Corporate Hedging in the Insurance Industry: The Use of Financial Derivatives by U.S. Insurers

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Abstract: In this paper we investigate the extent to which insurance companies utilize financial derivatives contracts in the management of risks. The data set we employ allows us to observe the universe of individual insurer transactions for a class of contracts, namely, those normally through of as off-balance-sheet (OBS). We provide information on the number of insurers using various types of derivatives contracts and the volume of transactions in terms of notional amounts and the number of counterparties. Life insurers are most active in interest rate and foreign exchange derivatives, while property-casualty insurers tend to be active in trading equity option and foreign exchange contracts. Using a multivariate probit analysis, we explore the factors that potentially influence the existence of OBS activities. We also investigate questions relating to whether certain subsets of OBS transactions (e.g., exchange traded) are related to such things as interest rate risk measures, organizational form, and other characteristics that may discriminate between desired risk/return profiles across a cross-section of insurers. We find evidence consistent with the use of derivatives by insurers to hedge risks posed by guaranteed investment contracts (GICs), collateralized mortgage obligations (CMOs), and other sources of financial risk.

JEL classification: G3, G22

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1. Introduction

The world of insurance has become a risky one. Insurers are facing increasing intra-industry competition as well as more intensive competition from other financial institutions such as banks and mutual funds. In response, insurers have developed a number of increasingly complex products and at the same time have had to reduce the profit loadings in these products in order to compete in the marketplace. In addition, the internationalization of financial markets has exposed insurers to stiffer competition from foreign firms and to levels and types of risks that were not present in the recent past. Add to this the historically high volatility in the prices of financial assets we have witnessed in the past quarter century and it is not surprising that insurance company managers are worried about financial risk.

Financial reporting and regulatory requirements also have made insurers more sensitive to the risks inherent in their asset and liability portfolios. The most prominent changes have been the adoption of risk-based capital requirements, Financial Accounting Standard (FAS) 115, requiring mark-to-market accounting for fixed income securities held in the "trading" or "available for sale" categories and FAS 119, requiring disclosure of the purpose of derivative transactions.

This changing market and regulatory environment has led insurers to explore new techniques for managing their asset and liability risk, without sacrificing income. Many insurers have turned to financial derivatives to manage risk and enhance income. The market for financial derivatives has grown rapidly over the past two decades and now offers a wide variety of contracts to manage nearly all types of financial exposures. The contracts range from

standardized derivatives that are traded on organized exchanges to individually tailored, over-the-counter (OTC) contracts created for a buyer by a derivatives dealer.[1]

The growth in derivatives markets has greatly expanded the risk management opportunity set available to insurers and other investors. However, following the recent well-publicized derivatives-related losses of Orange County California, Procter & Gamble, Gibson Greetings, and Barings Bank, derivatives have also become controversial, leading to more intensive scrutiny of derivatives practices by both state and Federal regulators.

Against this backdrop, it seems particularly important to understand the level and types of derivatives transactions that are currently being undertaken by insurers. However, the existing information on insurer derivatives activity is mostly anecdotal, and no comprehensive analysis of usage by insurers has yet been conducted. The purpose of the present paper is to remedy this deficiency in the existing literature by providing a detailed statistical analysis of the use of derivatives by U.S. life and property-casualty insurers. In addition to providing data on the extent of insurer activities, we also investigate the factors that influence the participation decisions of life and property/casualty insurers in the financial derivatives market. This information should prove useful to insurers that are present or potential participants in derivatives markets as well as to regulators concerned about the potential misuse of OBS contracts.

To conduct this study, we take advantage of the detailed disclosure requirements imposed on insurers by state regulators that provide information on individual holdings and transactions in derivatives markets. Specifically, we use data from Schedule DB of the 1994 annual statements

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[1]Some derivatives transactions, such as futures or forward contracts, do not directly create assets or liabilities on insurer balance sheet, but rather generate (sometimes contingent) cash flows. Hence, derivatives are often referred to as off-balance-sheet (OBS) contracts.

of all U.S. insurers reporting to the National Association of Insurance Commissioners (NAIC). Our data analysis provides, among other things, information on the number of insurers that are actively trading various types of derivatives contracts. Contrary to conventional wisdom, which holds that the vast majority of insurers active in derivatives are life insurers, we find that approximately equal numbers of life and property-casualty insurers are active in derivatives markets. We also provide information on the types of contracts that are most frequently traded by insurers and the volume of derivatives transactions. Finally, Probit analysis is employed in order to examine the determinants of derivatives market participation by insurers. We are able to consider questions such as what type of insurers are likely to use various types of derivatives contracts and for what purpose -- hedging financial risks, hedging underwriting exposure, or pursuing trading profits uncorrelated with underlying economic activities. We build on earlier work that has presented evidence on the participation decision by banks (Sinkey and Carter, 1995, Gunther and Siems, 1995), life insurers (Colquitt and Hoyt, 1995), and nonfinancial firms (Fenn, Post and Sharpe, 1996, Nance, Smith, and Smithson, 1993).

The discussion proceeds as follows: In section 2, we provide an overview of some basic reasons why insurers might wish to employ OBS contracts, and briefly reviews the prior literature on the use of derivatives by financial institutions. Section 3 describes the data base and presents statistics on the number of insurers using derivatives, the volume of those transactions, and statistics on counterparty exposure. Section 4 provides a brief summary of the prior literature on the determinants of corporate hedging and outlines our hypotheses. The determinants of derivatives usage are analyzed in section 5, and section 6 concludes.

2. Background: Derivatives and Financial Risk Management

The Need for Financial Risk Management

Insurers serve two primary functions in the economy -- (a) a risk-bearing and risk-pooling function and (b) financial intermediation. In their risk-bearing and risk-pooling function, insurers provide a mechanism for individuals and businesses exposed to the risk of loss of life, health, or property to transfer these risks to an insurer in return for a premium payment. The insurer can diversify most of this risk (usually called underwriting risk) by writing insurance on large numbers of policyholders (the risk-pooling function), whose risk of loss is more or less statistically independent. However, diversification does not fully eliminate underwriting risk, giving rise to the need for insurers to hedge this risk.[2]

The other important economic function performed by insurers is financial intermediation. Financial intermediation involves raising funds by issuing specialized types of debt contracts and investing the funds in financial assets. Although financial intermediation would not be needed if financial markets were complete and frictionless, market imperfections, incompleteness, and gains from specialization in certain types of financial transactions give intermediaries economic value. Intermediaries typically are compensated for their services in the form of *yield spreads*, i.e., they pay less for the funds they borrow than they earn on the funds they lend or invest.

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[2]Although reinsurance is still the predominant means of hedging underwriting risk, a derivatives market in underwriting risk has begun to emerge. The first exchange-traded insurance derivatives are the catastrophe insurance futures and options introduced by the Chicago Board of Trade (CBOT) in 1992-1993. These contracts have not traded very widely to date, although trading volume has been increasing steadily since a new sequence of contracts was introduced in the Fall of 1995. Insurance derivatives are likely to become very important in the future, expanding the industry's capacity to bear risk and smoothing out cyclical price fluctuations (for a discussion see Cummins and Geman, 1995). However, in the present paper we focus on financial derivatives.

The debt instruments issued by property-casualty insurance companies are insurance policies covering various types of risks such as automobile accidents, fires, work accidents, and lawsuits arising from defective products, professional malpractice, etc. The funds raised are invested primarily in traded bonds and stocks. Life insurers raise funds by issuing various types of products such as cash value life insurance, annuities, and guaranteed investment contracts (GICs). Like property-casualty insurers, they also invest in traded bonds and stocks, but life insurers are also major participants in the markets for privately placed bonds and mortgages.

The intermediation function of insurers gives rise to the majority of their need for financial risk management. One reason that this need arises is because the cash flows of the liabilities issued by insurers have different patterns and characteristics than the cash flows of the assets they invest in. This difference in asset and liability cash flows is in fact part of the definition of financial intermediation. An example is a portfolio of liability insurance policies, where the cash flows represent payments of liability judgments to claimants. This cash flow pattern is likely to differ from the cash flows of conventional assets such as bonds or stocks. Contracts with unusual cash flow patterns in life insurance include universal life, where policyholders have a great deal of discretion over the premiums contributed, variable life insurance and annuities, which are linked to equity indices or portfolios, single premium deferred annuities, and guaranteed investment contracts (GICs). These contracts typically were created to meet the needs of a particular class of investor and exist precisely because (and only as long as) the insurer has a comparative advantage in creating an asset portfolio which delivers the promised policy cash flows without exposing policyholders to unacceptable levels of risk. Creating these types of asset portfolios requires financial risk management.

Probably the most important of the more complex financial risk management tasks faced by both life and property-casualty insurers is to manage the *duration* and *convexity* of their asset portfolios and to manage relationship between the duration and convexity of assets and the duration and convexity of liabilities. This latter type of risk management is known as *asset-liability management* (ALM).[3]

The traditional ways to manage duration and convexity were by matching asset and liability cash flows or through portfolio immunization, i.e., structuring asset portfolios so that the durations of assets and liabilities were matched or at least managed to achieve organizational objectives. However, this type of asset-liability management can involve a considerable amount of trading and accompanying transactions costs. Financial derivatives often provide a cheaper and/or more flexible way to manage duration and convexity risk. This type of hedge involves simultaneously buying and/or selling various combinations of derivative contracts, such as swaps, calls, and puts.

Hedging vs. Speculation

While insurers and other investors can use derivatives to hedge risk, they can also use derivatives for income enhancement or "speculation." There is some concern in the regulatory community about the possibility that higher levels of derivatives activity may increase insurer insolvency risk. While it is certainly possible to construct derivatives positions that would expose

[3]Intuitively, duration is the sensitivity of the price of an asset to a change in interest rates, e.g., the percentage decline in the value of a bond in response to a specified percentage change in interest rates. Convexity is the change in an asset's price sensitivity, i.e., duration, when rates change. Duration gives a good indication of how much an asset's price will change in response to a small change in the level of interest rates; but because of the existence of convexity (convexity risk), duration does not give as good an approximation to the price change for relatively large changes in the level of interest rates.

insurers to significant amounts of risk, there are also income enhancement strategies such as covered call strategies which are no more risky than more traditional investments such as stocks and bonds.[4] Given the complexities of derivatives strategies and the dynamic nature of the market, determination of the appropriate type and level of regulation is difficult. Considerations include: derivative market reaction to regulations (i.e. creation of new derivatives to circumvent regulations), impact on the ability of insurers to manage its risks in an effective and efficient manner, and the level of statutory reporting necessary to provide appropriate information to investors and policyholders. For example, increased reporting of derivatives positions, by improving Schedule DB and making the resulting information more conveniently available to investors and policyholders, would enhance the role of market discipline in controlling insolvency risk, and market forces are nearly always more effective than direct regulation.

3. The Use of Derivatives By Insurers

The Data

Our data on the use of derivatives by insurers come from Schedule DB of the 1994 regulatory annual statements filed by insurers with the National Association of Insurance Commissioners. Parts A through D of Schedule DB list individual transactions across four general categories of derivatives; (A) options, caps and floors owned, (B) options, caps and floors written, © collar, swap and forward agreements, and (D) futures. In part E of schedule DB,

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[4] A covered call strategy is one where the holder of some underlying instrument (e.g., share in a stock) writes a call option on that particular investment. This has the immediate effect of generating income for the insurer. If share prices stay the same or decrease, the call is not exercised. If prices rise, the share are "called away" from the writer, however, the insurer can easily deliver the shares since it already owns them. The primary motivation for an insurer to undertake this investment strategy is to enhance the income of the insurer by selling the possibility of the capital gain in the underlying asset.

insurers are required to report their year-end counterparty exposure for all the contracts contained in sections A through D. Part E is potentially important because insurers may have reasons to engage in OBS activities during the year but to "clean out" their books for purposes of the annual regulatory report, which reflects holdings and liabilities at year end.

The sample of insurers we analyze consisted initially of all life and property-casualty (PC) companies that filed regulatory annual statements with the National Association of Insurance Commissioners for report-year 1994, a total of 1,760 life insurers and 2,707 PC insurers. Initial screening resulted in the elimination of firms with zero or negative assets, premiums, or surplus (equity) and firms that lack adequate group affiliation identifiers. Although the screening criteria resulted in the elimination of a large number of insurers, these are predominantly very small firms that in the aggregate account for only 2.2 percent of industry assets. The final sample consists of 1,207 life insurers and 2,063 PC insurers. Many of these insurers are members of groups that operate under common ownership. Because members of groups are likely to share common financial strategies and, in many cases, common investment departments, we analyze firms at the group level as well as the individual company level. The group/unaffiliated sample consists of 1,423 groups and unaffiliated single companies.

Extent of Derivatives Usage by Insurers

Number of Users. The numbers of insurers using derivatives, by industry and organizational form, are shown in Table 1, which focuses on the use of derivatives by insurer size quartile, where size is measured by total assets. The top part of the table shows the extent of derivatives usage by life insurers, PC insurers and groups/unaffiliated singles. Insurers were

counted as derivatives users if they reported any derivatives activity in 1994 in Schedule DB of the regulatory annual statement, either within-year transactions or end-of-year holdings. The table reveals the familiar size skewness characteristic of derivatives usage by both life insurers (Colquitt and Hoyt, 1995) and banks (Sinkey and Carter, 1995, Gunther and Siems, 1995). Less than 2 percent of the insurers in the smallest size quartile used derivatives in 1994. In the largest quartile, derivative transactions were reported by 38 percent of life insurers, 20 percent of PC insurers, and 35 percent of the groups and unaffiliated insurers.

For the industry as a whole, derivatives use was reported by 12 percent of life insurers, 7 percent of PC insurers, and 12.5 percent of groups and unaffiliated single insurers. Although derivatives usage in the PC industry is relatively low, the finding that 142 PC companies are active in OBS securities is somewhat surprising, given the conventional view that derivatives activity is confined almost exclusively to the life insurance industry. In fact, the number of PC insurers using derivatives (142) is about the same as the number of life insurers (144).

The second panel of Table 1 shows that stock firms are more likely to use derivatives than mutuals and reciprocals. In the life insurer sample, 16.4 percent of stock firms use derivatives, compared with 6.7 percent of mutuals. For PC insurers, 9.5 percent of stocks use derivatives, compared to 4.3 percent of mutuals. This is consistent with the managerial discretion hypothesis (Mayers and Smith, 1988), that stocks engage in more complex activities on average and have more need to hedge. It also could be consistent with more income enhancement transactions by stock insurers.

Types of Contracts. Table 2 provides some summary statistics on year-end 1994 open derivatives positions by type of contract for life and PC insurers combined. Table 2 provides

information on the number of insurers using each type of contract and the notional amounts of the contracts.[5] Column 1 shows the various derivative contract types, while column 2 shows the number of insurers holding this position at year end 1994. Columns 3 and 4 show the mean and median notional amounts by insurers. Based on the number of users, swaps are clearly the most popular type of contract used in the industry. Somewhat surprising is the relatively large number of insurers engaged in writing call options. Other positions with a relatively large amount of activity are short and long futures, put options owned, forwards and caps. The mean number of open positions significantly exceed the medians for nearly all contract types, indicating a significant skewness in the data, with a few (fairly large) participants accounting for a disproportionate share of end-of-year holdings.

Table 3 is similar to Table 2 but shows the total number of positions and their corresponding notional values opened during 1994. These amounts are expected to be larger than end-of-year holdings because many positions are opened and closed out during the same calendar year. Based on positions opened during the year, writing call options accounts for the largest amount of activity in terms of number of participants and positions taken during the year. Forwards, swaps, and futures also account for significant intra-year volume in terms of both the number of participants and the total notional values outstanding.

Underlying Assets. Tables 4 and 5, for life-health and property-liability insurers, respectively, provide a more detailed picture of derivatives activity by breaking down year-end positions by type of underlying asset as well as by type of derivative contract. Table 4 shows that

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[5] The notional value of an OBS contract is analogous to the par or face value of an underlying contract. It is important to emphasize, however, that none (or at most, a small amount in the case of options) of this notional value changes hands. It is used instead to calculate the cash flows that change hands.

interest rate swaps, interest rate caps and floors, bond futures, and foreign currency forwards are the most important types of derivatives for life insurers in terms of the number of users reporting open positions at the end of the year. Thus, while interest rate swaps are the most prevalent year-end position by life companies, a number of these institutions also engaged in interest rate risk management via contracts with option-like characteristics. In contrast to life insurers, Table 5 shows that the most common activity for PC insurers is in foreign currency forward contracts and the writing of equity call options. To the extent that PC companies face substantial foreign exchange exposure due to foreign based subsidiaries and/or the holding of foreign bonds or equities, this result is not unexpected.

Tables 4a and 5a are similar to Tables 4 and 5 but show the number of derivatives contracts opened by insurers during 1994. For life-health insurers, positions opened during the year greatly exceed end-of-year holdings for bond calls written, long and short bond futures, foreign currency forwards, and short foreign currency futures. For PC insurers, within- year transactions significantly exceed year-end positions for equity calls written, foreign currency swaps, short bond futures, and short equity futures. Short term hedging needs may account for part or all of the volume differences in open vs. year-end positions.[6]

Counterparty Exposure. It is also important to consider the counterparty exposure of insurers. Credit risk may be higher for OTC counterparties than for exchanges, so a heavy concentration of transactions in a few OTC counterparties could possibly expose insurers to excessive credit risk.

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[6]For example, if an insurers wished to lock in the rate on monthly predictable cash flows, they will show twelve contracts opened (and later closed) during the year. But only $\frac{1}{12}$ of this level in the year-end financial statements.

Tables 6 and 7 show data on the counterparty concentration of insurer derivatives transactions at year-end and on positions opened during 1994, respectively. The principal measures of counterparty concentration used here are the mean and median number of counterparties and the counterparty Herfindahl index, based on notional principle.[7] A high value of the Herfindahl index implies that an insurer has its transactions heavily concentrated among one or a few counterparties, with the maximum value of 1 indicating concentration of all notional principal in a single counterparty. Table 6 shows that the mean and median number of OTC counterparties at year-end are 4.7 and 2.0, respectively, and the mean and median OTC counterparty Herfindahl indices are 0.620 and 0.582, respectively. The within-year concentration statistics lead to similar conclusions. Although concentration among exchange counterparties is higher, it has been argued that credit risk is lower for exchange traded derivatives.

Tables 8 and 9 list the OTC counterparties used by insurers at year-end and during the year, respectively. The counterparties are ranked in terms of the total notional amount outstanding with insurers. The counterparty with the largest notional amount outstanding with insurers at year-end is Goldman Sachs followed by other large U.S. investment banks such as Morgan Guaranty, Bankers Trust, Salomon Brothers and Merrill Lynch. A number of foreign counterparties also appear on the list, such as Credit Suisse and Deutsche Bank. The leading

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[7]The Herfindahl index is defined as follows:

$$H = \sum_{i=1}^{n} \left(\frac{N_i}{N}\right)^2$$

where N_i = total notional principal with counterparty i, N = total notional principal with all counterparties, and n = total number of counterparties. The statistic is calculated for each active insurer.

dealers (as opposed to users) among U.S. insurers are General Reinsurance Financial and American International Group (AIG). The within-year concentration by counterparty appears much higher than the year-end concentration, but this is primarily due to transactions by Prudential Bache for a handful of insurers.

Table 10 shows concentration of insurer notional derivative values among organized exchanges. The CBOT is the leading exchange in terms of notional principal transactions for insurers, accounting for 89 percent of within-year notional principal and for 61 percent of year-end notional principal. The difference between the within-year and year-end values for the CBOT is primarily attributable to bond calls written by life insurers.

The above discussion is intended to provide some insight into the extent and composition of derivatives usage by insurers. In the next section we employ some formal statistical tests in an attempt to isolate the insurer specific factors that play a role in determining whether an insurer is likely to engage in various off balance sheet activities.

4. Determinants of Derivatives Usage: Prior Research and Hypotheses

Prior Research

A number of empirical studies of the determinants of derivatives usage by financial institutions have been conducted in recent years, including Kim and Koppenhaver (1992), Venkatachalam (1995), Sinkey and Carter (1995) and Colquitt and Hoyt (1995), among others.[8]

[8]Fenn, Post and Sharpe (1996) study the use of derivatives by non-financial firms and find that such firms use swaps to protect against fluctuations in debt financing costs due to changes in interest rates.

These papers investigate a number of hypotheses about the use of derivatives including the issue of whether derivatives are used for hedging or income enhancement.

Kim and Koppenhaver consider the characteristics that are associated with swap market participation by a sample of banks from the mid 1980's to the early 1990's. They find that much of the notional values in swaps is explained by dealer, as opposed to position, activities. Moreover, while dealer driven participation is directly related to capitalization levels, they find that the level of notional values is inversely related to capitalization levels. They argue that these results make sense to the extent that market discipline would require dealers to have relatively large capital ratios for protection against default risk, while for users the higher capital levels act as a substitute for other risk reduction activities such as interest rate swaps.

Gunther and Siems (1995), using more recent (early 1990s) data on banks, concluded that capitalization levels are related to the extent of derivatives usage, but not to the decision concerning whether to participate in derivatives markets. They found that highly capitalized banks tend to use derivatives to a greater extent than banks with weaker capital positions. The authors point out that this could be consistent with banks using derivatives for income enhancing ("speculative") activities, with market discipline and/or regulation constraining weaker banks' participation. Alternatively, it could suggest that highly capitalized banks use derivatives to hedge unwanted risk.

Gunther and Siems also report that their measure of interest rate risk exposure, the absolute value of the difference in the value of assets and liabilities repricing or maturing within one to five years divided by total assets, is actually inversely related to the use of non-swap derivatives. While the authors interpret this result as evidence of speculative activities by banks in

OBS contracts, their dependent variable excludes interest rate swap positions, which would logically be a superior instrument for hedging intermediate term interest rate risk than the short-dated exchange traded contracts that define their dependent variable. Indeed, Kim and Koppenhaver (1992) provide evidence that this same interest rate risk measure is positively related to swap activities, conditional on variables that account for non-swap derivatives activities.

Gunther and Siems also find that banks whose debt financing includes high levels of subordinated claims (notes and debentures) relative to assets engage in higher levels of OBS activity than banks with less subordinated debt. The positive association between subordinated claims and derivatives usage provides evidence that, from a regulatory perspective, more highly capitalized banks are more likely to engage in OBS activities. This follows from the fact that a certain percentage of subordinated debt claims are allowed to be counted as capital for purposes of determining risk-based capital ratios for banks.

Venkatachalam (1995) reports that while, on average, derivatives are used for hedging fluctuations in bank equity prices, a significant percentage of the firms in his sample appear to display a positive partial correlation between changes in the value of equity and changes in the value of their OBS positions. Our approach to looking into the question of hedging vs. "speculative" activities partly involves a decomposition of certain OBS positions into those associated with the purchase of volatility vs. its sale. In particular, we are able to isolate some factors influencing insurers to purchase options, caps and floors vs. writing these same contracts. This approach has the advantage of being able to directly measure whether insurers are writing volatility protection for others vs. hedging their own cash flows.

The literature on insurer participation in derivatives markets is much more limited than that concerning banks. Colquitt and Hoyt (CH) (1995) investigate the determinants of the use of futures and options by life insurers. They find that large insurers are more likely to engage in derivatives activity than smaller firms and that stock insurers are more likely to use derivatives than mutuals. The former finding is consistent with the banking literature and is usually attributed to economies of scale in human capital investments associated with derivatives. The CH finding with respect to stocks is consistent with the managerial discretion hypothesis (see Mayers and Smith, 1988) that stocks have a comparative advantage in conducting more complex and/or risky types of insurance business than mutuals because owners can more easily monitor and control management in the stock form of ownership, reducing agency costs. The tendency of stocks to conduct more complex or risky types of business, in turn, implies that stocks have more reason to use derivatives for hedging than mutuals and also are likely to have a comparative advantage in acting as derivatives dealers.

CH also find that the use of OBS contracts is positively related to measures of interest rate risk exposure. They also find that insurers domiciled in states prohibiting investment of general account funds in futures or options are less likely to engage in these OBS activities, but that usage is more likely for firms in these states as the level of separate account assets increases.

We extend the work of CH in a number of dimensions. First, in addition to studying the determinants of derivatives usage in general, we also investigate factors influencing the use of various types of derivatives such as options, swaps and futures. Second, whereas CH based their analysis on life insurers licensed in Georgia, our sample includes the universe of insurers reporting to the NAIC. Thus, we analyze derivatives usage by property-casualty (PC) insurers, as well as

life insurers, and conduct a separate analysis of insurance groups as well as studying individual companies. We believe that these extensions are important to isolate the rationales for derivatives use across organizations with substantial cross-sectional variation in risk/return profiles.

Hypotheses

We have a number of hypotheses, some of them taken from earlier work, regarding the factors that influence derivatives instrument choices and year-end exposure decisions. At the overall participation level, we expect size to be positively related to OBS activity if there are significant economies of scale in human capital investment and derivatives trading (Booth, Smith and Stolz, 1984, Hoyt, 1989). However, these scale economies, if they exist, may be offset by the fact that larger insurers may be more diversified and therefore in less need of OBS contracts as additional risk management tools. This potentially negative relationship is, however, predicated on the idea that OBS activities are almost solely for purposes of hedging. Our overall expectation is that information/transactions cost economies of scale will dominate any built in diversification benefits, resulting in greater usage by larger insurers.

Organizational form, i.e., the mutual vs. stock form of ownership, is another potential determinant of variability in the use of OBS instruments among insurers. The managerial discretion hypothesis suggests that stocks are expected to engage in more OBS activity than mutuals because stocks are more likely to be involved in complex and/or risky lines of business that give rise to the need for hedging. However, the use of derivatives by stock insurers is also likely to hinge on whether OBS activities are beneficial to stockholders and the degree to which stockholders are able to align managers' interests with their own. Conventional theory would

suggest that hedging is not beneficial to stockholders and thus that the existence of corporate hedging is evidence of agency costs. However, more recent work (e.g., Froot, Scharfstein, and Stein, 1993, and Nance, Smith, and Smithson, 1993) suggests that hedging may be a way to control certain types of incentive or principal-agent problems or otherwise enhance value if markets are incomplete, and thus may benefit stockholders. Smith and Stulz (1985) hypothesized that firms faced with a convex tax schedule could reduce expected taxes, and therefore increase firm value, by lowering the volatility of its taxable earnings stream.

Another organizational variable of some interest involves line of business specialization. Life insurers are generally believed to have higher interest rate risk exposure than their PC counterparts because there is an investment component in many life insurance contracts and policyholders are interest rate sensitive. Interest rate sensitivity has increased over the past twenty years with the introduction of universal life insurance, variable life insurance, and various types of new annuity products. Participation in the market for guaranteed investment contracts (GICs) provides another source of interest rate risk exposure for many life insurers. Property-casualty insurers' liabilities are also rate sensitive in the sense that their fair value reflects the present value of future loss cash flows. However, PC insurers' liabilities are generally shorter-term than those of life insurance, and PC insurers do not face the risk of disintermediation, such as the risk that policyholders will surrender policies or withdraw funds to take advantage of investments offering more attractive yields.

Both life and PC insurers also face interest rate risk on the asset side of the balance sheet because a large percentage of their investments are in rate sensitive long-term fixed income obligations. There have been few studies of the duration of insurer assets and liabilities, but the

existing literature suggests that the equity of many insurers is subject to a positive duration gap (e.g., Cummins and Weiss, 1991, Staking and Babbel, 1995). Because financial statement data are not sufficient to permit duration to be estimated, we use asset maturity and liability mix as proxies. We would expect larger maturity duration gaps to be associated with higher usage of OBS contracts that allow insurers to transfer this interest rate volatility.

To measure interest rate risk exposure due to asset holdings, we are able to disaggregate the bond portfolio into publicly traded and privately placed bonds and also to disaggregate into four general categories of bond instruments -- CMOs, loan backed bonds, other structured bonds, and non-loan-backed bonds. The disaggregation allows us to account for differential exposure of the major bond categories to interest rate and liquidity risk. For example, insurers may use derivatives to hedge the liquidity risk of privately placed bonds, and higher usage rates may also be associated with holdings of CMOs due to the potential for thinness of trading during periods of high rate volatility and due to the negative convexity of these instruments.

In a similar fashion, one would want to account for the degree of market risk exposure the institution faces, via its holdings of equity and/or exchange rate risk. We control for these factors by including variables that measure the overall percentage of investment in equity securities. We would expect equity holdings to be positively associated with derivative usage if the insurer's motivation is to hedge this equity exposure or to enhance their income by writing covered calls (see footnote 3). By looking at the purchase and sale of some contracts we can ask whether the demand is for the purchase or sale of volatility-altering contracts such as options.

Similar arguments can be made for foreign exchange exposure. Larger positions in foreign securities and/or the existence of foreign based subsidiaries may generate a demand for selling this

volatility, presumably through forward and futures markets for foreign exchange (parts C and D of Schedule DB). To the extent that insurers are not typically major market makers, one would expect to find little evidence of selling volatility through options (part B of Schedule DB). Residual equity exposure would presumably be managed in a fashion similar to that of domestic securities and should carry a similar sign.

Although the use of derivatives by most insurers is a relatively recent phenomenon,[9] insurers have long used reinsurance as a way of hedging underwriting risk and more recently have used financial reinsurance to hedge interest rate exposure and other types of financial risk (Tiller and Tiller, 1995). We account for the use of reinsurance by including in our regressions the ratio of ceded reinsurance premiums written to direct premiums written plus reinsurance assumed.[10] If there is a significant relationship between underwriting risk and returns in financial markets, then reinsurance designed to reduce underwriting risk might serve as a substitute for OBS activities. Financial reinsurance is more likely to be a substitute for OBS transactions but this type of reinsurance is a relatively recent product that is imperfectly proxied by our reinsurance variable. On the other hand, reinsurance and financial derivatives might be complements if insurers that engage in hedging of underwriting risk are also more likely to hedge financial risk.

To account for differences in business mix across insurers, we use a set of variables reflecting specialization in various PC and life/health lines of insurance. For PC insurers we include variables that reflect specialization in long and short-tail lines of business. As discussed above, the fair value of insurer liabilities reflects the discounted value of the loss cash flows.

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[9]Lehman Brothers (1994) reports that some of the more sophisticated insurers have been using derivatives for mor than twenty years. However, only a few large insurers fall into this category.

[10]This measure of reinsurance is also used by Colquitt and Hoyt (1995) and Mayers and Smith (1990).

Thus, interest rate changes have a more pronounced effect on the fair value of liabilities in long-tail lines than in short-tail lines. Because PC insurers are heavily invested in long-term bonds, long-tail liabilities may serve in part as a natural hedge against interest rate risk exposure from the bond portfolio to the extent that the fair value of these liabilities is inversely related to interest rates. Thus, we might expect PC insurers with higher proportions of long-tail liabilities to be less likely to engage in derivatives transactions designed to manage interest rate risk. On the other hand, short-tail liabilities are not as sensitive to interest rates and thus PC insurers with relatively large positions in the short-tail lines may be more likely to hedge interest rate risk through the use of derivatives.

Cash value life insurance policies, individual annuities and group annuities are generally associated with higher interest rate risk than policies (such as term life and group life) that primarily protect against mortality risk. Cash value life insurance and annuities incorporate a variety of options that expose insurers to prepayment and disintermediation risk due to competition from other financial intermediaries such as banks and mutual funds. Thus, we expect insurers with relatively large cash value life insurance and annuity reserves to be more likely to use derivatives to manage risk.

As a final control variable, we use a regulatory dummy set equal to 1 if the company is domiciled in a state that prohibits general account funds from being invested in certain OBS contracts and to 0 otherwise. We would expect this variable to carry a negative sign in the empirical specification if the more restrictive regulatory environment is not already captured by our measures of such factors as equity market participation and other investment restrictions that may be formally or informally imposed by states that wish to limit insurers' positions in activities that regulators feel are excessively risky.

Absent accounting, regulatory, or information effects, the same factors associated with positions during the year should retain explanatory power for end of year holdings. However, to the extent that there is different regulatory treatment for the use of derivatives across life and PC underwriters, one would expect to see institutions that are less penalized, for example in terms of risk based capital requirements, engage in more derivatives usage. For example, because the life insurer risk-based capital formula includes a charge for the use of swaps, whereas the property-casualty formula includes no charges for derivatives, life insurers may be less likely than PC insurers to hold non-zero swap positions at year-end.

There may also exist accounting reasons for end of year positions that differ from those found on an average day during the year. Widely held stock corporations, for example, must report financial condition information to both state regulatory agencies and the SEC, the latter on a quarterly basis. Mutual insurers, on the other hand, have fewer external reporting requirements. To the extent that the more widely dispersed information on stock insurers is impounded into their stock prices, repositioning outstanding contracts in the year-end reports would not yield positive value. Because mutuals have fewer disclosure requirements (and the fact that regulatory calculations apply to year end balances), mutuals have more opportunity to manage any informational transfers associated with reporting reflections of the underlying risk of the cash flows. There may be other reasons, beyond any associated with capital requirements, that would encourage institutions to alter year end positions, e.g., "window dressing."

5. Determinants of Derivatives Usage: Results

Users and Non-Users: Summary Statistics

Tables 11 and 12 focus on the asset and liability portfolios of insurers as well as their use of reinsurance and other company characteristics. The tables reveal that PC insurers tend to hold higher proportions of their portfolios in stocks than do life insurers, whereas life insurers invest more in CMOs, privately placed bonds, and real estate and mortgages than do PC insurers. Both types of insurers are heavily invested in publicly traded bonds. The average maturities of life insurers' bond portfolios are higher than for PC firms.

Life insurers that use derivatives invest more in mortgages, real estate, and privately placed bonds than non-users, and have proportionately more GICS, individual life insurance reserves, and group annuity reserves than non-users. PC derivatives users hold proportionately more stocks, CMOs and loan backed bonds than non-users. Both life and PC insurers that use derivatives have less of their portfolios in cash and short-term investments than non-users, suggesting that derivatives are being used to manage liquidity risk by generating cash flows when interest rates are moving in directions that either reduce the market value of the firm's assets or increase the market value of the firm's liabilities.

Multi-Variate Modeling

Although the averages provide some intriguing suggestive evidence relating to our hypotheses on the use of derivatives by insurers, multivariate methods are needed to provide more definitive answers. Accordingly, we estimate probit models of derivative usage with a dependent variable equal to 1 if the insurer uses derivatives and equal to 0 otherwise. We estimate models for overall derivatives usage and for each of the five major categories of derivatives transactions/holdings reported in Schedule DB. The probit models are estimated using maximum

likelihood methods. Logit and Gompit models also were estimated, with similar results. For a discussion of probit, see Greene (1990).

The use of multivariate statistical models, such as our probit model, provides important insights into the influence of the independent variables (insurer characteristics) on the dependent variable (derivatives use or non-use) that cannot be obtained from tables of averages and are also difficult to extract from cross-tabulations. In effect, the multivariate models allow one to focus on the influence of each variable, after controlling for the influence of all other variables in the equation. The influence of each independent variable is measured by its sign and magnitude as well as the statistical significance of its coefficient, as discussed below. The importance of controlling for other possibly influential factors when evaluating the effect of a specific variable involves the idea that the variable in question may appear to be important (unimportant) when considered in isolation but may be unimportant (important) after controlling for other potentially influential insurer characteristics.

In interpreting the probit results, the reader should keep in mind that the dependent variable equals 1 if an insurer uses derivatives and equals 0 if the insurer does not use derivatives. Thus, variables with positive coefficients are associated with the use of derivatives and variables with negative coefficients are associated with non-use. It is also worth reiterating that the dependent variable is set equal to 1 if the insurer showed *any* activity in sections 1 through 3 of parts A through D of Schedule DB, i.e., the insurer is counted as a derivatives user if it reported year-end derivative positions, if it opened derivatives positions during the year, or if it closed derivative positions during the year.

To give the reader an idea of how well the empirical specification explains the variability of the dependent variable, the likelihood ratio index has been calculated for each probit equation.

The likelihood ratio index ranges from 0 to 1 and can be interpreted in a similar manner to the R^2 statistic reported in ordinary least squares regressions. For a more technical discussion of the likelihood ratio index see Maddala (1983).

Probit Results: Life Insurers

This section reports results for individual life/health insurance companies, i.e., each company is treated as a separate observation unit whether or not it is a member of a group. To control for group affiliation, we include a dummy variable equal to 1 if the insurer is a member of a group in which at least one other group member is active in derivatives. A dummy variable is also included for unaffiliated single companies. Thus, the category not represented by a dummy variable consists of members of groups where at most one group member is active in derivatives.

The life/health insurer results, presented in Table 13, show clearly that size (measured by the natural logarithm of assets) is a strong determinant of the use of derivatives. Thus, like earlier authors, we find evidence consistent with the existence of significant economies of scale in human and fixed capital. The findings imply a minimum size before OBS activities become viable from a cost perspective. Reinforcing this finding, an insurer is much more likely to use derivatives if it is a member of a group in which at least one other insurer engages in OBS transactions. This is intuitively appealing to the extent that, if one member of the group is involved, then the marginal cost of other group members taking advantage of the risk/return opportunities afforded by OBS contracts is declining to the extent that each member of the group rationally does not duplicate these fixed costs.

Life insurer involvement in derivatives is also correlated with the degree of reinsurance, as Colquitt and Hoyt found. However, it is noteworthy that it is significantly positively correlated

with the writing of options, caps and floors and with the reporting of counterparty exposure at year-end but not with the use of other types of derivatives. To the extent that most life insurers have positive equity duration gaps, writing call options on bonds may be a complement to reinsurance for flattening out the relationship between interest rates and equity value. However, at this point we cannot rule out the possibility that life insurers are taking on more volatility in OBS contracts (e.g., by writing bond and equity calls) as they simultaneously use reinsurance markets to sell off the financial risk component of their life insurance claims. The purchase of derivatives contracts also seems to be correlated with the average maturity of publicly traded bonds. This could again be viewed as an attempt to shorten the duration of equity by purchasing interest rate caps and/or buying put options on long term bonds.

Interestingly, the use of swaps and futures contracts is highly correlated with the percentage of CMO's (particularly those that are privately placed) and the percentage of GIC's issued by the institution. One interpretation of these results is that life and health institutions are hedging the duration gap between privately placed CMO's, that may look attractive because of their yields, but may have poor liquidity, and GIC's, which are typically shorter term and reasonably rate sensitive. It is, of course, possible that some of these (short) positions (e.g., futures) are also attempts to dynamically hedge the convexity risk displayed by CMO's. A final possibility for the positive CMO-derivatives correlation may be the similarity of analytical capabilities required to successful manage this asset class and incorporate derivatives into the firm's investment strategies.

We also note that the percentage of reserves held as individual life reserves is positively related to the use of derivatives; in particular swap contracts, which mainly consist of interest rate swaps for life insurers. To the extent that individual life reserves represent interest sensitive

instruments, their behavior may mirror to some extent that displayed by GIC's, which are also highly correlated with the use of swaps.

Finally, stock insurers are somewhat more likely to report year-end counter-party exposure than mutuals, as expected, if mutuals can exploit information asymmetries to gain value by year-end balance sheet window-dressing. This finding also would be consistent with the managerial discretion hypothesis, also as expected, if our asset or reserve categories do not fully capture the differences between stock and mutual asset and product portfolios.

Probit Results: Property-Casualty Insurers

Results for the probit regressions that focus only on PC insurers (shown in Table 14) provide a number of similarities, but also a number of sharp contrasts, when compared to results for their life insurer counterparts. Similar to life insurers, and for what we suppose are very similar reasons, both size and group affiliation with an OBS user are positively associated with the use of derivatives by PC companies.

There also appears to be a tendency for unaffiliated single firms to use derivatives, particularly in terms of writing caps, floors and options. The greater use of derivatives by unaffiliated insurers may reflect the fact that they forfeit a source of diversification by not being organized as a group and thus may have a greater need to hedge through the use of derivatives. An insurance group is similar to a portfolio of options, worth more to the owners than an option on a portfolio. Under corporate law, the creditors of an insolvent subsidiary cannot reach the assets of other members of the group unless they are successful in "piercing the corporate veil," which usually requires a finding of fraud or similar wrong-doing by the group's owners. The portfolio of options effect may be stronger for PC insurers than for life insurers because PC

insurers are more exposed to volatility from their underwriting operations whereas the underwriting risk exposure of life insurers is minimal. Thus, the option to fail may be worth more to PC insurers, motivating PC insurers that are not members of groups to engage in other types of risk management.

There are several important contrasts between the life insurer and PC insurer results. First, we note that the percentage of assets held in stocks is strongly positively related to the use of derivatives by PC insurers but is not a significant determinant of the use of derivatives by life insurers. More specifically, stocks held are positively associated with the writing and buying of options by PC insurers. The strong relationship with writing calls and/or buying puts is consistent with covered call and "dividend capture" strategies.[11] The fact that end of the year counterparty exposure is not related to the level of stock holdings provides some auxiliary evidence that these positions may not be carried over from year to year. (Recall from Tables 5 and 5a that the number of insurers showing within-year equity call option transactions is much larger than the number showing end-of-year positions in these contracts.)

Second, the relationship between real estate holdings and the use of OBS contracts differs between PC and life companies. For life insurers, real estate is significantly negatively related to the use of swaps but is not related to the use of other types of derivatives. This makes sense to the extent that real estate values are less sensitive to interest rate changes than, say, a fixed income security; hence the lower need for swap contracts as a risk management tool. For PC companies, on the other hand, real estate holdings are positively associated with the purchase and sale of options but not associated with swaps.

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[11] Dividend capture is a covered call strategy that involves the purchase of the security for the sole purpose of receiving the dividend. By simultaneously writing a call option, the insurer is protected should the ex-dividend price fall by more than the amount of the dividend.

A third contrast between PC and life insurers is the relationship between reinsurance and OBS contracts. For PC insurers, the use of reinsurance is inversely related to the writing of options. This result contrasts sharply with that reported for life insurers. One interpretation of this result is consistent with the hypothesis that PC insurers that choose to focus on the generation of income, as opposed to risk management, can accomplish this task by writing options, for which they receive a fee, and simultaneously abstaining from the (potentially costly) reinsurance of their liabilities.

Writing long-tail commercial policies (general liability and workers' compensation insurance) seems to be associated with a lower likelihood of being party to OBS contracts, particularly swaps. This would be consistent with the interpretation of long-tail liabilities as a natural hedge for interest rate risk in the asset portfolio, thus reducing the need for interest rate risk management.

A somewhat puzzling finding is the positive relationship between auto physical damage insurance and OBS activity, specifically the writing of options. Based on similar reasoning as in the long-tail commercial case, OBS transactions might be related to the short-tailed auto physical damage line because the fair value of liabilities in this line is mostly unaffected by changes in interest rates. OBS transactions may be related to short tail auto physical damage to the extent that heavy reliance on these typically short term contracts results ceteris paribus in a larger equity duration gap. Another possible explanation is that auto physical damage tends to be a relatively profitable line of business. Thus, a concentration in auto physical damage may be complementary to other income enhancing strategies like the writing of covered call, discussed earlier.

Probit Results: Groups and Unaffiliated Single Companies

At a general level, the group results mirror, to a large extent, the results reported for the individual life and PC insurers. Large groups and those with relatively heavy exposure in stocks and/or GIC's, tend to be heavily involved in OBS activities; the former in writing options and the latter in swap contracts. Substantial investments in long term privately placed bonds are again correlated with the writing of options, caps and floors.

Life premiums ceded and individual life reserves remain correlated with derivatives usage, with the former being related to both the writing and purchase of options, caps and collars. In the group models, high levels of group annuity reserves are also associated with a high likelihood of derivatives usage, particularly the purchase of option type contracts. To the extent that these are interest sensitive accounts, the writing of interest rate floors or call options on bonds to fund the purchase of, say, interest rate caps makes some sense from the perspective of self-financing interest rate risk strategies. This would again tend to flatten out the equity/interest rate relationship, for which there is some evidence that the insurer earns a high reward/risk ratio (Staking and Babbel, 1995).

We note that the writing of auto physical damage policies retains a strong positive association with the writing of option type contracts, while long-term privately placed CMO's are associated with a high probability of futures activity (duration hedging) and the purchase of option type contracts (e.g., puts and calls or caps and floors) in an effort to hedge the negative convexity of these contracts.

Finally, the dummy variable for states that prohibit insurers from using derivatives was insignificant and was eliminated from the final versions of the regressions. This finding, which is contrary to the Colquitt-Hoyt results, may be due to the fact that their sample consisted of life insurers licensed in Georgia, which is one of the states that prohibits domestic companies from

using derivatives. Because few major insurers are domiciled in the prohibiting states, the result may disappear in our larger sample. It is also possible that our larger set of control variables absorbs the regulatory effect.[12]

6. Conclusions

Like other types of financial and non-financial firms, insurers are increasingly using financial derivatives to manage risk. Although the overall proportion of all insurers using derivatives remains small, derivatives use has become widespread among firms in the largest size quartile. The proportion of life insurers using derivatives is higher than the proportion of PC users, but the number of life and PC firms using derivatives is approximately equal.

Interest rate swaps, caps, and floors and bond futures are the types of contracts used by the largest number of life insurers reporting year-end derivatives positions in their financial statements, consistent with the use of such contracts by life companies to manage interest rate risk. Some life insurers also tend to write substantial amounts of bond calls and puts during the year, little of which remains open at the end of the year. Life insurers are also actively trading foreign currency forwards. For PC insurers, the contracts used by the largest number of insurers are equity calls written, foreign currency forwards, and equity puts purchased. Based on transactions during the year, a substantial volume of notional principle in the PC industry also arises from positions in equity options and short positions in bond futures and equity futures.

[12]The omission of the regulatory variable had no noticeable effect on the coefficients of the other variables in the probit models.

An overall conclusion is that life insurers are using derivatives primarily to manage interest rate and exchange rate risk, while PC insurers are active in equity and foreign exchange derivatives markets.

In addition to number of insurers trading in derivatives markets and the volume of notional principal, we also conduct a probit analysis of the determinants of the use of derivatives by insurers. Consistent with prior research on insurers and banks, we find evidence consistent with significant economies of scale affecting the use of derivatives. Large firms are much more likely to use derivatives than smaller firms. Reinforcing this finding, insurers that are members of groups where at least one other group member uses derivatives are significantly more likely to engage in derivatives trading.

We also find evidence consistent with the use of derivatives to manage the positive duration gap that tends to characterize insurer equity. For example, insurers that write more GICs and hold more individual life reserves and annuity reserves are more likely to use derivatives. Bond portfolio maturity is also positively correlated with the use of derivatives, and there is evidence that insurers tend to use derivatives to hedge the risk of CMOs and privately placed bonds. Insurers also appear to be using derivatives as part of equity income enhancement strategies and to manage convexity risk.

Interestingly, we find that PC insurers who write more short-tail auto physical damage insurance are more likely to use derivatives than those writing long-tail commercial liability and workers' compensation insurance. We also find that the level of reinsurance is inversely related to the use of derivatives by PC insurers, which is the opposite of what we, and Colquitt and Hoyt before us, find for life insurers. Specifically, we find that it is derivatives usage in the form of writing options that is correlated with reinsurance for both PC and life insurers, but with different

signs. Unfortunately, at the level of aggregation used in this study, we are unable to distinguish between the hypotheses that one or the other of these types of insurers is using derivatives as a complement or substitute for risk taking on the balance sheet. The problem is that the writing of options, caps, and floors can be used either to reduce risk or increase income. Investigating the source of the demand by insurers for these contracts is a major priority in our plans for future research.

We also find significant differences between positions taken during the year and positions that remain open at the end of the year. In particular, stock companies seem to display little difference between within-year and end-of-year positions, while mutuals display more end-of-year variation vis a vis their positions during the year. This result is consistent with the hypothesis that prices are at least partially revealing and therefore that managers of stock corporations have less incentive to engage in management of end-of-year positions. Stock companies in general tend to engage in more derivatives trading, a result that is consistent with the managerial discretion hypothesis.

We have been able to report on the universe of insurers that report derivatives usage in Schedule DB in this paper. Unfortunately, this may understate the actual amount of activity there is in financial instruments with embedded derivative features. In particular, structured notes, which are fixed income securities with derivative characteristics, provide insurers a way to utilize derivatives in their investment strategies without having to specifically identify their usage. For example, an insurer could purchase a 5 year structured note for which the coupon rate is tied to movements in the S&P 500 index instead of the more conventional fixed rate coupon. This security combines a 5 year "plain vanilla" bond with an embedded swap contract paying fixed and receiving the return on the S&P 500 index. Under statutory accounting rules, this type of

instrument is reported in Schedule D of the annual statement, but Schedule D does not provide enough detail to distinguish this bond from bonds that do not have embedded derivatives. Investigating the popularity of these investments and determining what effect their existence may have on an insurer's decisions to participate directly in derivative markets is clearly an avenue for future research that should be pursued.

More work also needs to be done on the question of whether the regularities that we find in these data are primarily related to efforts to flatten the relationship between insurer surplus value and financial market prices or, alternatively, are related to strategies involving what might be called "covered" income strategies such as the dividend capture hypothesis outlined in this paper. This is a topic for future research that will hopefully enable us to shed light on the issue of whether usage of some contracts is associated with risk reduction, while other contracts may be used to enhance income while keeping additional risk exposure at a minimum.

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Table 1

Proportion of Insurers Active in Derivatives, by Quartile

	Life/Health Insurers	Property/Casualty Insurers	Groups
Quartile 1	0.66%	0.58%	1.69%
Quartile 2	0.66%	3.29%	3.93%
Quartile 3	8.28%	3.49%	9.55%
Quartile 4	38.08%	20.16%	34.83%
All Firms	11.93%	6.88%	12.51%
Number of Insurers	1207	2063	1423

Proportion of Derivative Users Organized As Stock Companies, by Quartile

	Life/Health Insurers		Property/Casualty Insurers		Groups	
	Stocks	**Mutuals**	**Stocks**	**Mutuals**	**Stocks**	**Mutuals**
Quartile 1	1.43%	0.00%	1.78%	0.00%	1.69%	0.00%
Quartile 2	0.83%	0.00%	4.14%	2.16%	2.25%	1.69%
Quartile 3	10.76%	1.85%	3.71%	3.38%	7.87%	1.69%
Quartile 4	65.07%	48.78%	26.51%	21.93%	22.47%	12.36%
All Firms	16.42%	6.69%	9.55%	4.30%	8.57%	3.94%
Number of Users	123	21	108	34	122	56

Table 2

Derivatives Use By Insurers

Number of Users and Open Positions: Year-End 1994
By Type of Contract

		Number of Open Derivative Agreements/Positions					
Contract Type	Number of Users	Mean	Median	Standard Deviation	Min	Max	Total
Financial Options Owned							
Call Options	31	4.81	3.00	5.77	1	27	149
Put Options	41	4.66	2.00	7.74	1	47	191
Caps	24	6.25	3.50	8.44	1	35	150
Corridors	1	8.00	8.00	.	8	8	8
Floors	16	6.50	2.50	9.78	1	33	104
Financial Options Written							
Call Options	59	11.32	5.00	19.68	1	104	668
Put Options	12	2.08	1.00	1.78	1	5	25
Caps	3	26.67	6.00	40.20	1	73	80
Floors	1	7.00	7.00	.	7	7	7
Collar, Swap and Forward Aggreements Open							
Collars	3	2.00	2.00	1.00	1	3	6
Forwards	38	18.63	11.00	28.41	1	140	708
Swaps	86	16.14	6.00	23.10	1	98	1388
Futures Contracts Open							
Long Futures	28	6.39	3.00	8.87	1	36	179
Short Futures	43	7.21	3.00	9.25	1	38	310
All Derivative Contracts							
	212	18.74	1.00	7.00	306	35	3973

Notional Amounts for Open Positions: Year-End 1994
By Type of Contract

		Total Notional Amounts					
Contract Type	Number of Users	Mean	Median	Standard Deviation	Min	Max	Total
Financial Options Owned							
Call Options	31	133,828,036	45,635,258	150,858,811	95,700	500,000,000	4,148,669,104
Put Options	41	128,401,259	22,593,000	327,031,359	8,726	1,870,000,000	5,264,451,600
Caps	24	835,624,328	142,500,000	1,777,579,269	5,000,000	6,500,000,000	20,054,983,881
Corridors	1	89,000,000	89,000,000	.	89,000,000	89,000,000	89,000,000
Floors	16	613,390,775	180,250,000	1,125,288,729	10,000,000	4,447,500,000	9,814,252,403
Financial Options Written							
Call Options	59	68,068,420	5,990,000	147,002,425	1,925	615,806,000	4,016,036,788
Put Options	12	7,157,583	1,400,000	17,736,228	7,000	63,000,000	85,891,000
Caps	3	610,314,195	350,000,000	678,989,017	100,000,000	1,380,942,584	1,830,942,584
Floors	1	124,936,686	124,936,686	.	124,936,686	124,936,686	124,936,686
Collar, Swap and Forward Aggreements Open							
Collars	3	90,000,000	100,000,000	36,055,513	50,000,000	120,000,000	270,000,000
Forwards	38	350,969,410	32,887,774	1,372,341,450	18,000	8,284,915,000	13,336,837,587
Swaps	86	449,938,992	141,044,542	725,295,041	3,500,000	4,590,323,798	38,694,753,274
Futures Contracts Open							
Long Futures	28	104,125,733	46,181,966	138,274,810	262,650	558,915,019	2,915,520,516
Short Futures	43	162,415,289	50,695,925	277,367,750	299,883	1,136,381,109	6,983,857,408
All Derivative Contracts							
	212	507,689,306	67,397,500	1,377,772,176	1,925	10,517,699,124	107,630,132,832

Note - Total notional amount for equity call/put options calculated as No. of Contracts * 100 * Strike Price
- Total notional amount for bond call/put options calculated as par value of underlying bonds
- Total notional amount reported for futures contract calculated as no. of contracts * futures payoff * strike price

Table 3

Derivatives Use By Insurers

Number of Users and Opened Positions During 1994
By Type of Contract

Contract Type	Number of Users	Number of Derivative Agreements/Positions Opened					
		Mean	Median	Standard Deviation	Min	Max	Total
Financial Options Opened							
Call Options	50	15.04	3.00	33.23	1	163	752
Put Options	62	14.02	4.00	23.46	1	101	869
Caps	19	4.21	4.00	3.10	1	13	80
Corridors	1	8.00	8.00	.	8	8	8
Floors	8	8.63	2.50	14.76	1	44	69
Financial Options Written							
Call Options	121	40.82	15.00	65.63	1	448	4,939
Put Options	32	10.31	5.50	14.00	1	58	330
Caps	4	8.25	3.50	11.41	1	25	33
Floors	1	8.00	8.00	.	8	8	8
Collar, Swap and Forward Aggreements Opened							
Collars	4	4.50	2.00	5.69	1	13	18
Forwards	39	79.79	18.00	196.72	1	893	3,112
Swaps	71	28.99	5.00	139.03	1	1,167	2,058
Futures Contracts Opened							
Long Futures	54	21.93	5.00	46.21	1	293	1,184
Short Futures	62	22.81	12.50	29.90	1	145	1,414
All Derivative Contracts							
	268	55.50	16.50	133.08	1	1,222	14,874

Notional Amounts for Positions Opened During 1994
By Type of Contract

Contract Type	Numbers of Users	Total Notional Amounts					
		Mean	Median	Standard Deviation	Min	Max	Total
Financial Options Opened							
Call Options	50	173,408,546	30,000,000	404,317,751	3,000	2,472,225,000	8,670,427,298
Put Options	62	664,872,903	44,146,375	3,432,286,046	30,000	26,868,900,000	41,222,119,955
Caps	19	585,091,711	205,000,000	1,450,341,545	5,000,000	6,500,000,000	11,116,742,511
Corridors	1	89,000,000	89,000,000	.	89,000,000	89,000,000	89,000,000
Floors	8	832,156,550	412,500,000	1,222,401,871	75,000,000	3,742,400,000	6,657,252,403
Financial Options Written							
Call Options	121	1,337,880,976	15,781,250	10,687,000,591	5,000	115,274,305,000	161,883,598,051
Put Options	32	357,705,270	16,480,000	1,148,541,536	60,000	6,298,262,500	11,446,568,625
Caps	4	570,665,200	225,000,000	787,748,330	94,000,000	1,736,660,800	2,282,660,800
Floors	1	141,352,155	141,352,155	.	141,352,155	141,352,155	141,352,155
Collar, Swap and Forward Aggreements Opened							
Collars	4	402,500,123	75,000,000	706,180,951	490	1,460,000,000	1,610,000,490
Forwards	39	831,412,118	106,037,489	2,785,233,669	18,000	16,190,987,282	32,425,072,583
Swaps	71	412,856,106	150,000,000	960,521,239	3,500,000	7,498,202,706	29,312,783,517
Futures Contracts Opened							
Long Futures	54	817,476,057	72,220,620	3,195,160,149	57,678	22,780,118,545	44,143,707,077
Short Futures	62	1,072,196,368	178,602,091	4,389,527,625	301,172	34,442,171,172	66,476,174,791
All Derivative Contracts							
	268	1,557,751,717	53,003,622	10,100,039,739	5,000	126,535,050,986	417,477,460,263

Note - Total notional amount for equity call/put options calculated as No. of Contracts * 100 * Strike Price
- Total notional amount for bond call/put options calculated as par value of underlying bonds
- Total notional amount reported for futures contract calculated as no. of contracts * futures payoff * strike price

Table 4

Derivatives Use By Life/Health Insurers

Notional Amounts for Open Positions: Year-End 1994
By Type of Risk, Type of Contract

Underlying Risk	Number of Users	Total Notional Amounts					
		Mean	Median	Standard Deviation	Min	Max	Total
Financial Options Opened							
Bonds							
Calls	13	127,414,115	100,000,000	126,048,080	875,000	436,496,000	1,656,383,500
Puts	11	153,130,246	37,600,000	256,934,871	3,000,000	799,732,710	1,684,432,710
Floors	1	350,000,000	350,000,000	.	350,000,000	350,000,000	350,000,000
Equities							
Calls	6	67,614,333	70,750,000	48,628,081	1,250,000	125,000,000	405,686,000
Puts	8	17,044,288	3,137,259	26,259,835	1,325,000	72,312,500	136,354,300
Foreign Currency							
Puts	1	153,690,059	153,690,059	.	153,690,059	153,690,059	153,690,059
Floors	1	10,000,000	10,000,000	.	10,000,000	10,000,000	10,000,000
Interest Rates							
Calls	6	178,500,000	142,500,000	176,555,940	10,000,000	500,000,000	1,071,000,000
Puts	6	382,458,333	100,000,000	729,018,697	50,000,000	1,870,000,000	2,294,750,000
Caps	23	870,878,130	160,000,000	1,806,930,911	5,000,000	6,500,000,000	20,030,196,992
Floors	15	630,283,494	160,500,000	1,160,745,866	50,000,000	4,447,500,000	9,454,252,403
Corridors	1	89,000,000	89,000,000	.	89,000,000	89,000,000	89,000,000
Financial Options Written							
Bonds							
Calls	9	141,724,556	38,000,000	199,781,310	10,000,000	615,521,000	1,275,521,000
Puts	2	34,000,000	34,000,000	41,012,193	5,000,000	63,000,000	68,000,000
Equities							
Calls	14	8,376,274	2,347,637	13,181,561	1,925	41,023,000	117,267,833
Puts	4	401,750	450,000	353,288	7,000	700,000	1,607,000
Foreign Currency							
Calls	2	29,520,253	29,520,253	6,392,603	25,000,000	34,040,506	59,040,506
Puts	3	610,314,195	350,000,000	678,989,017	100,000,000	1,380,942,584	1,830,942,584
Caps	1	105,000	105,000	.	105,000	105,000	105,000
Interest Rates							
Caps	1	124,936,686	124,936,686	.	124,936,686	124,936,686	124,936,686
Floors	1	7,350,000	7,350,000	.	7,350,000	7,350,000	7,350,000
Collar, Swap and Forward Aggreements Opened							
Bonds							
Forwards	2	12,509,000	12,509,000	17,684,942	18,000	25,000,000	25,018,000
Commodities							
Forwards	1	814,091	814,091	.	814,091	814,091	814,091
Swaps	4	13,144,940	13,101,458	2,643,202	10,144,940	16,231,904	52,579,760
Equities							
Swaps	3	90,430,544	100,000,000	61,209,443	25,000,000	146,291,633	271,291,633
Foreign Currency							
Forwards	13	251,562,498	35,186,206	608,372,125	466,097	2,205,963,561	3,270,312,479
Swaps	14	91,626,581	51,493,447	135,414,264	1,900,000	519,476,537	1,282,772,132
Interest Rates							
Collars	3	90,000,000	100,000,000	36,055,513	50,000,000	120,000,000	270,000,000
Swaps	69	515,545,943	202,500,000	769,953,930	3,500,000	4,590,323,798	35,572,670,044
Mortgages							
Forwards	1	30,933,500	30,933,500	.	30,933,500	30,933,500	30,933,500
Futures Contracts Opened							
Bonds							
Long Futures	17	143,169,814	100,687,462	151,225,245	2,975,625	558,915,019	2,433,883,442
Short Futures	19	153,724,613	62,552,413	197,375,794	301,172	637,581,250	2,920,767,647
Equities							
Long Futures	4	9,704,588	11,796,900	6,514,970	282,650	14,961,900	38,818,350
Short Futures	3	30,314,025	21,195,250	23,616,373	12,816,525	57,130,300	90,942,075
Interest Rates							
Long Futures	2	115,455,952	115,455,952	76,585,478	61,315,983	169,595,921	230,911,904
Short Futures	3	421,735,974	212,924,846	508,674,843	50,695,925	1,001,587,150	1,265,207,921

Note - Total notional amount for equity call/put options calculated as No. of Contracts * 100 * Strike Price
- Total notional amount for bond call/put options calculated as par value of underlying bonds
- Total notional amount reported for futures contract calculated as no. of contracts * futures payoff * strike price

Table 4a

Derivatives Use By Life/Health Insurers

Notional Amounts for Positions Opened During 1994
By Type of Risk, Type of Contract

Underlying Risk	Number of Companies	Total Notional Amounts					
		Mean	Median	Standard Deviation	Min	Max	Total
Financial Options Opened							
Bonds							
Calls	21	238,306,045	97,200,000	349,856,330	53,400	1,289,125,000	5,004,426,935
Puts	15	499,645,000	215,000,000	970,008,760	3,000,000	3,900,600,000	7,494,675,000
Caps	1	600,000,000	600,000,000	.	600,000,000	600,000,000	600,000,000
Equities							
Calls	11	127,602,927	20,231,000	350,983,529	3,000	1,183,100,000	1,403,632,200
Puts	11	85,333,950	3,760,914	180,371,583	517,000	556,225,000	938,673,452
Foreign Currency							
Calls	1	50,000,000	50,000,000	.	50,000,000	50,000,000	50,000,000
Puts	1	294,894,095	294,894,095	.	294,894,095	294,894,095	294,894,095
Floors	1	54,845,787	54,845,787	.	54,845,787	54,845,787	54,845,787
Interest Rates							
Calls	4	69,978,375	63,706,750	20,919,991	52,500,000	100,000,000	279,913,500
Puts	7	474,960,000	100,000,000	735,846,969	1,200,000	1,870,000,000	3,324,720,000
Caps	17	605,897,390	200,000,000	1,535,402,636	5,000,000	6,500,000,000	10,300,255,622
Floors	8	825,300,827	412,500,000	1,221,544,601	75,000,000	3,742,400,000	6,602,406,616
Corridors	1	89,000,000	89,000,000	.	89,000,000	89,000,000	89,000,000
Financial Options Written							
Bonds							
Calls	16	8,954,163,813	294,250,000	28,709,818,906	10,000,000	114,309,375,000	143,266,621,000
Puts	14	739,031,184	164,700,000	1,645,566,814	5,000,000	6,169,125,000	10,346,436,573
Equities							
Calls	32	81,736,341	3,777,000	260,599,464	6,500	1,160,950,000	2,615,562,911
Puts	8	17,641,125	1,862,500	45,086,639	182,000	129,137,500	141,129,000
Foreign Currency							
Calls	2	111,420,000	111,420,000	122,216,336	25,000,000	197,840,000	222,840,000
Puts	2	45,750,000	45,750,000	49,851,028	10,500,000	81,000,000	91,500,000
Interest Rates							
Calls	1	200,000,000	200,000,000	.	200,000,000	200,000,000	200,000,000
Caps	4	570,665,200	225,000,000	787,748,330	94,000,000	1,738,660,800	2,282,660,800
Floors	1	141,352,155	141,352,155	.	141,352,155	141,352,155	141,352,155
Collar, Swap and Forward Aggreements Opened							
Bonds							
Forwards	2	89,259,000	89,259,000	126,205,833	18,000	178,500,000	178,518,000
Commodities							
Forwards	1	814,091	814,091	.	814,091	814,091	814,091
Swaps	4	15,123,199	10,144,940	16,621,910	1,000,000	39,202,916	60,492,796
Equities							
Swaps	3	78,822,323	75,000,000	20,996,070	60,000,000	101,466,968	236,466,968
Foreign Currency							
Forwards	18	1,496,433,804	103,071,799	4,038,453,980	18,375	16,190,173,191	26,935,808,469
Swaps	6	97,481,357	51,510,984	147,927,768	3,117,359	392,473,263	584,888,142
Interest Rates							
Collars	4	402,500,123	75,000,000	706,180,951	490	1,460,000,000	1,610,000,490
Swaps	55	457,177,757	170,000,000	1,002,212,183	3,500,000	7,105,729,443	25,144,776,624
Mortgages							
Swaps	2	42,476,750	42,476,750	24,362,303	25,250,000	59,703,500	84,953,500
Futures Contracts Opened							
Bonds							
Long Futures	38	990,774,220	167,515,678	2,990,004,871	57,678	17,621,019,718	37,649,420,363
Short Futures	37	659,821,605	163,345,479	1,253,705,141	301,172	6,468,392,975	24,413,399,396
Equities							
Long Futures	6	21,224,944	12,832,475	19,663,145	1,034,400	51,814,850	127,349,661
Short Futures	4	96,165,400	69,944,388	65,954,103	51,673,325	193,099,500	384,661,600
Foreign Currency							
Long Futures	1	982,090,300	982,090,300	.	982,090,300	982,090,300	982,090,300
Short Futures	2	1,535,827,584	1,535,827,584	2,044,906,448	89,860,368	2,981,794,800	3,071,655,168
Interest Rates							
Long Futures	4	1,086,540,738	83,417,087	2,060,935,589	2,320,250	4,177,008,527	4,346,162,950
Short Futures	4	7,495,078,463	997,285,953	13,682,321,625	11,963,750	27,973,778,197	29,980,313,852

Note - Total notional amount for equity call/put options calculated as No. of Contracts * 100 * Strike Price
- Total notional amount for bond call/put options calculated as par value of underlying bonds
- Total notional amount reported for futures contract calculated as no. of contracts * futures payoff * strike price

Table 5

Derivatives Use By Property/Casualty Insurers

Notional Amounts for Open Positions: Year-End 1994
By Type of Risk, Type of Contract

Underlying Risk	Number of Users	Total Notional Amounts Mean	Median	Standard Deviation	Min	Max	Total
Financial Options Opened							
Bonds							
Calls	1	360,000,000	360,000,000	.	360,000,000	360,000,000	360,000,000
Equities							
Calls	8	81,444,576	2,481,250	135,505,375	95,700	299,583,573	651,556,604
Puts	19	50,861,808	4,200,000	102,641,279	8,726	429,467,400	966,374,350
Foreign Currency							
Calls	1	750,000,000	750,000,000	.	750,000,000	750,000,000	750,000,000
Puts	1	614,345,030	614,345,030	651,464,507	153,690,059	1,075,000,000	614,345,030
Interest Rates							
Caps	1	870,878,130	160,000,000	1,808,930,911	5,000,000	6,500,000,000	870,878,130
Commodities							
Puts	1	22,593,000	22,593,000	.	22,593,000	22,593,000	22,593,000
Financial Options Written							
Bonds							
Calls	7	157,971,429	37,000,000	234,434,872	1,600,000	613,300,000	1,105,800,000
Equities							
Calls	31	46,926,147	1,696,500	121,632,207	55,000	536,461,000	1,454,710,550
Puts	5	1,786,800	2,100,000	1,587,272	200,000	3,870,000	8,934,000
Foreign Currency							
Calls	1	3,591,900	3,591,900	.	3,591,900	3,591,900	3,591,900
Collar, Swap and Forward Aggreements Opened							
Commodities							
Swaps	1	20,000,000	20,000,000	.	20,000,000	20,000,000	20,000,000
Equities							
Forwards	1	54,579,478	54,579,478	.	54,579,478	54,579,478	54,579,478
Swaps	3	62,082,499	77,617,961	42,134,074	14,386,492	94,243,044	186,247,497
Foreign Currency							
Forwards	21	474,056,192	10,008,000	1,794,047,735	24,292	8,284,915,000	9,955,180,039
Swaps	4	16,948,052	15,125,000	5,537,112	12,500,000	25,042,209	67,792,209
Interest Rates							
Swaps	8	155,175,000	57,210,000	253,394,616	20,000,000	772,800,000	1,241,400,000
Futures Contracts Opened							
Bonds							
Short Futures	8	51,722,660	31,578,454	53,552,165	3,442,675	156,105,563	413,781,282
Equities							
Long Futures	6	13,622,393	1,569,825	28,688,122	304,602	72,108,991	81,734,360
Short Futures	8	28,456,368	8,990,775	45,675,560	299,883	132,465,543	227,650,941
Foreign Currency							
Long Futures	2	65,086,230	65,086,230	85,324,742	4,752,526	125,419,934	130,172,460
Short Futures	4	31,970,873	12,956,353	43,675,533	4,752,526	97,218,260	127,883,492
Interest Rates							
Short Futures	3	645,874,683	752,780,228	409,171,161	193,862,703	990,981,119	1,937,624,050

Note - Total notional amount for equity call/put options calculated as No. of Contracts * 100 * Strike Price
- Total notional amount for bond call/put options calculated as par value of underlying bonds
- Total notional amount reported for futures contract calculated as no. of contracts * futures payoff * strike price

Table 6a

Derivatives Use By Property/Casualty Insurers

Notional Amounts for Positions Opened During 1994
By Type of Risk, Type of Contract

Underlying Risk	Number of Companies	Total Notional Amounts					
		Mean	Median	Standard Deviation	Min	Max	Total
Financial Options Opened							
Bonds							
Calls	4	107,260,156	4,400,000	208,503,472	240,625	420,000,000	429,040,625
Caps	1	3,700,000	3,700,000	.	3,700,000	3,700,000	3,700,000
Equities							
Calls	17	45,228,620	2,000,000	97,754,593	62,500	299,583,573	768,886,539
Puts	32	46,510,943	6,123,250	89,360,998	30,000	423,614,600	1,488,350,179
Foreign Currency							
Calls	2	18,513,749	18,513,749	11,416,844	10,440,822	26,586,677	37,027,499
Puts	2	54,825,496	54,825,496	24,447,617	37,538,420	72,112,571	109,650,991
Interest Rates							
Caps	1	212,786,889	212,786,889	.	212,786,889	212,786,889	212,786,889
Financial Options Written							
Bonds							
Calls	11	53,818,182	16,900,000	90,906,730	1,000,000	274,000,000	592,000,000
Equities							
Calls	72	134,566,642	7,557,000	765,782,885	5,000	6,484,850,000	9,688,798,231
Puts	12	9,079,458	1,740,250	14,998,730	60,000	46,923,000	108,953,500
Foreign Currency							
Calls	2	111,420,000	111,420,000	122,216,336	25,000,000	197,840,000	222,840,000
Puts	2	305,330,776	305,330,776	385,133,877	33,000,000	577,661,553	610,661,553
Collar, Swap and Forward Aggreements Opened							
Equities							
Swaps	3	87,239,322	94,243,044	69,615,702	14,386,492	153,088,430	261,717,966
Foreign Currency							
Forwards	19	279,470,106	106,037,489	382,962,444	280,675	1,562,890,000	5,309,932,023
Swaps	5	525,580,704	144,000,000	916,462,406	3,989,397	2,149,411,426	2,627,903,521
Interest Rates							
Swaps	7	44,512,000	15,250,000	50,777,677	7,800,000	150,000,000	311,584,000
Futures Contracts Opened							
Bonds							
Long Futures	4	58,679,631	32,702,998	75,477,588	3,674,626	165,637,902	234,718,523
Short Futures	9	354,166,997	430,321,955	330,895,761	2,735,234	825,944,641	3,187,502,976
Equities							
Long Futures	7	71,713,224	41,662,910	104,813,780	937,186	296,131,414	501,992,566
Short Futures	12	287,957,755	109,868,050	589,032,880	626,901	2,139,248,405	3,455,493,055
Foreign Currency							
Long Futures	4	75,493,179	21,815,534	115,907,674	9,235,800	249,105,847	301,972,714
Short Futures	3	12,587,381	18,403,949	10,589,305	364,644	18,993,551	37,762,144
Interest Rates							
Short Futures	4	486,346,650	473,319,466	461,963,530	7,766,550	990,981,119	1,945,386,600

Note - Total notional amount for equity call/put options calculated as No. of Contracts * 100 * Strike Price
- Total notional amount for bond call/put options calculated as par value of underlying bonds
- Total notional amount reported for futures contract calculated as no. of contracts * futures payoff * strike price

Table 6

Counterparty Exposure in End of Year Holdings, 1994

All Counterparties

Variable	Number of Companies	Mean	Median	Standard Deviation	Minimum	Maximum
Number of Counterparties per Company	212	3.774	2.000	5.083	1.000	31.000
Number of Transactions per Counterparty	212	5.545	3.000	7.041	1.000	44.000
Counterparty Herfindahl	212	0.710	0.981	0.340	0.064	1.000

Excluding Exchange Traded Contracts and Unknown Counterparties

Variable	Number of Companies	Mean	Median	Standard Deviation	Minimum	Maximum
Number of Counterparties per Company	138	4.717	2.000	5.545	1.000	27.000
Number of Transactions per Counterparty	138	4.021	2.500	4.652	1.000	27.000
Counterparty Herfindahl	138	0.620	0.582	0.353	0.067	1.000

Exchange Traded Contracts Only

Variable	Number of Companies	Mean	Median	Standard Deviation	Minimum	Maximum
Number of Counterparties per Company	91	1.319	1.000	0.758	1.000	4.000
Number of Transactions per Counterparty	91	7.907	3.000	10.206	1.000	48.000
Counterparty Herfindahl	91	0.926	1.000	0.178	0.338	1.000

Table 7

Counterparty Exposure in Positions Opened During 1994

All Counterparties

Variable	Number of Companies	Mean	Median	Standard Deviation	Minimum	Maximum
Number of Counterparties per Company	268	2.940	1.000	4.073	1.000	35.000
Number of Transactions per Counterparty	268	21.362	7.000	35.075	1.000	257.500
Counterparty Herfindahl	268	0.792	1.000	0.283	0.048	1.000

Excluding Exchange Traded Contracts and Unknown Counterparties

Variable	Number of Companies	Mean	Median	Standard Deviation	Minimum	Maximum
Number of Counterparties per Company	144	3.563	2.000	4.694	1.000	31.000
Number of Transactions per Counterparty	144	11.124	2.708	24.180	1.000	240.000
Counterparty Herfindahl	144	0.716	0.951	0.324	0.051	1.000

Exchange Traded Contracts Only

Variable	Number of Companies	Mean	Median	Standard Deviation	Minimum	Maximum
Number of Counterparties per Company	145	1.545	1.000	1.067	1.000	5.000
Number of Transactions per Counterparty	145	34.108	13.000	50.087	1.000	293.000
Counterparty Herfindahl	145	0.905	1.000	0.197	0.263	1.000

Table 8

1994 OTC Counterparties End of Year Holdings

Rank	Counterparty	Number of Companies Using Counterparty	Total Notional Amount Outstanding	Percent of Total Industry OTC Notional
1	GOLDMAN SACHS	35	11,661,292,733	12.1%
2	MORGAN GUARANTY	29	11,583,928,965	12.0%
3	BANKER'S TRUST	36	11,359,451,231	11.8%
4	SALOMON BROTHERS	45	6,277,215,409	6.5%
5	MERRILL LYNCH	49	5,461,390,937	5.7%
6	PRUDENTIAL BACHE	10	4,982,500,401	5.2%
7	UBS SECURITIES	15	4,942,663,326	5.1%
8	LEHMAN BROTHERS	23	4,505,237,641	4.7%
9	UNKNOWN	29	3,402,842,651	3.5%
10	GEN RE FINANCIAL	17	3,018,925,231	3.1%
11	MORGAN STANLEY	29	2,740,188,832	2.8%
12	CREDIT SUISSE	27	2,037,799,372	2.1%
13	CITIBANK	16	2,018,544,392	2.1%
14	DEUTSCHE BANK	14	1,724,412,763	1.8%
15	REP NAT'L BNK-NY	2	1,680,187,168	1.7%
16	FIRST CHICAGO	8	1,558,846,084	1.6%
17	CHASE MANHATTAN BANK	15	1,540,110,495	1.6%
18	SWISS BANK	12	1,245,353,905	1.3%
19	AIG	16	1,175,746,335	1.2%
20	BARCLAY'S BANK PLC	20	1,165,776,187	1.2%
21	J P MORGAN	9	977,334,093	1.0%
22	CHEMICAL BANK	21	850,294,905	0.9%
23	ABN-AMBO BANK	3	850,000,000	0.9%
24	BANK OF AMERICA	10	707,078,653	0.7%
25	BANK OF MONTREAL	6	637,483,190	0.7%
26	COLUMBINE LIFE INSURANCE CO	1	567,700,000	0.6%
27	SECURITY LIFE OF DENVER	1	567,700,000	0.6%
28	ROYAL BANK OF CANADA	11	538,732,814	0.6%
29	FORD MOTOR CREDIT	1	530,000,000	0.5%
30	BEAR STEARNS	2	460,000,000	0.5%
31	CREDIT LYONNAIS	7	427,413,059	0.4%
32	BANK OF TOKYO	2	422,000,000	0.4%
33	FIRST BOSTON	7	357,420,000	0.4%
34	NOMURA BANK ITL	6	337,144,300	0.3%
35	BANK OF NEW YORK	6	327,133,959	0.3%
36	BANK OF NOVA SCOTIA	8	258,340,286	0.3%
37	COPLEY FINANCING CORPORATION	1	240,000,000	0.2%
38	CAD IMPERIAL BANK	8	218,152,334	0.2%
39	SOCIETE GENERALE	4	210,059,229	0.2%
40	SUMITOMO BANK LIMITED	2	205,000,000	0.2%
41	SCHRODER	1	203,850,000	0.2%
42	ING CAPITAL MARKETS	3	188,594,385	0.2%
43	BANQUE PARIBAS	4	162,330,000	0.2%
44	NATIONSBANK	4	161,600,000	0.2%
45	ODC CAPITAL CORP.	1	146,400,000	0.2%
46	LLOYDS BANK	4	132,950,079	0.1%
47	FIRST NATIONAL BANK OF CHCIAGO	7	125,797,383	0.1%
48	CU ASSURANCE CO PLC	3	123,130,966	0.1%
49	PAINE WEBBER	2	112,460,415	0.1%
50	TORONTO DOMINION SEC	5	104,910,747	0.1%
	All Others (67)		1244707196	1.3%

Table 9

1994 OTC Counterparties on Contracts Opened During 1994

Rank	Counterparty	Number of Companies Using Counterparty	Total Notional Amount Outstanding	Percent of Total Industry OTC Notional
1	PRUDENTIAL BACHE	9	64,737,627,643	36.8%
2	GOLDMAN SACHS	30	21,599,604,258	12.3%
3	SALOMON BROTHERS	33	9,687,057,758	5.5%
4	BANKER'S TRUST	22	8,835,745,906	5.0%
5	MORGAN STANLEY	26	7,429,192,842	4.2%
6	UNKNOWN	51	6,649,641,928	3.8%
7	MERRILL LYNCH	38	6,086,695,215	3.5%
8	LEHMAN BROTHERS	23	5,822,472,637	3.3%
9	UBS SECURITIES	11	5,388,846,273	3.1%
10	SWISS BANK	11	4,475,425,663	2.5%
11	MORGAN GUARANTY	15	4,129,848,121	2.3%
12	CITIBANK	17	3,333,947,009	1.9%
13	BANK OF AMERICA	6	2,111,420,374	1.2%
14	KIDDER PEABODY	1	2,089,003,805	1.2%
15	FIRST CHICAGO	6	1,900,373,516	1.1%
16	CREDIT SUISSE	14	1,780,550,000	1.0%
17	FIRST BOSTON	8	1,689,891,927	1.0%
18	AIG	8	1,662,690,653	0.9%
19	BANK OF NEW YORK	4	1,485,735,628	0.8%
20	DEUTSCHE BANK	8	1,347,998,865	0.8%
21	REP NAT'L BNK-NY	2	1,270,000,000	0.7%
22	BARCLAY'S BANK PLC	13	1,174,318,515	0.7%
23	CHASE MANHATTAN BANK	12	953,063,988	0.5%
24	CHEMICAL BANK	18	848,191,915	0.5%
25	J P MORGAN	8	844,764,013	0.5%
26	GEN RE FINANCIAL	8	663,300,000	0.4%
27	ROYAL BANK OF CANADA	6	641,798,085	0.4%
28	ABN-AMBO BANK	3	574,538,194	0.3%
29	BANK OF MONTREAL	7	557,836,488	0.3%
30	FORD MOTOR CREDIT	1	500,000,000	0.3%
31	COLUMBINE LIFE INSURANCE CO	1	468,200,000	0.3%
32	SECURITY LIFE OF DENVER	1	468,200,000	0.3%
33	PAINE WEBBER	4	423,037,759	0.2%
34	CAD IMPERIAL BANK	3	363,858,302	0.2%
35	FIRST NATIONAL BANK OF CHCIAGO	6	297,460,210	0.2%
36	BEAR STEARNS	5	293,865,394	0.2%
37	ING CAPITAL MARKETS	1	290,000,000	0.2%
38	REPUBLIC OF	1	250,723,600	0.1%
39	NOMURA BANK ITL	3	250,416,528	0.1%
40	NORTHERN TRUST	2	232,376,709	0.1%
41	MARSHALL & ILSLEY	1	231,033,028	0.1%
42	BANK OF BOSTON	1	219,000,000	0.1%
43	BANK OF TOKYO	2	205,000,000	0.1%
44	NATIONSBANK	4	171,900,000	0.1%
45	SUMITOMO BANK LIMITED	2	130,000,000	0.1%
46	LLOYDS BANK	2	118,721,758	0.1%
47	BANK OF NOVA SCOTIA	2	107,500,000	0.1%
48	MERCADIAN	1	80,000,000	0.0%
49	NAT'L WESTMINSTER BK PLC	3	72,825,603	0.0%
50	POSTIPANKKI BANK	1	64,119,217	0.0%
	All Others (84)	99	909,515,817	0.5%

Table 10

1994 Exchange Counterparties End of Year Holdings

Exchange	Number of Companies Using Exchange	Total Notional Amount Outstanding	Percent of Total Industry Exchange Traded Notional
CHICAGO BOARD OF TRADE (CBOT)	36	6,814,876,588	61.11%
CHICAGO BOARD OF OPTIONS EXCHANGE	31	2,340,684,750	20.99%
NEW YORK STOCK EXCHANGE	13	1,015,164,830	9.10%
NASDAQ	3	331,969,500	2.98%
MATIF	1	232,073,282	2.08%
CHICAGO MERCANTILE EXCHANGE	4	194,875,950	1.75%
LONDON INTERNATIONAL FINANCIAL FUTU	1	71,692,554	0.64%
UNKNOWN EXCHANGE	3	60,841,291	0.55%
AMERICAN STOCK EXCHANGE	11	37,688,900	0.34%
OPTIONS CLEARING CORPORATION	1	19,808,400	0.18%
KANSAS CITY BOARD OF TRADE	3	15,038,250	0.13%
PHILADELPHIA STOCK EXCHANGE	5	9,303,000	0.08%
PACIFIC STOCK EXCHANGE	3	5,404,500	0.05%
AMERICAN OPT EXCHANGE	1	1,332,000	0.01%
TOKYO STOCK EXCHANGE	2	604,485	0.01%
PHILADELPHIA OPT EXCHANGE	1	580,000	0.01%
CHICAGO STOCK EXCHANGE	1	62,500	0.00%

1994 Exchange Counterparties on Contracts Opened During 1994

Exchange	Number of Companies Using Exchange	Total Notional Amount Outstanding	Percent of Total Industry Exchange Traded Notional
CHICAGO BOARD OF TRADE (CBOT)	56	187,558,963,048	88.88%
CHICAGO BOARD OF OPTIONS EXCHANGE	53	11,741,503,705	5.56%
UNKNOWN EXCHANGE	3	4,073,155,379	1.93%
NEW YORK STOCK EXCHANGE	32	1,945,723,680	0.92%
LONDON INTERNATIONAL FINANCIAL FUTU	3	1,250,835,489	0.59%
MATIF	1	1,208,772,636	0.57%
CHICAGO MERCANTILE EXCHANGE	10	880,466,295	0.42%
KANSAS CITY BOARD OF TRADE	3	642,405,900	0.30%
NASDAQ	3	474,045,226	0.22%
OPTIONS CLEARING CORPORATION	1	417,371,900	0.20%
AMERICAN STOCK EXCHANGE	23	330,489,500	0.16%
INT'L MONETARY MKT	2	326,155,068	0.15%
PHILADELPHIA STOCK EXCHANGE	16	104,274,500	0.05%
PACIFIC STOCK EXCHANGE	8	34,949,250	0.02%
TOKYO STOCK EXCHANGE	3	12,479,768	0.01%
AMERICAN OPT EXCHANGE	1	10,384,250	0.00%
PHILADELPHIA OPT EXCHANGE	2	7,005,000	0.00%
MIDWEST STOCK EXCHANGE	2	3,760,500	0.00%
CHICAGO STOCK EXCHANGE	2	1,655,000	0.00%

Table 11

Means of Independent Variables, Non-Users vs. Users

	Life/Health Insurers		Property/Casualty Insurers		Groups	
Variable	**Non-Users**	**Users**	**Non-Users**	**Users**	**Non-Users**	**Users**
Total Assets (000000's)	$ 656.5	$ 8,594.7	$ 248.8	$ 1,710.1	$ 563.5	$ 11,125.7
Stocks	7.5%	6.9%	9.9%	19.2%	9.3%	12.6%
Real Estate	6.2%	8.7%	1.6%	2.4%	3.9%	5.9%
Publicly Traded Bonds	60.7%	55.5%	64.9%	61.6%	63.2%	58.0%
Privately Placed Bonds	2.4%	9.8%	0.9%	1.6%	1.3%	5.4%
Cash + Short Term Investments	6.85%	2.73%	7.56%	4.57%	7.78%	3.70%
All Other Assets	16.41%	16.35%	15.04%	10.62%	14.52%	14.32%
Ave Maturity Publicly Traded Bonds	7.67	9.84	6.36	8.05	6.78	8.92
Ave Maturity Privately Placed Bonds	2.46	7.11	1.65	4.18	1.92	5.71
Commercial Liability Reserves	-	-	21.9%	19.7%	12.4%	8.7%
Auto Liability Reserves	-	-	19.3%	26.1%	12.0%	10.8%
Auto Physical Damage Reserves	-	-	4.7%	5.7%	3.1%	3.1%
Multi-Peril Reserves	-	-	14.9%	14.3%	12.2%	5.5%
Group Life Reserves	11.2%	4.5%	-	-	4.2%	1.7%
Individual Life Reserves	47.5%	53.6%	-	-	14.6%	28.7%
Group Annuity Reserves	1.7%	6.3%	-	-	0.5%	3.7%
Guaranteed Investment Contracts	0.4%	5.2%	-	-	0.2%	2.6%
Accident and Health Reserves	4.5%	3.8%	1.7%	1.0%	2.6%	2.4%
Life/Health Premiums Ceded to Reinsurers	14.4%	13.4%	-	-	4.8%	7.4%
Property/Casualty Premiums Ceded to Reinsurers	-	-	34.9%	31.3%	20.8%	16.5%
Single Unaffiliated Company Dummy	0.26	0.08	0.29	0.20	-	-
Stock Organizational Form Dummy	0.70	0.85	0.59	0.76	-	-
Affliated Member Active In Derivatives Dummy	0.08	0.62	0.09	0.57	-	-
Group Stock Organizational Form Dummy	-	-	-	-	0.64	0.69
Property/Casulty Group Dummy	-	-	-	-	0.62	0.35
Life Group Dummy	-	-	-	-	0.30	0.34
Surplus Herfindahl Index	-	-	-	-	0.87	0.64

Table 12

Proportion and Average Maturity of Bond Portfolio Held in Various Categories

	Life/Health Insurers		Property/Casualty Insurers		Groups	
Variable	**Non-Users**	**Users**	**Non-Users**	**Users**	**Non-Users**	**Users**
Publicly Traded Commercial Bonds	70.2%	54.3%	83.6%	79.5%	79.8%	66.2%
Publicly Traded CMO's	11.3%	18.1%	5.6%	8.6%	7.1%	13.7%
Publicly Traded Loan Backed Bonds	10.9%	8.9%	7.0%	7.6%	8.5%	8.9%
Publicly Traded Other Bonds	1.5%	1.8%	1.4%	1.5%	1.6%	1.9%
Privately Placed Commercial Bonds	3.2%	14.5%	1.1%	2.5%	1.7%	7.9%
Privately Placed CMO's	0.1%	0.5%	0.0%	0.1%	0.1%	0.4%
Privately Placed Loan Backed Bonds	0.3%	0.8%	0.1%	0.1%	0.1%	0.5%
Privately Placed Other Bonds	0.2%	1.1%	0.2%	0.2%	0.1%	0.6%
Ave Maturity Publicly Traded Commercial Bonds	6.756	8.731	5.891	7.474	6.010	8.060
Ave Maturity Publicly Traded CMO's	6.016	10.158	4.313	7.014	4.811	8.604
Ave Maturity Publicly Traded Loan Backed Bonds	7.537	11.208	4.998	8.683	5.872	10.079
Ave Maturity Publicly Traded Other Bonds	2.032	6.398	1.091	3.426	1.440	4.867
Ave Maturity Privately Placed Commercial Bonds	2.337	6.925	1.475	3.586	1.774	5.238
Ave Maturity Privately Placed CMO's	0.826	4.823	0.134	1.416	0.390	4.281
Ave Maturity Privately Placed Loan Backed Bonds	1.133	5.383	0.340	0.972	0.643	3.700
Ave Maturity Privately Placed Other Bonds	0.819	4.000	0.214	1.313	0.386	3.080

Table 13

Probit Regressions Results: Life/Health Companies Only

	Any Derivatives Activity	Buying Options	Writing Options	Swaps, Forwards and Collars	Futures	End of Year Counterparty
Intercept	-8.6912 ***	-9.8702 ***	-7.2478 ***	-18.2937 ***	-7.7654 ***	-12.2988 ***
Log Assets	0.3343 ***	0.3601 ***	0.2293 ***	0.7356 ***	0.3000 ***	0.4413 ***
Stocks	0.4113	0.9266	0.9090	1.1052	-0.0147	0.9172
Real Estate	-1.3487	-2.0014	0.1236	-5.7044 ***	-1.0796	-1.4923
GIC's	3.1328 ***	1.9488 *	0.4247	6.6962 ***	3.7015 ***	2.4059 **
Publicly Traded Commercial Bonds	-0.5759	-0.1365	0.3320	-2.4443 **	-1.0143	0.1914
Publicly Traded CMO's	-0.4359	-0.4867	0.1391	-0.6710	-1.4462	0.9373
Publicly Traded Loan Backed Bonds	-0.1933	1.6554	0.2337	-2.1903	-0.3980	0.5930
Publicly Traded Other Bonds	-10.1851 **	-1.3156	-5.6562	-6.8738	-5.1888	-0.7223
Privately Placed Commericial Bonds	0.5147	-0.0325	-2.5482	2.6482	0.2147	4.1822 ***
Privately Placed CMO's	21.3578 *	19.3110	16.7593	31.4762 **	36.3088 **	19.1315
Privately Placed Loan Backed Bonds	-0.0842	4.1189	-0.8522	3.0948	5.4317	5.3790
Privately Placed Other Bonds	6.2962	12.8734	3.3007	16.1040	-4.4388	-1.3822
Ave Maturity, Publicly Traded Commercial Bonds	0.0221	-0.0204	0.0298	-0.0163	0.0036	0.0072
Ave Maturity, Publicly Traded CMO's	-0.0076	-0.0164	-0.0174	0.0327	-0.0141	-0.0313 *
Ave Maturity, Publicly Traded Loan Backed Bonds	-0.0144	0.0185	0.0055	-0.0196	-0.0006	0.0075
Ave Maturity, Publicly Traded Other Bonds	0.0282 **	0.0348 **	0.0062	0.0465 **	0.0333 *	0.0210
Ave Maturity, Privately Placed Commericial Bonds	0.0028	0.0477 *	-0.0174	0.0628 *	-0.0064	-0.0003
Ave Maturity, Privately Placed CMO's	0.0141	0.0237	0.0149	-0.0429 **	0.0220	-0.0094
Ave Maturity, Privately Placed Loan Backed Bonds	0.0114	-0.0088	-0.0104	-0.0012	0.0007	0.0045
Ave Maturity, Privately Placed Other Bonds	-0.0001	-0.0422	0.0311	0.0103	-0.0419	0.0099
Group Life Reserves	0.1826	-0.0346	0.1188	2.6311 **	0.3730	0.2570
Individual Life Reserves	0.7897 **	0.5361	0.2803	1.8453 **	0.3525	0.3362
Group Annuity Reserves	0.8178	1.2085	-0.9055	0.5939	1.5579 *	0.1384
Accident and Health Reserves	0.7773	0.6627	0.2719	1.4972	0.8385	0.2507
Life/Health Premiums Ceded to Reinsurers	0.4923	0.5167	1.0644 ***	0.4368	0.4222	1.1214 **
Single Unaffiliated Company	0.3230	-0.4478	0.3438	0.4945	0.1261	0.4258
Stock Dummy	0.1496	-0.0414	0.0738	0.1591	-0.1544	0.5617 *
Affiliated Member Active in Derivatives Dummy	1.2434 ***	0.8048 ***	0.8168 ***	0.9446 ***	0.8530 ***	0.9556 ***
Log - L	-221.748	-143.119	-149.977	-94.751	-119.475	-134.373
Number of 0's	1063	1137	1159	1129	1150	1132
Number of 1's	144	70	48	78	57	75
Likelihood Ratio Index	0.50	0.46	0.26	0.67	0.48	0.52

Note - * significant at the 10% level
** significant at the 5% level
*** significant at the 1% level

Table 14

Probit Regressions Results: Property Casualty Companies Only

	Any Derivatives Activity		Buying Options		Writing Options		Swaps, Forwards and Collars		Futures		End of Year Counterparty	
Intercept	-7.9100	***	-7.1762	***	-6.8488	***	-15.1918	***	-8.6921	***	-10.5763	***
Log Assets	0.3028	***	0.2060	***	0.2221	***	0.6377	***	0.3230	***	0.4069	***
Stocks	1.4809	***	1.5935	*	1.5405	**	0.2131		0.1219		0.5986	
Real Estate	3.6538	***	4.6418	***	3.8574	**	0.4982		0.6111		4.3155	
Total Commercial Bonds	-0.2860		0.3239		0.2506		0.2922		-0.9229		-0.3466	
Total CMO's	1.0826		2.3885	**	2.0654	**	-0.5982		-5.4174	**	-1.3789	
Total Loan Backed Bonds	0.3365		0.5742		0.4770		1.1758		-1.5982		1.1418	
Total Other Bonds	-0.4355		0.2023		-0.3590		1.9400		-1.4798		-2.8172	
Ave Maturity, Total Commercial Bonds	0.0128		-0.0060		0.0252		-0.0112		0.0357		0.0292	
Ave Maturity, Total CMO's	0.0009		-0.0078		-0.0130		0.0111		0.0280		0.0110	
Ave Maturity, Total Loan Backed Bonds	0.0020		0.0054		-0.0112		0.0189		-0.0227		0.0019	
Ave Maturity, Total Other Bonds	0.0312	**	0.0157		0.0182		0.0595	**	0.0526	**	0.0398	*
Commerical Liability Reserves	-0.6885	**	-0.7839	*	-0.3895		-1.6627	**	-0.7853		-1.5855	***
Auto Liability Reserves	0.0945		0.3824		0.3128		0.2550		-0.9546		-0.5914	
Multi-Peril Reserves	0.0906		-0.0955		0.2998		-2.6080	*	-0.2835		-0.0777	
Auto Physical Damage Reserves	0.9814	**	0.4000		1.3203	***	-6.2179		-2.2045		-0.3878	
Accident/Health Reserves	-0.5368		-0.4533		0.0992		-9.3455		-3.2661		0.4804	
Property/Casualty Premiums Ceded to Reinsurers	-0.5404	**	0.1447		-0.5863	**	0.5573		0.0034		-0.0319	
Single Unaffiliated Company	0.7776	***	0.4098	*	0.5876	***	0.4463		0.8573	**	0.4680	
Stock Dummy	0.1612		0.3647	*	-0.0687		-0.1754		0.6231	*	0.1857	
Affiliated Member Active In Derivatives Dummy	1.3977	***	1.0117	***	1.2032	***	0.9489	***	0.9977	***	1.2255	***
Log - L	-324.241		-158.024		-252.113		-76.163		-80.166		-98.567	
Number of 0's	1921		2016		1979		2031		2036		2026	
Number of 1's	142		47		84		32		27		37	
Likelihood Ratio Index	0.37		0.30		0.28		0.54		0.44		0.47	

Note - * significant at the 10% level
** significant at the 5% level
*** significant at the 1% level

Table 15

Probit Regression Results: All Groups

	Any Derivatives Activity		Buying Options		Writing Options		Swaps, Forwards and Collars		Futures		End of Year Counterparty	
Intercept	-6.8969	***	-7.8522	***	-5.5534	***	-16.3751	***	-7.5916	***	-10.3514	***
Log Assets	0.2662	***	0.2697	***	0.1736	***	0.7076	***	0.3069	***	0.3947	***
Stocks	1.7472	***	1.2948		1.9748	***	-0.6557		0.7906		1.9076	*
Real Estate	-0.4644		0.0449		0.9827		-2.0900		-2.4477		-1.8021	
GIC's	2.9641	***	2.4425	*	1.7768		5.2492	***	4.2849	***	4.1215	***
Publicly Traded Commercial Bonds	-0.3720		-0.3034		0.2091		-0.5988		-1.2334	*	-0.0630	
Publicly Traded CMO's	0.2755		0.4704		0.6673		0.3228		-2.4125	*	0.4485	
Publicly Traded Loan Backed Bonds	0.0747		1.4290		0.2336		0.9557		-1.0229		1.6532	
Publicly Traded Other Bonds	0.3815		0.7770		0.4718		-2.8245		-9.8446		-3.4972	
Privately Placed Commericial Bonds	0.1087		0.9068		-3.4933		1.4486		-1.0505		2.2137	
Privately Placed CMO's	3.9159		3.5988		9.8633		14.4148	*	9.3661		6.8268	
Privately Placed Loan Backed Bonds	0.5498		5.4371		-1.8728		9.5701		2.7038		3.2331	
Privately Placed Other Bonds	-8.6560		2.8131		-4.1695		13.8516		3.4831		3.4604	
Ave Maturity, Publicly Traded Commercial Bonds	0.0223		0.0029		0.0158		0.0093		0.0153		-0.0061	
Ave Maturity, Publicly Traded CMO's	-0.0059		-0.0033		-0.0071		-0.0018		-0.0089		-0.0320	*
Ave Maturity, Publicly Traded Loan Backed Bonds	-0.0030		0.0197		-0.0073		0.0061		-0.0119		0.0164	
Ave Maturity, Publicly Traded Other Bonds	0.0123		0.0202		-0.0069		0.0367		0.0469	**	0.0260	
Ave Maturity, Privately Placed Commericial Bonds	0.0103		0.0252		0.0128		0.0120		0.0086		0.0014	
Ave Maturity, Privately Placed CMO's	0.0479	***	0.0441	**	0.0300	*	0.0029		0.0366	*	0.0298	
Ave Maturity, Privately Placed Loan Backed Bonds	0.0044		0.0088		-0.0218		0.0085		-0.0031		0.0260	
Ave Maturity, Privately Placed Other Bonds	0.0121		-0.0489	*	0.0453	**	-0.0387		-0.0311		-0.0309	
Commericial Liabilities Reserves	-0.3227		-0.0004		0.1352		-2.6315	**	-0.8040		-1.3621	
Auto Liability Reserves	0.0958		0.7763	*	0.4175		-2.6530		-0.8285		-0.1749	
Auto Physical Damage Reserves	1.2445	**	1.1468		1.5017	***	0.0746		-2.9627		0.2716	
Multi-Peril Reserves	-0.1687		-3.4658	**	0.2286		-1.4669		-1.0081		0.5714	
Group Life Reserves	-0.4813		-0.5295		0.1868		-12.4003	*	-0.2941		-0.2426	
Individual Life Reserves	0.4833		0.7109		0.5552		0.0649		0.4097		0.2641	
Group Annuity Reserves	2.2968	**	2.9821	***	0.7276		0.1655		3.8267	***	1.6757	
Accident and Health Reserves	0.3929		0.5307		0.2346		-0.0770		-2.9305		-0.2351	
Life Premiums Ceded	1.2663	***	1.5291	**	1.4732	***	0.4390		0.2530		2.1412	***
Property/Casualty Premiums Ceded	-0.0926		0.4561		-0.2219		0.9533		0.8407		-0.2589	
Group Stock Organizational Form Dummy	0.1607		0.1217		0.0030		0.0738		0.1286		0.3786	*
Property/Casualty Group Dummy	0.3687	*	0.9235	***	0.0349		1.0045	**	0.4703		0.3300	
Life Group Dummy	-0.3417		-0.1168		-0.6270	***	0.0316		0.4440		-0.4297	
Surplus Herfindahl Index	-0.0441		-0.8819	**	0.0422		-0.4578		-0.3897		-0.2140	
Log L	-347.869		-175.731		-266.967		-92.414		-114.283		-131.601	
Number of Non-Users	1245		1343		1333		1355		1368		1357	
Number of Users	178		80		90		68		55		66	
Likelihood Ratio Index	0.35		0.43		0.20		0.66		0.51		0.51	

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