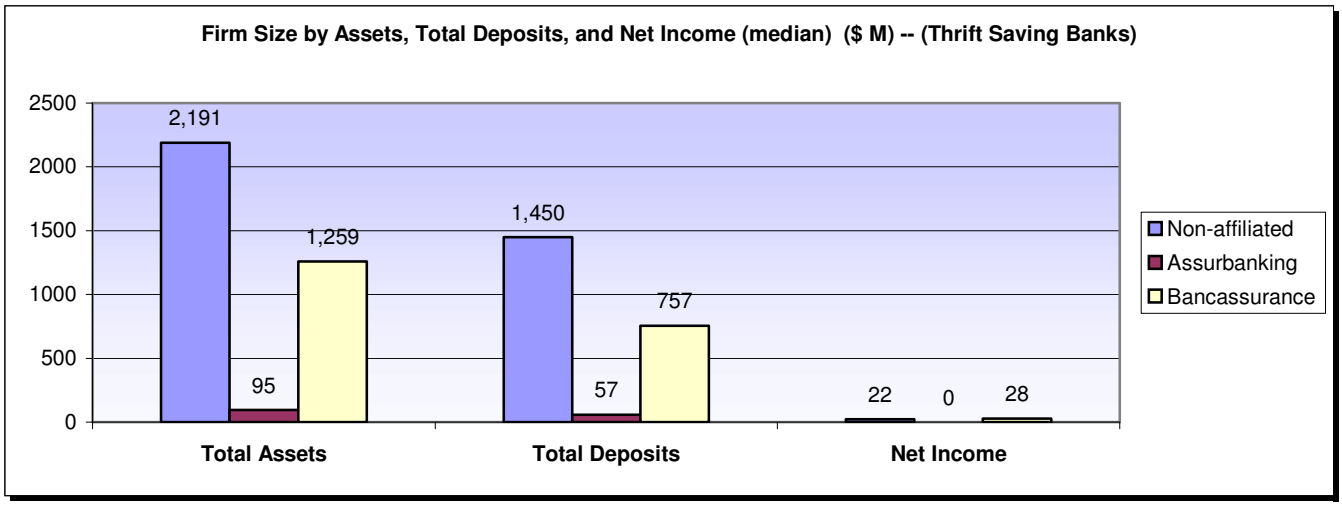

Table 13 Total Deposit, Interest Bearing Deposit, Total Loan & Lease

This table shows the portfolio of traditional banking products. The traditional banking products are deposits on the liability side of the balance sheet and loans on the asset side. Total deposits include deposits and saving accounts that either require interest payment or are not allowed to pay interest. Interest bearing deposits only include those requiring interest payment, such as savings accounts and time deposits. Total loans and lease include loans to individuals, commercial and industrial loans, and all other loan and lease. To smooth out size effects we scale Total Deposits, Interest Bearing Deposits, and Total Loans & Lease by total asset.

Panel A: Commerical Banks: Total Deposit, Interest Bearing Deposit, Total Loan & Lease

	Mean			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
Total Deposit	0.64	0.74	0.70	0.75
Interest Bearing Deposit	0.55	0.61	0.58	0.62
Total Loan & Lease	0.57	0.63	0.64	0.63

	Median			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
Total Deposit	0.71	0.76	0.70	0.77
Interest Bearing Deposit	0.59	0.63	0.58	0.64
Total Loan & Lease	0.61	0.65	0.66	0.65

	t - Test (P-value)			
	Bancass. ~ Non-affi.	Bancass. ~ Non-affi. w/ ins.	Bancass. ~ Non-affi. w/o ins.	Non-affi. w/ ins. ~ Non-affi. w/o ins.
Total Deposit	**0.00**	**0.07**	**0.00**	**0.00**
Interest Bearing Deposit	**0.03**	0.17	**0.02**	**0.01**
Total Loan & Lease	**0.04**	**0.03**	**0.05**	0.28

Bancassurance-affiliated CBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Assurbanking-affiliated CBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Since the assurbanking-affiliated CBs are tiny in size and no more than 10 in number, we merge them to bancassurance-affiliated CBs. Non-affiliated CBs WITHOUT INS are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Non-affiliated CBs WITH INS are those without any affiliation with insurance companies, but underwriting such inhouse insurance products as credit related insurance, mortgage insurance.

Figure 13.a

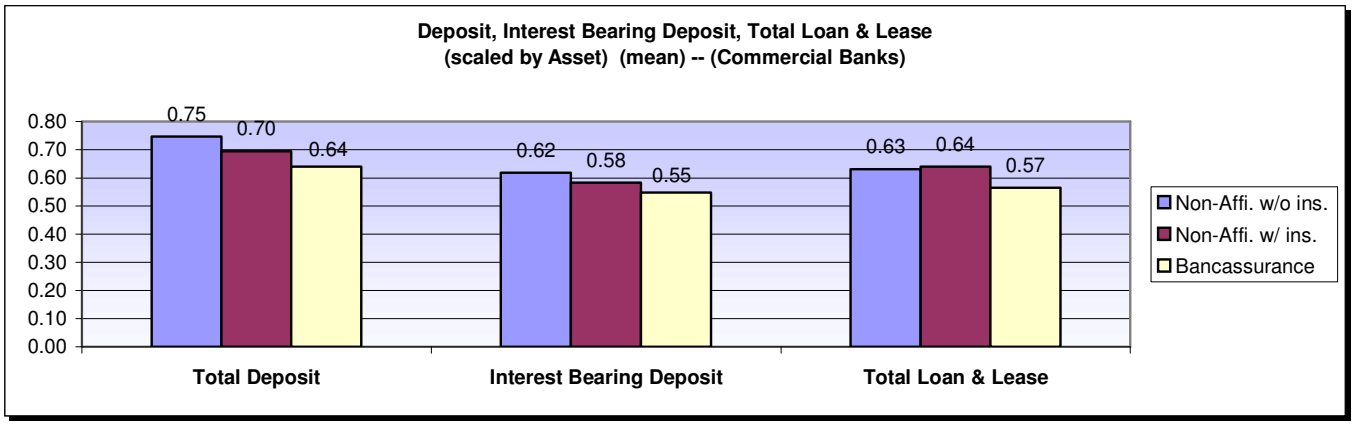

Table 13 **Panel B: Thrift Saving Banks: Total Deposit, Interest Bearing Deposit, Total Loan & Lease**

	Mean			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
Total Deposit	0.67	0.53	0.52	0.55
Interest Bearing Deposit	0.63	0.48	0.49	0.45
Total Loan & Lease	0.64	0.42	0.36	0.60

	Median			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
Total Deposit	0.68	0.64	0.64	0.61
Interest Bearing Deposit	0.62	0.61	0.61	0.52
Total Loan & Lease	0.66	0.53	0.35	0.72

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Total Deposit	**0.00**	**0.00**	**0.05**	0.37
Interest Bearing Deposit	**0.00**	**0.01**	**0.01**	0.32
Total Loan & Lease	**0.00**	**0.00**	0.34	**0.02**

Non-affiliated SBs are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Assurbanking-affiliated SBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Bancassurance-affiliated SBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Affiliated SBs refer to either Assurbanking-affiliated SBs or Bancassurance-affiliated SBs.

Figure 13.b

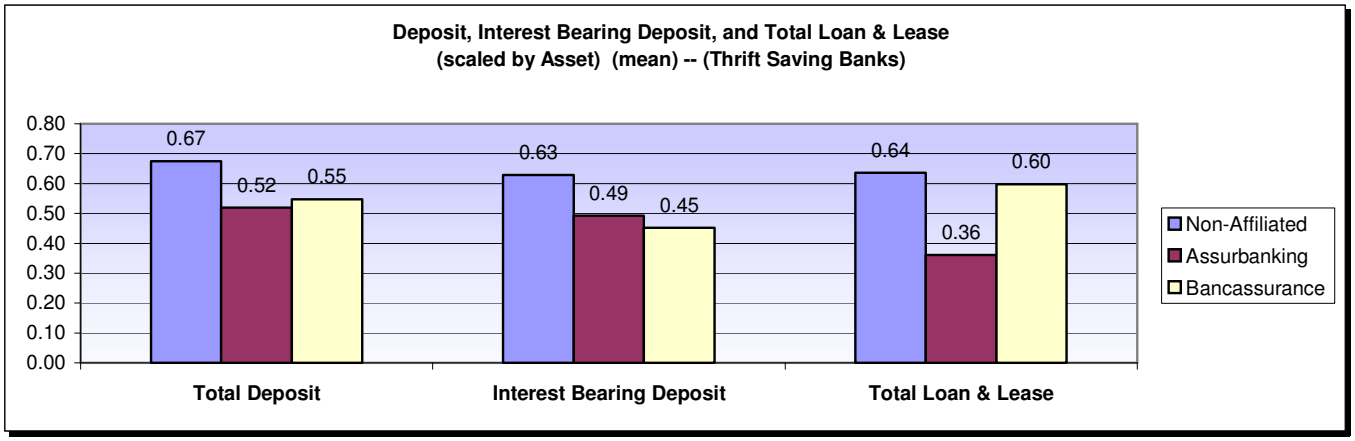

Table 13.1 Interest Income and Non-Interest Income

Panel A: Commercial Banks Performance: Interest Income, Non-Interest Income, %Non-interest Income to Interest Income

This table provides the statistics of Commercial Banks' (CBs) Interest Income, Non-Interest Income, and Ratio of Non-interest Income to Interest Income between banks. Interest income includes interest and fee income on loans, income from lease financing receivables, interest income on balances due from depository institutions, interest and dividend income on securities, and other interest income. Non-interest income comes from fiduciary activities, service charges on deposit accounts, investment banking, advisory, brokerage, and underwriting fees and commissions. To control for the size effect, we scale them by total asset.

	Mean			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
Interest Income	0.061	0.048	0.047	0.049
Non-Interest Income	0.076	0.017	0.020	0.017
%Non-interest Income to Interest income	0.753	0.385	0.432	0.377

	Median			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
Interest Income	0.046	0.048	0.048	0.048
Non-Interest Income	0.022	0.011	0.016	0.011
%Non-interest Income to Interest income	0.429	0.234	0.323	0.222

	t - Test (P-value)			
	Bancass. ~ Non-affi.	Bancass. ~ Non-affi. w/ ins.	Bancass. ~ Non-affi. w/o ins.	Non-affi. w/ ins. ~ Non-affi. w/o ins.
Interest Income	**0.06**	**0.05**	**0.06**	0.17
Non-Interest Income	**0.04**	**0.05**	**0.04**	0.14
%Non-interest Income to Interest income	**0.01**	**0.02**	**0.01**	0.23

Bancassurance-affiliated CBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Assurbanking-affiliated CBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Since the assurbanking-affiliated CBs are tiny in size and no more than 10 in number, we merge them to bancassurance-affiliated CBs. Non-affiliated CBs WITHOUT INS are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Non-affiliated CBs WITH INS are those without any affiliation with insurance companies, but underwriting such inhouse insurance products as credit related insurance, mortgage insurance.

Figure 13.1.a

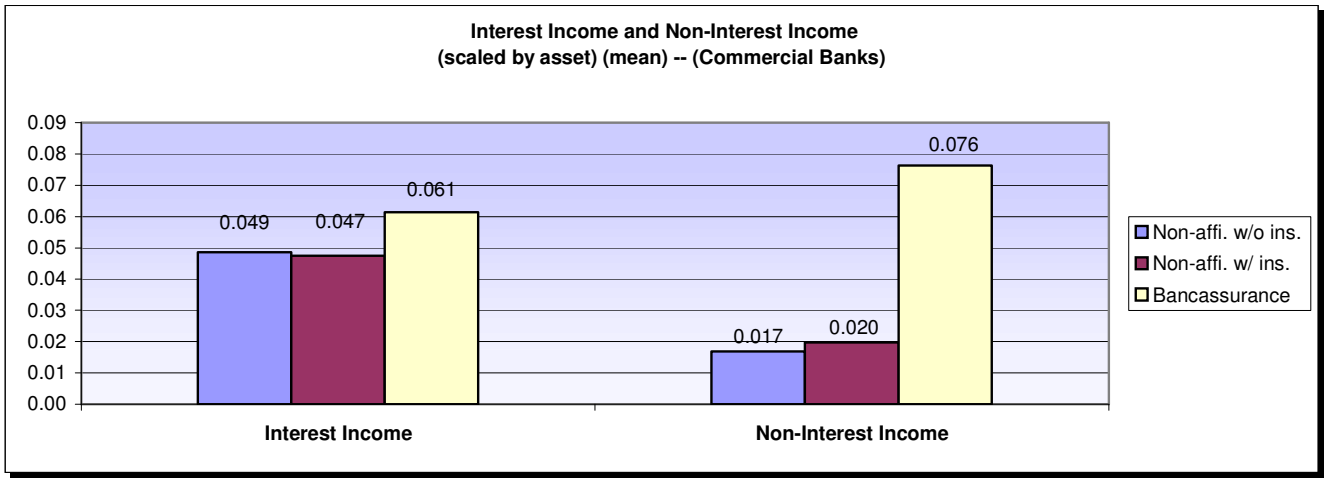

Table 13.1 **Panel B: Thrift Saving Banks Performance: Interest Income, Non-Interest Income, %Non-Interest Income to Interest Income**

This table provides the statistics of Thrift Saving Banks' (SBs) Interest Income, Non-Interest Income, and Ratio of Non-interest Income to Interest Income between banks. Interest income includes interest and fee income on loans, income from lease financing receivables, interest income on balances due from depository institutions, interest and dividend income on securities, and other interest income. Non-interest income comes from fiduciary activities, service charges on deposit accounts, investment banking, advisory, brokerage, and underwriting fees and commissions. To control for the size effect, we scale them by total asset.

	Mean			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
Interest Income	0.048	0.038	0.034	0.049
Non-Interest Income	0.008	0.109	0.110	0.105
%Non-interest Income to Interest income	0.609	0.052	0.060	0.030

	Median			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
Interest Income	0.047	0.039	0.036	0.046
Non-Interest Income	0.005	0.017	0.010	0.020
%Non-interest Income to Interest income	0.111	0.004	0.003	0.004

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Interest Income	**0.00**	**0.00**	0.40	**0.00**
Non-Interest Income	**0.00**	**0.01**	**0.06**	0.47
%Non-interest Income to Interest income	**0.03**	**0.04**	**0.09**	0.20

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Figure 13.1.b

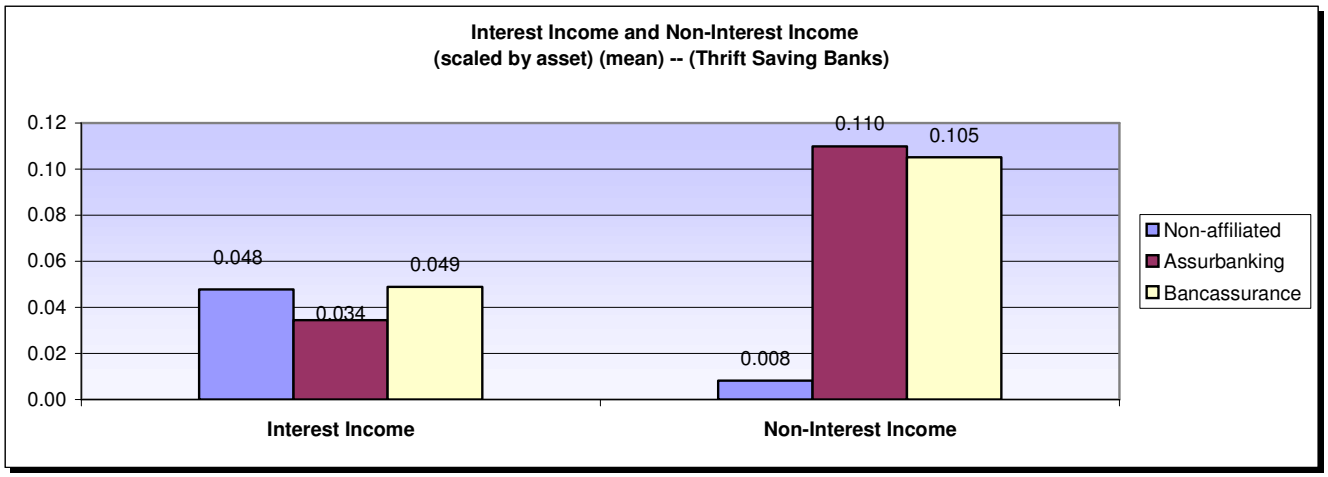

Table 14 Banks Operating Performance: Return on Asset (ROA), Return on Equity (ROE), and Net Operating Income to Assets

This table reports banks' overall performance - Return on Asset (ROA), Return on Equity (ROE), and Ratio of Net Operating Income to Asset. The P-value of t-test is also provided.

Panel A: Commercial Banks: ROA, ROE, and Net Operating Income to Assets

	Mean (%)			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
ROA	6.15%	3.19%	4.39%	3.00%
ROE	35.70%	35.58%	47.46%	33.71%
Net Operating Income to Asset	5.80%	3.09%	4.27%	2.90%

	Median (%)			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
ROA	2.26%	1.53%	3.19%	1.48%
ROE	17.30%	17.15%	28.09%	16.15%
Net Operating Income to Asset	2.11%	1.46%	3.09%	1.39%

	t - Test (P-value)			
	Bancass. ~ Non-affi.	Bancass. ~ Non-affi. w/ ins.	Bancass. ~ Non-affi. w/o ins.	Non-affi. w/ ins. ~ Non-affi. w/o ins.
ROA	**0.03**	0.14	**0.02**	**0.03**
ROE	0.49	0.12	0.41	**0.05**
Net Operating Income to Asset	**0.04**	0.18	**0.03**	**0.03**

Bancassurance-affiliated CBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Assurbanking-affiliated CBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Since the assurbanking-affiliated CBs are tiny in size and no more than 10 in number, we merge them to bancassurance-affiliated CBs. Non-affiliated CBs WITHOUT INS are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Non-affiliated CBs WITH INS are those without any affiliation with insurance companies, but underwriting such inhouse insurance products as credit related insurance, mortgage insurance.

Figure 14.a

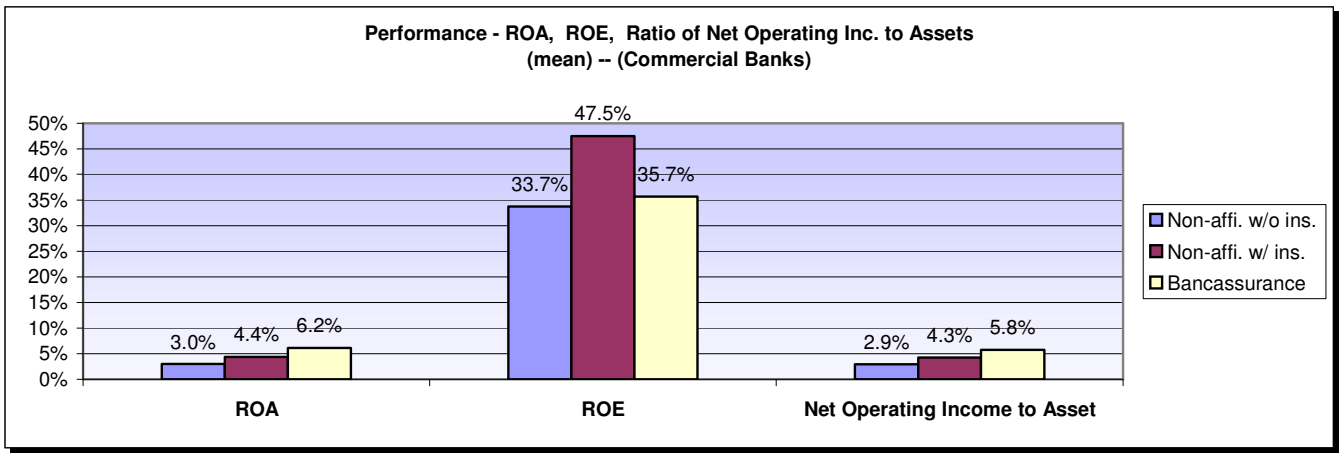

Table 14 **Panel B: Thrift Saving Banks: ROA, ROE, and Net Operating Income to Assets**

	Mean (%)			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
ROA	1.18%	-0.97%	-1.65%	0.93%
ROE	12.86%	4.75%	0.30%	17.16%
Net Operating Income to Asset	0.82%	-1.43%	-1.98%	0.10%

	Median (%)			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
ROA	1.04%	0.40%	0.24%	1.33%
ROE	11.06%	4.27%	2.25%	16.48%
Net Operating Income to Asset	0.88%	0.24%	0.17%	0.78%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
ROA	**0.02**	**0.01**	0.42	**0.07**
ROE	**0.00**	**0.00**	0.21	**0.00**
Net Operating Income to Asset	**0.01**	**0.02**	0.24	**0.10**

Non-affiliated SBs are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Assurbanking-affiliated SBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Bancassurance-affiliated SBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Affiliated SBs refer to either Assurbanking-affiliated SBs or Bancassurance-affiliated SBs.

Figure 14.b

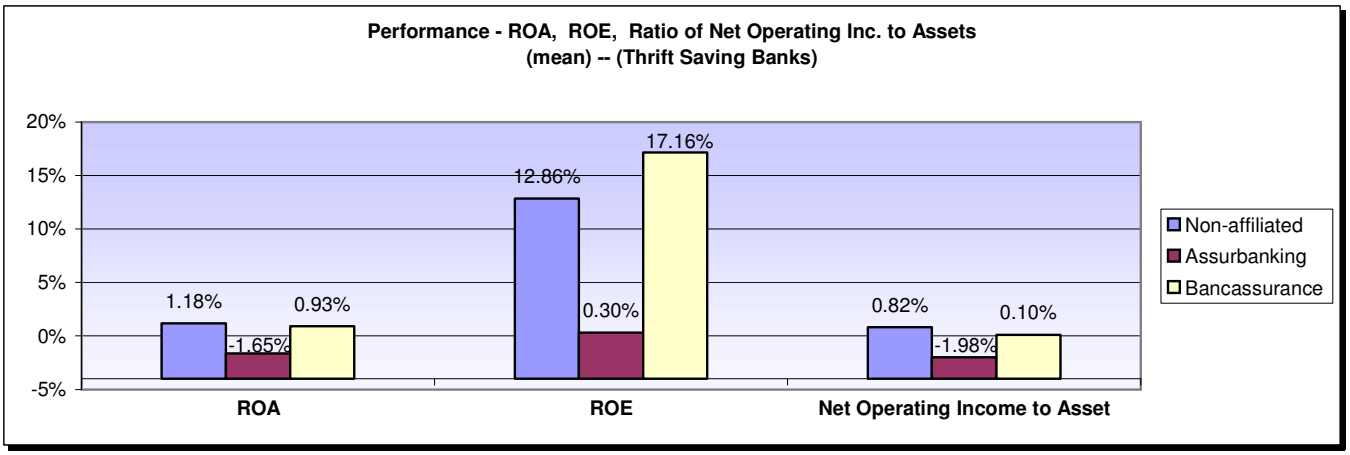

Table 14.1 Banks Operation Performance: Interest Margin, Non-Interest Margin

This table shows Interest Margin and Non-interest Margin measuring the profitability of banks. (1) Interest margin is defined as the dollar difference between interest income and interest expense as a percentage of earning assets. (2) Similarly, non-interest margin is defined as the dollar difference between non-interest income and non-interest expense as a percentage of earning assets.

Panel A: Commercial Banks Performance: Interest Margin, Non-interest Margin

	Mean (%)			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
Interest Margin	5.12%	3.99%	3.75%	4.03%
Non-Interest Margin	1.11%	-1.54%	-1.32%	-1.58%

	Median (%)			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
Interest Margin	3.98%	3.92%	3.71%	3.97%
Non-Interest Margin	-1.41%	-1.69%	-1.34%	-1.75%

	t - Test (P-value)			
	Bancass. ~ Non-affi.	Bancass. ~ Non-affi. w/ ins.	Bancass. ~ Non-affi. w/o ins.	Non-affi. w/ ins. ~ Non-affi. w/o ins.
Interest Margin	**0.07**	**0.04**	**0.08**	**0.01**
Non-Interest Margin	0.11	0.13	**0.10**	**0.02**

Bancassurance-affiliated CBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Assurbanking-affiliated CBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Since the assurbanking-affiliated CBs are tiny in size and no more than 10 in number, we merge them to bancassurance-affiliated CBs. Non-affiliated CBs WITHOUT INS are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Non-affiliated CBs WITH INS are those without any affiliation with insurance companies, but underwriting such inhouse insurance products as credit related insurance, mortgage insurance.

Figure 14.1.a

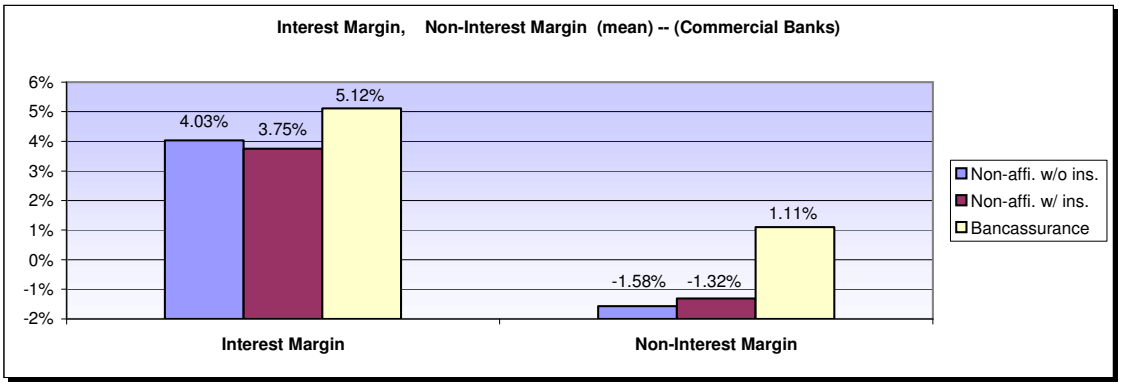

Table 14.1 Panel B: Thrift Saving Banks Operation Performance: Interest Margin, Non-interest Margin

	Mean (%)			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
Interest Margin	3.09%	3.10%	2.67%	4.30%
Non-Interest Margin	-1.54%	-4.38%	-4.96%	-2.76%

	Median (%)			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
Interest Margin	3.27%	3.04%	2.49%	3.89%
Non-Interest Margin	-1.62%	-2.26%	-2.41%	-1.99%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
Interest Margin	0.49	**0.04**	**0.03**	**0.01**
Non-Interest Margin	**0.05**	**0.07**	0.25	0.22

Non-affiliated SBs are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Assurbanking-affiliated SBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Bancassurance-affiliated SBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Affiliated SBs refer to either Assurbanking-affiliated SBs or Bancassurance-affiliated SBs.

Figure 14.1.b

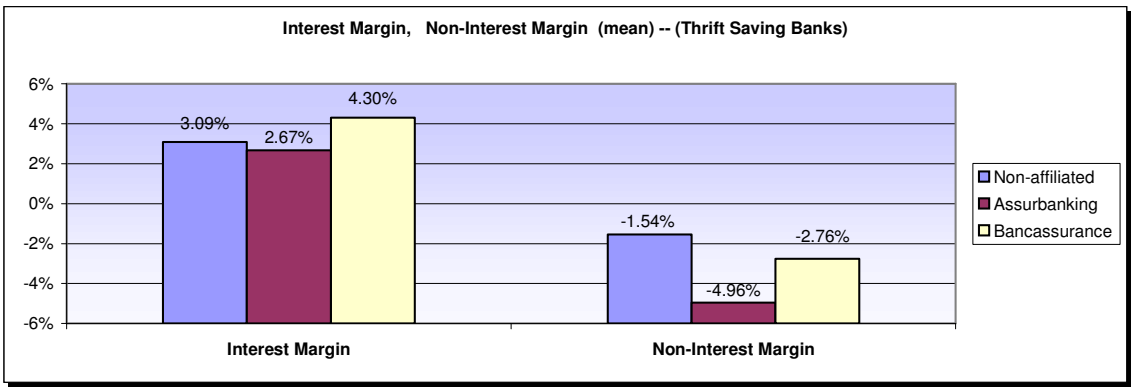

Table 14.2 Banks OperationPerformance: Risk-Based Capital (RBC) Ratio, Loan to Deposit (LTD) Ratio, Net Charge-off to Loan Ratio

This table provides bank's Risk-Based Capital (RBC) Ratio, Loan to Deposit (LTD) Ratio, and Loan Charge-offs Ratio. (1) RBC ratio is calculated as the ratio of total risk-based capital to risk-weighted assets. (2) LTD ratio is used as a measure of bank's liquidity and is calculated as a bank's gross loans divided by total deposits, indicating the percentage of a bank's loans funded through deposits. (3) Charge-offs are loans written off as uncollectable by the banks and are measured on a net basis, loans charged off as losses minus recoveries on loans preciously charged off, The loan charge-offs ratio is calculated as net loan charge-offs divided by the total loans.

Panel A: Commercial Banks Performance: RBC Ratio, Net Loan to Deposit Ratio, Net Charge-off to Loan Ratio

	Mean (%)			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
RBC Ratio	117.27%	48.72%	85.58%	42.94%
Loan to Deposit Ratio	344.74%	239.63%	303.30%	230.50%
Net Charge-off to Loan Ratio	3.54%	1.11%	2.17%	0.95%

	Median (%)			
	Bancassurance	Non-Affiliated	Non-affi. w/ ins.	Non-affi. w/o ins.
RBC Ratio	33.54%	14.15%	32.13%	13.89%
Loan to Deposit Ratio	117.37%	98.99%	166.87%	95.96%
Net Charge-off to Loan Ratio	1.14%	0.38%	0.87%	0.35%

	t - Test (P-value)			
	Bancass. ~ Non-affi.	Bancass. ~ Non-affi. w/ ins.	Bancass. ~ Non-affi. w/o ins.	Non-affi. w/ ins. ~ Non-affi. w/o ins.
RBC Ratio	**0.06**	0.25	**0.05**	**0.02**
Loan to Deposit Ratio	0.23	0.39	0.21	**0.10**
Net Charge-off to Loan Ratio	**0.00**	0.11	**0.00**	**0.04**

Bancassurance-affiliated CBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Assurbanking-affiliated CBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Since the assurbanking-affiliated CBs are tiny in size and no more than 10 in number, we merge them to bancassurance-affiliated CBs. Non-affiliated CBs WITHOUT INS are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Non-affiliated CBs WITH INS are those without any affiliation with insurance companies, but underwriting such inhouse insurance products as credit related insurance, mortgage insurance.

Figure 14.2.a

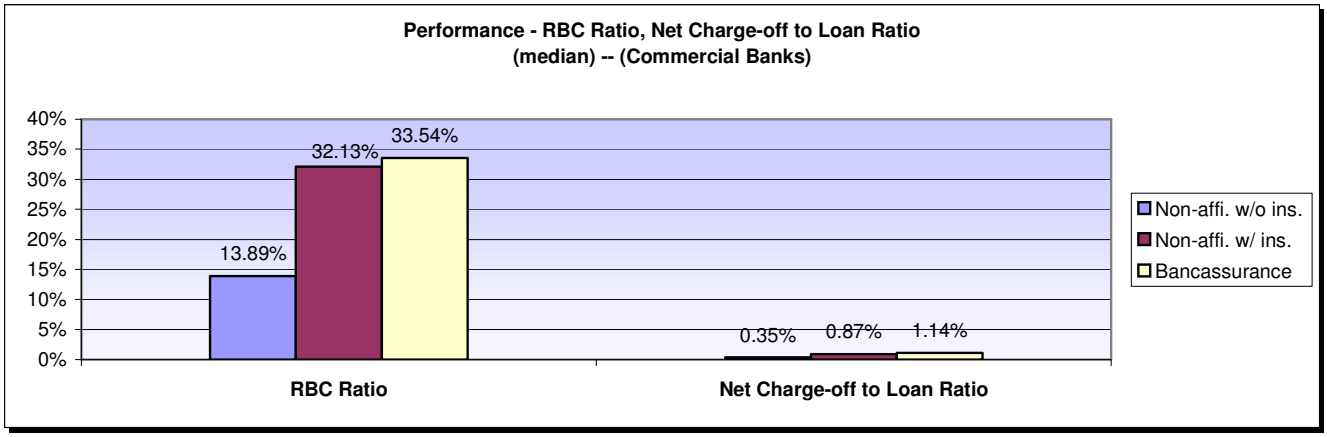

Table 14.2 **Panel B: Thrift Saving Banks Performance: RBC Ratio, Net Loan to Deposit Ratio, Net Charge-off to Loan Ratio**

	Mean (%)			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
RBC Ratio	16.96%	47.43%	55.97%	23.65%
Loan to Deposit Ratio	98.70%	89.76%	81.38%	113.13%
Net Charge-off to Loan Ratio	0.39%	0.55%	0.27%	1.12%

	Median (%)			
	Non-Affiliated	Affiliated	Assurbanking	Bancassurance
RBC Ratio	14.31%	15.23%	15.65%	14.17%
Loan to Deposit Ratio	98.06%	72.59%	49.87%	103.58%
Net Charge-off to Loan Ratio	0.06%	0.12%	0.10%	0.35%

	t - Test (P-value)			
	Non-affi.~ Affi.	Non-affi. ~ Assurb.	Non-affi. ~ Bancass.	Assurb.~Bancass.
RBC Ratio	**0.00**	**0.00**	0.18	**0.02**
Loan to Deposit Ratio	0.37	0.31	0.30	0.24
Net Charge-off to Loan Ratio	0.26	0.28	0.12	**0.08**

Non-affiliated SBs are those without any affiliation (either direct control or through holding companies they belong to) with insurance companies. Assurbanking-affiliated SBs are those directly owned by insurers or owned through their holding companies, which are owned or controled by insurers. Bancassurance-affiliated SBs are those affiliated with insurers by directly holding insurers or through their holding companies, which own or control insurers. Affiliated SBs refer to either Assurbanking-affiliated SBs or Bancassurance-affiliated SBs.

Figure 14.2.b

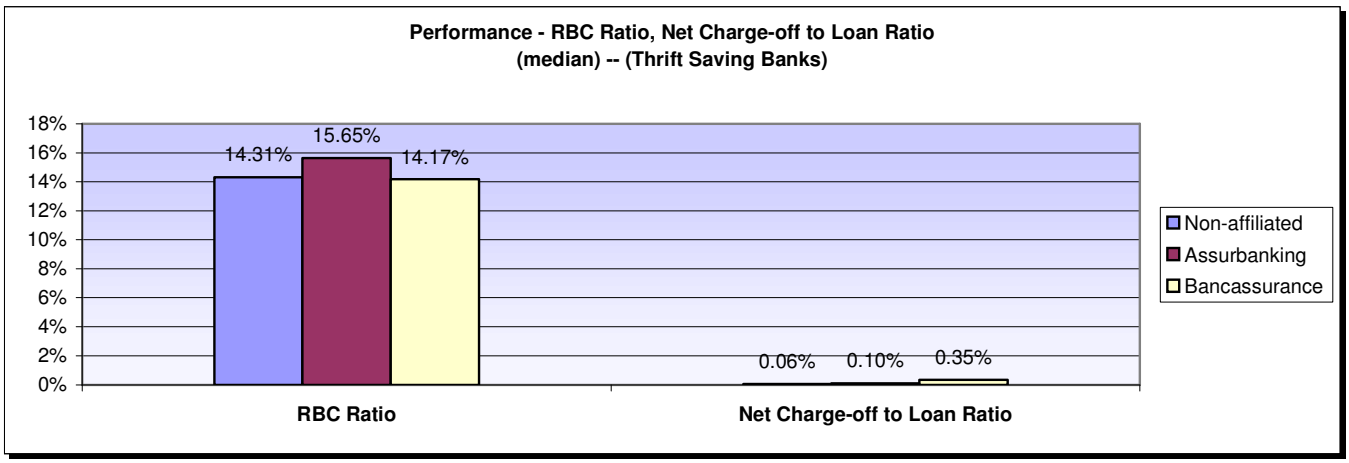

Table 15: Property-Liability Insurance Products and Lines of Business Definitions

Products	Lines of Business
Personal Property	Private Passenger Automobile Physical Damage
Personal Liability	Farmowners Multiple Peril
	Homeowners Multiple Peril
	Private Passenger Automobile Liability
Commercial Property	Fire
	Allied Line
	Inland Marine
	Earthquake
	Burglary and Theft
	Commercial Automobile Physical Damage
	Fidelity
	Surety
	Mortgage Guaranty
	Financial Guaranty
	Group Accident and Health
	Credit Accident and Health
	Other Accident and Health
	Credit
	Aggregate write-ins
Commercial Liability	Commercial Automobile Liability
	Workers' Compensation
	Commercial Multiple Peril
	Medical Malpractice (occurrence, claims made)
	Ocean Marine
	Aircraft
	Boiler and Machinery
	Other Liability (occurrence, claims made)
	Products Liability (occurrence, claims made)
	International
	Reinsurance

Table 16 Data Sample Statistics

This table lists the number of firms contained in the data sample by sectors and product lines. The firms under common ownership are aggregated to the group level. Joint firms are those producing both banking and insurance products. Life, PC, CB and SB subsidiaries are joint producers' business divisions by product lines. Insurance and banking specialists are firms producing only insurance or banking products, respectively. The data sample accounts for 98 percent life insurance industry assets, 94 percent property-liability insurance assets, 88 percent commercial banks assets, and 81 percent thrift saving banks assets.

	2003	2004	2005	**Total**
Joint Firms	88	85	87	260
- Bank & LH	38	37	36	111
- Bank & PC	14	15	15	44
- Bank & LH, PC	36	33	26	95
Insurance Specialists	204	208	209	621
- Life Insurers	110	104	102	316
- PC Insurers	144	149	151	444
Banking Specialists	461	470	509	1,440
- Commercial Banks	389	402	439	1,230
- Thrift Saving Banks	132	132	146	410

Note: LH is the abbreviation for life insurance. PC is the abbreviation for property-liability insurance. "Bank & LH" refers to the affiliation between banks and life insurance companies, "Bank & PC" refers to the affiliation between banks and property-liability insurance companies, and "Bank & LH, PC" refers to the affiliation between banks, life insurance and property-liability insurance.

Table 17. Outputs and Inputs Measures

Panel A: Property-Liability Insurers

Outputs

Quantity	Price
Present Value of Losses Incurred ($PV(L)$)	Price = (Premium Earned - Present Value of Losses Incurred) / Present Value of Losses Incurred
(1) Personal short-tail lines	
(2) Personal long-tail lines	
(3) Commercial short-tail lines	
(4) Commercial long-tail lines	
Average Invested Assets	Expected Rate of Return (ROR) on the Insurer's Assets
Insurer holding of stocks and other invested assets	-- Expected ROR on Invested Assets is the weighted average of the expected return on stocks and on other invested assets -- Expected ROR on stocks is cost of equity capital using 3-Factor Fama-French CAPM with industry beta (SIC 6311) from Ibbotson Associates. -- Expected ROR on other invested assets is the ratio of acutal investment income (minus dividends on stock) to insurer holding of other invested assets.

Inputs

Quantity	Price
Adminstrative Labor	
Total Administration and Manager Labor Expenses/Input Price	Real Average Weekly Wages SIC 6331
Agent Labor	
Total Acquisition Expenses/Input Price	Real Average Weekly Wages SIC 6411
Materials & Physical Capital	
Dollar Value of Net Premises and Fixed Assets	The occupancy and fixed asset expenditures divided by the quantity of physical capital.
Materials & Business Services	
All Non Labor Expense / Input Price	Real Avg. Weekly Wage SIC 7300
Financial Equity Capital	
Equity Capital (Surplus)	Cost of equity capital using 3-Factor Fama-French CAPM using industry beta (SIC 6331) from Ibbotson Associates.
Debt Capital	
Loss Reserves and Unearned Premium Reserves	Price = Investment Income Attributed to Policy Holders / Input Quantity

Panel B: Life-Health Insurers

Outputs

Quantity	Price
Incurred Benefits plus Additions to Reserves ($L + W$)	Price = [Premium Earned + Investment Income - (Incurred Benefits + Additions to Reserves)] / (Incurred Benefits + Additions to Reserves)
(1) Personal life insurance	
(2) Personal annuities	
(3) Group life insurance	
(4) Group annuities	
(5) Accident & Health	

Inputs

Quantity	Price
Adminstrative Labor	
Total Administration and Manager Labor Expenses/Input Price	Real Average Weekly Wages SIC 6311
Agent Labor	
Total Acquisition Expenses/Input Price	Real Average Weekly Wages SIC 6411
Materials & Physical Capital	
Dollar Value of Net Premises and Fixed Assets	The occupancy and fixed asset expenditures divided by the quantity of physical capital.
Financial Equity Capital	
Equity Capital (Surplus)	Cost of equity capital using 3-Factor Fama-French CAPM using industry beta (SIC 6311) from Ibbotson Associates.
Debt Capital	
Loss Reserves and Unearned Premium Reserves	Price = Investment Income Attributed to Policy Holders / Input Quantity

Panel C: Banks

Outputs

Quantity	Price
Consumer Loans	
Residential real estate loans, Loans to individuals.	Total interest income earned on these loans divided by the quantity of these loans
Business Loans	
Commercial real estate loans, Commercial & Industrial loans, Farm loans, Other loans.	Total interest income earned on these loans divided by the quantity of these loans
Other Assets	
Securities and Investments held, and Off-Balance Sheet (OBS) activities	Sum of the total interests and earnings on securities and investment and the total non-interest income divided by the total dollar value of "other assets".

Inputs

Quantity	Price
Deposits	
Demand Deposits, Saving and Small Time Deposits, and Other deposits (domestic only)	Total interest expenses on the deposits divided by the quantity of total deposits
Labor	
Number of Employees Reported	The salary, wage and welfare per employee
Physical Capital	
Dollar Value of Net Premises and Fixed Assets	The occupancy and fixed asset expenditures divided by the quantity of physical capital.
Purchased Funds	
Federal Funds Purchased, Foreign Deposits, and Other Liabilities for Borrowed Money	The interest paid on these funds divided by the dollar value of purchased funds

Table 18. Descriptive Statistics of Variables in Composite Function Estimation - Commercial Banks

This table provides summary statistics of variables used in the composite function estimation. Cost, Revenue, Profit, and output quantities are in thousands.

Panel A: Descriptive statistics for diversified commercial banks (N= 111)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	3,821,298	8,868,608	4,035	51,172,912
Revenue	5,020,367	11,661,406	4,949	67,617,667
Profit	1,199,069	2,816,317	-18,449	16,444,755
Output quantity - Consumer loans	33,050,750	73,816,765	0	358,827,325
Output quantity - Business loans	20,434,609	48,476,928	0	268,248,721
Output quantity - Other assets	150,522,991	479,974,730	74,302	3,117,297,782
Input price - Labor	78.5325	45.3557	35.8438	347.2667
Input price - Net premiuses and fixed assets	1.6137	5.7786	0.0000	52.2632
Input price - Deposits	0.0169	0.0147	0.0009	0.0969
Input price - Purchased Fund	0.0250	0.0241	0.0000	0.2176

Panel B: Descriptive statistics for specialist commercial banks (N= 1,238)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	288,041	644,243	20,013	5,518,470
Revenue	368,159	822,725	18,563	7,105,638
Profit	80,118	186,667	-59,209	1,738,170
Output quantity - Consumer loans	1,741,006	4,120,055	0	35,748,992
Output quantity - Business loans	2,261,665	5,119,329	0	46,505,825
Output quantity - Other assets	4,183,472	12,178,919	139,659	129,215,588
Input price - Labor	59.8007	22.7612	20.1755	276.4737
Input price - Net premiuses and fixed assets	0.3977	0.6602	0.0000	14.1736
Input price - Deposits	0.0149	0.0056	0.0020	0.0596
Input price - Purchased Fund	0.0290	0.0247	0.0000	0.6769

Panel C: Descriptive statistics for all commercial banks (N= 1,349)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	578,768	2,782,530	4,035	51,172,912
Revenue	750,957	3,654,265	4,949	67,617,667
Profit	172,189	879,677	-59,209	16,444,755
Output quantity - Consumer loans	4,317,271	23,114,961	0	358,827,325
Output quantity - Business loans	3,756,992	15,516,865	0	268,248,721
Output quantity - Other assets	16,224,752	143,365,414	74,302	3,117,297,782
Input price - Labor	61.3420	25.8804	20.1755	347.2667
Input price - Net premiuses and fixed assets	0.4977	1.7991	0.0000	52.2632
Input price - Deposits	0.0151	0.0069	0.0009	0.0969
Input price - Purchased Fund	0.0287	0.0246	0.0000	0.6769

Table 19. Descriptive Statistics of Variables in Composite Function Estimation - Thrift Saving Banks

This table provides summary statistics of variables used in the composite function estimation. Cost, Revenue, Profit, and output quantities are in thousands.

Panel A: Descriptive statistics for diversified thrifit saving banks (N= 68)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	219,562	512,449	5,416	3,177,384
Revenue	251,198	596,823	6,025	3,670,408
Profit	31,636	87,580	-20,548	493,024
Output quantity - Consumer loans	1,529,552	3,048,094	0	12,826,927
Output quantity - Business loans	283,622	1,129,100	0	7,047,061
Output quantity - Other assets	3,337,837	9,804,086	7,400	50,942,408
Input price - Labor	72.6990	28.7693	38.7872	251.0833
Input price - Net premiuses and fixed assets	5.1889	12.3835	0.0000	61.9318
Input price - Deposits	0.0212	0.0067	0.0060	0.0361
Input price - Purchased Fund	0.0287	0.0284	0.0000	0.1990

Panel B: Descriptive statistics for specialist thrift saving banks (N= 202)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	258,653	336,869	32,583	2,526,626
Revenue	328,918	434,286	47,141	3,253,980
Profit	70,265	111,019	-19,880	727,354
Output quantity - Consumer loans	3,405,588	4,586,445	895	27,655,552
Output quantity - Business loans	924,846	1,767,719	0	16,150,809
Output quantity - Other assets	2,734,887	4,311,897	114,652	28,828,965
Input price - Labor	63.2470	24.1848	29.1730	295.5603
Input price - Net premiuses and fixed assets	0.5389	0.4275	0.0000	2.9332
Input price - Deposits	0.0185	0.0057	0.0059	0.0422
Input price - Purchased Fund	0.0385	0.0390	0.0000	0.5253

Panel C: Descriptive statistics for all thrift saving banks (N= 270)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	248,808	387,931	5,416	3,177,384
Revenue	309,344	480,404	6,025	3,670,408
Profit	60,536	106,781	-20,548	727,354
Output quantity - Consumer loans	2,933,105	4,324,080	0	27,655,552
Output quantity - Business loans	763,352	1,652,333	0	16,150,809
Output quantity - Other assets	2,886,741	6,156,456	7,400	50,942,408
Input price - Labor	65.6275	25.6923	29.1730	295.5603
Input price - Net premiuses and fixed assets	1.7100	6.5131	0.0000	61.9318
Input price - Deposits	0.0191	0.0060	0.0059	0.0422
Input price - Purchased Fund	0.0360	0.0368	0.0000	0.5253

Table 20. Descriptive Statistics of Variables in Composite Function Estimation - Life Insurance Companies

This table provides summary statistics of variables used in the composite function estimation. Cost, Revenue, Profit, and output quantities are in thousands.

Panel A: Descriptive statistics for diversified life insurance companies (N= 133)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	831,038	1,033,719	535	4,145,507
Revenue	1,125,697	1,400,670	3,545	6,489,245
Profit	294,659	434,943	-38,546	2,343,738
Output quantity - Life Insurance	957,672	1,636,354	8	7,719,653
Output quantity - Annuities	1,435,005	2,609,786	0	12,558,310
Output quantity - Accident & Health Insurance	284,276	535,468	0	2,669,184
Input price - Administration and management labor	1265.34	228.10	807.00	1882.00
Input price - Agent labor	1024.27	98.11	796.52	1457.71
Input price - Materials and physical capital	706.63	145.73	435.05	1019.43
Input price - Equity capital	0.1200	0.0061	0.1132	0.1280
Input price - Debt capital	0.0445	0.0140	0.0102	0.0823

Panel B: Descriptive statistics for specialist life insurance companies (N= 315)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	237,061	311,482	79	1,833,309
Revenue	311,534	422,973	255	2,373,229
Profit	74,474	139,820	-66,198	1,005,259
Output quantity - Life Insurance	217,125	364,395	0	2,955,663
Output quantity - Annuities	251,982	437,434	0	2,867,009
Output quantity - Accident & Health Insurance	252,897	587,877	0	3,382,254
Input price - Administration and management labor	1241.30	219.13	760.00	1923.00
Input price - Agent labor	999.39	99.63	760.01	1412.22
Input price - Materials and physical capital	714.76	177.99	353.01	1473.32
Input price - Equity capital	0.1200	0.0061	0.1132	0.1280
Input price - Debt capital	0.0466	0.0173	0.0102	0.1192

Panel C: Descriptive statistics for all life insurance companies (N= 448)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	413,398	676,399	79	4,145,507
Revenue	553,239	918,529	255	6,489,245
Profit	139,841	282,382	-66,198	2,343,738
Output quantity - Life Insurance	436,975	999,362	0	7,719,653
Output quantity - Annuities	603,192	1,561,572	0	12,558,310
Output quantity - Accident & Health Insurance	262,213	572,405	0	3,382,254
Input price - Administration and management labor	1248.44	221.85	760.00	1923.00
Input price - Agent labor	1006.78	99.72	760.01	1457.71
Input price - Materials and physical capital	712.35	168.94	353.01	1473.32
Input price - Equity capital	0.1200	0.0061	0.1132	0.1280
Input price - Debt capital	0.0460	0.0164	0.0102	0.1192

Table 21. Descriptive Statistics of Variables in Composite Function Estimation - Property-Liability Insurance Companies

This table provides summary statistics of variables used in the composite function estimation. Cost, Revenue, Profit, and output quantities are in thousands.

Panel A: Descriptive statistics for diversified property-liability insurance companies (N= 114)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	535,078	1,077,620	52	6,792,995
Revenue	662,600	1,247,356	73	7,258,835
Profit	127,522	218,534	-24,344	1,123,429
Output quantity - Personal property-liability insurance	485,816	1,130,523	0	5,597,831
Output quantity - Commercial property-liability insurance	312,227	690,986	0	3,923,788
Output quantity - Invested assets	3,128,234	5,587,308	2,570	29,081,332
Input price - Administration and management labor	1145.71	130.96	792.00	1408.00
Input price - Agent labor	1007.18	125.09	665.00	1438.53
Input price - Materials and physical capital	679.10	203.02	432.33	1655.83
Input price - Equity capital	0.0811	0.0015	0.0798	0.0832
Input price - Debt capital	0.0287	0.0267	0.0102	0.1889

Panel B: Descriptive statistics for specialist property-liability insurance companies (N= 443)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	331,560	458,874	323	4,402,666
Revenue	421,052	592,411	233	5,921,569
Profit	89,492	182,961	-385,183	1,518,902
Output quantity - Personal property-liability insurance	167,852	315,397	0	1,961,435
Output quantity - Commercial property-liability insurance	284,816	451,168	0	3,970,428
Output quantity - Invested assets	2,339,506	3,114,810	5,791	26,166,168
Input price - Administration and management labor	1171.83	152.04	664.00	1707.00
Input price - Agent labor	1046.39	130.13	714.00	1444.00
Input price - Materials and physical capital	706.07	158.86	296.82	1154.76
Input price - Equity capital	0.0811	0.0015	0.0798	0.0832
Input price - Debt capital	0.0315	0.0281	0.0102	0.3449

Panel C: Descriptive statistics for all property-liability insurance companies (N= 557)

Variable Definition	Mean	Std. Dev.	Min	Max
Cost	373,214	640,437	52	6,792,995
Revenue	470,490	777,640	73	7,258,835
Profit	97,275	191,188	-385,183	1,518,902
Output quantity - Personal property-liability insurance	232,929	596,087	0	5,597,831
Output quantity - Commercial property-liability insurance	290,426	508,898	0	3,970,428
Output quantity - Invested assets	2,500,934	3,762,829	2,570	29,081,332
Input price - Administration and management labor	1166.48	148.23	664.00	1707.00
Input price - Agent labor	1038.37	129.97	665.00	1444.00
Input price - Materials and physical capital	700.55	168.99	296.82	1655.83
Input price - Equity capital	0.0811	0.0015	0.0798	0.0832
Input price - Debt capital	0.0309	0.0278	0.0102	0.3449

Table 22. Cost, Revenue, and Profit Scope Economy Estimates

Panel A: Cost Scope Economies

	Cost Scope Economies		
	1st Quartile	Median	3rd Quartile
All	-19.9% **	-11.4% **	-36.0% ***
Joint Firms	-0.1%	-24.1% ***	-70.8% ***
Synthetic Joint Firms	-24.4% ***	-26.0% ***	-78.6% ***

Panel B: Revenue Scope Economies

	Revenue Scope Economies		
	1st Quartile	Median	3rd Quartile
All	29.2% ***	25.6% ***	49.6% ***
Joint Firms	15.7% **	32.1% ***	74.3% ***
Synthetic Joint Firms	33.7% ***	38.8% ***	78.1% ***

Panel C: Profit Scope Economies

	Profit Scope Economies		
	1st Quartile	Median	3rd Quartile
All	2.6% *	3.9% *	7.6% ***
Joint Firms	-0.4%	2.0% *	16.9% ***
Synthetic Joint Firms	6.3% ***	10.3% ***	25.9% ***

Notes: The data sample used to evaluate scope economies contains 260 actual joint firms and 298,185 hypothetic joint firms, which is created by merging every insurance specialist with every bank specialist. Scope economy is present if the scope economy score is greater than zero; Scope diseconomy is present if the scope economy score is less than zero; Neither scope economy nor diseconomy is present if the scope economy score equals zero.

*** Significant at 1%

** Significant at 5%

* Significant at 10%

Table 23. Descriptive Statistics of Regression Variables (N = 214)

This table provides summary statistics of regression variables for financial groups joint producing banking and insurance products. Observations with extreme scope economy scores, e.g., scope economy scores >1 or <-1, are excluded from the sample. The final sample used in the regression contains 214 actual joint producers

Variable	Definition	Mean	Std. Dev.	Min	Max
CSCORE	Cost scope economy score	-0.4231	0.4233	-1.0000	0.8984
RSCORE	Revenue scope economy score	0.4482	0.3748	-0.7694	1.0000
PSCORE	Profit scope economy score	0.1772	0.2430	-0.4029	1.0000
LASSETGTA	Log (Total group assets)	23.1793	2.1399	19.1334	27.7889
P_SHARE	Total retail products business share (%)	0.6485	0.2184	0.0079	0.9886
P_SHARE_INS	Insurance retail products share (%)	0.5731	0.3408	0.0000	1.0000
P_SHARE_BK	Banking retail products share (%)	0.6090	0.2812	0.0000	0.9997
DV_BKASSUR	Dummy - Bancassurer	0.3832	0.4873	0.0000	1.0000
DV_ASSURBK	Dummy - Assurbank	0.5093	0.5011	0.0000	1.0000
DV_CONG	Dummy - Conglomerate	0.1075	0.3104	0.0000	1.0000
BKASSUR_LH	Dummy - Bancassurer doing life insurance only	0.1776	0.3830	0.0000	1.0000
BKASSUR_PC	Dummy - Bancassurer doing property-liab. insurance only	0.0561	0.2306	0.0000	1.0000
BKASSUR_LHPC	Dummy - Bancassurer doing both life & property-liab. insurance	0.1495	0.3574	0.0000	1.0000
ASSURBK_CB	Dummy - Assurbank doing commercial banking only	0.0841	0.2782	0.0000	1.0000
ASSURBK_SB	Dummy - Assurbank doing thrift saving only	0.4112	0.4932	0.0000	1.0000
ASSURBK_CBSB	Dummy - Assurbank doing both commercial banking & thrift saving	0.0140	0.1178	0.0000	1.0000
CONG_LH	Dummy - Conglomerate doing life insurance only	0.0140	0.1178	0.0000	1.0000
CONG_PC	Dummy - Conglomerate doing property-liab. insurance only	0.0327	0.1783	0.0000	1.0000
CONG_LHPC	Dummy - Conglomerate doing both life & property-liab. insurance	0.0607	0.2394	0.0000	1.0000
PRODHHI	Insurance product mix HHI	0.5424	0.2469	0.1650	1.0000
PRODHHI_B	Banking product mix HHI	0.4097	0.2590	0.0000	1.0000
DPWHHI	Insurance geographic business HHI	0.2889	0.3518	0.0000	1.0000
LOFFDOM	Log (number of bank branches and offices)	2.0552	2.4232	0.0000	8.6923
DV_MKT_H	Insurance horizontal distribution dummy	0.4907	0.5011	0.0000	1.0000
DV_MKT_V	Insurance vertical distribution dummy	0.1869	0.3908	0.0000	1.0000
C_TO_A	Capital to assets ratio	0.1610	0.1132	0.0311	0.5314
XEFF_C_LH	Cost X-efficiency - Life insurance	0.0846	0.2196	0.0007	1.0000
XEFF_C_PC	Cost X-efficiency - Property-Liability insurance	0.1364	0.2546	0.0034	1.0000
XEFF_C_BK	Cost X-efficiency - Banking	0.1549	0.2882	0.0020	1.0000
XEFF_R_LH	Revenue X-efficiency - Life insurance	0.0882	0.2198	0.0017	1.0000
XEFF_R_PC	Revenue X-efficiency - Property-Liability insurance	0.1210	0.2484	0.0044	1.0000
XEFF_R_BK	Revenue X-efficiency - Banking	0.1358	0.2781	0.0013	1.0000
XEFF_P_LH	Profit X-efficiency - Life insurance	0.7392	0.1123	0.4943	1.0000
XEFF_P_PC	Profit X-efficiency - Property-Liability insurance	0.9419	0.0209	0.9068	1.0000
XEFF_P_BK	Profit X-efficiency - Banking	0.4157	0.1985	0.1676	1.0000

Table 24. Scope Economies Regression Analysis - Joint firms (N=214)

This table provides the regression results for financial conglomerates joint producing banking and insurance products. A truncated Tobit model is used. The dependent variabe for the regression <1> and <4> is cost scope economy score; the dependent variabe for the regression <2> and <5> is revenue scope economy score; the dependent variabe for the regression <3> and <6> is profit scope economy score.

	Cost Scope Economies < 1 >		Revenue Scope Economies < 2 >		Profit Scope Economies < 3 >		Cost Scope Economies < 4 >		Revenue Scope Economies < 5 >		Profit Scope Economies < 6 >	
Independed Variables	Coefficient	*t* stat.	Coefficient	*t* stat.	Coefficient	*t* stat.	Coefficient	*t* stat.	Coefficient	*t* stat.	Coefficient	*t* stat.
Intercept	5.1188	5.91 ***	-3.7674	-6.34 ***	-3.9126	-7.27 ***	5.2104	6.51 ***	-4.0153	-6.96 ***	-4.3025	-8.25 ***
Firm size variables												
Log (Total group assets)	-0.1940	-5.71 ***	0.1506	6.33 ***	0.0693	9.25 ***	-0.1967	-6.29 ***	0.1562	6.88 ***	0.0717	10.04 ***
Business and product mix variables												
Total retail products business share (%)	-0.8422	-3.96 ***	0.4321	2.74 ***	0.0954	1.77 ***						
Insurance retail products share (%)							-0.6826	-4.52 ***	0.2618	2.39 **	0.0779	2.17 **
Banking retail products share (%)							-0.1349	-0.84	0.1210	0.91	0.0971	2.26 **
Dummy - Bancassurer	-0.1420	-0.81	0.2235	1.69 *	0.0135	0.30						
Dummy - Assurbank	0.2330	1.52	-0.1033	-0.91	-0.0596	-1.48						
Dummy - Bancassurer doing life insurance only							-0.1468	-0.69	0.3293	2.15 **	-0.0164	-0.30
Dummy - Bancassurer doing property-liab. insurance only							-0.6623	-2.31 **	0.7024	3.33 ***	0.0333	0.49
Dummy - Bancassurer doing both life & property-liab. insurance							-0.3106	-1.41	0.4867	2.90 ***	0.1199	2.25 **
Dummy - Assurbank doing commercial banking only							-0.0599	-0.28	0.1730	1.10	-0.0741	-1.32
Dummy - Assurbank doing thrift saving only							0.0825	0.44	0.1802	1.34	0.0221	0.47
Dummy - Assurbank doing both commercial banking & thrift saving							0.5763	1.66 *	-0.4800	-1.81 *	-0.1919	-1.92 *
Dummy - Conglomerate doing life insurance only							-0.5877	-1.72 *	0.5222	1.98 **	0.1362	1.33
Dummy - Conglomerate doing property-liab. insurance only							-0.5175	-1.94 **	0.6693	3.24 ***	0.1316	1.85 *
Business diversification variables												
Insurance product mix HHI	-0.3979	-2.01 **	0.2160	1.49	0.1373	2.83 ***	-0.2691	-1.35	0.0893	0.60	0.1651	3.33 ***
Banking product mix HHI	-0.0698	-0.41	0.0415	0.32	-0.0255	-0.56	-0.0679	-0.44	0.0270	0.22	-0.0133	-0.31
Insurance geographic business HHI	0.2422	1.50	-0.3447	-2.89 ***	-0.1004	-2.55 **	0.3720	2.31 **	-0.4286	-3.51 ***	-0.0898	-2.29 **
Log (number of bank branches and offices)	-0.0104	-0.31	-0.0031	-0.12	0.0159	2.08 **	-0.0409	-1.25	0.0222	0.88	0.0179	2.37 **
Insurance distribution system variables												
Insurance horizontal distribution dummy	-0.0102	-0.10	0.0537	0.70	-0.0200	-0.77	0.0488	0.48	-0.0198	-0.25	-0.0213	-0.82
Insurance vertical distribution dummy	0.1029	0.74	0.0073	0.07	0.0174	0.50	0.1500	1.12	-0.0592	-0.58	0.0038	0.12
Leverage variable												
Capital to assets ratio	-2.0945	-4.23 ***	1.6671	4.54 ***	0.2432	1.96 **	-2.1069	-4.61 ***	1.6650	4.80 ***	0.1850	1.57
X-efficiency variables												
Cost X-efficiency - Life insurance	-0.6069	-2.23 ***					-0.7758	-2.90 ***				
Cost X-efficiency - Property-Liability insurance	-0.5800	-2.81 ***					-0.3641	-1.82 *				
Cost X-efficiency - Banking	-0.1290	-0.77					-0.1249	-0.73				
Revenue X-efficiency - Life insurance			0.4271	2.32 **					0.6218	3.22 ***		
Revenue X-efficiency - Property-Liability insurance			0.3495	2.31 **					0.2595	1.65 *		
Revenue X-efficiency - Banking			0.0755	0.59					0.0922	0.67		
Profit X-efficiency - Life insurance					0.5299	5.18 ***					0.5832	5.92 ***
Profit X-efficiency - Property-Liability insurance					1.9393	3.51 ***					2.1479	4.08 ***
Profit X-efficiency - Banking					0.2079	3.33 ***					0.1919	2.97 ***
Year dummy variables												
Year 2003	-0.2440	-2.34 **	0.2325	2.97 ***	0.0737	2.77 ***	-0.2755	-2.87	0.2461	3.37 ***	0.0725	2.90 ***
Year 2004	-0.1316	-1.32	0.1570	2.07 **	0.0561	2.05 **	-0.1412	-1.55	0.1557	2.21 **	0.0551	2.15 **
Average value of dependent variable	-0.4231		0.4482		0.1772		-0.4231		0.4482		0.1772	
Number of observations	214		214		214		214		214		214	

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level