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The Role of Internal Capital Markets in Financial Intermediaries: Evidence From Insurer Groups

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Abstract

We exploit the transparency of internal capital markets (ICMs) within insurance groups to investigate the activity and efficiency of ICMs within insurance groups. Specifically, we compare the relationship between internal capital transfers and investment to that between capital from other sources and investment. The ability to track the actual ICM transactions allows for more direct analysis of ICM activity than most previous studies. Consistent with theory, we find evidence that ICMs play a significant role in the investment behavior of affiliated insurers. We then use these detailed data to execute a more direct test of ICM efficiency than currently exists in the literature. Consistent with ICM efficiency, results suggest that capital is allocated to subsidiaries with the best expected performance.

Introduction

The topic of internal capital markets (ICMs) in conglomerate firms has generated significant interest among researchers for many years. Two key questions have emerged pertaining to ICMs. The first and most fundamental question is simply whether or not ICMs are active within conglomerate firms. Obviously, if ICMs are not active, they are not creating value, regardless of what theory might imply about their potential. If ICMs are indeed active, the next important question is whether or not they are efficient. In other words, do the headquarters of conglomerates allocate capital to the divisions with the best expected returns? This study considers both questions.

A prominent characteristic of the U.S. property–liability insurance industry is the prevalence of insurer groups. In 2003, 1,863 of the 2,699 total U.S. property–liability

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insurers were members of insurer groups, accounting for more than two-thirds of all insurance premiums written in the United States. One potential consequence of a grouping structure is the creation of an active ICM within the group, with corporate headquarters allocating capital among the group members.

This article is the first to explicitly examine ICMs within groups of insurance companies. Insurance companies present a unique framework for analyzing ICM activity. As described more fully later, when an insurer increases investment (premiums written) it must also either increase capital, increase reinsurance, alter its loss exposure, or accept an increase in its probability of insolvency. In addition to external means, the first two of these alternatives may be accomplished within an ICM in the form of reinsurance ceded to affiliates or other intragroup capital transactions.

The above framework for insurer investment, along with the detailed financial data available for insurance companies, makes the industry well suited for studying ICMs. ICM transactions among members of insurance groups and insurance holding companies, whether accomplished via reinsurance transactions or transfers of capital, are reported in statutory filings. We are able to exploit these detailed data to investigate the purpose, relative importance, and efficiency of ICM activity in insurance groups. We examine the purpose of ICM activity by testing whether inflows of capital to an affiliate from the rest of the group and/or increases in reinsurance ceded by the affiliate to other group members leads to higher growth in premiums written by the affiliate. To assess the relative importance of ICM activity, we also compare the magnitude of the effect of ICM transactions on affiliates' investment to that of changes in capitalization from other sources. We approach the question of ICM efficiency with a different model. We test the relation between ICM transfers and expected performance. The ability to track the actual ICM transactions allows for more direct evidence regarding the impact and efficiency of ICMs than most previous studies, which generally must first indirectly test for ICM activity and then simply estimate the volume of such activity.[1]

This study should be of interest not only to insurance company owners' managers, and policyholders but also to insurance regulators who devote significant resources to understanding the purpose and importance of internal capital transfers in the assessment of insurers' financial condition.

PREVIOUS LITERATURE[2]

ICM Activity

Alchain (1969) and Williamson (1970, 1975) were among the first to consider the concept of ICMs as a means of explaining the existence of diversified firms. Williamson (1975) defines an ICM as a situation where cash flows in the M-form firm are not automatically returned to their sources but instead may be reallocated to other segments of the firm at the discretion of a central governing authority. However, as the subsequent the literature produced evidence of a diversification discount (e.g., Lang and Stulz, 1994; Berger and Ofek, 1995), many questioned the existence of active ICMs.

[1] The exception to this is Dahl, Shrieves, and Spivey (2002), who use an approach similar to ours in investigating loan growth at affiliated banks.

[2] A large literature has developed in recent years on the topic of ICMs. Here, we focus on only a small number of these studies that are most relevant to the present paper.

A substantial theoretical and empirical literature has developed to explore the activity of ICMs. In empirical studies, evidence of ICM activity generally involves showing that investment at the division level depends on the cash flows of the rest of the conglomerate or holding company (Houston, James, and Marcus, 1997; Shin and Stulz, 1998).[3] The empirical results have been decidedly mixed. For example, the results of Shin and Stulz (1998) and Rajan, Servaes, and Zingales, (2000) suggest that ICM activity is not an economically significant factor in the investment strategy of conglomerate firms. On the other hand, some empirical studies have found support for the hypothesis that ICMs are active and play a meaningful role in the operations of financial intermediaries (e.g., Houston, James, and Marcus, 1997). These contrasting results between studies of financial intermediaries and of other industries are consistent with the implications of the model developed by Stein (1997), which implies that incentives to establish ICMs may be greatest among firms that are narrowly focused and whose assets present difficulty in valuation. Financial intermediaries tend to display both of these characteristics. However, some evidence of active and significant ICMs has been found for nonfinancial industries such as discount retailing (Khanna and Tice, 2001), an industry that is focused but would not seem to exhibit high levels of information asymmetry. Clearly, as with many questions related to ICMs, the literature has not yet achieved a full answer regarding precisely which industry characteristics are likely to lead to greater ICM importance.

ICM Efficiency

Economists have also not reached consensus regarding the effects of ICMs on firm value. Some theoretical analyses suggest ICMs should increase firm value. For example, Stein (1997) develops a model in which headquarters creates value by engaging in "winner picking" and allocating capital to divisions where returns are highest. By contrast, some recent articles have described how ICMs might in fact hinder investment efficiency by allocating resources more poorly than would external capital markets (e.g., Rajan, Servaes, and Zingales, 2000; Scharfstein and Stein, 2000). These studies introduce layers of agency problems within conglomerates' hierarchies that lead to misallocation of resources. For example, in the model of Scharfstein and Stein (2000), the introduction of agency problems between division managers and the CEO results in an outcome that the authors describe as "socialism," in which stronger divisions subsidize weaker ones, inconsistent with what would occur in an efficient ICM.

The empirical literature on ICMs is constrained by lack of data on investment and financing decisions within firms. However, through clever use of available data, several papers reveal information about ICM activity and efficiency. Results are mixed across studies, with some rejecting ICM efficiency, and others finding results consistent with efficient ICMs. The earliest tests of ICM efficiency generally use Compustat segment data and use Tobin's Q to proxy for investment opportunity. Most of these studies conclude that ICMs are not efficient (e.g., Shin and Stulz, 1998; Rajan, Servaes, and Zingales, 2000). However, studies using different data, methodologies, and proxies for investment opportunities do not reject the efficiency hypothesis. For example, Whited

[3] The present study is not hindered by the need to test for or estimate ICM activity. In our sample of insurance groups, ICM transactions are reported directly in statutory annual reports.

(2001) develops an alternative estimator of Q and does not find evidence of the cross-subsidization indicated by previous studies. Khanna and Tice (2001) analyze data from the discount retail industry. They find that ICMs in that industry are efficient because managers of diversified firms make better investment decisions than their counterparts in single-industry firms. They attribute their finding of ICM efficiency to the fact that they are studying an industry characterized by related diversification, as opposed to unrelated diversification. They conclude that diversification has both benefits (e.g., "winner picking" among divisions) and costs (e.g., "influence costs," "empire building," and "power grabbing") and that the benefits appear to outweigh the costs for related diversified firms, but not for unrelated diversified firms.

Campello (2002) analyzes small banks' responses to changes in monetary policy to assess the efficiency of ICMs in bank holding companies. As in our efficiency analysis, he does not use Tobin's Q as a proxy for investment opportunity as most other studies in this area do. He proxies for investment opportunities with performance measures at the subsidiary level that are often used to assess the performance of bank managers. As discussed in more detail below, we also use performance measures (return on assets [ROA] and underwriting ROA) to proxy for investment opportunities.

THE IMPACT OF ICMS ON INVESTMENT

The Purpose of ICM Transfers

The most likely purpose for transferring capital via an ICM is to facilitate investment growth of the affiliate receiving the capital. However, several other plausible explanations for the occurrence of such transfers exist. For example, capital transfers among affiliates can facilitate a tax minimization strategy. Gramlich, Limpaphayom, and Ghon Rhee (2004) shows that Japanese keiretsu, another form of business conglomerate, actively manage tax liabilities by transferring earnings to less profitable members. Additionally, insurers can transfer capital to an affiliate to replace depleted surplus following a capital shock. Also in the case of insurers, transferring capital among affiliates creates an additional layer of information asymmetry between insurance groups and other parties such as regulators, policyholders and shareholders. Indeed, insurance regulators devote substantial resources to investigation of the nature and substance of transactions between affiliated insurers when the assessing insurers' financial condition (see National Association of Insurance Commissioners [NAIC] 2000a,b). In each of these situations, a transfer of capital via an ICM may not lead to an increase in investment. Thus, the first goal of this study is to determine if ICM transfers facilitate growth in investment or serve some other end.

Insurance Company Investment

Before proceeding to investigate the impact of ICM activity on affiliated insurers' investment behavior, the general model of insurer investment introduced earlier is formulated more fully in an empirically testable fashion. When an insurer increases investment (premiums written), it should also do at least one of four things: (1) hold more capital, (2) increase premiums ceded to reinsurers, (3) alter its loss exposure, or (4) increase its probability of insolvency.[4] This leads to the following empirically

[4] An insurer could also raise capital *ex post* if losses are too much larger than expected, or courts could pierce the corporate veil, requiring affiliates under common ownership to pay

testable model of insurer investment, where change in investment is described as a function of change in capitalization and change in underwriting exposure:

$$\Delta INVESTMENT = f[\Delta CAPITAL, \Delta EXPOSURE], \tag{1}$$

where

$\Delta INVESTMENT$ = change in premiums written by the insurer from one period to the next,
$\Delta CAPITAL$ = change in capitalization of the insurer, via change in surplus or change in reinsurance ceded, and
$\Delta EXPOSURE$ = change in the insurer's underwriting exposure.

Note that change in capitalization is defined to include both changes in surplus as well as changes in reinsurance ceded because both are capital structure decisions that can substitute for one another (Berger, Cummins, and Tennyson, 1992; Garven and Lamm-Tennant, 2003). Surplus serves as a buffer fund for the insurer so that the insurer will be able to pay claims even if actual losses are greater than expected losses. Instead of, or in addition to, holding more surplus an insurer may cede risks to a reinsurer. In return for a portion of the direct premium the reinsurer becomes liable for a portion of losses incurred. Thus, both an increase in surplus and an increase in the proportion of premiums ceded to reinsurers can effectively increase an insurer's capacity to underwrite risks without increasing the probability of insolvency. Thus, we expect a positive relationship between change in surplus and investment, as well as a positive relationship between change in reinsurance ceded and investment.

We expect the relationship between investment and underwriting risk exposure to be negative. There are many types of insurance that a property–liability insurance company can underwrite. Risks may differ across lines of business and across geographic regions within a line of business. For example, the variability of losses from property insurance is likely to be different from the variability of losses from liability insurance, and the risk characteristics for automobile insurance written in California are likely to differ significantly from those written in Montana. All else equal, an insurer may reduce its probability of insolvency by diversifying its exposures across lines of business and geographic locations, or by choosing to underwrite insurance in lines of business and geographic areas that are not subject to a great risk of catastrophic losses. Therefore, an insurer may be able to increase its investment without ceding more reinsurance or increasing its surplus, and without increasing its probability of insolvency, if it decreases its overall underwriting risk.

Of course, an insurer may choose to increase premiums written without increasing surplus, without increasing reinsurance ceded, and without altering its underwriting exposure. In this case, the insurer will have increased its probability of insolvency.

unexpectedly large losses. Because regulatory concerns make these strategies less attractive to insurers and such actions are rarely observed, we implicitly assume this behavior will not occur or does not represent the operating strategy of insurers. This assumption is not empirically problematic in our analysis because it can only bias against finding our expected results.

However, because increasing the probability of insolvency can have important negative consequences for an insurer due both to increased regulatory interference as well as product market responses such as a reduction in demand and/or reduction in the prices obtainable for policies sold (Sommer, 1996; Cummins and Danzon, 1997), this is not expected to be the general behavior of insurers. To the extent that insurers do choose to simply increase their probability of insolvency when increasing premiums written, rather than first adjusting their surplus, reinsurance, or underwriting exposure, this will bias against finding the anticipated empirical results described above.

In sum, the hypothesized model of insurer investment is characterized by the following relationships: the change in investment of an insurer is positively related to change in surplus and change in reinsurance ceded and negatively related to change in underwriting exposure. This model will be tested empirically in a later section. If this model is validated empirically, the next step is to expand the model to differentiate between ICM activity and changes in capital from other sources, and then empirically assess the impact of ICM activity on the investment behavior of affiliated insurers.

Insurer Investment and ICMs

To analyze the impact of ICM activity on insurance company investment behavior, the model of the previous section must be modified. Changes in insurer capitalization can be disaggregated between changes resulting from ICM transactions and changes resulting from some other source.[5] The resulting analytical model may be written as follows:

$$\Delta INVESTMENT = f[\Delta ICMCAPITAL, \Delta OTHERCAPITAL, \Delta EXPOSURE], \quad (2)$$

where

$\Delta INVESTMENT$ = change in premiums written by the insurer from one period to the next,
$\Delta ICMCAPITAL$ = change in capitalization of the company that is the result of ICM transactions,
$\Delta OTHERCAPITAL$ = change in capitalization of the company that is not the result of ICM transactions, and
$\Delta EXPOSURE$ = change in the insurer's underwriting exposure.

A change in an affiliated insurer's capitalization due to ICM transactions ($\Delta ICMCAPITAL$) can occur by two means. First, capital can be transferred to the affiliated insurer from some other entity within the group. Second, reinsurance can be ceded by the affiliate to other members of the group. Changes in capitalization not due to ICM transactions ($\Delta OTHERCAPITAL$) can arise from a variety of sources, such as changes in reinsurance ceded to external reinsurers, payment of dividends, issuance of external equity, and the firm's retained earnings (or losses).

[5] Cummins and Danzon (1997) also disaggregate capital changes; in their case, the breakdown is between new internal capital, new external capital, and the loss shock from old liabilities.

Changes in external reinsurance ceded or other changes in capital not due to ICM transactions are hypothesized to have the same impact on investment growth as discussed above for overall changes in capitalization; namely, an increase in reinsurance or capital should be associated with an increase in investment. Of particular interest here, however, is the impact of ICM transactions. If ICM funds are used to facilitate investment growth among affiliated insurers, then a positive relationship should exist between ICM infusions of capital and investment growth, whether accomplished via direct capital transfers or internal reinsurance arrangements. Furthermore, we can evaluate the importance of ICM transactions in insurers' investment strategies by comparing the impact of these transactions on investment to that of changes in capital from other sources.

EMPIRICAL ANALYSIS: ICM IMPACT ON INSURER INVESTMENT

Sample Selection

The sample for the analysis of insurer investment includes company-level observations for affiliated insurers for data years 1996–2003 obtained from the NAIC. To be included in our sample, companies must have commenced business before 1995 and must persist throughout the sample period. We are interested in capital transactions among established affiliates while operating as going concerns.

Calculations of several variables in our model require the insurer to report positive values for premiums written, assets and surplus. Firms that report nonpositive values for those measures are discarded. Similar to Shin and Stulz (1998), observed changes of more than 100 percent of the previous year in our dependent or explanatory variables are windsorized at 100 percent to reduce the affect of outliers in our analysis.[6] Our sample includes seven temporal observations for each of 712 affiliated insurance companies, a total of 4,984 observations. The variables used in our analysis are described below and are also defined in Table 1. Summary statistics appear in Table 2.

ICM Transactions

Affiliated insurers are required to report transactions with affiliates in mandatory filings to state insurance regulators.[7] We use these data to proxy for ICM transactions. We include four types of transactions in our measure of ICM surplus transfers: shareholder dividends, capital contributions, disbursements incurred in connection with guarantees made on behalf of affiliates, and capital transferred when one affiliate buys an asset from another.[8]

Shareholder dividends are dividends paid to affiliates that own shares of the reporting insurer's stock. Capital contributions are simply transfers of capital in any form (e.g.,

[6] Shin and Stulz (1998) omit such observations. We windsorize them because extreme changes in insurance markets following the September 11, 2001 World Trade Center disaster diminish our sample significantly if we discard these observations.

[7] Reinsurance transactions with affiliates are reported in the Underwriting and Investment Exhibit Part 2B—Premiums Written. Other capital transfers are reported in Schedule Y—Part 2 Summary of the Insurer's Transactions with any Affiliates.

[8] The authors thank Mike Pickens, Arkansas Insurance Commissioner, and Leo Liu, Manager of Financial Analysis for the Arkansas Insurance Department, for sharing their insight and reference materials regarding transfers of capital among affiliated insurers.

TABLE 1
Variable Definitions

$\Delta Investment_{i(t)} = [PW_{i(t)} - PW_{i(t-1)}]/PW_{i(t-1)}$
$PW_{i(t)}$ = premiums written by insurer i in year t; includes direct premiums written and reinsurance premiums assumed
$\Delta Surplus_{i(t)} = [SURPLUS_{i(t-1)} - SURPLUS_{i(t-2)}]/SURPLUS_{i(t-2)}$
$SURPLUS_{i(t)}$ = the difference between insurer i's assets and its liabilities in year t
$\Delta ICM\ Surplus_{i(t)} = [SRFA_{i(t-1)} - STTA_{i(t-1)}]/SURPLUS_{i(t-2)}$
$SRFA_{i(t)}$ = surplus received from affiliates by insurer i in year t
$STTA_{i(t)}$ = surplus transferred to affiliates from insurer i in year t
$\Delta External\ Surplus_{i(t)} = NEWSTOCK_{i(t-1)}/SURPLUS_{i(t-2)}$
$NEWSTOCK_{i(t)}$ = proceeds from equity issued by insurer i in year t
$\Delta Other\ Surplus_{i(t)} = [SURPLUS_{i(t-1)} - (SRFA_{i(t-1)} - STTA_{i(t-1)}) - NEWSTOCK_{i(t-1)} - SURPLUS_{i(t-2)}]/SURPLUS_{i(t-2)}$
$\Delta Reinsure_{i(t)} = [(RC_{i(t)} - RA_{i(t)})/PW_{i(t)}] - [(RC_{i(t-1)} - RA_{i(t-1)})/PW_{i(t-1)}]$
$RC_{i(t)}$ = reinsurance ceded by insurer i in year t
$RA_{i(t)}$ = reinsurance assumed by insurer i in year t
$\Delta ICM\ Reinsure_{i(t)} = [(RCTA_{i(t)} - RAFA_{i(t)})/PW_{i(t)}] - [(RCTA_{i(t-1)} - RAFA_{i(t-1)})/PW_{i(t-1)}]$
$RCTA_{i(t)}$ = reinsurance ceded to affiliates by insurer i in year t
$RAFA_{i(t)}$ = reinsurance assumed from affiliates by insurer i in year t
$\Delta External\ Reinsure_{i(t)} = [(RCTNA_{i(t)} - RAFNA_{i(t)})/PW_{i(t)}] - [(RCTNA_{i(t-1)} - RAFNA_{i(t-1)})/PW_{i(t-1)}]$
$RCTNA_{i(t)}$ = reinsurance ceded to nonaffiliates by insurer i in year t
$RAFNA_{i(t)}$ = reinsurance assumed from nonaffiliates by insurer i in year t
$\Delta Geographic\ Concentration_{i(t)} = HERFGEO_{i(t)} - HERFGEO_{i(t-1)}$
$HERFGEO_{i(t)} = \sum_{s=1}^{51} [(\frac{PW_S}{PW})^2]$. PW_S = premiums written in state S
$\Delta Line\text{-}of\text{-}Business\ Concentration_{i(t)} = HERFLOB_{i(t)} - HERFLOB_{i(t-1)}$
$HERFLOB_{i(t)} = \sum_{L=1}^{23} [(\frac{PW_L}{PW})^2]$. PW_L = premiums written in line of business L
$\Delta Catastrophe\ Exposure_{i(t)} = CATEX_{i(t)} - CATEX_{i(t-1)}$
$CATEX_{i(t)}$ = the ratio of premiums written for property coverage in Eastern coastal states and earthquake coverage in California to total premiums written by insurer i in year t
$\Delta Long\ Tail_{i(t)} = LTL_{i(t)} - LTL_{i(t-1)}$
$LTL_{i(t)}$ = the ratio of premiums written in long tail (liability) lines of insurance to total premiums written by insurer i in year t
$Mutual_i$ = one if insurer i is a mutual insurance company, and zero otherwise

cash, securities, real estate, surplus notes, etc.). Guarantees made on behalf of affiliates include assets of one affiliate used as collateral for another affiliate's financing arrangements. The reporting insurer may also alter its surplus by purchasing an asset from an affiliate, selling an asset to an affiliate, or exchanging assets with an affiliate. For example, the reporting insurer can increase its surplus by selling an asset to an affiliate at the current market price. If the reporting insurer reported the asset at amortized value, and if the market value increased since the asset was originally purchased, the reporting insurer will recognize an increase in surplus equal to difference between book value and market value. The holding company or parent company must offset the noneconomic inflation of surplus by recording a deferred gain and an unrealized loss until the asset is sold to an unrelated third party (NAIC, 2001, p. IP25-4). Thus, such a transaction is clearly an ICM transfer.

TABLE 2
Sample Description

Variable	Mean	Standard Deviation
Δ*Investment*	0.215	0.400
Δ*Reinsure*	0.003	0.140
Δ*Surplus*	0.077	0.191
Δ*ICM Reinsure*	0.004	0.133
Δ*External Reinsure*	−0.001	0.086
Δ*ICM Surplus*	−0.003	0.173
Δ*Other Surplus*	0.077	0.183
Δ*External Surplus*	0.002	0.029
Δ*Line-of-Business Concentration*	−0.046	0.142
Δ*Geographic Concentration*	−0.006	0.075
Δ*Catastrophe Exposure*	−0.002	0.091
Δ*Long Tail*	−0.036	0.115
Mutual	0.159	0.366

Note: Table 1 for variable descriptions.

While our measure of ICM transactions is more accurate than what is typically seen in the literature, it should be noted that it is still not an exact measure. Dahl, Shrieves, and Spivey (2002) note that in addition to direct capital transfers, bank holding companies can transfer capital by inflating fees charged among affiliates for providing services. The NAIC data include information on these transactions among members of an insurance group but do not net out the economic value of services provided. Thus, we do not include these transactions in our reported results. We expect excessive payment to affiliates for services rendered to be relatively uncommon among insurers because specific regulation prohibits such practices (see NAIC, 2000a,b).

Affiliated insurers can also exchange capital by ceding and assuming reinsurance. In return for a portion of the direct premium, the reinsurer becomes liable for a portion of losses incurred. Thus, the ceding insurer is essentially using the reinsurer's surplus to guarantee payment of future losses (Garven and Lamm-Tennant, 2003).

ICM transfers among affiliated insurers are quite common. Table 3 displays the average volume of each type of transaction during our sample period. Reinsurance among affiliates is the most common form of ICM transfer; on average, 488 insurers cede reinsurance to affiliates (receive capital) and 281 insurers assume reinsurance from affiliates (provide capital) annually. Only 10 percent of group members do not participate in reinsurance transactions with affiliates during the sample period. With an average of $221.6 million of premium ceded or assumed per transaction, internal reinsurance is also the largest type of ICM transfer in terms of nominal value.

Dividends are the second most common transaction. Each year an average of 77 insurers receive dividends and 251 insurers pay dividends to affiliates. The average dividend payment is almost $34 million. This type of transfer is obviously limited by ownership (i.e., one firm cannot receive a dividend from another unless they own a portion of that firm); however, significant variation in the amount of dividends over

TABLE 3
Volume of Internal Capital Market Transactions

Transaction	Receive[a]	Provide[b]	Average Size[c]
Reinsurance	488	281	$221.6
Dividends	77	251	33.7
Capital contributions	112	92	60.6
Guarantees	10	9	5.6
Exchanges	75	75	53.7

[a]Average number of companies receiving capital via each type of transaction annually, 1996–2003.
[b]Average number of companies providing capital via each type of transaction annually, 1996–2003.
[c]Average transaction size in millions of U.S. dollars, 1996–2003.

time suggests that these transfers are managed dynamically by the parent company. Capital contributions are received by 112 insurers and provided by 92 insurers each year. The average amount of these transactions is $60.6 million. On average, 75 insurers receive and provide capital to affiliates by exchanging assets for a price above book value. The average amount of such transfers is $53.7 million. Guarantees made on behalf of affiliates are the least common and smallest type of transfer. Averages of 10 insurers receive capital and 9 insurers provide capital this way each year. The average size of each transfer in this category is approximately $5.6 million.

The average annual number and size of transfers described above is evidence of substantial ICM activity among affiliated insurers, but these figures do not fully capture the extent to which insurers are party to these transfers. It is very common in our sample to observe a firm receiving capital from affiliates in one-year and providing capital for affiliates in another year. For example, 431 insurers provide capital in at least one year in the form of reinsurance transactions with affiliates and 643 insurers receive capital in this form at least once. Two hundred and fifty-six sample insurers are both net providers and net receivers of capital via reinsurance transactions during different years of the sample period. The other types of ICM transaction described above display similar activity. We argue that this evidence is consistent with active reallocation of capital by a corporate headquarters.

Empirical Approach

We use a two-step approach to test the impact of ICM activity on the firm's investment behavior, emulating the theoretical development described in the section "The Impact of ICMs on Investment." First, we test our model of insurance company investment behavior using aggregate measures of capitalization to establish relationships between investment and changes in capitalization and underwriting exposure. Then, we alter the right-hand side of the regression equation to separate changes in capitalization based on whether or not they are the result of ICM transactions. A positive relationship between investment and changes in capital resulting from ICM transactions would be

consistent with ICMs redeploying assets to facilitate investment growth among affiliates. If these coefficients are nonpositive, we cannot reject the alternative hypothesis that these ICMs are being used for purposes other than facilitating growth, such as those discussed in the section "The Impact of ICMs on Investment" (e.g., regulation, tax minimization). Furthermore, by comparing the coefficient estimates for internal capital transfers to those for other sources of capital, we can determine the relative importance of ICMs in insurance groups.

Insurance Company Financing and Investment: Regression Model and Results

The first step in examining ICM activity is to establish the relationship between insurance company financing and investment behavior. Our primary model of financing and investment behavior in insurance companies (Equation (1)) presents investment as a function of change in policyholder surplus, change in reinsurance ceded, and change in underwriting exposure. The dependent variable, $\Delta Investment$ is the company's percent change in premiums written from period $t-1$ to period t. Following the reasoning of Houston, James, and Marcus (1997), we believe this measure is appropriate because writing insurance is the primary function of an insurance company. While insurers, like banks, also participate in activities such as the management of their asset portfolios, these activities are ancillary to insuring risks. Our measure of change in surplus, $\Delta Surplus$, is the change in policyholders' surplus from period $t-2$ to period $t-1$. This change in surplus represents a change in the insurer's capacity to write additional premiums without ceding more reinsurance or adjusting its underwriting exposure. We lag this variable one period relative to investment for two reasons. First, we expect insurers to adjust surplus before adjusting premiums written, so that they do not receive unwanted attention from rating agencies or regulators. Second, end of year surplus will depend in part on premiums written during that year, so using a contemporaneous measure of surplus would be inappropriate.

Change in net reinsurance ceded, $\Delta Reinsure$, is measured by the difference in the ratio of net reinsurance premiums ceded to total premiums written in periods t and $t-1$.[9] By ceding reinsurance, the primary insurer insulates itself from a portion of the risk that actual losses are greater than expected losses. The ratio of reinsurance ceded to total premiums written is appropriately treated as a capital structure decision because by increasing the proportion of premiums ceded to reinsurers, the primary insurer can write more insurance without increasing its surplus (Garven and Lamm-Tennant, 2003). Although the amount of premiums ceded depends on the amount of premiums written, we assume that the *ratio* is determined at the beginning of the period, before premiums are written.

We use three measures to proxy for underwriting exposure. The first two are Herfindahl indices of premiums written by state and by line of business. A higher index value indicates premiums are more concentrated in a geographic region or line of business; therefore, an increase in either index may represent an increase in underwriting exposure. However, it may be the case that the insurer is concentrating its premiums written in lines of business or geographic areas subject to less risk of

[9] Our net measure of reinsurance activity is similar to that used by Hoerger, Sloan, and Hassan (1990).

catastrophic losses. To partially account for these possible differences in exposure to catastrophic losses, we include a proxy for catastrophe exposure similar to the measure used by Gron (1999). It is meant to capture change in the company's exposure to loss from perils of natural disaster, such as hurricanes and earthquakes. It is calculated as the change in proportion of total premiums that are written in property lines in coastal states and earthquake coverage in California. Changes in these measures from the end of period $t - 1$ to the end of period t are used in empirical tests and are labeled Δ*Geographic Concentration*, Δ*Line-of-Business Concentration*, and Δ*Catastrophe Exposure*.

An insurer's investment might also depend on another aspect of its business mix. If an insurer writes new business in long tail lines of insurance, it may require less capital to increase premiums written than insurers writing other lines because future losses are discounted over a longer period. On the other hand, because long tail lines are associated with higher loss volatility (Cummins, Phillips, and Smith, 2001), increasing premiums in these lines may require additional capital. To control for changes in long tail premiums written, we add another variable, Δ*Long Tail*, equal to the change in an insurers ratio of premiums written in long tail lines to total premiums written from year $t - 1$ to t.

We also control for an insurer's ownership structure, which can affect its investment behavior.[10] Because mutual insurers are owned by their policyholders, they face limitations in accessing external capital markets. Thus, we expect mutual insurers to grow more slowly than stock insurers, all else equal. We control for ownership structure with *Mutual*, a dummy variable equal to one if the insurer is a mutual firm, and zero otherwise.

We estimate coefficients for these variables using generalized least squares (GLS) regression because we cannot rule out the presence of heteroskedasticity. Results are presented in Table 4. The positive and significant relationships between investment and surplus as well as investment and reinsurance are consistent with the theoretical model presented in the section "The Impact of ICMs on Investment." Some evidence also suggests that decreasing underwriting exposure through diversification is a method used to facilitate increases in investment. The significant and negative relationships between investment and concentration of premium written by geographic location and line-of-business are consistent with insurers increasing investment by entering new geographic markets and insuring different perils, resulting in a more diversified liability portfolio.

Change in premium written in long tail lines has a positive coefficient estimate, indicating that the present value discount for future claims empirically dominates the effect of increased uncertainty of losses in these lines of insurance. Regarding organizational form, we find that mutual insurers increase written premium more slowly than stock insurers. This may be due to difficulties mutual insurers face in accessing external capital markets. Mayers and Smith (1994) imply an alternative explanation for this result. Their managerial discretion hypothesis suggests mutual insurers should participate in well-established lines of insurance with fewer opportunities for premium growth.

[10] See Mayers and Smith (1982) and Lamm-Tennant and Starks (1993) for discussion of differences between stock and mutual insurers.

TABLE 4
Investment Model Results

Dependent Variable = $\Delta Investment$		
Variable	Coefficient Estimate	Standard Error
Intercept	0.072***	0.011
$\Delta Reinsure$	0.562***	0.029
$\Delta Surplus$	0.137***	0.026
Δ*Line-of-Business Concentration*	−0.017	0.044
Δ*Geographic Concentration*	−0.534***	0.054
Δ*Catastrophe Exposure*	−0.046	0.051
Δ*Long Tail*	0.199***	0.051
Mutual	−0.029***	0.011
R^2	0.54	

Note: See Table 1 for variable descriptions.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

In light of the results presented above, we can have confidence in our previous statement that before an insurer increases premiums written, it will (1) hold more capital, (2) increase premiums ceded to reinsurers, or (3) alter its loss exposure. Having validated these hypothesized relationships, we are now prepared to evaluate the impact of ICM activity on the investment behavior of affiliated insurers.

Impact of ICM Activity: Regression Model and Results

In the previous section we validated a general model of insurance company investment. In this section, we operationalize Equation (2) in order to empirically test the impact of ICM activity on insurer investment.

We begin by disaggregating the capitalization variables as described in the section "The Impact of ICMs on Investment." We separate $\Delta Surplus$ based on the origin of surplus funds. The new variable Δ*ICM Surplus* is equal to change in surplus resulting from ICM transactions. Δ*External Surplus* is equal to change in surplus from issuing external equity, or repurchasing treasury shares. The residual of Δ*ICM Surplus*, and Δ*External Surplus*, Δ*Other Surplus*, is equal to change in surplus resulting from anything other than ICM transactions or external equity issues. These changes in surplus could be the result of retained earnings (or losses) and payment of dividends to owners other than affiliates. We separate $\Delta Reinsure$ based on whether or not the assuming and ceding companies are affiliated with each other. Δ*ICM Reinsure* is equal to the change in an insurer's net reinsurance ceded to its affiliates. Δ*External Reinsure* measures the change in an insurer's net reinsurance ceded outside of its group or holding company.

The five new variables replace the two aggregate variables representing change in capitalization in the regression model. By estimating the new regression model, we can test the hypothesis that insurance groups use ICMs to facilitate investment growth among affiliates. Support for this hypothesis would include significant and positive coefficients on Δ*ICM Surplus* and Δ*ICM Reinsure*. The alternative is that insurers

TABLE 5
ICM Impact Model Results

Dependent Variable = Δ*Investment*		
Variable	Coefficient Estimate	Standard Error
Intercept	0.071***	0.011
Δ*ICM Reinsure*	0.638***	0.032
Δ*External Reinsure*	0.334***	0.049
Δ*ICM Surplus*	0.143***	0.033
Δ*Other Surplus*	0.134***	0.029
Δ*External Surplus*	0.411**	0.169
Δ*Line-of-Business Concentration*	−0.026	0.044
Δ*Geographic Concentration*	−0.531***	0.054
Δ*Catastrophe Exposure*	−0.035	0.050
Δ*Long-Tail Lines*	0.199***	0.051
Mutual	−0.028***	0.011
R^2	0.54	

Note: See Table 1 for variable descriptions.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

could transfer capital among affiliates for reasons other than facilitating growth, as described earlier. Furthermore, by comparing the size of the coefficients for the internal capital variables to those of the other capital and external capital variables, we can test the relative importance of ICM transfers in insurer investment behavior. Results are presented in Table 5.

The results are clearly consistent with the hypothesis that ICMs facilitate investment growth among affiliated insurers. Both types of ICM transactions display a significant and positive relationship with investment. The coefficient estimates for Δ*ICM Surplus*, and Δ*ICM Reinsure* are significant and positive. More importantly, the size of the coefficient estimates for the ICM transfer variables indicate that ICMs play an important role in the investment strategy of affiliated insurers. First, the coefficient estimate for Δ*ICM Reinsure* is both nominally and statistically larger than that for Δ*External Reinsure*. An *F*-test of the null hypothesis that the two coefficients are equal is rejected at the 1 percent confidence level ($F = 33.85$). The coefficient estimate for Δ*ICM Surplus* (0.143) is nominally larger than the coefficient estimate for Δ*Other Surplus* (0.134), but the difference between the two coefficients is not significant. The coefficient estimate for Δ*External Surplus* is significant and positive, but it is not statistically different from the coefficient estimate for Δ*ICM Surplus*. These results suggest insurer investment depends at least as much, if not more, on capital provided by group members than by retained earnings or capital from external sources.

Our results contradict the conclusions of a number of recent studies of firms across multiple industries excluding the financial sector (Shin and Stulz, 1998; Rajan, Servaes, and Zingales, 2000). The authors of these studies conclude that ICMs play only a limited role in the financing and investment behavior of firms. However, our results

concerning the importance of ICM transactions with respect to a company's investment behavior are consistent with the conclusions of studies of bank holding companies (Houston, James, and Marcus, 1997; Houston and James, 1998). Collectively, the conclusions of these efforts point to financial intermediation activities as a catalyst for active ICMs that facilitate investment growth.

EMPIRICAL ANALYSIS: ICM EFFICIENCY

In the previous section, we established that ICMs are active within insurance groups, and are used to facilitate investment growth in affiliates receiving ICM capital support. These findings alone, in our view, are a significant contribution to the literature, given that ICMs in the insurance industry have not been previously examined. However, the next logical question to ask is whether ICMs in the insurance industry are efficient. The fact that capital is transferred among insurer group members and that such transfers appear to facilitate investment growth in ICM-supported affiliates does not necessarily mean that ICMs are acting efficiently. It can only be said that ICMs are acting efficiently if they are being used to provide internal capital to the affiliates with the best prospects. To address this issue, further analysis is needed.

The primary goal of this section is to test the efficiency of ICMs in the insurance industry. In an efficient ICM, capital is transferred to affiliates with the best investment opportunities, which we define as the affiliates with the best expected performance over the coming period. We regress a measure of ICM transfers on proxies for expected performance relative to other subsidiaries in a group, plus other controls. A positive relation between ICM transfers and expected performance would be consistent with efficient ICMs.

Variables used in the empirical analysis of ICM efficiency are defined in Table 6. The dependent variable in the model measures ICM transfers to the insurer. Unfortunately, a single variable cannot adequately capture all of the potential forms of ICM transfers discussed in earlier sections. Measures of ICM transfers via reinsurance are not additive to measures of other forms of ICM transfers. To illustrate, a direct $100 capital contribution from one affiliate to another is not equivalent to $100 in premiums ceded via a reinsurance agreement between the affiliates. Although both represent capital transfers, they cannot be meaningfully added together. This did not pose a problem in the empirical analysis of the previous section, because separate variables could be used for internal reinsurance and other ICM transfers. By contrast, when using ICM transfers as the dependent variable, a single measure is needed. We have chosen as the dependent variable a measure of ICM transfers based on reinsurance transactions among affiliates. The variable, denoted as ICMT in the models, is the ratio of net internal reinsurance premiums ceded to total premiums written.[11] A higher value of ICMT for an insurer implies a larger amount of capital made available to the insurer from its affiliates.

We focus on internal reinsurance here instead of other ICM transfers for a variety of reasons. Internal reinsurance transactions are by far the most significant category

[11] Reinsurance premiums ceded and assumed among affiliates are reported in the Underwriting and Investment Exhibit Part 2B—Premiums Written of the NAIC Annual Statement.

TABLE 6
Variable Definitions

ICMT	Represents the net ICM transaction via internal reinsurance. It equals the ratio of reinsurance premium ceded to affiliates minus reinsurance premium assumed from affiliates to total premium earned
ROA	Return on assets minus the group's average return on assets in period $t - 1$
Underwriting ROA	Underwriting income divided by total assets minus the group's average underwriting ROA in period $t - 1$
Size	Natural logarithm of total assets in period $t - 1$
Capital	Capital (assets minus liabilities) divided by total assets in period $t - 1$
Relative Size	Insurer's assets divided by the group's assets in period $t - 1$
Mutual	Binary variable equal to one if the insurer is organized as a mutual company
Lines of Business	Percentage of direct premium written in each of 31 lines of insurance in period $t - 1$

of ICM transactions.[12] More than 90 percent of insurers in our sample participate in these transactions, while less than 40 percent of firms participate in any of the other ICM transfers. Although intragroup dividends are not nearly as significant in number or size as internal reinsurance, they are still fairly frequent. However, tracking the flow of dividends will not likely reveal the type of ICM "winner picking" that we are investigating for the following reasons. First, and perhaps most important, unlike internal reinsurance, dividends do not provide the flexibility to direct capital to a targeted affiliate based on performance. Dividends can only be paid based on ownership. Therefore, dividends cannot be used to transfer capital from affiliate A to affiliate B if affiliate B does not have ownership in affiliate A. In addition, even where ownership exists, dividends cannot be selectively directed to a specific firm. If a dividend is paid to one owner, it must be paid to all owners.

Another problem with using dividends in our context relates to the capacity to pay dividends. Unprofitable firms are simply less likely to have the ability to pay dividends. This is especially true because large dividends (as well as some other capital transfers, like payments related to surplus notes) must be preapproved by regulators. Obviously, regulators are more concerned with solvency than with firm performance, and would likely be reluctant to approve dividend payouts from a poorly performing firm to a well-performing firm.

For the reasons described above, we do not see dividend payments as a likely method of choice for allocating capital to divisions with high expected performance. We believe that internal reinsurance is a much more viable alternative.

The key independent variable in the analysis is a proxy for relative expected performance compared to other affiliated insurers. We use measures of past performance to

[12] See Table 3.

proxy for expected performance in the next period. While certainly imperfect, this is the best available proxy.[13] Specifically, we use two measures, both measured at time $t - 1$, to proxy for expected relative performance. The two measures are *ROA* and *Underwriting ROA*. In an efficient ICM, what is important in making capital transfer decisions is each firm's expected performance relative to other members of the group. To capture relative expected performance for a member firm, we use the difference between the expected performance measure of the firm and the average expected performance measure of all affiliates in the group.

ROA is defined as net income before taxes divided by total assets. We use this variable because it is a common overall measure of performance. However, we also test a second measure, *Underwriting ROA*, because some evidence suggests that investment portfolio decisions are sometimes made at the group level rather than by each subsidiary, while underwriting occurs at the subsidiary level (Mayers and Smith, 1992). Thus, underwriting performance may be a better measure of subsidiary performance than overall ROA. *Underwriting ROA* is defined as underwriting income (or loss) divided by total assets. It is equal to *ROA* except that investment income is subtracted from the numerator. The performance measures are lagged one period because they are meant to proxy for expected performance. The lag also avoids endogeneity with the dependent variable. If ICMs are efficient, we should observe a positive relation between expected performance and ICM transfers.

Relative investment opportunities will not be the sole basis for allocation of capital in an ICM, even if the ICM is efficient. Thus, additional controls are included in the model. The first control variable is a measure of firm size. Phifer (1996) offers that larger insurers face smaller transaction costs and receive better terms when accessing external capital markets, and thus have a lesser need than smaller insurers to rely on ICMs to obtain needed capital. The variable *Size* is measured as the natural logarithm of total assets in period $t - 1$. We expect a negative relation between *Size* and *ICMT*.

We also control for the size of affiliates relative to the size of their groups for two reasons. First, as stated above, larger firms receive better terms when accessing external capital markets (Phifer, 1996). Thus, if the group overall faces a capital constraint, it may be optimal for the largest firm to access external capital markets, and then redistribute the capital to its affiliates via the group's ICM, making the large member a net provider of internal capital. Second, insurers that are large relative to their groups face a supply constraint in the ICM. For example, if there are only two affiliates in a group, one with $1 of assets and the other with $100 of assets, the larger insurer cannot receive more than 1 percent of its prior year's assets as an ICM transfer. On the other hand, if the smaller insurer receives just $1 as an ICM transfer, its total assets will double. The variable, *Relative Size*, is equal to the firm's assets divided by the total assets of the group. We expect a negative relation between *Relative Size* and ICM transfers.

[13] Campello (2002) uses a similar approach. He distinguishes between "better" and "worse" bank affiliates using data on past loan performance. Prior studies use variations of Tobin's Q to proxy for investment opportunities. One drawback of using insurer data is that very few are publicly traded at the subsidiary level; therefore, we cannot estimate Q. Conversations with insurance industry analysts suggest that our measures are representative of the industry standard for evaluating the performance of insurance company managers.

An insurer's capital (or surplus) is the difference between its assets and liabilities. Capital serves as a buffer fund to make the insurer's promise to pay credible, even if actual losses are greater than expected losses. The more capital an insurer holds, the more it can invest in new projects (i.e., writing more insurance) without raising additional capital. In our model, *Capital* is the ratio of capital to total assets in period $t - 1$. We expect a negative relation between ICM transfers and *Capital*, because more heavily capitalized firms are less likely to need additional capital from the rest of the group, all else equal.

Finally, we control for each insurer's business mix. Lines of insurance differ by claim tail, parameter uncertainty, regulatory restrictions, and claiming trends. These differences affect the amount of capital each insurer requires to underwrite an additional unit of coverage. We include variables equal to the percentage of premium written in each line of insurance.[14]

Data and Sample Selection

The empirical analysis in this section uses data from the NAIC property–casualty insurer database representing year-end observations in years 1996 through 2003. Because several variables must be lagged in the regression equation, this yields seven observations for each insurer. To be included in our sample, an insurer must be affiliated with at least one other property–casualty insurer, to allow the possibility of an ICM transfer. It must hold assets and write premiums in each year, and it cannot have merged with or been acquired by another firm during the sample period. Similar to Shin and Stulz (1998), observations of ICM transactions greater than 100 percent of premium written in our dependent variable are excluded to reduce the affect of outliers in our analysis.[15] Finally, the firm must be organized as a stock or a mutual. We delete insurers organized as reciprocal exchanges and Lloyd's associations due to the unique, specialized nature of such firms. The final sample includes a seven-year panel of 653 insurers, for a total of 4,571 observations. Basic summary statistics for the sample appear in Table 7.

Methodology and Results

We estimate Equations (3) and (4) below using GLS regression. The two equations differ only in the proxy used for expected relative performance (lagged relative ROA versus lagged relative Underwriting ROA). Results are presented in Table 8.

$$ICMT_{(t)} = \beta_0 + \beta_1 * ROA_{(t-1)} + \beta_2 * Size_{(t-1)} + \beta_3 * Capital_{(t-1)} + \beta_4 * Relative\ Size_{(t-1)} + \beta_5 * Mutual + \sum_{j=1}^{30} \beta_{j+5} Line_{j(t-1)} + \varepsilon \quad (3)$$

[14] We exclude one line-of-business variable to avoid singularity in the regression matrix. Results for these variables are not included in Table 4, but they are available from the authors. Results do not change substantively if these variables are omitted from the regression model.

[15] Such observations are few, and results are not sensitive to the inclusion, exclusion, or windsorizing of these observations. We exclude them simply because these are generally firms in run off, which are unlikely to exhibit the same behavior as ongoing active insurers.

TABLE 7
Summary Statistics

Variable	Mean	Standard Deviation
ICMT	0.218	0.469
ROA	−0.004	0.071
Underwriting ROA	0.001	0.047
Size	18.398	1.818
Capital	0.291	0.203
Relative Size	0.202	0.286
Mutual	0.163	0.369

Note: Variable definitions are provided in Table 6.

$$ICMT_{(t)} = \beta_0 + \beta_1 * Underwriting\ ROA(t-1) + \beta_2 * Size_{(t-1)} + \beta_3 * Capital_{(t-1)} + \beta_4 * Relative\ Size_{(t-1)} + \beta_5 * Mutual + \sum_{j=1}^{30} \beta_{j+5} Line_{j(t-1)} + \varepsilon. \quad (4)$$

In the results reported in Table 8, the dependent variable measures net ICM transfers via internal reinsurance transactions. The key independent variable, meant to test for ICM efficiency, is the measure of relative expected performance. Relative *Underwriting ROA* is used as the performance measure in the first column, while relative overall *ROA* is used in the second column. In both cases, the coefficient on the relative expected performance measure is positive and significant.[16] These results imply that group members with better relative performance in period $t - 2$ to $t - 1$, which we use as a proxy for expected relative performance for period $t - 1$ to t, receive stronger internal capital support from the rest of the group for the next period. This is consistent with efficient ICMs allocating capital to group members with the best expected performance. This result is in sharp contrast to studies of ICM efficiency using Compustat segment data, which generally find that ICMs are inefficient (Shin and Stulz, 1998; Rajan, Servaes, and Zingales, 2002). However, it is consistent with results of some studies that use data other than Compustat (e.g., Khanna and Tice, 2001; Campello, 2002), or that carefully control for measurement error detected in prior studies (Whited, 2001).

[16] If we regress a measure of *ICMT* including only dividends, or only transfers other than reinsurance (dividends and other transfers divided by total assets), the coefficient estimates for the ROA variables are significant and negative. This is not surprising given our discussion of dividends and other transfers in the section "Empirical Analysis: ICM Efficiency." For completeness, we also create a dependent variable equal to the sum of reinsurance and other transfers divided by total assets. The validity of this measure rests on the assumption that the ceding insurer expects $1 in claim payments from the reinsurer for each $1 in premium ceded. We also altered this assumption to consider reinsurance premiums including loading costs of 20 percent. Both iterations of this alternative dependent variable produce results consistent with those from the reinsurance-based variable presented in Table 8.

TABLE 8
Results From ICM Efficiency Model

Variable	Coefficient Estimate	Standard Error	Coefficient Estimate	Standard Error
Intercept	1.511***	0.136	1.515***	0.135
Underwriting ROA$_{(t-1)}$	0.484***	0.128		
ROA$_{(t-1)}$			0.197*	0.107
Size$_{(t-1)}$	−0.060***	0.004	−0.063***	0.004
Capital$_{(t-1)}$	−0.527***	0.036	−0.514***	0.036
Relative Size$_{(t-1)}$	−0.524***	0.026	−0.518***	0.026
Mutual	0.128***	0.020	0.128***	0.020
R^2	0.25		0.24	

Note: Results for 31 line-of-business variables are available from the authors. One line of business (commercial multiple peril) is omitted to avoid singularity in the regression matrix. All variables used in the analysis are defined in Table 6.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

The results for the remaining variables are consistent across both regressions. Coefficients on both the *Size* and *Relative Size* variables are negative and significant. Thus, larger firms, measured both in absolute terms and relative to the size of the rest of their group, rely less on ICMs than do smaller firms. It is likely that large firms have a lesser need for ICMs than small firms because they can more easily and cheaply access external capital markets. In addition, they face an ICM supply constraint, because the larger they are relative to their group, the less likely that the group has the resources to provide internal capital in an amount that would be meaningful to the large firm.

Finally, the capitalization variable, *Capital*, enters into the regressions as negative and significant. This is as expected, as all else equal, firms with higher capital ratios have a lesser need for additional capital, either internal or external.

CONCLUSIONS

Using data from affiliated insurance companies, we investigate the purpose and relative importance of ICMs in financial intermediaries. One of the benefits of studying a sample of insurers is that the ICM transactions of insurers are reported in annual statements. These transparent ICMs allow us to execute a more direct test of the purpose and importance of ICMs than has been possible in many previous efforts. We provide a detailed description of ICM transactions within insurance groups. Although given minimal attention in previous literature, ICM transfers among affiliated insurers are shown to be very common and often substantial in size.

We develop and test a model of insurance company investment behavior. We find that the investment of an insurer is positively related to variables representing changes in its capitalization, and negatively related to changes in its underwriting risk exposure.

Next, we disaggregate the capitalization variables in the model based on whether or not the changes in capitalization result from ICM transactions. The two variables representing ICM transactions both display significant and positive relationships with investment that are at least as large as the relationships between investment and other sources of capital. We interpret these results as consistent with ICMs in insurance groups promoting growth in affiliates' investment. Contrary to a number of studies of nonfinancial firms, the relatively large coefficients on the ICM variables imply that ICM transactions play an economically significant role in the investment decision of affiliated insurers. Our results concerning the importance of ICM transactions with respect to insurance companies' investment behavior are consistent with the conclusions of studies of bank holding companies (Houston, James, and Marcus, 1997; Houston and James, 1998).

Finally, we use detailed data on the ICM transfers within insurance groups to execute a more direct test of ICM efficiency than currently exists in the literature. Consistent with efficiency, we find a positive relation between expected performance and ICM capital transfers. Thus, it appears that ICMs are being used to transfer capital to the affiliates with the best perceived investment opportunities. While these results are in sharp contrast to studies using segment data for diversified industrial firms (e.g., Shin and Stulz, 1998; Rajan, Servaes, and Zingales, 2000), they are consistent with those of studies using data from more homogenous industries such as discount retailers (Khanna and Tice, 2001) and financial services firms (Campello, 2002).

We offer several explanations for the differences between results in this study and those of many prior studies studying ICM activity and efficiency. First, Stein (1997) suggests that the value of ICMs may be greatest among firms that are narrowly focused and whose assets present difficulty in valuation. Insurers fit this description very well, except that with insurers it is generally the liabilities rather than the assets that are difficult to value. Second, similar to the argument made by Khanna and Tice (2001), insurance groups perform a relatively homogenous set of activities relative to diversified conglomerates in other industries. This potentially enables headquarters of insurance groups to do a better job of winner picking than headquarters of other conglomerates, while minimizing agency-related costs of diversification, such as empire building, influence costs, and power grabbing. Finally, our tests utilize a more direct measure of ICM activity than prior studies. Data on the actual ICM transfers within insurance groups is a more reliable measure of ICM activity than those used in prior studies which must infer possible ICM capital allocation via observed division investment activity.

Substantial work remains to be done to fully understand the impact of ICMs on firm value. While the results of this study are clearly consistent with ICM efficiency in the property–liability insurance industry, other studies have found evidence of inefficient ICMs in other industries. Future research is needed to determine the source of conflicting results in various studies of ICM efficiency. It may be that data limitations and methodological issues are leading to incorrect conclusions in some studies, or it may be that ICM efficiency varies across industry and time periods in ways that are not yet fully understood, and that there is no universal answer to the question of whether or not ICMs are efficient.

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