Conglomeration Versus Strategic Focus:
Evidence from the Insurance Industry

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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.

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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 have 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 merger of Citicorp and Travelers into Citigroup created a financial institution with over $700 billion in assets that operates in over 100 nations, and provides commercial banking, wholesale and retail investment banking, life and property-liability insurance, as well as other financial services. Further liberalization in terms of the potential repeal or scaling back of the Glass-Steagall Act of 1933 remains an active policy issue.

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 in the long run. 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. This explanation of the empirical puzzle suggests that the conglomeration hypothesis dominates for some types of financial service providers and the strategic focus hypothesis dominates for other 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 firms using the inefficient strategy to survive.[1] This third explanation of the empirical puzzle suggests that either the conglomeration or strategic focus hypothesis is

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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).

empirically valid, but competitive forces are insufficient to compel firms to adopt the more efficient strategy.

We distinguish among these alternative explanations of why joint producers and specialists coexist and evaluate the empirical validity of the conglomeration and strategic focus hypotheses using the concept of **profit scope economies**, which measures the relative efficiency of joint versus specialized production, taking both costs and revenues into account. If there are no profit scope economies or diseconomies between life and P-L insurance, then the first potential 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 of the empirical puzzle (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. Table 1 shows the relationships among profit scope economies, explanations of the coexistence of joint producers and specialists, and the validity of the hypotheses.

The profit scope economies concept employed here, which is based on the alternative profit function, dominates the more commonly used concept of cost scope economies for the purposes of 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 revenue scope diseconomies because customers prefer to purchase from companies that specialize in the type of insurance they are purchasing and can better tailor products for them. Again, cost scope economies alone may give a misleading impression, whereas profit scope economies account for both cost and revenue differences between joint producers and specialists. For our purposes, profit scope economies based on the alternative profit function also dominate profit scope economies based on the standard profit function, which generally excludes the benefits of one-stop shopping or other differences in revenue between joint producers and specialists because it controls for output prices. In addition to estimating profit scope economies, we estimate cost and revenue scope economies separately. This allows us to determine the extent to which the profit economies or diseconomies derive from cost or revenue sources.

Our analysis also extends the literature on financial institutions scope economies in several ways. This is the first estimation of profit scope economies based on the alternative profit function using data from any industry to our knowledge, in spite of the advantages of this approach. The availability of data on firms that specialize in both life and P-L insurance as well as those that jointly produce both sets of products also allows us to improve upon the traditional econometric method for estimating scope economies. Our "preferred" method uses cost, revenue, and profit functions estimated using only data for firms specializing in one set of products to evaluate the performance of these specialists, and similarly uses only data on joint producers to evaluate the performance of joint producers. We believe that our preferred method of evaluating scope economies dominates the "traditional" method in which performance of hypothetical specializing firms is extrapolated from information on joint producers because of an absence of data on specialists. The preferred concept avoids the problem of extrapolating outside the available data and allows for the possibility — if not the likelihood — that joint producers and specialists use different technologies.

Our preferred method also uses separate cost, revenue, and profit functions for the life insurance and P-L insurance divisions for the joint producers. This allows for the exclusion of irrelevant input prices and allows the coefficients of these functions to vary freely without artificially imposing symmetry. That is, the preferred approach allows the marginal effects of P-L insurance on the marginal costs of life insurance to differ from the marginal effects of life insurance on the marginal costs of P-L insurance. We believe that this is superior to the "traditional" method in which there are no exclusion restrictions on input prices and symmetry is implicitly imposed by the specification of a single cost, revenue, or profit function for the joint producers. We compare the results of estimating scope economies using the preferred and traditional methods and find that the two approaches lead to dramatically different conclusions.

Finally, we further explore the hypothesis that scope economies are present for some types of firms but not others by conducting a regression analysis with scope economies as the dependent variable and firm characteristics as explanatory variables. We develop and test hypotheses regarding which types of insurance firms are most likely and least likely to realize scope economies.

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 the subset of those involved in M&As or spinoffs. Firms undergoing these changes may have problems of interpretation because of short-term disruption costs, or because of sample selection biases in which the 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.

The paper proceeds as follows. In Section 2 provides background material on the hypotheses and on scope economies as applied to the insurance industry. Section 3 presents our methodology, and Section 4 presents the empirical results. Section 5 concludes.

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

The debate about the conglomeration and strategic focus hypotheses is particularly relevant to the insurance industry. The industry is experiencing a wave of mergers and acquisitions involving insurers as well as other types of financial service firms that raises both regulatory and business strategy issues. Moreover, the long-term survival of joint producers and specialists in the industry enables us to provide tests of the alternative

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[2]Studies of M&As within the banking industry have yielded mixed results. Some studies found that after the announcement of U.S. bank mergers, the combined value of the two firms goes down (e.g., Hannan and Wolken 1989, Houston and Ryngaert 1994). 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 1998).

explanations for this coexistence outlined in Table 1. Finally, the presence of true specialist firms in the industry allows us to introduce a new methodology (our "preferred" approach) for estimating economies of scope.

Consolidation and Spinoff Activity

A conflict between the conglomeration and strategic focus strategies is evident within the insurance industry. 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 businesses, and series of spinoffs ensued. For example, during the 1980s American Express acquired a diverse range of firms in pursuit of the financial supermarket strategy, many of which were later spun off after incurring 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. Also during the 1990s, Transamerica divested its P-L insurance operations (TIG Holdings) and Xerox divested its P-L insurance subsidiary. 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]

Coexistence of Joint Producers and Specialists

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,

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[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.

Guardian Life, Massachusetts Mutual, and New York Life have specialized in life insurance, and Fireman's Fund, St. Paul, General Reinsurance, Selective Insurance Group, and W.R. Berkeley have specialized in P-L insurance. It is the coexistence of joint producers and specialists that allows us to use profit scope economies to test the conglomeration versus strategic focus hypotheses and to use our preferred method of estimating scope economies.

In our empirical application, we use data on both joint producers and specialists. We employ information on 111 firms providing both types of insurance, 293 firms specializing in life insurance, and 280 firms specializing in P-L insurance over the period 1988-1992.[4] Importantly, we include only firms that remained in the same joint production or specialization status for the full five years or longer. This allows us to investigate the issue of relatively long-run coexistence and to try to distinguish between the conglomeration and strategic focus hypotheses. Our sample accounts for about 72 percent of U.S. insurance industry assets over the period.

Potential Sources of Profit Scope Economies/Diseconomies in Insurance

Profit scope economies in insurance may derive from either cost or revenue sources. Cost scope 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 each other's customer data base at a lower cost than building and maintaining two data bases. 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. Some customers may be willing to pay more for the convenience of one-stop shopping for their life and P-L insurance needs. 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 services in return 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

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[4]For the purposes of this analysis, the life insurance industry and output includes health insurance. Generally, the life insurance output of these firms dominates, accounting for about 80% of life plus health insurance output.

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.

Importantly, measured cost and revenue 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 therefore may avoid misleading findings that would 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. Only by examining profit scope economies can these cost and revenue effects be balanced to determine whether conglomeration versus strategic focus is the superior strategy.[5]

As discussed above, joint production may be more efficient for some types of firms, while specialization may be more efficient for others. We hypothesize that scope economies differ with firm scale because scope economies have a scale component to them. For example, there may be cost scope economies at small scale, but not at large scale. Providing two sets of products may efficiently share some fixed resources such as offices or computer equipment, but these economies may be exhausted for larger insurers or offset by problems of systems integration or management coordination and control. Revenue scope economies may also vary with scale. Large scale may be needed to generate consumption complementaries because of the need to maintain a large network of agencies or claims adjustment offices to provide services to policyholders.

We also hypothesize that insurers emphasizing personal lines of business are more likely to realize profit scope economies than those emphasizing commercial lines. Personal insurance buyers may be willing to pay more for one-stop shopping convenience because their search and transactions costs are relatively high or because

[5]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).

they are willing to pay for the advice of an agent or financial advisor who is familiar with their entire insurance portfolio. Commercial buyers, in contrast, face relatively trivial search costs and are more sophisticated shoppers who can easily deal direct with several different insurers. Thus, in the commercial market, an insurer may be more successful in adopting a focused strategy of striving to be the best in providing either life or P-L rather than emphasizing a broader product range. We test below for differences in scope economies between insurers emphasizing personal versus commercial lines of business. If scope economies vary with both scale and product mix, joint producers and specialists may have chosen scale and product mix combinations where scope economies exist and do not exist, respectively.

We hypothesize that 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, including the agents, office staff, computer systems, etc., 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, providing a potential source of revenue scope economies. We test below for differences in scope economies between integrated and non-integrated insurers.

There also is likely to be a relationship between X-efficiency and scope economies. The technologies employed by relatively X-efficient firms may embody more or less production complementarities or other benefits from sharing inputs than the technologies employed by other firms. It is also possible that efficient managers can do reasonably well in either joint or specialized production, whereas one of these production options is particularly difficult for less efficient managers. We do not have a clear prediction regarding the expected relationship between X-efficiency and scope economies. 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 operating on or near the efficient frontier and outperforming their competitors. If the latter effect dominates, there may be an inverse relationship between X-efficiency and scope economies.

Finally, we expect scope economies to be related to risk. Risk-sensitive policyholders or other creditors may be willing to pay more (creating revenue scope economies) or accept lower services (creating cost scope economies) to a joint producer in return for reduced default risk. We hypothesize that the scope economy benefits from risk reduction associated with conglomeration are higher if the standard deviations of returns in the individual life and P-L divisions are high, i.e., if there is more risk to be diversified away through conglomeration. Similarly, we hypothesize that these scope economy benefits from conglomeration are higher if the covariances between the returns of the two divisions are low or (preferably) negative, i.e., if more of the risk can be diversified. Finally, we also expect a negative association between the capital-to-asset ratio and scope economies, i.e., that firms with greater leverage risk (lower capital-to-asset ratios) have more to gain from diversification that reduces other types of risk.

Empirical Literature on Scope Economies in Insurance and other Financial Services

A few prior studies have investigated cost economies of scope within the insurance industry, but we are unaware of any insurance studies using revenue or profit scope economies, despite the advantages of a more inclusive approach. In addition, we are unaware of any studies of economies between life insurance and P-L insurance, the two major categories in the industry.

Within the life insurance segment, 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.

There have been a number studies of cost scope economies in other financial service industries. Examples of studies of cost scope economies within banking, within savings and loans, or within the securities industry include Berger, Hanweck, and Humphrey (1987), Mester (1987,1993), Hunter, Timme, and Yang (1990), Berger and Humphrey (1991), Goldberg, Hanweck, Keenan, and Young (1991), Pulley and Humphrey (1993), Noulas, Miller, and Ray (1993), and Ferrier, Grosskopf, Hayes, and Yaisawarng (1993). Most of these studies found no substantial evidence of benefits from cost scope economies. A limitation of these studies is that they have only been used to 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, but again only to evaluate the economies of producing traditional banking products within the same institution. 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, which combines scale and product mix effects. These studies generally did not find consistent benefits of either joint production or specialization within the banking industry.

Our analysis extends the literature on scope economies in insurance and other financial services by being 1) the first to estimate profit scope economies based on the alternative profit function, 2) the first to use our preferred method of estimating scope economies that allows for the possibility that joint producers and specialists use different technologies, and 3) the first to examine economies between life and P-L insurers. We also 1) estimate cost and revenue scope economies to determine the source of the profit scope economies, 2) estimate scope economies using the traditional method to compare the results with those of our preferred method, and 3) use the thick frontier method to determine if scope economies differ for best-practice firms.

3. Methodology

In this section, we first discuss and compare the traditional and "preferred" approaches to measuring cost, revenue, and profit 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 our hypotheses about the types of firms most likely to realize scope economies.

The Traditional Approach to Measuring Scope Economies

Cost scope economies. Although our main concentration is on using profit scope economies to distinguish between the conglomeration and strategic focus hypotheses, we begin our discussion of methodology with cost scope economies, which is the most familiar application. Cost scope economies are defined as the proportional increase in costs from producing a given output by specialists versus a joint producer. This standard textbook definition applies to both the traditional and preferred approaches to measuring scope economies.

The traditional approach to estimating scope economies of financial institutions is distinguished by the use of 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 vector w. We separate the outputs into two sets, denoted by the vectors y_1 and y_2, and assume that the z vector may be similarly separated into the vectors z_1 and z_2 that correspond to these same output groups. 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:

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

where $C_J(\bullet)$ is a continuous cost function which is estimated using data on joint producers only, even though it is evaluated at the hypothetical specialized output points (y_1, 0; z_1, 0) and (0, y_2; 0, z_2) as well as at the joint output point (y_1, y_2; z_1, z_2). The point of evaluation is typically the sample mean or median of the data set. 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 such as (y_1, 0; z_1, 0) and (0, y_2; 0, z_2) usually requires considerable extrapolation beyond the dense part of the available data sets of joint producers. This out-of-sample extrapolation may lead to inaccurate evaluations of $C_J(y_1, 0; z_1, 0; w)$ and $C_J(0, y_2; 0, z_2; w)$, with resulting inaccurate measurement of $S_C^T(1,2)$.

The second, more important drawback of the traditional approach is that it 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, and software, etc. Consequently, estimating scope economies based on the assumption of a single technology may yield misleading results.

It seems especially inappropriate to impose the restriction of the same technology on specialists when testing whether the costs that are dual to that technology are higher or lower when output is shifted to these specialists. Presumably, 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.[6]

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:

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

and

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

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

[6]Most of the prior cost scope economy studies of insurance had data on specialists as well as joint producers, although they used the same continuous cost function to represent both types of firms. These studies avoid the first drawback of extrapolation, but still have the more important second drawback of imposing the assumption that specialists use the same technology as joint producers.

in product quality or service intensity between the two types of firms. In our analysis, we wish to allow for these systematic differences that customers value, but cannot be measured easily with available data sets.

For our purposes, revenue and profit scope economies based on the alternative functions dominate 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. For example, if customers pay 5 percent higher prices to joint producers because of one-stop shopping convenience, this would be reflected in higher values for revenue and profit scope economies based on the alternative functions (all else equal), but would not affect economies based on the standard function because the profits and revenues would be evaluated at the same prices for both joint producers and specialists.[7]

Note that the alternative revenue and profit functions, $R_J(\bullet)$ and $\Pi_J(\bullet)$, are based on the same y and w arguments as the cost function, $C_J(\bullet)$. Given that profits equal revenues less costs and the same functional form is used for all three functions, this implies that $\Pi_J(\bullet) = R_J(\bullet) - C_J(\bullet)$. Thus, profit scope economies will reflect both revenue and cost scope economies. However, $S_\Pi^T(1,2)$ is not an exact linear function of $S_R^T(1,2)$ and $S_C^T(1,2)$ because of the denominators of the three scope economy ratios are different. Generally, $S_\Pi^T(1,2)$ will be larger in absolute value than $S_R^T(1,2)$ or $S_C^T(1,2)$ because the profits denominator is much smaller than revenues or costs.

The "Preferred" Approach to Measuring Scope Economies

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 and letting all the parameters differ, the technologies that are dual to these functions are

[7]We are not suggesting the standard functions are not useful, but rather just that they are not useful for capturing the effects of differences in customer satisfaction between joint producers and specialists. For example, Berger, Hancock, and Humphrey (1993) used the standard profit function and found that joint production is optimal for most banks, but that specialization is optimal for others. However, the choice of optimal output was based on the technology that is dual to the standard profit function and the prices that were assumed to be exogenous, and not reflective of differences in customer satisfaction.

allowed to be quite different.

Further, we have separate data on the life insurance and P-L insurance operations of the joint producers. U.S. insurance regulations prohibit insurers from offering both life and P-L insurance from a single corporate entity, so that all joint producers report data on the variables used in the cost, revenue, and profit functions separately. However, these separate entities may be commonly owned and managed. As a result, we can 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 can 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 of using it may give 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 our use of 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. Note that 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. Note also that 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 each output and fixed netput can affect the costs of the producing the other set of products.

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 $C_{J2}(\bullet)$. This avoids the problem of extrapolation and allows for the possibility (or likelihood) that the specialists use different technologies than the joint producers (i.e., that the technologies that are dual to the C_S and C_J cost functions differ).

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. This would occur if $\partial^2 C_{J1}/\partial y_{1i}\partial y_{2j} < 0$ 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 value for the 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. Thus, our general formulation should significantly increase the ability of the models to detect any existing scope economies or diseconomies by not enforcing parameter restrictions between joint producers and specialists or between the life and P-L divisions of joint producers that may not accurately represent the production process.

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

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

which contrasts with the traditional measure, which is restated here for convenience as:

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

As shown, the preferred method measures the same theoretical construct of the costs of two specialists minus the cost of a joint producer divided by the cost of a joint producer, holding total output and input prices constant. However, 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 cost functions by division for the joint producers in place of a single cost 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:

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

and

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

where the preferred R(•) and Π(•) functions are derived analogously to the preferred C(•) functions.

Comparing the Traditional and Preferred Approaches

As discussed, the traditional and preferred approaches differ in terms of the whether separate cost, revenue, or profit data by division are used for the joint producers, and whether separate equations are also run for specialists. To compare these 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 four separate cost 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 cost function for total life plus P-L costs for joint producers. The specialist data and cost functions are excluded.

Separate functions (joint) - Specialists excluded — Uses two separate cost functions for 1) life costs for joint producers, and 2) P-L costs for joint producers. The specialist data and cost functions are excluded.

Single function (joint) - Specialists included — Uses three separate cost 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.

By comparing the scope economies from the preferred and traditional approaches, we may see the full effects of the differences in assumptions between the approaches. The two intermediate cases — "Separate functions (joint) - Specialists excluded" and "Single function (joint) - Specialists included" — change one assumption at a time to help see which of the assumptions explains the difference between the preferred and traditional approaches. For example, if there is a substantial difference between the preferred approach estimates and the "Separate functions (joint) - Specialists excluded" estimates, this would suggest that the data violate the implicit assumption of the traditional approach 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 or excluded. Similarly, if there is a substantial difference between the preferred approach estimates and the "Single function (joint) - Specialists included" estimates, this would suggest that the data violate the assumption of the traditional approach 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 cost 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 this purpose because it does not allow zero values for outputs and fixed netputs. As a result of this problem and the extrapolation problem described above, a number of studies of financial institution cost scope economies have used methods that do not require evaluation at zero output, but rather at 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 zero (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 specifying a quadratic functional form for outputs and a separable function for input prices, but this form does not allow for potential 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** developed by Pulley and Braunstein (1992). The composite 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 multiple outputs with a log-quadratic component for input prices, with price-output interaction terms so that separability is not imposed. Assuming n outputs, y_i=1,...,n; r fixed netputs (inputs or outputs), z_j, j=1,...,r; m input prices, w_k, k=1,...,m; and T time periods, our version of the composite cost function is given by:

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

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; and

ε = 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 $R/(z_r w_m)$ and $\Pi/(z_r w_m)$, respectively, for the alternative revenue and profit functions, where R = revenues and Π = profits. The composite function allows for zero outputs and fixed netputs, and interactions between these terms and the input price terms. 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. The use of the same form and independent variables for the cost, revenue, and profit functions also assures that our estimates of cost, revenue, and scope economies are not confounded by differences in specification.

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, since the costs, revenues, and profits of the largest firms are many times larger than those of the smallest firms, large firms undoubtedly would have random errors with much larger variances in the absence of the normalization. In contrast, firms of different sizes have ratios of costs, revenues, or profits to equity that typically vary only by a few-fold. 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. This is a necessary condition for the cost function, i.e., costs must 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, as noted, we wish to keep the specification for the revenue and profit equations the same as the form of the cost function, so that our scope economy estimates are not confounded by specification differences. Second, it seems likely that output prices would generally move with input prices, so it is reasonable to assume that if all input prices double, all 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) data base for life insurers and the A.M. Best Company data base 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 relatively long-run coexistence and distinguish between the conglomeration and strategic focus hypotheses. Firms that changed status or entered or exited the market were excluded from the sample. As discussed earlier, firms undergoing these changes may have problems of interpretation because of short-term disruption costs, or because of sample selection biases in which the firms that choose to change their 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 assets in any year), firms with zero or negative net worth or premiums, or unusually high or low values for key operating statistics also were excluded from the sample 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. Insurance regulation prohibits insurers from offering both life and P-L insurance from a single corporate entity, so that all joint producers are organized under the group ownership form, as are many of the life and P-L specialists. Because insurance groups file separate accounting statements with regulators for each insurer that is a member of the group, we do not need to allocate costs, revenues, equity, or any other variables between the life and P-L divisions of the groups but rather aggregate the data reported by the each group's life and P-L members, respectively, to obtain the divisional totals for the joint producers. As noted, 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. Because we use data from multiple years, all financial values are adjusted to millions of constant 1982 dollars using the Consumer Price Index (CPI).

Dependent Variables. Costs are defined as insurer operating expenses, including marketing, underwriting, and administrative costs.[8] 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.[9] Although we focus primarily on profit scope economies, the cost and revenue scope economies may provide some interesting insights into the sources of these economies, i.e., differences in production costs versus differences in customer satisfaction.

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.[10]

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

[8]Unlike banks and other type of 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 an 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 rather than being included in operating expenses. Insurers have little or no conventional financial debt on their regulatory financial statements. Publicly traded insurers, which represent a small subset of the total number of insurers, often issue financial debt through their holding companies. However, even for these firms, the financial debt does not appear on the statutory accounting statements.

[9]Federal income taxes are netted out of revenues and profits, i.e., taxes are treated as negative revenues rather than included in costs. This treatment is consistent with insurance accounting practices.

[10]See Berger, Cummins, and Weiss (1997) and Cummins and Weiss (1999) for more details about insurance outputs and their measurement.

output.[11] Losses are useful to represent the risk pooling/risk-bearing function because this function involves collecting money 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 functions such as risk management services and providing a 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 the types of information reported. We adopt a modified version of the approach used in the recent literature and define insurance output for life insurers 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. The two invested asset variables are used because there are significant differences between the asset portfolio composition of life and P-L insurers.[12]

As additional controls for firm size and capital structure, we also include life and P-L insurance reserves and equity capital as fixed netputs in the estimation equations. These variables are treated as fixed netputs because an insurer's reserves and equity capital are built up over a long period of time and are difficult to change

[11]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).

[12]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 separate 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.

in the short-run. In addition, the level of 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 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 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. Thus, evaluating scope economies at the mid-point of the data 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, which is 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 y_i, z_j, and w_k variables, and are based on all firms writing P-L insurance (joint producers and P-L specialists) for the P-L y_i, z_j, and w_k variables. As a robustness check, we also try basing all the y_i and z_j valuations on the quartiles and median for the specializing firms only.

Regression Method

We also conduct a regression analysis of the determinants of scope economies, testing a number of hypotheses about the characteristics of firms that may be associated with greater or lesser scope economies. As described above, there are reasons to expect scope economies to vary with firm size, emphasis on personal versus commercial insurance lines, insurance distribution system (vertically integrated versus non-integrated), X-efficiency, and risk. By using regression analysis, we can see the effect of each of these factors, holding the others constant statistically. As control variables, we include dummies measuring organizational form — stock versus mutual ownership — which may be associated with different incentives with respect to costs, revenues, and profits.

Importantly, the profit scope economy regressions have implications for the main issues examined in this study — distinguishing among alternative potential explanations of the long-term coexistence of joint producers and specialists, and determining the conditions, if any, under which the conglomeration and strategic focus hypotheses hold. Under the first and third explanations for coexistence, measured profit scope economies should not vary greatly with firm characteristics. Under the first explanation (equal efficiency), neither the conglomeration hypothesis nor the strategic focus hypothesis is valid and all firms should be fairly close to no profit scope economies or diseconomies. Under the third explanation (market imperfections), one of the hypotheses is dominant and all firms should exhibit profit scope economies or diseconomies. Only under the second explanation of coexistence (joint production more efficient for some types of firm, 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 is valid for other types.

The dependent variables in our regression analysis are cost, revenue, and profit scope economy estimates. Scope economy estimates for the joint producers are simply 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 with the full sample. 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.[13] The average of these estimates reflects the average economies that would be achieved by combining the specialists randomly — greater or lesser gains could be achieved by choosing the combinations systematically. 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), although some observations were excluded

[13]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.

because of missing values for some of the regressors, because reinsurance was listed as the distribution system, 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. 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 somewhat differently. Presumably, the potential for scope economies or diseconomies has already influenced the choice to become a joint producer or specialist.

4. Results

In this section, we first present cost, revenue, and profit scope economies evaluated a number of different ways. We then analyze the results of the regression analysis to determine which firm characteristics are associated with scope economies and diseconomies. Our approach significantly extends the usual analysis of economies of scope in financial institutions, which is limited to the presentation of scope economies calculated at the mean or median of the data.

Scope Economy Estimates

The scope economy estimates are presented in Table 3, shown in percentage terms for expositional convenience. The cost, revenue, and profit scope economies are displayed across the columns from left to right, respectively. Each economy estimate is evaluated at Q1, the median, and Q3, i.e., at the 25^{th}, 50^{th}, and 75^{th} percentiles of the data. The rows of the table show estimates based on the preferred approach, the traditional approach, and the two intermediate methodologies, Separate functions - Specialists included and Separate functions (joint) - Specialists excluded described above. Standard errors for all the scope economy estimates are obtained using the method presented in Mester (1987). The asterisks denote cases where the estimates are significantly different from zero at the 10% level (*), 5% level (**), and 1% level (***), based on two-sided tests.

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% at the sample median. 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 long term coexistence of joint producers and specialists shown in Table 1 above. It is consistent with the possibility that joint production and specialization are approximately equally efficient and that neither the conglomeration nor the strategic focus hypotheses is valid. The result is also consistent with the possibility that joint production is more efficient for some types of insurers and specialization is more efficient for others, and 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 that tend to balance each other out and result in no profit economies or diseconomies at the median are also of interest. The finding of cost scope economies is likely to reflect production complementarities in view of the fact that shared resources such as computer systems, investment departments, data bases, 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 of approximately the same amount as the extra costs. The finding of revenue diseconomies suggests that some types of customers may prefer and be willing to pay more for the services of a specialist, who can better tailor insurance products to their individual needs. This interpretation is consistent with the 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 differ significantly from each other. Importantly, these results support our contention that focusing on cost economies or revenue economies alone may yield very misleading conclusions about the relative efficiency of joint and specialized production, and support our choice of profit economies to distinguish between the hypotheses.

Much of the remainder of the empirical analysis will be devoted to distinguishing between the first and second explanations of the long-term coexistence of joint producers and specialists by seeing if scope economies differ substantially by type of firm. We look next at the scope economies evaluated for different sizes of insurer. Again focusing on the results for the full sample for the preferred approach shows that estimated cost scope economies are 66.6% at the smallest quartile Q1, 24.8% at the median, and 8.8% at the largest quartile Q3, all of which are statistically significant. The inverse relationship between insurer size and cost scope economies is not surprising. As discussed earlier, scope economies have a scale component to them, and it is likely that small firms would more often need to share some fixed resources to be efficient. The data also show that revenue scope diseconomies decline from 50.9% for Q1 to 19.5% for the median, to 2.0% for Q3. The latter figure is neither economically significant 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 it may not be more efficient for small and medium-sized insurers. The regression analysis below examines the effects of insurer size, product mix, distribution system, X-efficiency, and risk simultaneously to try to separate out these effects.[14]

The second row of Table 3 shows economies for the full sample computed employing the traditional approach, which uses a single cost, revenue, or profit function for joint producers and excludes the data and

[14]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.

functions for specialists. As discussed above, this is the method most often used in research in financial services, so that comparison of these estimates with the preferred estimates in the first row of the table gives the full effect of the differences between the traditional and preferred approaches. The estimates shown 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 economies 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, which may be useful in determining which assumptions of the traditional method are most responsible for the different findings from the preferred method. As shown, the scope economy estimates for the "Separate functions (joint) - Specialists excluded" case in the second to last row of the table shows some quite striking differences from the estimates using the preferred approach. For instance, this intermediate case shows no evidence of the strong revenue scope diseconomies found in the preferred approach. This finding suggests that the data violate the implicit 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 intermediate case. In contrast, the estimates for the "Single function (joint) - Specialists included" 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 scope 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.

We also re-estimate cost, revenue, and profit scope economies using the "**thick frontier**" method, which uses the most X-efficient 50% of the firms in each size class terms based on the residuals from our main cost, revenue, and profit functions, respectively (Berger and Humphrey 1991).[15] Other studies have used this method

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[15]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.

to ascertain the relationship between X-efficiency and scope economies (e.g., Berger and Humphrey 1991, Mester 1993, Berger, Humphrey, and Pulley 1996), although we believe that our regression analysis below — which also controls for bank size, product mix, distribution system, risk, and organizational form — is a superior method for assessing 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, and supporting the notion that the conglomeration hypothesis is valid for some firm types, whereas the strategic focus is valid for other types.

Regression Results

Tables 4 and 5 show our regression analysis of the determinants of scope economies. As discussed above, we regress cost, revenue, and profit scope economy estimates on a number of firm characteristics — size, product mix, distribution system, X-efficiency, organizational form, and risk — to test several hypotheses, including whether the conglomeration hypothesis and strategic focus hypothesis 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 regression results for the joint producers. For expositional ease and brevity, we concentrate primarily on Table 4, where almost all of the parameters are statistically significant due to the large number of observations, and then discuss how the results in Table 5 differ. In addition to the coefficients and t-statistics, the tables also show E_{yx}, the elasticity of the dependent variable with respect to each independent variable at the sample mean, although in the interest of brevity we do not discuss these elasticities.

The first variable included in the equations 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 above for scope economies evaluated at Q1, the median, and Q3, where there were no controls for product mix, distribution system, organizational form, and risk. As discussed 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 the effects of 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. We hypothesized above 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 have low search costs and may be more interested in specialized services tailored to their needs. 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 to those in the revenue and profit economies regressions, suggesting that the revenue benefits from conglomeration for firms emphasizing personal lines are somewhat 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.

We hypothesized above 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 (cost economies) and the development of brand names brought about by the market and sales systems (revenue economies). For non-integrated insurers, economies of scope are less likely because the independent agents themselves can create virtual insurance supermarkets by offering life and P-L products from different insurers. Most, but not all of the results in Table 4 are consistent with this hypothesis. 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 in the regressions. Cost efficiency variables are specified in the cost scope economy regression, and revenue and profit efficiency variables appear respectively in the revenue and profit scope economy regressions. As discussed above, we do not have a clear prediction regarding the expected relationship between X-efficiency and scope economies, 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. We hypothesized that firms with higher standard deviations for their life and P-L operations and lower covariances between the two divisions are likely to have more to gain from mergers because the diversification benefits are expected to be greater for these firms. 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 addition, the capital-to-asset ratio has a positive, statistically significant coefficient in all three scope economy regressions, contrary to the prediction that better capitalized firms would receive fewer rewards from risk-sensitive customers than more poorly capitalized firms that have more leverage risk.

Two organizational form variables are included as control variables in the regressions — dummy variables for the stock life insurance and stock P-L insurance organizational forms. Mutual insurers are the omitted categories. As discussed above, we include these variables as controls because they may be related to cost, revenue, and profit incentives. The regression 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 with the main hypotheses discussed above. 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 discussed 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. Again, the results support the second explanation of coexistence — that joint production is more efficient for some insurers, and specialization is more efficient for others. Again, the results suggest that the conglomeration hypothesis more often applies to large insurers, those emphasizing personal lines, those using vertically integrated systems, and those that are more 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 this empirical puzzle of the coexistence of joint producers and specialists, each of which has a different implication for the validity of the conglomeration and strategic focus hypotheses:

1) joint production and specialization may be 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, supporting the second explanation of coexistence and suggesting 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, that emphasize personal lines of business, that use vertically integrated distribution systems, and that are profit efficient, all else equal, while the strategic focus hypothesis tends to apply more to insurers that are small, that emphasize commercial lines, that use non-integrated distribution systems, and that 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.

References

Amihud, Y., and Lev, B. (1981). "Risk Reduction As a Managerial Motive For Conglomerate Mergers," *Bell Journal of Economics* 12: 605-617.

Baumol, W., Panzar, J., and Willig, R. (1982). *Contestable Markets and the Theory of Industry Structure.* San Diego: Harcourt Brace Jovanovich.

Berger, A.N., Cummins, J.D., and Weiss, M.A. (1997). "The Coexistence of Multiple Distribution Systems for Financial Services: The Case of Property-Liability Insurance," *Journal of Business* 70: 515-546.

Berger, A.N., Hancock, D., and Humphrey, D.B. (1993). "Bank Efficiency Derived from the Profit Function,"*Journal of Banking & Finance* 17: 317-347.

Berger, A.N., and Hannan, T.H. (1998). The Efficiency Cost of Market Power in the Banking industry: A Test of the 'Quiet Life' and Related Hypotheses, *Review of Economics and Statistics* 80: 454-65.

Berger, A.N., Hanweck, G.A., and Humphrey, D.B. (1987). "Competitive Viability in Banking: Scale, Scope, and Product Mix Economies," *Journal of Monetary Economics* 20: 501-520.

Berger, A.N., and Humphrey, D.B. (1991). "The Dominance of Inefficiencies over Scale and Product Mix Economies in Banking," *Journal of Monetary Economics* 28 (August): 117-148.

Berger, A.N., Humphrey, D.B., and Pulley, L.B. (1996). "Do Consumers Pay for One-Stop Banking? Evidence from an Alternative Revenue Function," *Journal of Banking and Finance* 20: 1601-1621.

Berger, P.G. and Ofek, E. (1995). "Diversification's Effect on Firm Value," *Journal of Financial Economics* 37: 39-65.

Calomiris, C.W. (1998). "Universal Banking 'American Style'," *Journal of Institutional and Theoretical Economics* 154: 44-60.

Comment, R. and Jarrell, G.A. (1995). "Corporate Focus and Stock Returns," *Journal of Financial Economics* 37: 67-87.

Cummins, J.D., Tennyson, S, and Weiss, M.A. (1999). "Consolidation and Efficiency In the U.S. Life Insurance Industry," *Journal of Banking and Finance* 23 (February): 325-357.

Cummins, J.D. and Weiss, M. A. (1999). "Analyzing Firm Performance in the Insurance Industry Using Frontier Efficiency Methods," in Georges Dionne, ed., *Handbook of Insurance Economics* (Norwell, MA: Kluwer Academic Publishers), in press.

Cybo-Ottone, A., and Murgia, M. (1998). "Mergers and Shareholder Wealth in European Banking," working paper, Associazione Bancaria Italiana.

DeLong, G.L. (1998). "Domestic and International Bank Mergers: The Gains from Focusing Versus Diversifying," working paper, New York University.

Ferrier, G., Grosskopf, S., Hayes, K., and Yaisawarng, S., (1993). Economies of Diversification in the Banking Industry: A Frontier Approach, *Journal of Monetary Economics*, 31, 229-49.

Gallo, J.G., Apilado, V.P. and Kolari, J.W. (1996). "Commercial Bank Mutual Fund Activities: Implications for Bank Risk and Profitability, *Journal of Banking and Finance* 20: 1775-1791.

Gertner, R. H., Scharfstein, D.S. and Stein, J.C. (1994). “Internal versus External Capital Markets,” *The Quarterly Journal of Economics* 109: 1211-1230.

Goldberg, L.G., Hanweck, G.A., Keenan, M., and Young, A. (1991). “Economies of Scale and Scope in the Securities Industry,” *Journal of Banking and Finance* 15: 91-107.

Grace, M. F., and Timme, S. G. (1992). "An Examination of Cost Economies in the United States Life Insurance Industry," *Journal of Risk and Insurance* 59, 72-103.

Herring, R. J. and Santomero, A. M. (1990). “The Corporate Structure of Financial Conglomerates,” *Journal of Financial Services Research* 4: 471-497.

Houston, J.F.,and Ryngaert, M. D. (1994). “The Overall Gains from Large Bank Mergers,” *Journal of Banking and Finance* 18: 1155-76.

Hunter, W. C., Timme, S.G., and Yang, W.K. (1990). “An Examination of Cost Subadditivity and Multiproduct Production in Large U.S. Banks,” *Journal of Money, Credit and Banking* 22: 504-25.

Jensen, M.C. (1986). “Agency Costs of Free Cash Flow, Corporate Finance and Takeovers,” *American Economic Review* 76: 323-329.

John, K., and Ofek, E. (1995). “Asset Sales and Increase in Focus,” *Journal of Financial Economics* 37: 105-126.

Kanatas, G. and Qi, J. (1999). “Banking Scope and Information Production,” Paper Presented at 1999 CEPR/Journal of Financial Intermediation Symposium on Competition, Regulation and Financial Integration, INSEAD, Fontainebleau, France.

Kanatas, G. and Qi, J. (1998). “Underwriting by Commercial Banks: Incentive Conflicts, Scope Economies and Project Quality,” *Journal of Money, Credit, and Banking* 30: 119-133.

Kellner, S., and Mathewson, F.G. (1983). “Entry, Size Distribution, Scale, and Scope Economies in the Life Insurance Industry,” *Journal of Business* 56: 25-44.

Lang, L.H.P.,. and Stulz, R. E. (1994). “Tobin’s Q, Corporate Diversification and Firm Performance,” *Journal of Political Economy* 102: 1248-1280.

Lang, G., and Welzel, P. (1998). “Technology and Cost Efficiency in Universal Banking: a Thick Frontier Approach,” *Journal of Productivity Analysis* 10: 63-84.

Lewellen, W.G. (1971). “A Pure Financial Rationale for Conglomerate Merger,” *Journal of Finance* 26: 521-537.

McKillop, D.G., Glass, J.C., and Morikawa, Y. (1996). “The Composite Cost Function and Efficiency in Giant Japanese Banks,” *Journal of Banking & Finance* 20: 1651-1671.

Meador, J.W., Ryan, H.E., Jr., and Shellhorn, C.D. (1998). “Product Focus Versus Diversification: Estimates of X-Efficiency for the U.S. Life Insurance Industry,” working paper, Northeastern University, Boston, MA.

Mester, L.J. (1987). “A Multiproduct Cost Study of Savings and Loans,” *Journal of Finance* 42: 423-445.

Mester, L. J. (1993). "Efficiency in the Savings and Loan Industry," *Journal of Banking and Finance* 17: 267-86.

Meyer, M., Milgrom, P., and Roberts, J. (1992). "Organizational Prospects, Influence Costs, and Ownership Changes," *Journal of Economics and Management Strategy* 1: 9-35.

Noulas, A.G., Miller, S.M., and Ray, S.C. (1990). "Returns to Scale and Input Substitution for Large U.S. Banks," *Journal of Money, Credit, and Banking* 22: 94-108.

Pulley, L. B. and Braunstein, Y. M. (1992). "A Composite Cost Function for Multiproduct Firms with an Application to Economies of Scope in Banking," *Review of Economics & Statistics* 74: 221-230.

Pulley, L. B. and Humphrey, D. B. (1993). "The Role of Fixed Costs and Cost Complementarities in Determining Scope Economies and the Cost of Narrow Banking Proposals," *Journal of Business* 66: 437-462.

Röller, L. H. (1990). "Proper Quadratic Cost Functions With an Application to the Bell System," *Review of Economics and Statistics* 72: 202-210.

Servaes, H. (1996). "The Value of Diversification During the Conglomerate Merger Wave," *Journal of Finance* 51: 1201-1225.

Siconolfi, M. (1998). "Big Umbrella: Travelers and Citicorp Agree to Join Forces In $83 Billion Merger," *Wall Street Journal* (New York: Dow Jones & Company), April 7.

Teece, D. J. (1980). "Economies of Scope and the Scope of Enterprise," *Journal of Economic Behavior and Organization,* 1: 233-247.

Toivanen, O. (1997). "Economies of Scale and Scope in the Finnish Non-Life Insurance Industry," *Journal of Banking and Finance* 21: 759-779.

Vander Vennet, R. (1999). "Cost and Profit Dynamics In Financial Conglomerates and Universal Banks in Europe," Paper Presented at 1999 CEPR/Journal of Financial Intermediation Symposium on Competition, Regulation and Financial Integration, INSEAD, Fontainebleau, France.

Williamson, O.E. (1970). *Corporate Control and Business Behavior: An Inquiry Into the Effects of Organizational Form On Enterprise Behavior* (Englewood Cliffs, NJ: Prentice Hall).

Winton, A. (1999). "Don't Put All Your Eggs in One Basket? Diversification and Specialization in Lending," working paper, Finance Department, University of Minnesota, Minneapolis.

Yuengert, A. M. (1993). "The Measurement of Efficiency in Life Insurance: Estimates of a Mixed Normal-Gamma Error Model," *Journal of Banking and Finance* 17, 483-496.

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**	**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.

Table 3

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

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

*** = 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	E_{yx}[3]	Coefficient	t-stat	E_{yx}[3]	Coefficient	t-stat	E_{yx}[3]
Intercept	0.672	73.28 ***		-0.757	-93.56 ***		-1.138	-89.89 ***	
Ln(Insurance Output)	-0.028	-73.07 ***	-0.111	0.027	78.17 ***	-0.150	0.053	95.21 ***	0.647
Life Personal Output %	-1.313	-184.88 ***	-0.359	1.068	174.32 ***	-0.404	1.039	107.45 ***	0.862
P-L Commercial Output %	0.201	50.60 ***	0.241	-0.180	-50.53 ***	0.300	-0.313	-54.36 ***	-1.142
P-L Personal Output %	-1.393	-123.66 ***	-0.526	0.771	87.21 ***	-0.403	0.821	56.47 ***	0.941
Life Exclusive Agent Dummy[1]	0.053	35.76 ***	0.213	-0.034	-25.01 ***	0.188	0.013	6.03 ***	0.163
Life Direct Marketing Dummy	0.050	22.94 ***	0.199	0.012	6.23 ***	-0.068	0.107	33.02 ***	1.302
Life Mass Marketing Dummy	0.022	6.51 ***	0.090	0.012	3.95 ***	-0.069	0.139	27.12 ***	1.701
P-L Vertical Integration Dummy	0.043	34.79 ***	0.172	-0.004	-3.79 ***	0.023	0.058	31.86 ***	0.707
Life X-efficiency	0.258	54.98 ***	0.337	-0.132	-41.12 ***	0.177	0.017	6.10 ***	0.210
P-L X-efficiency	0.229	47.29 ***	0.472	-0.043	-12.83 ***	0.134	0.041	12.09 ***	0.139
Life ROE Standard Deviation	-0.161	-24.32 ***	-0.071	0.148	25.12 ***	-0.091	0.288	23.59 ***	0.386
P-L ROE Standard Deviation	-0.093	-11.99 ***	-0.030	0.115	16.80 ***	-0.052	0.606	45.43 ***	0.598
Life & P-L ROE Covariance	-0.187	-9.20 ***	0.012	0.293	15.91 ***	0.026	0.799	16.31 ***	-0.156
Capital to Asset Ratio	0.242	37.21 ***	0.225	0.026	5.08 ***	-0.033	0.029	3.58 ***	0.082
Life Stock Firm Dummy[2]	-0.006	-5.73 ***	-0.025	0.015	14.62 ***	-0.081	-0.001	-0.46	-0.009
P-L Stock Firm Dummy	0.005	5.51 ***	0.022	-0.006	-6.45 ***	0.032	-0.020	-12.98 ***	-0.243
Adjusted R^2	20.9%			20.3%			14.6%		

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 marketing 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 marketing category is P-L non-vertically integrated marketing (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%

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**	E_{yx}[3]	**Coefficient**	**t-stat**	E_{yx}[3]	**Coefficient**	**t-stat**	E_{yx}[3]
Intercept	0.089	0.58		-0.118	-0.75		-0.823	-3.08 ***	
Ln(Insurance Output)	0.030	5.20 ***	0.119	-0.010	-1.82 *	0.050	0.031	2.95 ***	0.383
Life Personal Output %	-0.608	-3.01 ***	-0.112	0.901	5.06 ***	-0.208	1.147	3.41 ***	0.657
P-L Commercial Output %	0.051	0.69	0.080	0.069	1.06	-0.137	-0.140	-1.03	-0.688
P-L Personal Output %	-0.693	-3.71 ***	-0.377	0.515	2.97 ***	-0.350	0.866	2.62 ***	1.458
Life Exclusive Agent Dummy[1]	-0.008	-0.28	-0.031	0.025	0.99	-0.124	-0.033	-0.66	-0.404
Life Direct Marketing Dummy	-0.047	-1.36	-0.187	0.069	2.09 **	-0.341	0.121	1.79 *	1.478
Life Mass Marketing Dummy	-0.204	-3.05 ***	-0.801	0.250	4.05 ***	-1.231	0.256	2.11 **	3.122
P-L Vertical Integration Dummy	0.040	2.30 **	0.159	-0.010	-0.61	0.048	-0.015	-0.47	-0.181
Life X-efficiency	-0.363	-5.40 ***	-0.727	0.112	2.36 **	-0.192	0.108	1.33	0.346
P-L X-efficiency	-0.390	-4.23 ***	-1.087	0.028	0.39	-0.075	0.201	3.67 ***	0.645
Life ROE Standard Deviation	0.280	1.45	0.121	-0.010	-0.06	0.005	0.152	0.43	0.203
P-L ROE Standard Deviation	0.244	1.32	0.084	-0.161	-0.96	0.069	0.017	0.05	0.018
Life & P-L ROE Covariance	1.863	1.90 *	-0.081	-0.918	-1.03	-0.050	-1.313	-0.72	0.176
Capital to Asset Ratio	0.275	2.69 ***	0.272	-0.335	-3.81 ***	0.414	0.377	2.50 **	1.155
Life Stock Firm Dummy[2]	0.022	0.59	0.085	0.008	0.26	-0.041	-0.181	-2.72 ***	-2.203
P-L Stock Firm Dummy	0.017	0.82	0.066	-0.030	-1.59	0.149	0.015	0.40	0.186
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 % = 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 marketing 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 marketing category is P-L non-vertically integrated marketing (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%