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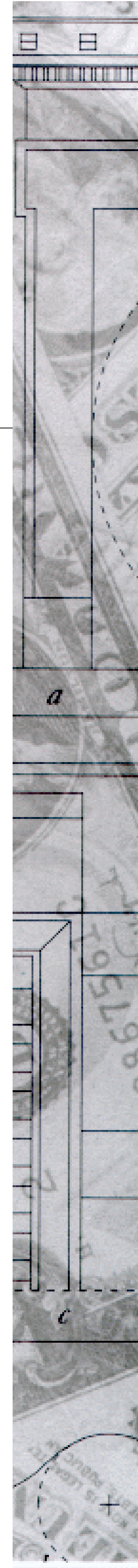

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Conglomeration versus Strategic Focus: Evidence from the Insurance Industry

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Conglomeration Versus Strategic Focus:
Evidence from the Insurance Industry

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Conglomeration Versus Strategic Focus:
Evidence from the Insurance Industry

Abstract

We provide evidence on the validity of the **conglomeration hypothesis** versus the **strategic focus hypothesis** for financial institutions using data on U.S. insurance companies. We distinguish between the hypotheses using **profit scope economies**, which measures the relative efficiency of joint versus specialized production, taking both costs and revenues into account. The results suggest that the conglomeration hypothesis dominates for some types of financial service providers and the strategic focus hypothesis dominates for other types. This may explain the empirical puzzle of why joint producers and specialists both appear to be competitively viable in the long run.

JEL classification codes: G22, G28, G34, L23, L89
Key words: Insurance, Conglomeration, Focus, Mergers, Scope Economies

1. **Introduction**

There is considerable disagreement in the finance literature about the benefits of integrating firms in different lines of business versus firms remaining specialized in their areas of expertise. Proponents of the **conglomeration hypothesis** argue that owning and operating a broad range of businesses can add value from exploiting cost scope economies by sharing inputs in joint production (e.g., Teece 1980), or taking advantage of revenue scope economies in providing “one-stop shopping” to consumers who are willing to pay for the extra convenience of financial supermarkets (e.g., Herring and Santomero 1990, Gallo, Apilado, and Kolari 1996, Calomiris 1998). Conglomeration may also improve financial efficiency and add value by creating internal capital markets which may be less prone than external markets to imperfections such as information asymmetries (e.g., Williamson 1970, Gertner, Scharfstein, and Stein 1994). In addition, conglomeration may diversify risk, reducing the expected costs of financial distress or bankruptcy, allowing greater financial leverage and/or permitting firms to earn higher revenues from risk-sensitive customers who are willing to pay more or accept reduced services in return for lower default risk (e.g., Lewellen 1971, Winton 1999).

In contrast, proponents of the **strategic focus hypothesis** argue that firms can maximize value by focusing on core businesses and core competencies. According to this hypothesis, conglomeration may reflect agency problems in which managers may add businesses to protect the value of their human capital (Amihud and Lev 1981) or to increase their private benefits (Jensen 1986). Under the strategic focus hypothesis, conglomeration also may exacerbate agency problems by allowing cross-subsidization or additional free cash flow to weak subsidiaries and blunt the market discipline that would otherwise block negative net present value investments (Jensen 1986, Meyer, Milgrom, and Roberts 1992).

Nowhere is this controversy of more policy relevance and research interest than in the financial services industry. Some nations have had universal-type financial systems that allow firms to provide many types of financial services in the same firm for many years, whereas other nations have restricted integration of financial services – particularly commercial banking with other activities – because of issues of systemic risk, concentration of economic power, and other concerns. Recent liberalization of product restrictions in some nations has resulted in mergers and acquisitions (M&As) creating financial service firms of tremendous size and scope. For example, pursuant to the Federal Reserve’s decision to expand bank holding companies’ abilities to underwrite corporate debt and equity, the 1998 Travelers-Citicorp merger created a financial institution with over $700 billion in assets that operates in over 100 nations, and provides commercial banking, investment banking, life and property-liability insurance, and other financial services. The Gramm-Leach-Bliley Act of 1999 effectively removed many of the remaining U.S. restrictions on combining banking, securities underwriting, and insurance, and may result in significant additional conglomeration in the financial services industry.

Of particular research interest is the observation that some financial firms follow a conglomeration policy while others follow a focused managerial strategy, even where multiple financial services have been legally allowed for long periods of time. In our empirical application, we examine the U.S. insurance industry, where firms have never been restricted from providing both life insurance and property-liability (P-L) insurance. Nonetheless, some firms choose to produce jointly, while others choose to specialize in one insurance business or the other. In long-run competitive equilibrium, it would be expected that firms would gravitate toward joint production if the conglomeration hypothesis were correct and toward specialization if the strategic focus hypothesis were true. Firms following the inefficient strategy would be compelled by market forces to change strategy or exit the industry. Nonetheless, we observe large, mature firms following both strategies for long periods of time.

We offer three potential explanations for this empirical puzzle of the coexistence of joint producers and specialists, each of which has a different implication for the empirical validity of the conglomeration and strategic focus hypotheses. First, joint production and specialization may be approximately equally efficient, so firms may follow either strategy and be competitively viable in the long run. This implies that neither the conglomeration hypothesis nor the strategic focus hypothesis holds. Second, joint production may be more efficient for some types of firms, while specialization may be more efficient for others, so that the conglomeration hypothesis dominates for the former types and the strategic focus hypothesis dominates for the latter types. Third, it is possible that either joint production or specialization is more efficient, but that market imperfections allow firms choosing the less efficient strategy to survive in the long run. That is, barriers to entry, regulation, or other competitive impediments reduce market discipline and allow inefficient firms to survive.[1] This third explanation suggests that either the conglomeration or strategic focus hypothesis is empirically valid, but competitive forces are insufficient to compel firms to adopt the more efficient strategy.

We distinguish among these alternative explanations and hypotheses using the concept of **profit scope**

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[1]Consistent with this third explanation, prior research found that high local market concentration in banking allowed firms to exercise market power in pricing and remain in business with significant cost inefficiencies (Berger and Hannan 1998).

economies, which measures the relative efficiency of joint versus specialized production, taking both costs and revenues into account. Table 1 shows the relationships among profit scope economies, explanations of the coexistence of joint producers and specialists, and the validity of the hypotheses. If there are no profit scope economies or diseconomies between life and P-L insurance, then the first explanation for the empirical puzzle (equal efficiency) is correct, and neither of the hypotheses is valid. If profit scope economies hold for some types of firms and diseconomies hold for other types, then the second explanation (joint production more efficient for some, specialization more efficient for others) is correct, and each hypothesis is valid for some types of firms. If there are profit scope economies or diseconomies for all types of firms, then the third explanation (market imperfections) is correct. The conglomeration hypothesis is valid if there are global scope economies and the strategic focus hypothesis is valid if there are global scope diseconomies.

Profit scope economies dominate the more commonly used concept of cost scope economies for distinguishing among the hypotheses. This is because profit scope economies incorporate differences in revenue between joint producers and specialists that may reflect systematic differences in product quality or service intensity which are otherwise unmeasurable. For example, joint producers may incur additional expenses to provide one-stop shopping to customers who are willing to pay for the extra convenience. In this event, joint producers might be measured as having cost scope diseconomies because of the additional expenses, but may appropriately be measured as having profit scope economies if extra revenues from customers who value the convenience more than cover the additional expenses. Alternatively, there may be complementaries in production that create cost scope economies, but also there may also be revenue scope diseconomies because customers prefer to purchase from companies that specialize and can better tailor products for them. Again, cost scope economies alone may give a misleading impression. We estimate cost and revenue scope economies as well as profit scope economies, to determine the source of the profit economies or diseconomies.

Our “preferred” method for estimating scope economies makes two main improvements over the traditional method. First, we use only data from specialists to evaluate the performance of specialists and use only data on joint producers to evaluate the performance of joint producers, avoiding problems of extrapolation and allowing for the possibility (if not the likelihood) that joint producers and specialists use different technologies. Second, we use separate cost, revenue, and profit functions for the life insurance and P-L insurance divisions for the joint producers, which allows for the exclusion of irrelevant variables and avoids artificially imposing symmetry. We compare the results using the preferred and traditional methods and find that the two approaches lead to dramatically different conclusions.

Finally, we further explore the possibility that scope economies are present for some types of firms but not others by developing and testing hypotheses regarding which types of insurance firms are most likely and least likely to realize scope economies. We do so by conducting regression analyses with scope economies as the dependent variables and firm characteristics as explanatory variables.

To put our study into context, some prior studies have evaluated the conglomeration and strategic focus hypotheses outside of the financial services industry using data on market values of firms before and after M&As or spinoffs (e.g., Lang and Stulz 1994, Berger and Ofek 1995, Comment and Jarrell 1995, John and Ofek 1995, Servaes 1996). These studies usually found that conglomeration is value-destroying and increases in corporate focus are value-enhancing, supporting the strategic focus hypothesis.

Nonetheless, this remains largely an open question for the financial services industry. A study of M&As between banks and insurers and among banks in Europe found that many of the events increased combined value (Cybo-Ottone and Murgia 1998). The announcement of the Citicorp-Travelers merger also resulted in an increase in the stock prices of both merger partners (Siconolfi 1998).[2] Our use of profit scope economies has an advantage over these studies of being able to include all firms, not just those involved in M&As or spinoffs. Firms undergoing these changes may have problems of interpretation because of short-term disruption costs or sample selection biases in which firms that choose to change their strategy may not be representative of the long-term benefits and costs of maintaining one of the strategies. In addition, profit scope economies do not require market data, and may be applied to virtually all firms, rather than just those that are publicly traded. However, we acknowledge that biases and inaccuracies exist in the accounting data used to estimate scope economies.

Section 2 provides background on the hypotheses and on scope economies applied to the insurance industry. Section 3 presents our methodology, Section 4 gives our empirical results, and Section 5 concludes.

2. The Hypotheses and Scope Economies Applied to the Insurance Industry

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[2]Studies of M&As within the banking industry have yielded mixed results. Some found that the combined value of the two firms goes down after the announcement of U.S. bank M&As (e.g., Hannan and Wolken 1989, Houston and Ryngaert 1994), although a study of recent U.S. bank M&A found increases in value (Houston, James, and Ryngaert 1999). A study of domestic and international M&As involving U.S. banks found more value creation from international M&As, although it also found that more concentrated geographic and activity focus had positive effects on value (DeLong 1999).

The debate about the conglomeration and strategic focus hypotheses is particularly relevant to the insurance industry, where a conflict between conglomeration and focused strategies is evident. Some insurers have followed a conglomeration policy, pursuing M&As for growth and diversification into additional insurance lines and markets. For example, Travelers acquired Aetna's P-L operations to add to its already diversified insurance offerings. Other insurers have followed a "back to basics" strategy, focusing on their core businesses and spinning off other businesses. In the past few years, Aetna and CIGNA sold their P-L insurance subsidiaries to focus on their life insurance and health care businesses, while Allstate divested unprofitable subsidiaries to focus on personal auto insurance.

At various times, the insurance industry has also been a major part of M&A and spinoff movements involving conglomerates that span several financial service industries. During some periods, conglomeration was the prevailing model, and there were M&As designed to create financial supermarkets. During other periods, firms returned to a focus on core industries, and series of spinoffs ensued. For example, during the 1980s American Express pursued the financial supermarket strategy and acquired a diverse range of firms, many of which were later spun off after heavy losses. Similarly, Sears first built up its financial services businesses, and then divested its holdings of Allstate Insurance Group, Dean Witter, and Coldwell Banker in the early 1990s to focus on its core business of retailing. More recently, there has been a swing back towards the conglomeration approach, with the Travelers-Citicorp merger and Travelers' earlier acquisitions of Primerica and Smith-Barney being among the most prominent transactions.[3] Our sample period of 1988-1992 might be viewed as a transition period, as the insurance industry was finishing a conglomeration phase and beginning some spinoff activity.

Despite the pace of M&A and spinoff activities, many large, successful firms have long kept to either the conglomeration or the focused strategy. For example, ITT Hartford, Travelers, State Farm, Liberty Mutual, and USAA have produced both life and P-L insurance services for many years, while New England Mutual, Guardian Life, Massachusetts Mutual, and New York Life have specialized in life insurance, and St. Paul, General Reinsurance, Selective Insurance Group, and W.R. Berkeley have specialized in P-L insurance.

Potential Sources of Profit Scope Economies/Diseconomies in Insurance

Profit scope economies in insurance may derive from either cost or revenue sources. Cost scope

[3]The academic literature suggests that these trends in corporate strategy may be more than just fads. For example, Servaes (1996) provides empirical evidence that the market penalty for diversification has varied widely over time and that in some periods the penalty appears to be negligible.

economies may be realized from shared information systems, investment departments, policyholder service centers, or other operations. For example, the life insurance and P-L insurance divisions of a joint producer may use a joint customer database at a lower cost than building and maintaining two databases. Cost economies can also arise from sharing managerial expertise and from sharing physical inputs such as offices, computer hardware, or software. Revenue scope economies may occur due to consumption complementarities arising from reductions in consumer search and transactions costs as well as enhanced service quality. Sharing a brand name may raise revenues and/or reduce marketing costs. Finally, by reducing firm risk through diversification, conglomeration may lead to higher profits from risk-sensitive customers who are willing to pay more or accept lower service quality in exchange for reduced default risk.

Insurance scope **diseconomies** may also derive from cost or revenue sources. Cost scope diseconomies may arise because of coordination and administrative costs from offering a broad range of products. Revenue scope diseconomies may arise if specialists have better knowledge and expertise in their products and can better tailor products for individual customers, and thereby charge more than joint producers. This may be especially the case for commercial products in which corporate clients often have relatively low search costs and place high value on tailored products.

Measured economies or diseconomies may also reflect systematic differences in product quality or service intensity between joint producers and specialists. Profit scope economies may capture the effects of these differences in quality on both costs and revenues, and avoid misleading findings that may otherwise be present in cost or revenue scope economy measures alone. As noted above, if joint producers incur additional expenses to provide "one-stop shopping" convenience for customers, there may be measured cost scope diseconomies because of the additional expenses and revenue scope economies because customers pay for the added convenience. Similarly, there may be revenue scope diseconomies if customers prefer the more tailored products of specialists which offset cost scope economies of production. Profit scope economies balance these cost and revenue effects to determine whether conglomeration versus strategic focus is the superior strategy.[4]

Empirical Literature on Scope Economies in Insurance and other Financial Services

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[4]Consistent with these arguments, a prior study found large differences in measured cost efficiency between P-L insurers using different distribution systems, but that most of these differences were eliminated when profit efficiency was measured (Berger, Cummins, and Weiss 1997). These data suggest that some insurers spend more to create higher quality services (creating the appearance of cost inefficiency) and are recompensed for the higher quality with higher revenues (which are captured in measured profit efficiency).

A few prior studies have investigated cost economies of scope within the insurance industry. Within the life insurance segment of the industry, Kellner and Mathewson (1983) found cost scope economies in the Canadian industry, Grace and Timme (1992) found no significant cost economies of scope in the U.S. industry, and Meador, Ryan, and Shellhorn (1998) found cost efficiency benefits to diversification across product lines within life insurance (not strictly a scope economy study). Within the P-L insurance segment, Toivanen (1997) found modest cost economies of scope in the Finnish industry. We are unaware of any insurance studies using revenue or profit scope economies or any studies of economies between life insurance and P-L insurance.

There have been a number studies of cost scope economies within other financial service industries, such as banking, savings and loans, or securities (e.g., Berger, Hanweck, and Humphrey 1987, Mester 1987,1993, Hunter, Timme, and Yang 1990, Berger and Humphrey 1991, Goldberg, et al. 1991, Pulley and Humphrey 1993, Noulas, Miller, and Ray 1993, Ferrier, et al. 1993). Most of these studies found no substantial evidence of cost scope economies. A limitation of these studies is that they evaluate the economies of keeping traditional banking, savings and loan, or securities products within the same institution, rather than examining economies between different types of institutions. One exception is Lang and Welzel (1998), which found mostly diseconomies of producing loans and investment-oriented services within German universal banks.

A few prior studies have used revenue and profit economies in the banking literature. Berger, Hancock, and Humphrey (1993) analyzed profit scope economies using the standard profit function, Berger, Humphrey, and Pulley (1996) analyzed revenue scope economies using the alternative revenue function, and Clark and Siems (1997) used the alternative profit function to evaluate expansion-path scale economies. These studies generally did not find consistent benefits of either joint production or specialization within the banking industry.

3. <u>Methodology</u>

In this section, we first discuss and compare the traditional and "preferred" approaches to measuring scope economies. Estimation issues, including functional form, data sample, variables, valuation points, and the use of the thick frontier method are also presented. The section concludes by outlining a regression analysis of scope economies designed to determine the types of firms most likely to realize scope economies.

<u>The Traditional Approach to Measuring Scope Economies</u>

Cost scope economies. Although our main focus is profit scope economies, we begin our methodology discussion with cost scope economies, which is the most familiar application. Cost scope economies are defined as the proportional increase in costs from producing given outputs by specializing firms versus joint producers.

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 specializing firms. We specify an output vector y, a vector of fixed netputs (inputs or outputs) z, and an input price vector w. We separate both the output and netput vectors into two sets, denoted by the vectors y_1 and y_2 for outputs and the vectors z_1 and z_2 for netputs. Below, we relabel y_1 and z_1 as the life insurance outputs and fixed netputs and y_2 and z_2 as the P-L insurance outputs and fixed netputs. The traditional measure of cost scope economies between product lines 1 and 2 is given by:

$$S_C^T(1,2) = \frac{C_J(y_1, 0; z_1, 0; w) + C_J(0, y_2; 0, z_2; w) - C_J(y_1, y_2; z_1, z_2; w)}{C_J(y_1, y_2; z_1, z_2; w)} \qquad \textbf{(1)}$$

where $C_J(\bullet)$ is a continuous cost function which is estimated using data on joint producers only, although it is also evaluated at the hypothetical specialized output points $(y_1, 0; z_1, 0)$ and $(0, y_2; 0, z_2)$. Cost scope economies are determined to be present if $S_C^T(1,2) > 0$, and diseconomies are deemed present if $S_C^T(1,2) < 0$. The economies (diseconomies) are measured as the proportionate increase (decrease) in costs predicted to result from a change from joint production to specialized production of product lines 1 and 2.

There are two main drawbacks to the traditional approach. First, evaluating costs at specialized output points usually requires considerable extrapolation beyond the sample data, which may lead to inaccurate evaluations of specialist costs and inaccurate measurement of scope economies. Second, and perhaps more important, the traditional approach imposes the assumption that specialists use the same technology as joint producers. That is, the technology that is the dual to the continuous cost function $C_J(\bullet)$ is restricted to hold for the specialists by using $C_J(y_1, 0; z_1, 0; w)$ and $C_J(0, y_2; 0, z_2; w)$ to represent the costs of these firms. In actuality, it seems quite possible that joint producers and specialists would use different technologies. Firms are likely to adopt a technology that is best suited to the types of outputs produced and market segments served. For example, joint producers might concentrate their efforts on cross-selling life and P-L insurance products via advertising and marketing, whereas specialists might concentrate more on tailoring the products to meet individual customer needs. Presumably, these activities would require different personnel training, communication systems, database management, software, etc. If there is a substantial difference in costs between joint producers and specialists, at least part of this difference in costs is likely due to the use of a different technology. Thus, the traditional approach may assume away one of the important differences that it is trying to test.

Revenue and Profit Scope Economies. Revenue and profit scope economies are defined here as the proportional reductions in revenues or profits, respectively, from producing a given output by specialists versus by a joint producer. Applying the traditional approach, a single continuous revenue or profit function is estimated only for joint producers, but is assumed to apply to specialists as well. Again using the simple example of two products, the traditional measures of revenue and profit scope economies are given by:

$$S_R^T(1{,}2) = \frac{R_J(y_1, y_2; z_1, z_2; w) - R_J(y_1, 0; z_1, 0; w) - R_J(0, y_2; 0, z_2; w)}{R_J(y_1, y_2; z_1, z_2; w)} \quad \textbf{(2)}$$

and

$$S_\Pi^T(1{,}2) = \frac{\Pi_J(y_1, y_2; z_1, z_2; w) - \Pi_J(y_1, 0; z_1, 0; w) - \Pi_J(0, y_2; 0, z_2; w)}{\Pi_J(y_1, y_2; z_1, z_2; w)} \quad \textbf{(3)}$$

where $R_J(\bullet)$ and $\Pi_J(\bullet)$ are continuous revenue and profit functions, respectively, estimated using data on joint producers only. Similar to the cost case, revenue or profit scope economies are determined to be present if $S_R^T(1,2) > 0$ or $S_\Pi^T(1,2) > 0$, respectively, and diseconomies are deemed present if these expressions are negative.

Importantly, revenue and profit scope economies as employed here are based on the alternative forms of the revenue and profit functions that take outputs y as exogenous and allow for price-setting behavior by the firms. It is assumed that firms have enough market power that joint producers and specialists can charge different prices that reflect differences in customer convenience (e.g., one-stop shopping) or other systematic differences in product quality or service intensity between the two types of firms. For our purposes, using the revenue and profit scope economies based on the alternative functions dominates economies based on the standard forms of the revenue and profit functions, which specify an output price vector p in place of the output quantity vector y. Economies based on the standard functions generally do not capture systematic differences in revenue between joint producers and specialists that reflect differences in customer satisfaction because the standard functions control for these differences with measured prices. We are not suggesting the standard functions are not useful, just that they are not useful for capturing the effects of differences in customer satisfaction between joint producers and specialists. For example, if customers pay higher prices to joint producers because of one-stop shopping convenience, this would be reflected in higher revenue and profit scope economies based on the alternative functions (all else equal), but would not affect economies based on the standard functions, which are evaluated at the same prices for both joint producers and specialists.

<u>The "Preferred" Approach to Measuring Scope Economies</u>

The “preferred” approach to estimating scope economies of financial institutions is distinguished by the use of cost, revenue, and profit functions that are estimated separately for joint producers and specialized firms. This is possible only when data are available on both types of institutions. This avoids the two main drawbacks of the traditional approach — extrapolating beyond the dense part of the data set and imposing the artificial assumption that specialists use the same technology as joint producers. By estimating separate functions for the two types of firms, the technologies that are dual to these functions are allowed to differ.

Further, we have separate data on the life insurance and P-L insurance operations of the joint producers because U.S. regulators require joint-producing insurers to report data on their life and P-L operations separately. As a result, we estimate separate cost, revenue, and profit functions for each set of operations without having to impose artificial assumptions on how each set of outputs and fixed netputs affect the production of the other set. In addition, we impose exclusion restrictions on the input prices that affect one set of operations and not the other set. Thus, our data set and preferred method may result in more accurate estimation of the cost, revenue, and profit functions for the joint producers, as well as removing the main drawbacks of the traditional approach.

For convenience, we refer to the aggregated data from the life insurance subsidiaries owned by a joint producer as the life insurance “division” or “division 1" with outputs y_1 and fixed netputs z_1 and similarly for P-L “division 2" with outputs y_2 and fixed netputs z_2. We use the cost functions to illustrate our use of separate functions for joint producers and specialists and separate functions by division for the joint producers. Let:

$C_{S1}(y_1; z_1; w_1)$ be the cost function for firms specializing in y_1 and z_1;

$C_{S2}(y_2; z_2; w_2)$ be the cost function for firms specializing in y_2 and z_2;

$C_{J1}(y_1, y_2; z_1, z_2; w_1)$ be the cost function for division 1 for joint producers; and

$C_{J2}(y_1, y_2; z_1, z_2; w_2)$ be the cost function for division 2 for joint producers;

where w_1 and w_2 are the vectors of input prices relevant to the specialists, which are subsets of w, but may have common elements. The cost functions for the specialists, $C_{S1}(\bullet)$ and $C_{S2}(\bullet)$, exclude the outputs, fixed netputs, and input prices that apply only to the other specialty, as these are irrelevant to a specialist. The cost functions for each of the divisions of the joint producers, $C_{J1}(\bullet)$ and $C_{J2}(\bullet)$, also exclude the irrelevant input prices, but do each specify all of the outputs and fixed netputs, so that they can affect the costs of the other division. The functions for the specialists $C_{S1}(\bullet)$ and $C_{S2}(\bullet)$ are free to have completely different parameters from the functions for the joint producers, $C_{J1}(\bullet)$ and $C_{J2}(\bullet)$, which avoids the problem of extrapolation and allows for the possibility (or likelihood) that the specialists use different technologies than the joint producers.

The use of separate functions by division for the joint producers, $C_{J1}(\bullet)$ and $C_{J2}(\bullet)$, allows the outputs and fixed netputs of each product line to differentially influence the costs of each division without artificially imposing symmetry on these effects. This allows, for example, the possibility that additional production of the j[th] type of P-L insurance **reduces** the marginal costs of producing the i[th] type of life insurance, while additional production of the i[th] type of life insurance **raises** the marginal costs of the j[th] type of P-L insurance, i.e., $\partial^2 C_{J1}/\partial y_{1i}\partial y_{2j} < 0$ and $\partial^2 C_{J2}/\partial y_{1i}\partial y_{2j} > 0$. Under the traditional approach, symmetry is implicitly imposed and these marginal effects are restricted to be identical because there is a single cost function for joint producers, $C_J(\bullet)$, with a single cross-derivative, $\partial^2 C_J/\partial y_{1i}\partial y_{2j}$. Similarly, the traditional approach imposes symmetry on the marginal effects of each fixed netput on the marginal costs of each output and fixed netput of the other division and the marginal effects of the outputs and fixed netputs of the other division and the marginal costs of the fixed netput. These effects are free to differ in the preferred approach.

The "preferred" measure of cost scope economies is given by:

$$S_C^P(1,2) = \frac{C_{S1}(y_1;z_1;w_1) + C_{S2}(y_2;z_2;w_2) - C_{J1}(y_1,y_2;z_1,z_2;w_1) - C_{J2}(y_1,y_2;z_1,z_2;w_2)}{C_{J1}(y_1,y_2;z_1,z_2;w_1) + C_{J2}(y_1,y_2;z_1,z_2;w_2)} \quad \textbf{(4)}$$

which contrasts with the traditional measure, equation (1). As shown by comparing equations (1) and (4), the preferred method differs by using separate unrestricted estimations of specialist cost functions in place of extrapolation from joint production [i.e., $C_{S1}(y_1; z_1; w_1)$ and $C_{S2}(y_2; z_2; w_2)$ in place of $C_J(y_1, 0; z_1, 0; w)$ and $C_J(0, y_2; 0, z_2; w)$, respectively], and by using separate unrestricted functions by division for joint producers in place of a single function [i.e., $C_{J1}(y_1, y_2; z_1, z_2; w_1) + C_{J2}(y_1, y_2; z_1, z_2; w_2)$ in place of $C_J(y_1, y_2; z_1, z_2; w)$].

The preferred measures of revenue and profit scope economies are given by:

$$S_R^P(1,2) = \frac{R_{J1}(y_1,y_2;z_1,z_2;w_1) + R_{J2}(y_1,y_2;z_1,z_2;w_2) - R_{S1}(y_1;z_1;w_1) - R_{S2}(y_2;z_2;w_2)}{R_{J1}(y_1,y_2;z_1,z_2;w_1) + R_{J2}(y_1,y_2;z_1,z_2;w_2)} \quad \textbf{(5)}$$

and

$$S_\Pi^P(1,2) = \frac{\Pi_{J1}(y_1,y_2;z_1,z_2;w_1) + \Pi_{J2}(y_1,y_2;z_1,z_2;w_2) - \Pi_{S1}(y_1;z_1;w_1) - \Pi_{S2}(y_2;z_2;w_2)}{\Pi_{J1}(y_1,y_2;z_1,z_2;w_1) + \Pi_{J2}(y_1,y_2;z_1,z_2;w_2)} \quad \textbf{(6)}$$

where the preferred $R(\bullet)$ and $\Pi(\bullet)$ functions are derived analogously to the preferred $C(\bullet)$ functions.

Comparing the Traditional and Preferred Approaches

To compare the traditional and preferred approaches and to try to determine how each of these differences in assumptions and methods affect the results, we calculate scope economies four different ways. For convenience, we illustrate below the four methods for cost scope economies alone, but the revenue and profit economies are measured analogously:

Preferred	Uses separate functions for 1) life costs for joint producers, 2) P-L costs for joint producers, 3) total costs for life specialists, and 4) total costs for P-L specialists.
Traditional	Uses a single function for total life plus P-L costs for joint producers. Specialist data and cost functions are excluded.
Specialists excluded	Uses separate functions for 1) life costs for joint producers, and 2) P-L costs for joint producers. Specialist data and cost functions are excluded.
Single joint function	Uses separate functions for 1) total life plus P-L costs for joint producers, 2) total costs for life specialists, and 3) total costs for P-L specialists.

Comparing the scope economies from the preferred and traditional approaches yields the full effects of the differences between the approaches. The two intermediate cases each impose just one of the two main assumptions of the traditional approach on the preferred approach to help see which of the assumptions explains the differences in results between the approaches. If there is a substantial difference between the preferred approach estimates and the "Specialists excluded" estimates, this would suggest that the data violate the assumption that specialists use the same technology as joint producers, since the two estimations differ only in whether the specialist data and cost functions are included. Similarly, if there is a substantial difference between the preferred approach estimates and the "Single joint function" estimates, this would suggest that the data violate the assumption that a single set of parameters characterizes the cost properties of both life and P-L insurance for joint producers, since the two estimations differ only in whether single versus separate functions are specified for life and P-L costs for the joint producers.

Functional Forms for the Cost, Revenue, and Profit Functions

Early studies of scope economies used the translog functional form to estimate the cost function. However, this functional form is not well suited for scope economy estimation because it does not allow zero values for outputs and fixed netputs. As a result of this problem and the extrapolation problem described above, some studies of scope economies have proxied for specialized production using output levels close to zero or within the limits of the available data set. Unfortunately, the translog is not well behaved in regions around zero, and scope economy estimates have been shown to vary widely depending upon the value chosen to represent specialized production (Berger, Hanweck, and Humphrey 1987, Röller 1990). Some researchers have used the Box-Cox functional form (which admits the translog as a limiting case), but have often found the Box-Cox parameters to be close to the translog, yielding similar difficulties for evaluating near zero output (e.g., Pulley and Humphrey 1993). Baumol, Panzar, and Willig (1982) suggested a quadratic functional form for outputs and a separable function for input prices, but this form does not allow for interactions between outputs and prices.

Fortunately, a functional form has been developed that admits zero values for outputs but does not impose separability between outputs and input prices. This is the **composite functional form** of Pulley and Braunstein (1992). This form has been applied to study bank cost scope economies (Pulley and Humphrey 1993, McKillop, Glass, and Morikawa 1996) and bank revenue scope economies (Berger, Humphrey, and Pulley 1996). We adopt a modified version of the composite form.

The composite function combines a quadratic structure for outputs and fixed netputs with a log-quadratic component for input prices, with interaction terms so that separability is not imposed. Assuming n outputs, y_i=1,...,n; r fixed netputs, z_j, j=1,...,r; m input prices, w_k, k=1,...,m; and T time periods, we specify:

$$\frac{C}{z_r w_m} = \left[\sum_{t=1}^{T} \alpha_t D_t + \sum_{i=1}^{n+r-1} \beta_i q_i + \sum_{i=1}^{n+r-1} \sum_{j=1}^{n+r-1} \beta_{ij} q_i q_j + \sum_{i=1}^{n+r-1} \sum_{k=1}^{m-1} \delta_{ik} q_i v_k\right] \bullet \exp\left(\sum_{k=1}^{m-1} \gamma_k v_k + \frac{1}{2} \sum_{k=1}^{m-1} \sum_{l=1}^{m-1} \gamma_{kl} v_k v_l\right) + \epsilon \tag{7}$$

where C = costs,

D_t = dummy for year t (needed for our pooled sample, see below);

$q_i = y_i/z_r$ = ith output divided by the last fixed netput, i=1,...,n;

$q_i = z_{i-n}/z_r$ = first r-1 fixed netputs divided by the last fixed netput, i=n+1,...,n+r-1;

$v_k = \ln(w_k/w_m)$ = natural log of first m-1 input prices divided by last input price, k=1,...,m-1;

α, β, δ, γ = coefficient vectors to be estimated; and

ϵ = a random error term.

The alternative revenue and profit functions are identical to the cost function, except that the numerator of the dependent variable is replaced by revenues or profits. That is, the dependent variable becomes $R/(z_r w_m)$ or $\Pi/(z_r w_m)$, where R = revenues and Π = profits.[5] The use of the same form and independent variables for the cost, revenue, and profit functions assures that our estimates of cost, revenue, and scope economies are not confounded by differences in specification. The composite cost, revenue, and profit functions are estimated using non-linear least squares.

We normalize the dependent variables of the cost, revenue, and profit functions by the quantity of the last fixed netput (z_r) and the price of the last input (w_m). We also normalize all the output terms and the first r-1 fixed netput terms by z_r, and we normalize the first m-1 input prices by w_m. As discussed below, z_r is equity capital and w_m is the price of business services.

The normalization by equity capital, z_r, is designed to 1) help control for heteroskedasticity, 2) help reduce scale biases in estimation, and 3) give the models more economic interpretation. With regard to heteroskedasticity, large firms would have random errors with much larger variances in the absence of the normalization since the costs, revenues, and profits of the largest firms are many times larger than those of the smallest firms. With regard to scale biases, large firms will tend to have much higher costs, revenues, and profits than small firms could achieve in the short run because large firms' capital and assets have been built up over decades. However, small firms can easily achieve our normalized ratios in the short term. With regard to economic meaning, the normalization by equity makes the dependent variables, particularly the profit dependent variable, closer to the goals of the firm. The expression $\Pi/(z_r w_m)$ is essentially the return on equity normalized by an input price, or a measure of how well the firm is employing its scarce financial capital. In addition, because one of our fixed netputs is reserves (the principal liability item for insurers), normalization by equity provides a control for financial leverage.

The normalization by w_m imposes linear homogeneity in the input prices, a necessary condition for the cost function (i.e., costs double if all input prices double). Linear homogeneity is not necessary for the alternative revenue and profit functions, but we impose this condition for two reasons. First, this keeps the specification the same for the cost, revenue, and profit equations, so that our scope economy estimates are not confounded by

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[5]The composite function also has the advantage of allowing for zero or negative values of the dependent variable, which occur frequently in the case of profits.

specification differences. Second, output prices generally move with input prices, so it is reasonable to assume that if all input prices double, output prices would double, as would profits and revenues.

The specification of outputs, y_i, fixed netputs, z_j, and input prices, w_k, vary somewhat, depending upon whether the function is for joint producers versus specialists. The functions for joint producers include all of the output and fixed netput variables, whereas the functions for the specialists do not include the outputs or fixed netputs for the other specialty. The specification for the joint producers also depend upon whether a single function versus separate functions is specified. In the single function specification, the equity capital fixed netput is combined into a single fixed netput, z_r, for normalizing the cost, revenue, or profit function, whereas in the separate functions specification, the equity capital of the relevant insurance division is used for normalizing.

Data Sample

Our data sources are the National Association of Insurance Commissioners (NAIC) database for life insurers and the A.M. Best Company database for P-L insurers for 1988-1992. The data in both sources are from annual regulatory statements filed with the NAIC.

We include only firms that remained as either joint producers or specialists for the full five years in order to investigate the issue of long-run coexistence. Firms that changed status or entered or exited the market are excluded. Such firms may have problems of interpretation because of short-term disruption costs, or sample selection biases because firms that choose to change strategy may not be representative of the long-term benefits and costs of maintaining one of the strategies. Extremely small firms (less than $10 million in real -valued assets in any year), firms with zero or negative net worth or premiums, or unusually high or low values for key operating statistics also are excluded because such firms are unlikely to be in or near long-term equilibrium.

Firms in our sample that are under common ownership are aggregated to the group level and treated as a single producer. All joint producers are organized under the group ownership form by regulation, as are many of the life and P-L specialists. As noted, we do not mix the data of the life and P-L divisions of the joint producers, but we do aggregate the data of each group's life and P-L members separately to obtain the divisional totals. Our sample contains 111 joint producers, 293 life specialists, and 280 P-L specialists, together accounting for about 72 percent of industry assets.

Variables

The sample period averages for the variables used in our analysis are shown in Table 2 for joint producers and specialists. All financial values are adjusted to millions of constant 1982 dollars using the Consumer Price Index (CPI). The asterisks in the column labeled "test stat" show that most of the means are statistically significantly between joint producers and specialists.

Dependent Variables. Costs are defined as insurer operating expenses, including marketing, underwriting, and administrative costs.[6] Revenues include premium and investment income less losses and loss adjustment expenses, and may be thought of as being the mark-up over losses. As noted, these revenues may reflect systematic differences in product quality or service intensity that are valued by customers. Profits are defined as net income, which equals revenues minus costs. Revenues and profits are net of Federal income taxes.

Outputs and Fixed Netputs. Insurers are analogous to other financial service firms in that their outputs consist primarily of services which are difficult to measure and are paid for largely with foregone investment income. To define outputs, we use a modified version of the value-added approach, which counts as important outputs those that have significant value added based on operating cost allocations. Insurance output includes the risk-pooling and risk-bearing that helps customers diversify and manage their own risks, as well as real services related to insured losses, such as coverage design, loss prevention, and loss settlement services. Insurers also perform financial intermediation services by investing premium funds until losses are compensated.[7]

Different output proxies are used for life and P-L insurers, reflecting differences in the types of insurance and data availability. For P-L insurers, the present value of real losses incurred is used as a proxy for insurance output.[8] Losses are useful to represent the risk-pooling/risk-bearing function because this function involves collecting funds from everyone in the risk pool and redistributing it to policyholders that incur losses. Thus, losses represent the total amount redistributed by the pool. Losses are also highly correlated with real service

[6]Unlike other financial services firms, insurers do not report interest expense, so there is no explicit allowance in our variables for the cost of debt service. The borrowed funds of insurers consist of prepaid premiums and policy reserves for the payment of future claims. Both P-L and life insurers give implicit credit to policyholders for these borrowed funds by discounting expected loss cash flows when calculating premiums, and most life insurers also recognize investment income on policyholder funds by paying policyholder dividends. Thus, debt service costs are implicitly treated in our analysis as negative revenues.

[7]See Berger, Cummins, and Weiss (1997) and Cummins and Weiss (2000) for more details about insurance outputs and their measurement.

[8]Losses incurred are an accrual measure of the losses an insurer becomes liable for in a given year and equal losses paid plus reserves for losses that will eventually be paid for events occurring during the specified year. Some researchers have used premiums to measure insurance output. This is incorrect because premiums represent output price times output quantity rather than just quantity (see Yuengert 1993).

functions such as risk management services and providing legal defense in liability suits. Losses are reported at present value because claims settlement lags can be significant in lines such as liability insurance. We use two insurance outputs for P-L insurers — personal lines and commercial lines — because of the different characteristics of these lines in terms of the types of risks insured and services provided.

For life insurers, it is not possible to obtain meaningful present values based on publicly available data because of the complexity of life insurance products and limitations in information reported. We adopt a modified version of the approach used in the recent literature and define life insurance output as incurred benefits (e.g., Yuengert 1993, Cummins, Tennyson, and Weiss 1999). Incurred benefits represent payments received by policyholders in the current year and are useful proxies for the risk-pooling/risk-bearing function because they measure the amount of funds pooled and redistributed by insurers. Analogous to P-L insurance, we specify separate output variables for personal and commercial life insurance.

To proxy for the financial intermediation output, we include invested assets for life insurance and for P-L insurance. Both variables are used because there are significant differences between the asset portfolio composition of life and P-L insurers.[9]

We include life and P-L insurance reserves and equity capital as fixed netputs as additional controls for firm size and capital structure. These are treated as fixed because reserves and equity capital are built up over long periods of time and are difficult to change in the short-run. In addition, equity capital is partly determined by risk-based capital and other regulatory rules, with most insurers holding equity in excess of the amounts that would be optimal in the absence of regulation to provide a cushion against incurring regulatory costs.

Input Prices. Insurer inputs can be classified into three principal groups: labor, business services, and financial equity capital. Because physical capital represents a small proportion of total costs, we lump it together with business services. Separate labor input variables are used for life and P-L insurance.

The prices of labor are indices (1982 = 1) for wages for Standard Industrial Classification (SIC) class 6311 (Life Insurers) for life insurers, and for SIC class 6331 (Fire, Marine, and Casualty Insurers) for P-L

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[9]In addition to their invested assets, some life insurers also report "separate accounts," which are separately managed asset accounts for large business customers such as corporate pension plans. Separate accounts are not included in our analysis because they are administered separately from the insurer's normal operations, and because we do not have cost, revenue, and profit data on these accounts. We also exclude accounts receivable, the third major category of assets, from the intermediation variable, since the insurer does not have possession of the funds to perform any intermediation function.

insurers, both obtained from the U.S. Department of Labor. The business services price index (1982 =1) is from the U.S. Department of Commerce, Bureau of Economic Analysis.

Valuation Points

Most studies of financial institution scope economies evaluate the economies at a single point, the mean or median of the data set. However, as discussed above, scope economies may differ greatly depending upon the scale and product mix at the valuation point, so evaluation at a single point may give misleading results. To resolve this problem, we evaluate scope economies at several scale-product mix combinations and also include scale and product mix in our regression analysis (described below). We use the values at the first size quartile (Q1), the median, and the third size quartile (Q3) of each insurance output y_i, each fixed netput z_j, and each input price w_k, i.e., at the 25^{th}, 50^{th}, and 75^{th} percentiles of the data for these variables. These valuation points are based on all firms writing life insurance (joint producers and life specialists) for the life insurance variables, and are based on all firms writing P-L insurance (joint producers and P-L specialists) for the P-L variables. As a robustness check, we also evaluate scope economies at the quartiles and medians for the specializing firms only.

Regression Analysis

We also conduct a regression analysis of the determinants of scope economies and test whether a number firm characteristics are associated with greater or lesser scope economies. The dependent variables are cost, revenue, and profit scope economy estimates. The profit scope economy regressions have implications for distinguishing among the explanations for the long-term coexistence of joint producers and specialists, and determining when the conglomeration and strategic focus hypotheses hold. Under the first and third explanations for coexistence, profit scope economies should not vary greatly with firm characteristics. Under the first explanation (equal efficiency), all firms should be fairly close to no profit scope economies or diseconomies and neither hypothesis is valid. Under the third explanation (market imperfections), one of the hypotheses dominates and all firms should exhibit either profit scope economies or diseconomies. Only under the second explanation of coexistence (joint production more efficient for some firm types, specialization more efficient for others) should profit scope economies vary greatly. Such variance would support this explanation and suggest that the conglomeration hypothesis holds for some types of firms and the strategic focus hypothesis holds for other types.

Scope economy estimates for the joint producers are obtained by putting the exogenous variables for each of the joint producers for each of the years into the scope economy formulas using the preferred approach. Scope economy estimates for the specialists are formed by simulating mergers of every life insurance specialist with every P-L specialist in the same year, creating pro forma insurers.[10] Considering all possible firm pairings reduces the potential for bias by avoiding arbitrarily excluding ex ante some firm combinations that might be associated with scope economies or diseconomies.

There are potentially 555 observations for the joint producers (111 firms times 5 years) and 410,200 observations for the merged specialists (293 life insurers times 280 P-L insurers times 5 years). Some of the simulated firm observations were excluded because of missing values of regressors, because reinsurance is listed as the distribution system or the distribution system is unknown, or because the scope economy dependent variable was too extreme to be believable [$S_C^P(1,2)$, $S_R^P(1,2)$, or $S_\Pi^P(1,2) > 1$ or < -1]. The resulting data set used in the regressions totaled 457 joint firms and 259,126 merged specialists (these deletions apply only to the regression analysis, not to other analyses in this paper).[11] We run the regressions separately for the joint producers and merged specialists because of the likelihood that the exogenous variables will affect the scope economies of these two types of firms differently. Presumably, the scope economies/diseconomies potential has already influenced the choice to become a joint producer or specialist.

We advance several hypotheses about the relationship between scope economies and firm characteristics, and include variables in our regressions to test these hypotheses. First, we hypothesize that scope economies may vary with firm size. There may be cost scope economies at small scale from sharing some fixed resources such as offices or computers, but these economies may be exhausted for larger insurers or offset by problems of coordination and control. In contrast, large scale may be needed to generate revenue economies from consumption complementaries because of the need to maintain a large network of branch offices.

Second, we hypothesize that insurers emphasizing personal lines of business may be more likely to realize revenue and profit scope economies than those emphasizing commercial lines. Personal insurance buyers may be willing to pay more for one-stop shopping convenience, whereas commercial buyers face relatively trivial

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[10]The term pro forma insurer refers to the hypothetical firm that would be created by the merger of two insurers if the merged firm had the same outputs, fixed netputs, and input prices as the two separate insurers.

[11]To give an idea of the sources of the deletions of the merged specialists, we note that 42.2% of the deletions occurred because reinsurance is listed as the distribution system or the distribution system is unknown. Extreme values of profit scope economies (more than 100% in absolute value) accounted for 35.9% of the deletions. It seems reasonable to delete these observations from the regressions, which if taken literally, would imply that these specialists are predicted to earn negative profits [$S_\Pi^P(1,2) > 1$] or to have profits more than twice as high than if they had merged [$S_\Pi^P(1,2) < -1$]..

search costs and can easily deal directly with several different insurers.

Third, scope economies may be greater for vertically integrated firms than for non-vertically integrated firms because integrated firms can exploit shared resources at more points in the value chain. Vertically integrated insurers distribute their products through exclusive agents, direct marketing (using company employees), or mass marketing (mail and/or mass media advertising). Non-vertically integrated insurers distribute through independent agents who sell the products of multiple insurers. Vertically integrated insurers may "reuse" their relatively large investments in marketing and sales systems to sell both life and P-L insurance, creating cost scope economies. Vertically integrated firms also rely more heavily on brand names than non-integrated insurers, which may create revenue scope economies. Revenue scope economies may also be less likely for non-integrated insurers because the independent agents themselves can create virtual insurance supermarkets by offering life and P-L products from different insurers.

Fourth, scope economies may be related to X-efficiency, although we do not have a clear prediction of the direction of the relationship. On the one hand, managers with the ability to achieve high levels of X-efficiency may be better able to realize economies of scope, yielding a positive relationship between efficiency and scope economies. On the other hand, efficient managers may have less need to expand into other products to improve performance because they are already outperforming their competitors.

Fifth, scope economies may be related to risk. Risk-sensitive policyholders or other creditors may be willing to pay more to or accept lower services from a joint producer in return for reduced default risk, creating revenue or cost economies, respectively. These scope economies from risk reduction are likely to be higher if the risks of the individual life and P-L divisions are high (high standard deviations of returns or low capital-to-asset ratios), giving more benefit from risk reduction; and if the covariances between the returns of the two divisions are low or (preferably) negative, giving a greater ability to reduce risks.

Sixth, we include dummies measuring organizational form — stock versus mutual ownership. These forms may be associated with different incentives with respect to costs, revenues, and profits and are often included in efficiency studies.

A few words are in order about correlations of the error terms in the scope economy regressions. The dependent variables are scope economy estimates, which are functions of the exogenous variables for the insurers and estimated coefficients from the cost, revenue, or profit functions. The scope economy estimates for a given insurer do **not** reflect the dependent variables or residuals from that insurer, except trivially to the extent that a single observation affects the coefficients. The error terms in the scope economy regressions may be correlated with other error terms in the same equation because the error terms embody estimation error from the same estimated coefficients of the cost, revenue, or profit functions. As a result of these correlations, the standard errors may be understated and the statistical significance may be overstated in the scope economy regressions. However, we do not expect these correlations to be large or the problems to be substantial. The scope economies appear to be dominated by differences due to variation in the exogenous variables from the cost, revenue, and profit functions, rather than the coefficient estimates from these functions. As shown below, our results range from large scope diseconomies to large scope economies, a variation which is not likely to be explained by estimation error in the cost, revenue, or profit function coefficients.

We do not expect heteroskedasticity to be a problem, since the scope economies reflect the relative predicted costs, revenues, or profits of specialists versus joint producers evaluated at different points, but do not reflect the costs, revenues, or profits of the individual firms at those points (except trivially). Nonetheless, to control for any heteroskedasticity, the significance tests reported in our regression models are based on White's corrected covariance matrices.

4. Results

We first present scope economies evaluated a number of different ways. We then analyze the regression results to determine which firm characteristics are associated with scope economies and diseconomies.

Scope Economy Estimates

The scope economy estimates are presented in Table 3, shown in percentage terms for expositional convenience. Each cost, revenue, and profit scope economy estimate is evaluated at the first quartile (Q1), the median, and the third quartile (Q3), i.e., at the 25^{th}, 50^{th}, and 75^{th} percentiles of the data. The table shows estimates based on the preferred approach, the traditional approach, and the two intermediate methods, Specialists excluded and Single joint function. Asterisks denote statistical significance based on standard errors obtained using the method in Mester (1987).

We first examine the results at the median for the preferred approach. The data show cost scope economies of 24.8%, revenue scope diseconomies of 19.5%, and profit scope economies of 3.6%. The cost scope economies and revenue scope diseconomies are both large in absolute value and statistically significant at the 1%

level, while the profit scope economies are quite small and are not significantly different from zero. The lack of profit scope economies at the sample median is consistent with either of our first two potential explanations of the coexistence of joint producers and specialists shown in Table 1. Joint production and specialization may be approximately equally efficient and neither the conglomeration nor the strategic focus hypotheses may be valid. Alternatively, joint production may be more efficient for some types of insurers and specialization more efficient for others, so that each hypothesis is valid for some types of firms. This may occur if there are scope economies or diseconomies for firms with different characteristics that are not revealed at the industry median, a possibility we examine below. Finally, the lack of measured profit scope economies at the median is **not** consistent with the third explanation of the empirical puzzle — that either joint production or specialization is substantially more efficient, so that one of the hypotheses is globally dominant and market imperfections allow firms choosing the inefficient strategy to survive.

The findings of large, statistically significant cost scope economies and revenue scope diseconomies are also of independent interest. The finding of cost scope economies likely reflects production complementarities in view of the fact that shared resources such as computer systems, investment departments, databases, and managerial expertise are reasonably generic and thus should be exploitable by both lines of business. These shared resources may create cost scope economies, at least for insurers that are too small to fully utilize these resources in specialized production. Specialists may also tend to incur more costs than joint producers for the purpose of providing higher quality services for which they are recompensed with higher revenues.

The finding of revenue diseconomies suggests that some customers may prefer and pay more for the services of a specialist, who can better tailor insurance products to their individual needs. This interpretation is consistent with conventional wisdom in the insurance industry that the characteristics needed to be a successful life insurance agent are very different from those needed to succeed in P-L insurance. As well, the contracts and underwriting characteristics of the two types of insurance also differ significantly. These results support our contention that focusing on cost economies or revenue economies alone may yield misleading conclusions.

Much of the remainder of the empirical analysis will be devoted to distinguishing between the first and second explanations of the coexistence of joint producers and specialists by seeing if scope economies differ substantially by type of firm. We look next at the scope economies for different sizes of insurer. Based on the results for the preferred approach, there are estimated cost scope economies of 66.6% at Q1, 24.8% at the median, and 8.8% at Q3, all of which are statistically significant. The inverse relationship between insurer size and cost scope economies is not surprising. As discussed earlier, it is likely that small firms would more often need to share some fixed resources to be efficient. The preferred approach results also show revenue scope diseconomies of 50.9% at Q1, 19.5% at the median, and 2.0% at Q3. The latter figure is neither economically nor statistically significant, suggesting that for large insurers, there are essentially no revenue diseconomies.

These data suggest that small and medium-sized insurers may be able to provide high quality, tailored insurance policies on a convenient basis for only life or P-L products, but not both together. In contrast, large insurers may be able to achieve a scale in which they can provide high quality varieties of both types of insurance or can maintain large enough networks of agents and offices that provide convenience to offset problems in tailoring insurance products, avoiding revenue diseconomies of scope. The data show no significant profit scope economies or diseconomies for small and medium-sized insurers, but do show statistically significant profit scope economies of 34.9% for large firms. That is, the large firms benefit from the modest cost scope economies but do not suffer from revenue scope diseconomies, yielding profit scope economies. The findings are consistent with the second potential explanation of the long-term coexistence of joint producers and specialists — conglomeration may be the more efficient strategy for at least some types of large insurers, but may not be more efficient for small and medium-sized insurers.[12] The regression analysis below examines the effects of insurer size and other firm characteristics more carefully to try to separate out these effects.

The second row of Table 3 shows economies computed by the traditional approach, which uses a single cost, revenue, or profit function for joint producers and excludes the data and functions for specialists. The estimates suggest that the traditional method may yield very misleading findings. This method shows substantial profit scope diseconomies for all sizes of firms (two of the three estimates are statistically significant), as opposed to no significant profit economies or diseconomies for small and medium-sized insurers and statistically significant diseconomies for large insurers. The cost and revenue scope economy estimates differ greatly as well.

The remaining two rows of Table 3 show the two intermediate cases between the preferred and traditional approaches. The scope economy estimates for the "Specialists excluded" case shows some quite striking differences from the preferred approach estimates. For instance, this intermediate case shows no evidence of the

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[12]The cost, revenue, and profit scope economy results were robust to basing the valuation points on the distributions of outputs and fixed netputs for the specializing firms, rather than all the firms writing the associated type of insurance.

strong revenue scope diseconomies found in the preferred approach. This suggests that the data violate the assumption of the traditional approach that specialists use the same technology as joint producers, since exclusion of the specialist cost, revenue, and profit functions is the only methodological difference in this case. In contrast, the estimates for the "Single joint function" case in the last row of the table generally give similar conclusions to the preferred case shown in the first row — cost scope economies offset by revenue scope diseconomies to yield essentially no profit economies or diseconomies (although there are some differences in magnitudes). These findings suggest that the assumption of the traditional approach that a single function that imposes symmetry characterizes total costs, revenues, or profits of both life and P-L divisions of joint producers does not matter as much to the findings as the same-technology assumption for joint producers and specialists.

The scope economies shown in Table 3 are expressed in their most natural individual units of measurement — the percents of costs, revenues, or profits gained from joint production. However, the cost, revenue, and profit economy estimates are not directly comparable because they are expressed in terms of different denominators. In particular, the profit denominator for profit scope economies is much smaller than the cost and revenue denominators for cost and revenue economies. To make these economies comparable, we also compute the cost savings and revenue gains from joint production in terms of the profits of a joint producer, i.e., using the profit scope economies denominator. Using the preferred approach, the cost savings from joint production are 284.6%, 133.2%, and 32.4% of profits, respectively, evaluated at Q1, the median, and Q3, and the corresponding revenue gains in terms of profits are -277.6%, -125.6%, and -9.2% (results for the traditional and intermediate methods are available from the authors). The cost and revenue economies and diseconomies are much larger when measured this way, exceeding profits in some cases. Nonetheless, they still yield the same basic conclusions as the more conventional measures shown in Table 3. Cost scope economies are approximately offset by revenue scope diseconomies for small and medium-sized insurers, as represented by Q1 and the median. Again, the cost economies and revenue diseconomies become smaller for large insurers, as represented by Q3, with the revenue diseconomies becoming much smaller, implying profit scope economies for these large firms.[13]

We also re-estimate scope economies using the "thick frontier" method, which uses the most X-efficient

[13]Notably, the cost and revenue figures do not sum precisely to the "preferred" profit scope economies shown in Table 3 because the cost, revenue, and profit scope economies are each measured from separate nonlinear functions that are not constrained to match one another, although the separate treatment of costs and revenues does yield the same qualitative conclusions as the profit scope economy measure.

50% of the firms in each size class based on the residuals from our main cost, revenue, and profit functions, respectively (Berger and Humphrey 1991).[14] Others have used this method to ascertain the relationship between X-efficiency and scope economies (e.g., Berger and Humphrey 1991, Mester 1993, Berger, et al. 1996), although we believe that our regression analysis which controls for many other factors is a better way to assess this relationship. The thick frontier results (not shown in tables) do show some differences from the main results – smaller cost and profit scope economies for X-efficient insurers than for the full sample. However, the main conclusion is supported. The profit scope economies are heterogenous, consistent with the second potential explanation of the coexistence of joint producers and specialists, supporting the notion that the conglomeration hypothesis is valid for some types of firm and the strategic focus hypothesis is valid for other types.

Regression Results

As discussed above, we regress scope economy estimates on a number of firm characteristics to test some of the determinants of scope economies and to examine whether the conglomeration and strategic focus hypotheses apply to all firms, some types of firms, or no firms. Table 4 shows the results for cost, revenue, and profit scope economies for the simulated merged firms formed from combining the specialists, and Table 5 shows the results for the joint producers. For expositional ease and brevity, we concentrate primarily on Table 4, and then discuss how the results in Table 5 differ.

The first variable shown in Table 4 is the natural logarithm of insurance output, a measure of firm size. The coefficient on Ln(Insurance Output) is negative and significant in the cost scope economy equation and positive and significant in the revenue and profit scope economy equations. These findings are consistent with the results shown in Table 3 for scope economies evaluated at Q1, the median, and Q3, where there were no controls for other factors. As above, these findings suggest that small firms obtain the most benefits of sharing inputs to reduce joint costs, large firms are best able to maintain networks that provide convenience in providing products jointly, and that on net, there may be a profitability benefit to joint production for the largest insurers.

We next consider product mix. Three variables are included to represent the firms' emphasis on lines of business – the percentages of total insurance output in life personal lines, P-L personal lines, and P-L commercial lines. The omitted percentage (which would add up to 100%) is life commercial lines. As discussed,

[14]We use the most X-efficient 50% of firms rather than the more common 25% to have enough degrees of freedom to re-estimate reliably the cost, revenue, and profit functions.

we hypothesize that insurers emphasizing personal lines may be more likely to realize revenue and profit scope economies because personal insurance buyers may be willing to pay more for one-stop shopping convenience, whereas commercial buyers may be more interested in tailored specialized services. The results in Table 4 are consistent with this hypothesis. In the revenue and profit economies equations, the coefficients on Life Personal Output % and P-L Personal Output % are positive and statistically significant, and the coefficient on P-L Commercial Output % is negative and significant, consistent with one-stop shopping benefits being higher for firms emphasizing personal insurance lines. Interestingly, the coefficients in the cost economies equation have the opposite signs, suggesting that the revenue benefits from conglomeration for personal lines firms are partially offset by higher costs.

The effects of distribution systems are captured in four dummy variables — Life Exclusive Agent, Life Direct Marketing, Life Mass Marketing, and P-L Vertical Integration. The first three are types of vertically integrated distribution systems for life insurers, and the last one represents all types of vertical distribution systems for P-L insurance. As explained in the notes to Tables 4 and 5, we aggregate the two types of vertically integrated systems for P-L insurance, as they do not differ greatly. Non-integrated distribution systems, i.e., distribution through independent agents, are the omitted categories. As discussed, we expect that insurers using vertically integrated distribution systems are more likely to realize scope economies than those using non-integrated systems because of the reuse of marketing and sales systems, the development of brand names brought about by the marketing and sales systems, and the fact that the independent agents that distribute insurance for non-integrated insurers can create their own virtual insurance supermarkets without need for conglomeration. Most, but not all of the results in Table 4 are consistent with these expectations. All four of the coefficients on the vertical distribution variables in the cost and profit economies equations are positive and statistically significant, although the coefficients in the revenue economies equation are mixed.

Measures of the X-efficiency of the life and P-L insurance divisions are included, cost X-efficiency in the cost scope economy regression, revenue X-efficiency in the revenue scope economy regression, and profit X-efficiency in the profit economy regression. As above, we do not have a clear prediction for these variables, and the results here are mixed. The results suggest that X-efficient firms have more cost and profit scope economies, but less revenue scope economies.

The results for the risk variables are also mixed. As discussed, we expect firms with higher standard deviations and lower capital-to-asset ratios for their life and P-L operations and lower covariances between the two divisions to have more to gain from conglomeration. The standard deviations in the revenue and profit scope economy regressions and the covariance in the cost scope economy equation are consistent with the hypothesis, but the other coefficients are not consistent with the hypothesis. In particular, the capital-to-asset ratio has a positive, statistically significant coefficient in all three scope economy regressions, contrary to expectations.

Finally, two organizational form variables are included to account for differences in incentives. We include dummy variables for the stock life insurance and stock P-L insurance organizational forms; mutual insurers are the omitted categories. The results show no consistent pattern for these variables.

The profit scope economy regression in Table 4 (but not the cost and revenue regressions) also helps distinguish among our main hypotheses. The finding of a number of large, statistically significant coefficients in the profit scope economies regression provides support for second explanation of the long-term coexistence of joint producers and specialists — that joint production is more efficient for some types of insurers, and specialization is more efficient for other types. These data also suggest the types of firms to which the conglomeration and strategic focus hypotheses are most likely to apply. In particular, the regression results, combined with the findings in Table 3 above, suggest that the conglomeration hypothesis more often applies to large insurers, those that emphasize personal lines of business, those using vertically integrated distribution systems, and those that are more profit X-efficient, all else held equal, while the strategic focus hypothesis more often applies to small insurers, those that emphasize commercial lines, those using non-integrated distribution systems, and those that are less profit X-efficient.

Table 5 shows the regression results for the joint producers. Here, we focus only on the most important equation, the profit scope economy regression. The results provided additional support for the second explanation of coexistence. Again, the results suggest that the conglomeration hypothesis more often applies to insurers that 1) are large, 2) emphasize personal lines, 3) use vertically integrated distribution systems, and 4) are relatively profit X-efficient, and vice versa for the strategic focus hypothesis. However, the results are less strong, with less statistical significance and two statistically insignificant coefficients with reversed signs on the vertical integration variables, presumably because of the smaller number of observations.

5. Conclusions

This paper provides evidence on the validity of the **conglomeration hypothesis** versus the **strategic**

focus hypothesis as applied to financial institutions. If the conglomeration hypothesis is valid, then it is value maximizing for individual firms to provide multiple types of financial services to take advantage of superior cost and/or revenue performance. In contrast, if the strategic focus hypothesis is valid, financial firms maximize value by providing one line of services, focusing on their area of core competence. This issue has strong policy relevance and research interest, given the recent merger waves in the financial services industry, the liberalization of financial product restrictions, and the globalization of financial service firms.

An important empirical fact is the long-term coexistence of financial service firms that follow a conglomeration strategy as well as firms that follow a focused managerial strategy. In our empirical application, we examine the U.S. insurance industry — where firms are legally allowed to offer both life insurance and property-liability (P-L) insurance under common ownership and management — and yet many large, successful firms have long chosen to provide either both types of insurance, just life insurance, or just P-L insurance.

We offer three potential explanations for the empirical puzzle of the coexistence of joint producers and specialists, with different implications for the validity of the conglomeration and strategic focus hypotheses:

1) joint production and specialization are approximately equally efficient, so neither hypothesis is valid,

2) joint production is more efficient for some types of firms, while specialization is more efficient for others, so the conglomeration hypothesis dominates for the former types, and the strategic focus hypothesis dominates for the latter types, or

3) one form of production is more efficient, but market imperfections allow firms choosing the other strategy to survive, in which case one of the hypotheses is globally valid, but not of primary importance in determining managerial strategy.

We distinguish among these alternatives using the concept of **profit scope economies**, which measures the relative efficiency of joint versus specialized production, taking both costs and revenues into account. A finding of no profit scope economies or diseconomies would support the first explanation, a finding of profit scope economies for some types of firms and diseconomies for other types would support the second explanation, and a finding of global profit scope economies or global diseconomies would support the third explanation.

The results suggest that substantial profit scope economies hold for some types of firms and substantial diseconomies hold for other types. This supports the second explanation of coexistence and suggests that the conglomeration hypothesis dominates for the former types, and the strategic focus hypothesis dominates for the latter types. In particular, the data suggest that the conglomeration hypothesis tends to apply more to insurers that are large, emphasize personal lines of business, use vertically integrated distribution systems, and are profit X-efficient, all else equal, while the strategic focus hypothesis tends to apply more to insurers that are small, emphasize commercial lines, use non-integrated distribution systems, and are profit X-inefficient.

We also estimate cost and revenue scope economies separately to determine the source of profit scope economies. We generally find cost scope economies and revenue scope diseconomies that tend to balance each other out in the profit scope economy measure, although the results again differ somewhat by type of firm. The cost economies are consistent with the sharing of inputs that may create lower costs for joint producers, especially at small scale. The revenue diseconomies are consistent with a greater ability of specialists to tailor products to their customers' needs, for which they are able to charge higher prices on average. These findings generally run counter to claims of large benefits from "one-stop shopping" convenience for customers, and suggest that the benefits from joint production tend to be on the cost side, rather than the revenue side. The results also suggest that cost economies or revenue economies alone may yield misleading conclusions, and support our choice to emphasize profit scope economies to distinguish between the hypotheses.

Additional methodological findings suggest that the commonly used "traditional" approach to measuring scope economies may give misleading results. This approach specifies a single cost, revenue, or profit function for joint producers and excludes the data and functions for specialists, implicitly imposing symmetry on the functions for the joint producers and assuming that joint producers and specialists use the same technology. Our "preferred" approach — which uses separate cost, revenue, or profit functions for the life and P-L divisions of joint producers and includes the data for specialists in their own functions — gives considerably different results from the traditional approach. Our investigation suggests that the main problem with the traditional approach may be that the data violate the assumption that specialists use the same technology as joint producers.

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Table 1

Relationships Among Profit Scope Economies, Explanations of Coexistence of Joint Producers and Specialists, and the Conglomeration and Strategic Focus Hypotheses

Profit Scope Economies	**Explanation of Coexistence**	**Valid Hypothesis**
No profit scope economies or diseconomies.	Joint and specialized production are equally efficient.	Neither hypothesis is valid.
Profit scope economies for some types of firms and diseconomies for others.	Joint production is more efficient for the first types of firms, specialized is more efficient for the other types.	Conglomeration hypothesis is valid for the first types of firm, strategic focus is valid for the other types.
Profit scope economies for all firms.	Joint production is more efficient, but specialists survive because of market imperfections.	Conglomeration hypothesis is valid.
Profit scope diseconomies for all firms.	Specialized production is more efficient, but joint producers survive because of market imperfections.	Strategic focus hypothesis is valid.

Table 2
Summary Statistics

	Joint Producers			Specialists	
Operating Performance	**Mean**	**Standard Deviation**	**Test Stat**	**Mean**	**Standard Deviation**
Life & P-LCosts	$779,846	$1,302,488	***	$60,710	$157,599
Life & P-L Revenues	$899,560	$1,427,274	***	$73,048	$190,406
Life & P-L Profits	$119,714	$234,436	***	$12,338	$47,034
Life Cost X-efficiency	33.7%	14.0%	***	56.7%	15.1%
P-L Cost X-efficiency	50.5%	12.3%	***	75.9%	14.4%
Life Revenue X-efficiency	24.5%	17.0%	***	39.5%	16.0%
P-L Revenue X-efficiency	54.7%	13.1%		54.6%	12.6%
Life Profit X-efficiency	18.2%	19.9%	***	26.4%	33.0%
P-L Profit X-efficiency	27.5%	32.1%		27.1%	25.1%
Outputs					
Life Personal Insurance	$86,040	$183,935	***	$13,087	$54,042
Life Commercial Insurance	$314,076	$946,562	***	$28,495	$127,857
P-L Personal Insurance	$405,205	$1,410,302	***	$9,226	$45,345
P-L Commercial Insurance	$348,713	$656,084	***	$18,535	$94,536
Life Assets	$4,102,469	$11,271,530	***	$622,996	$3,042,558
P-L Assets	$2,121,817	$4,137,740	***	$117,516	$584,109
Fixed Netputs					
Life Reserves	$3,588,017	$9,990,074	***	$555,369	$2,782,302
P-L Reserves	$1,717,221	$3,222,242	***	$85,271	$431,048
Life Equity Capital	$382,952	$836,594	***	$49,433	$205,933
P-L Equity Capital	$610,847	$1,431,545	***	$37,799	$238,477
Input Prices					
Life Labor	$1.56	$0.14		$1.56	$0.14
P-L Labor	$1.63	$0.14		$1.63	$0.14
Materials	$1.49	$0.10		$1.49	$0.10
Marketing and Organizational Characteristics					
Life Specialist	--	--		51.1%	50.0%
P-L Specialist	--	--		48.9%	50.0%
Life Personal Output Percent	10.2%	11.9%	***	27.3%	37.1%
P-L Commercial Output Percent	35.2%	26.5%	*	30.0%	40.4%
P-L Personal Output Percent	33.1%	28.2%	***	18.8%	32.5%
Life Commercial Output Percent	21.5%	26.1%		23.8%	34.7%
Life Agent Dummy	73.0%	44.5%	***	35.3%	47.8%
Life Direct Dummy	10.8%	31.1%	**	3.8%	19.2%
Life Mass Marketing	1.8%	13.3%		0.9%	9.3%
P-L Vertical Integration Dummy	37.5%	48.5%	***	11.2%	31.5%
Life Return on Equity (ROE)	10.2%	12.5%		10.2%	26.1%
P-L Return on Equity (ROE)	7.9%	14.9%		9.9%	15.4%
Life & P-L Equity to Life & P-L Assets	25.7%	13.1%		27.8%	18.8%
P-L Stock Dummy	56.8%	49.6%	***	25.4%	43.6%
Life Stock Dummy	91.9%	27.3%	***	34.2%	47.4%

Note: All monetary variables are deflated to 1982 dollars using the CPI and are expressed in millions. There are 111 joint producers, 293 life insurance specialists, and 280 property-liability specialists in the sample. The column "z-tests" provides the results of tests of the null hypothesis that the means of the variables are equal for joint producers and specialists. *** indicates rejection of null at 1% level, ** at the 5% level, and * at the 10% level.

Table 3
Cost, Revenue, and Profit Scope Economy Estimates: U.S. Insurance Industry

	Cost Scope Economies			Revenue Scope Economies			Profit Scope Economies		
Method	**Q1**	**Median**	**Q3**	**Q1**	**Median**	**Q3**	**Q1**	**Median**	**Q3**
Preferred	66.6% ***	24.8% ***	8.8% **	-50.9% ***	-19.5% ***	-2.0%	-9.6%	3.6%	34.9% ***
Traditional	-14.9%	-16.9% **	5.6%	-1.2%	5.4%	-10.6% **	-36.0%	-50.2% ***	-50.2% **
Specialists excluded	17.4%	2.3%	-1.4%	-2.0%	2.3%	3.3%	25.4% *	15.1%	9.2%
Single joint function	17.7% *	7.9% **	18.4% ***	-15.4% *	-7.7% **	-14.8% **	1.0%	-3.8%	3.5%

Note: NA = not applicable. The sample size used in estimating the joint cost, revenue, and profit functions is 555 (111 firms over 5 years). The sample size used in estimating the cost, revenue, and profit functions for life specialists is 1,465 (293 firms over 5 years), and the sample size for P/L specialists is 1,400 (280 firms over years). The valuation points for the life insurance variables are based on all firms writing life insurance (joint firms and life specialists) and the valuation points for the P/L variables are based on all firms writing P/L insurance (joint firms and P/L specialists).
*** = significant at the 1% level, ** = significant at the 5% level, * = significant at the 10% level.

Table 4
Scope Economy Regressions For Simulated Joint Firms
Dependent Variable: Scope Economies

Variable	Cost Scope Economies			Revenue Scope Economies			Profit Scope Economies		
	Coefficient	t-stat		Coefficient	t-stat		Coefficient	t-stat	
Intercept	0.8256	81.65	***	-0.9366	-100.91	***	-1.2971	-92.90	***
Ln(Insurance Output)	-0.0353	-81.91	***	0.0355	86.06	***	0.0605	97.69	***
Life Personal Output %	-1.3105	-188.00	***	1.0361	180.24	***	1.0480	113.02	***
P-L Commercial Output %	0.1923	42.77	***	-0.1931	-48.35	***	-0.3411	-55.13	***
P-L Personal Output %	-1.3656	-112.99	***	0.7466	80.29	***	0.8934	54.93	***
Life Exclusive Agent Dummy[1]	0.0489	31.47	***	-0.0274	-19.37	***	0.0180	7.37	***
Life Direct Marketing Dummy	0.0248	9.76	***	0.0405	17.28	***	0.1280	37.17	***
Life Mass Marketing Dummy	0.0207	6.56	***	0.0171	5.49	***	0.1506	29.29	***
P-L Vertical Integration Dummy	0.0315	23.62	***	-0.0022	-1.94	*	0.0733	35.94	***
Life X-efficiency	0.2750	54.48	***	-0.1369	-44.62	***	0.0106	3.37	***
P-L X-efficiency	0.2462	43.50	***	-0.0380	-10.79	***	0.0214	5.27	***
Life ROE Standard Deviation	-0.1934	-25.54	***	0.1578	23.64	***	0.3238	23.40	***
P-L ROE Standard Deviation	-0.2383	-25.35	***	0.1743	23.02	***	0.7993	52.91	***
Life & P-L ROE Covariance	-0.2842	-12.25	***	0.3151	15.20	***	0.9084	16.22	***
Capital to Asset Ratio	0.2508	338.25	***	0.0491	17.89	***	0.0074	1.46	
Life Stock Firm Dummy[2]	-0.0091	-8.22	***	0.0175	16.90	***	-0.0013	-0.77	
P-L Stock Firm Dummy	-0.0007	-0.68		-0.0034	-3.73	***	-0.0074	-4.46	***
Adjusted R^2	19.8%			19.7%			15.6%		

Note: Insurance Output is the sum of P-L Personal, P-L Commercial, Life Personal, and Life Commercial Insurance Outputs. Life Personal Output % = Life Personal Output/Insurance Output, P-L Commercial Output % = P-L Commercial Output/Insurance Output, P-L Personal Output % = P-L Personal Output /Insurance Output. The omitted category is Life Commercial Output %.

[1]Life insurance marketing is conducted through three vertically integrated systems: exclusive agents, direct marketing (company employees, and mass marketing (mail and mass media advertising). The omitted, non-vertically integrated, category for life insurance is independent agents. P-L insurers also use exclusive agents and direct marketing. However, there is less difference between exclusive agency and direct marketing than for life insurers and hence these two categories are combined for P-L companies and represented by the P-L vertical integration dummy variable. No firms in our sample use mass marketing for P-L insurance. The omitted P-L category is independent agents.

[2]We include dummy variables for life stock and P-L stock firms. In each case mutual insurers are the omitted category.

*** =significant at 1% **=significant at 5% *=significant at 10% , based on White's heteroskedasticity consistent covariance matrices.

Table 5
Scope Economy Regressions For Joint Firms
Dependent Variable: Scope Economies

	Cost Scope Economies			Revenue Scope Economies			Profit Scope Economies		
Variable	Coefficient	t-stat		Coefficient	t-stat		Coefficient	t-stat	
Intercept	0.0886	0.62		-0.1178	-0.77		-0.8232	-3.02	***
Ln(Insurance Output)	0.0303	5.19	***	-0.0102	-1.83	*	0.0314	3.02	***
Life Personal Output %	-0.6077	-1.92	**	0.9005	2.83	***	1.1468	3.26	***
P-L Commercial Output %	0.0505	0.57		0.0691	0.90		-0.1400	-0.94	
P-L Personal Output %	-0.6930	-3.65	***	0.5147	3.45	***	0.8662	2.29	**
Life Exclusive Agent Dummy[1]	-0.0078	-0.31		0.0252	1.14		-0.0331	-0.55	
Life Direct Marketing Dummy	-0.0474	-1.32		0.0693	2.36	**	0.1212	1.61	
Life Mass Marketing Dummy	-0.2035	-3.17	***	0.2499	4.47	***	0.2560	2.57	***
P-L Vertical Integration Dummy	0.0405	2.04	**	-0.0098	-0.56		-0.0148	-0.44	
Life X-efficiency	-0.3626	-5.67	***	0.1117	2.27	**	0.1084	1.48	
P-L X-efficiency	-0.3901	-4.42	***	0.0284	0.38		0.2010	3.77	***
Life ROE Standard Deviation	0.2798	1.50		-0.0098	-0.06		0.1516	0.39	
P-L ROE Standard Deviation	0.2444	1.25		-0.1615	-0.93		0.0172	0.04	
Life & P-L ROE Covariance	1.8627	1.80	*	-0.9177	-1.00		-1.3130	-0.68	
Capital to Asset Ratio	0.2751	2.11	**	-0.3354	-3.05	***	0.3775	2.58	***
Life Stock Firm Dummy[2]	0.0215	0.57		0.0084	0.24		-0.1806	-2.57	***
P-L Stock Firm Dummy	0.0169	0.80		-0.0303	-1.62		0.0153	0.40	
Adjusted R^2	29.7%			19.7%			15.4%		

Note: Insurance Output is the sum of P-L Personal, P-L Commercial, Life Personal, and Life Commercial Insurance Outputs. Life Personal Output % = Personal Output/Insurance Output, P-L Commercial Output % = P-L Commercial Output/Insurance Output, P-L Personal Output % = P-L Personal Output/Insurance Output. The omitted category is Life Commercial Output %.

[1]Life insurance marketing is conducted through three vertically integrated systems: exclusive agents, direct marketing (company employees), and mass marketing (mail and mass media advertising). The omitted, non-vertically integrated, category for life insurance marketing is independent agents. P-L insurers also use exclusive agents and direct marketing. However, there is less difference between between exclusive agency and direct marketing than for life insurers and hence these two categories are combined for P-L companies and represented by the P-L Vertical Integration Dummy variable. No firms in our sample use mass marketing for P-L insurance. The omitted P-L marketing category is independent agents.

[2]We include dummy variables for life stock and P-L stock firms. In each case mutual insurers are the omitted category.

[3]E_{yx} = elasticity of the dependent variable with respect to each independent variable, evaluated at sample means.

*** =significant at 1% **=significant at 5% *=significant at 10% , based on White's heteroskedasticity consistent covariance matrices.