The Demand for Homeowners Insurance with Bundled Catastrophe Coverages*

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Abstract

In this paper we estimate demand for homeowner insurance in Florida. Since we are interested in a number of factors influencing demand, we approach the problem from two directions. Using 3SLS estimation, we first estimate two hedonic equations representing the price mark-up and the level of premiums per contract. We are interested in how the contracts are bundled and how the various terms influence the price mark-up and the overall level of premiums. Second, we estimate the demand for homeowners insurance using the ISO's indicated loss cost as our proxy forreal insurance services demanded. We assume that the demand for coverage is essentially a joint demand and thus we can estimate the demand for cat cover separately from the demand for non-cat cover. Two notable results are that cat coverage is more price sensitive than non-cat coverage and that cat coverage is an inferior good.

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I. Introduction

A. The Problem of Catastrophic Risk

The risk of natural disasters in the U.S. has significantly increased in recent years, straining private insurance markets and creating troublesome problems for disaster-prone areas. The threat of mega-catastrophes resulting from intense hurricanes or earthquakes striking major population centers has dramatically altered the insurance environment. Estimates of probable maximum losses to insurers from a mega-catastrophe range from $50-$115 billion depending on the location and intensity of the event (RMS/ISO, 1995).[1] Under current conditions, many insurers could become insolvent or financially impaired if a mega-catastrophe occurred, with rippling effects throughout insurance markets and the economy (ISO, 1996a).[2]

Increased catastrophe risk poses difficult challenges for insurers, reinsurers, property owners, and public officials (Kleindorfer and Kunreuther, 1999). The fundamental dilemma concerns insurers' ability to finance low-probability, high-consequence (LPHC) events. LPHCs generate a host of interrelated issues with respect to how the risk of such events are managed, financed and priced (Russell and Jaffe, 1997). Insurers have sought to raise their prices and

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[1] These maximum probable loss (PML) estimates are based on a 500-year "return" period. In other words, the probability that a loss would occur in any given year that would exceed the PML is one in 500.

[2] An Insurance Services Office (1996a) study estimated the impact of severe catastrophes on the financial condition of 80 insurer groups that report detailed statistical data to ISO. Utilizing catastrophe models, ISO estimated that a mega-catastrophe causing $50 billion or more in insured losses could result in 36 percent of insurers becoming insolvent and many more becoming financially impaired, depending on their location. The ISO analysis included estimates of the impact of insurers' reinsurance arrangements based on information available from Best's Reports. The companies in the ISO sample represented approximately 28 percent of total industry property insurance premiums.

decrease their exposure to catastrophe losses, while looking for efficient ways to diversify their exposure through reinsurance and securitization.

To preserve the availability and affordability of insurance coverage state legislators and insurance regulators have resisted insurers' efforts to raise prices and terminate policies (Klein, 1998). Regulatory restrictions have been complemented by state residual insurance mechanisms with significant flaws (Marlett and Eastman, 1997). Government policies have imposed significant cross-subsides from low-risk to high-risk areas as well as cross-subsidies from non-catastrophe lines of insurance to the catastrophe lines. These policies distort incentives and undermine the ability of market forces to operate effectively in managing catastrophe risk (Grace, Klein and Kleindorfer, 1999).

B. Overview of Study

As concerns about natural disasters have grown, economists have begun to explore the special problems they pose and their implications for insurance markets. Understandably, recent research on catastrophe risk has focused on the topics of industry capacity, reinsurance, securitization, and mitigation. Yet, much less is known about the microeconomics of catastrophe insurance markets at the primary level (i.e., transactions between primary insurers and individual consumers). Analyzing the supply of and demand for catastrophe insurance and integrating this analysis with research on risk diversification and mitigation is essential to formulating a more complete picture of the catastrophe risk problem and evaluating viable solutions.

This research project represents the first significant attempt to examine the nature of the natural disaster insurance market at a detailed, micro-economic level. Our examination is made possible by the unprecedented assembly of an extensive, detailed database on residential insurance transactions affected by catastrophe risk.[3] These data are supplemented by information on insurer financial and organizational characteristics and the demographics of residential households at a Zip code level. We have initially focused our analysis on demand transactions in Florida. We have data for New York that we will employ to develop a corresponding demand model for New York. Further we hope to build a complementary supply model for both states. Since the risk and regulatory environments of these two states differ in important ways, this will eventually permit us to undertake an interesting comparative analysis.

Our paper contributes to previous research by exploring several significant aspects of residential insurance markets in areas threatened by natural disasters. Our initial analysis encompasses the key determinants of the demand for residential/catastrophe insurance and their effects on the quantity, quality and price of insurance purchased. Among the phenomena we seek to illuminate are the sensitivity of demand and supply to prices, policy features, and the bundling/unbundling of perils and coverages.

The paper proceeds as follows: Section II provides background on the demand for insurance that we will use in our methodology; Section III contains a description of the methodology and the results; Section IV summarizes the paper and briefly describes future research directions.

II. The Demand for Homeowners Insurance in Florida

A. Introduction to the Demand Analysis

To obtain estimates of the demand homeowners insurance products significant amounts of micro-level data are required. With the cooperation of the Insurance Services Office (ISO), we

[3] These data were provided by the Insurance Services Office (ISO). The insurers included in this database granted explicit permission for the authors to use these data under a confidentiality agreement.

obtained information from a group of primary insurers writing business in Florida and New York that file detailed premium and exposure data with ISO. We use the data for the four-year period 1995-1998 for analyses that are reported here.[4]

The database contains full homeowners' premium and exposure data for 60 companies, comprising some 20 groups, taken as a snapshot in the first quarter of each of the four years, 1995-1998. Each exposure record contains slightly aggregated information on similar groups of policies in every Zip code in which reporting companies did business. The information contains relevant data regarding the characteristics of the policies actually purchased by homeowners for each such company, including premiums, structural information on the nature of the insured property, and coverages purchased.

By analyzing locational information (Zip code, standard ISO reporting territory and community characteristics), information on the company selling the policy, and Census information on the socio-demographic characteristics of each Zip code, a very rich picture of the nature of demand for homeowners insurance coverage can be deduced using standard econometric techniques. It should be noted that the database constructed has exposure records for Florida and New York for both homeowners multi-peril coverages as well as dwelling fire and extended coverage policies that offer less bundled coverages for non-catastrophe and catastrophe damages. This paper will focus only on homeowner multi-peril coverage policies in Florida, leaving to a later paper the joint analysis of multi-peril and dwelling fire policies as well as an analysis of the supply of homeowners insurance in both Florida and New York. In either case,

[4] The sample of insurers was drawn from the top 50 insurer groups in New York and Florida in terms of market share. It should be noted that our database contains only a subset of insurers that report statistical data to ISO. In subsequent analyses, we hope to include data from large insurers who do not report data to ISO. Further we have not yet been able to make a comparison of the companies for which we have data to the total market characteristics of New York and Florida.

given the states of interest here, the hazard of interest is windstorm damage. We first provide a brief introduction to the foundations of the modeling used in this process.

B. Modeling the Demand for Insurance Products

Introduction to the Structure of Demand for Homeowners Insurance

There are several features of this market that serve to constrain and structure the analysis of demand. First, we take the view that homeowners insurance, including coverage against windstorm damage, is essentially mandatory, although some homeowners may elect a "no coverage" policy, i.e., they have no property insurance.[5] (Consider this "no coverage" option as purchasing an insurance product with "infinite deductibles" at a price of zero.) Second, as a number of previous analyses have shown (e.g., Joskow (1973), Cummins and Weiss (1991), Grace, Klein and Kleindorfer (1999)), the market for homeowners insurance products is workably competitive.[6] The basic demand problem for the homeowner is to select a single optimal policy from among the menu of policies offered in the market. This involves a complex tradeoff among the various attributes of the coverage and options purchased, the characteristics and needs of the homeowner, and the perceived quality of the companies from which coverage can be purchased. Demand in this market arises from the optimal consumer choice of a bundle of product and company attributes, given personal and geographic characteristics for each homeowner. The feasible set of such "bundled products" is the set of insurance policies,

[5] Lenders typically require hazard insurance for homes with mortgages. It is possible that some homeowners without a mortgage have opted not to purchase insurance. We shall control for this in the models below using census data (as of 1990) on the percent of homeowners having mortgages in each ZIP code represented in our sample. However, insurers only typically insure 80 percent of the value of real estate (as the land is not insurable). It is quite possible that people might still have mortgage payments to make but opt out of insuring because the mortgage is less than 20 percent of the property's value.

[6] Indeed, the standard structural and performance benchmarks, such as concentration ratios and various financial indicators of profitability and excess profits, would underscore this statement See Bartlett, Klein and Russell (1999).

coverage options, and company attributes that can be sustained in competitive equilibrium.

The theoretical foundation for this demand analysis, and the interacting market equilibrium, may therefore be conveniently thought of in the context of the model of price-quality competition (e.g., Gal-or, 1983). In a competitive market, the differences in what homeowners are willing to pay for various features will be reflected in the price at which various bundled products with these features sell. What we model will therefore essentially be a regression of observed price in the market place against various features of the products sold and the companies that sell them. We are interested in the factors that appear to influence demand, including whether these factors appear reasonable on the basis of theory. Since there is also considerable evidence that homeowners do not search thoroughly for "best offers", we are also be interested in aspects of the market that appear to arise from behavioral considerations (e.g., Kunreuther, 1998b), including the price dispersion of similar policies offered in the same territory.

At the outset, we note the following features of the homeowners insurance market that we rely on in our modeling. While the structure of this market may be workably competitive, it is nonetheless clearly a regulated market. On the demand side, this does not occasion any theoretical difficulties as the model we develop below attempts only to explain, for policies actually offered in the market, how various features are valued, within the feature (e.g., various deductible levels) and across features (e.g. deductible levels versus type of coverage). It is important to bear in mind that the set of policies offered in the market, and their prices in particular, are not necessarily the result of a perfectly competitive market.

We assume that the set of policies offered by companies, together with their underwriting and marketing strategies, are expected profit maximizing, subject to imposed regulatory

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for a discussion of how regulation-imposed insurance price subsidies may be sustained for a period of time.

constraints. This suggests that companies find the regulatory policies imposed not so onerous as to cause them to leave the state. Since there may be underbracing of some catastrophe coverages in some areas, this further implies that there may be cross-subsidies from one line of business to another. These cross-subsidies may be sustainable in equilibrium if they allow insurance companies to earn a reasonable rate of return on all lines of business and if they are driven by consumer preferences for certain feature bundles and cross-marketing. The continuation of these cross-subsidies over time implies some further inertia that may, at least in part, be due to regulatory restrictions on terminating policies. Beyond the obvious implications for understanding rate adequacy and precision, this suggests the importance of detecting cross-marketing synergies in the demand and supply analysis, as well as detecting trends in aggregate supply by particular insurers in terms of increasing the diversification of their portfolios of insurance policies.

Defining Price and Modeling Demand for Homeowner Policies

Assume that a particular homeowner, with characteristics *Z* (income, family status, type of structure, etc.), faces a choice among different policy options for insuring his home, where the set H gives the available policy options in the homeowners market. A typical such option "*h*" in the set *H* would be one offered by firm *i* (with characteristics X_i) with certain policy features such as deductible levels, loss valuation methods, and premium *P(h).* The homeowner must choose one of the options in *H* and does so by maximizing his expected utility over the risks or gambles implied by each choice h. Let us represent this expected utility *U(h, P(h))* in quasi-linear form[7] as:

[7] As Willig (1976) has shown, this form, with constant marginal utility of income, is appropriate for demand modeling when the good in question does not absorb a significant fraction of the homeowner's budget, a reasonable assumption in the case of insurance. This is not to say, of course, that there are no income effects across consumers, only that the marginal utility of income for each consumer is assumed constant over the range of policy options

$$U(h, P(h), Z) = V(F(h), Z) - P(F(h), Z) \qquad (1)$$

where *V* represents, for a consumer of type *Z,* the consumer's willingness to pay for various coverages or "features" of an insurance policy and *F(h)* represents the vector of such features, including the characteristics of the company offering the policy that may make a difference to consumers. Note that both *V* and *P* are shown to depend on only the vector of features *F* and the characteristics of the homeowner (possibly only the type of structure, but perhaps also such locational characteristics as community rating or location of nearest fire department). This is without loss of generality since one of these features could itself be the premium level *P(h).* The homeowner then maximizes the function *U(h, P(h), Z)* over the set *H.* Assuming that the features can be more or less continuously varied (that is, there is a rich menu of policies available in the market), we can represent the choice problem as choosing an insurance policy by choosing optimal features of the policy. This leads to a solution to the homeowner's maximization problem characterized by $MV/MF_i = MP/MF_i$, which of course varies with consumer characteristics *Z.* From this logic, one can understand the structure of demand in this market by examining the structure of how premiums vary with policy features.[8] This leads to estimation problems of the following general type, neglecting for the moment the details here of functional form:

$$P(F, X, Z) = aF + bX + cZ + e \qquad (2)$$

offered.

[8] Indeed, if V and P are estimated using bilinear or translog families of functions, then knowledge of one will lead (up to a linear transformation) to knowledge of the other.

where we have separated the policy features into categories, those pertaining to the policy itself (the vector *F*), those that pertain to the company (the vector *X*), and those pertaining to neighborhood characteristics (the vector *Z*). In this model, *P(F, X, Z)* could be either the total premium for a given policy or more likely, normalizing by units of coverage, premium per unit of coverage.

"Price" for insurance products, as for other products and services, is defined on the basis of value-added per unit (in this case, per dollar) of output. At the policy level, this value-added measure of price can be captured by subtracting the discounted value of expected losses covered by the policy from the policy's premium.[9] Denoting by *L(F, Z)* the expected losses for a policy *h* with features *F* and by *P(F, X, Z)* its premium, we obtain the following definition of price *p(F, X, Z)* for a homeowners policy *h = (F, X, Z)* characterized by the parameters *(F, X)* and indexed by consumer and loss characteristics *Z*:

$$p(F, X, Z) = \frac{P(F, X, Z) - PV((L(F, Z))}{PV(L(F, Z))} = \frac{(1+r)P(F, X, Z) - L(F, Z)}{L(F, Z)} \qquad (3)$$

where *PV(L(F, Z)) = L(F, Z)/(1+r)* is the present value of expected losses on the policy for the policy period and "r" is the insurer's return on equity for the period. *L(F,Z)* is The indicated loss costs per unit of coverage for the policy features (*F*) and structure (*Z*) in question. We will, in fact, directly estimate (3) using a functional form similar to (2). For the ISO database underlying this study, we have directly the premiums for each policy (or group of identical policies), "r" is

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[9] Note that we do not consider the effects of taxes in this model. See Myers and Cohn (1987) and Cummins (1990) for a more detailed discussion of “price” in the insurance context. See also Cummins and Weiss (1998) for a related empirical study of price and profitability using frontier efficiency methods. As noted in the latter paper, the definition of price in (3) properly accounts for the insurer’s expenses and the opportunity costs of the owner's capital invested in the insurance business.

the average ratio of investment income to earned premiums for companies, and *L(F, Z)* represents the advisory Indicated Loss Costs, as computed by ISO procedures, for the policy characteristics *(F, Z)*.[10]

A further analysis is undertaken on the Indicated Loss Costs. We employ our indicated loss costs as a measure of real insurance services output. ISO calculates an expected indicated loss costs for each contract. That is, ISO uses actual experience to determine say the expected loss costs for a given type of homeowners policy that covers a brick house in Zip code 30029 with ordinance/law coverage. ISO also attributes a catastrophic (cat) loss cost and a non-catastrophic (non-cat) loss cost for each possible combination of location, policy form, and additional contract terms. Thus, we can estimate three further regressions.

Indicated loss costs are a proxy for the amount of insurance that would go to a particular house. One could employ the coverage A limitation also. While the coverage A limitation reflects the homeowners perceived value of the home it does not necessarily reflect the risk of loss to the home. It is essentially the maximum possible loss rather than the expected loss.

As mentioned above, three loss cost equations will be estimated. The first is for the cat coverage, the second is for the non-cat coverage. The third will be for the total catastrophic coverage.

They will be of the following form:

$$L(F,Z)_{i=C,NC,TOT} = b_1 F + b_2 Z + b_3 X + b_4 P + e \qquad (4)$$

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[10] We discuss the ISO procedures briefly in Grace, et. al., (1999). For the moment, the reader should take these advisory Indicated Loss Costs as our best estimates of the expected annual costs resulting from policy features, structural characteristics and location of a property. The non-catastrophe portion of Indicated Loss Costs is based on actuarial experience and the catastrophe portion is based on catastrophe modeling results. As discussed below, the expected loss costs implied in individual insurers' prices can vary from the ISO Indicated Loss Costs which represent overall industry projected costs. Also, Indicated Loss Costs are not the same loss costs approved by regulators.

where $L(F,Z)_i$ reflects the quantity demanded of real insurance services measured by the Indicated Loss Costs for cat, non-cat, or total coverage, *F* represent a vector of policy form terms, *Z* represents a vector of neighborhood characteristics, *X* represents a vector of company characteristics, and *P* represents price.

These general forms of the Premium equation (2), the Price equation (3) and the Loss Cost equations (4) will serve as the basis for our estimation procedures. They incorporate both non-catastrophe perils and windstorm damage. The reader may think of these simply as separate features of the policy in question. We are interested in identifying the separate effects of these factors in our empirical analysis.

Hypotheses

The received theory on factors influencing demand for insurance products is rich and long, both in terms of the rational consumer model (e.g., Arrow, 1971) as well as in behavioral and experimental studies of protective behavior (e.g., Kunreuther, 1998b). The basic theory recognizes that, through pooling, insurance provides a mechanism to reduce the volatility of losses at a price, the "risk premium" or loading, that risk averse consumers are prepared to pay. Competition then assures that the coverages that are provided in the market are produced efficiently so as to minimize the total costs of providing such coverages, including the capital costs backing these policies. Behavioral and experimental studies of both insurance underwriters, and consumers (Kunreuther, 1996 and Kunreuther, et al., 1995), however, show that both the supply and demand of insurance is more complicated in reality. This is especially true in areas like catastrophe insurance where understanding and evaluating the hazard itself is more difficult. Thus, in what follows, we begin with the standard hypotheses derived from the normative theory based on risk pooling among risk averse individuals. We are also interested in such issues as price dispersion (for similar policies) which would suggest less-than-complete consumer search or other “market imperfections” on the demand side.

C. Descriptive Statistics for Various Policies in Florida

The basic contract features of the Florida policies are summarized in Table 1. The HO3 policy is the typical contract sold. It has coverages for the home itself, attached structures, personal property, loss of use, personal liability, and medical payments to others. There are also options (not shown in Table 1) to cover personal property at a greater value than the default, or to cover liability at a greater level than the default, for example 10 percent of the home's insured value. The major difference between an HO3 policy and an HO5 policy is that the HO5 has more options built in. While replacement cost coverage[11] is optional for the HO3 policy, it is a standard term of the HO5 policy. Similarly Ordinance or Law Coverage[12] is optional for the HO3 contract, but standard in the HO5. Finally, Off Premises Theft coverage[13] is optional for HO3 policies and standard for HO5 policies.

The difference between the HO3 and HO5 policies and the HO8 policies is the overall comprehensiveness of the coverage. HO5 and HO3 contracts cover all losses except those specifically included while the HO8 policy covers only listed losses. Presumably one could obtain endorsements for additional coverages, but this does not seem to be empirically true in our Florida data.

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[11] Replacement cost contracts will rebuild a covered home to its previous state no matter the cost. Repair coverage will repair to a similar, but not exact state. The major differences is that if a house is built with unique construction materials (e.g. Italian marble staircase), the replacement cost coverage will replace exactly the materials and workmanship of the damaged property. Repair coverage is lower quality insurance in the sense that a new staircase will be put in the house, but it may not be of the quality of the original materials.

[12] Ordinance or Law Coverage will upgrade a rebuilt house after a covered loss to the current building code. Without the coverage, the house may be "repaired" or rebuilt to its previous state. Bringing the property up to code will then be the responsibility of the homeowner.

[13] This term will cover losses of personal property that are off the premises of the covered property.

Table 2 shows descriptive statistics of the various contracts in Florida during the period 1995-1998. These data are aggregated at the Zip code level by certain contract characteristics.[14] We see that HO3 contracts make up the majority of contracts written in the state from the sample companies during this period. Overall, HO3 contracts account for approximately 96.44 % of all contracts written by the sample companies. The other two policies, HO5 (3.54%) and HO8 (0.14%) account for the remainder of polices written.

The average HO3 premium is less than the average HO5 premium while the average HO8 premium is less than the average HO3 premium. This makes intuitive sense. The HO3 is the typical policy sold and it is more expensive than the less inclusive HO8 policy, but not as expensive as the more comprehensive HO5 policy. Further the mark-up differs among between the policies. The mark-up is the variable we employ as our definition of price and is defined as (1+r)(Premiums-Indicated Loss Costs)/Indicated Loss Costs.

HO5 contracts have the highest average deductible followed by HO3 and then by HO8 polices. We can also look at some of the contract terms across polices. Off premises coverage is not a popular endorsement, but ordinance or law coverage is. Further, persons who purchased HO8 polices seem to live in areas with a lower ratio of cat loss costs to total loss costs than people who purchased HO5 or HO3 polices.

D. Descriptive Statistics for Bundled Contracts

Table 3 shows the average prices for bundled and unbundled HO3 contracts and for the

[14] Contracts were aggregated by (1) whether the contract had replacement cost coverage, (2) whether the contract transferred the wind portion to the wind pool, (3) whether the contract was in a Zip code that was in the top 25 percent, middle 50 percent, or bottom 25 percent of median home values in the state, and whether its (4) wind or (5) fire deductibles were above the mean.

average HO5 and the average HO8 policy. It should be noted that the premiums per contract for the HO5 policy is $934 and the bundled HO3 policy with replacement cost coverage, ordinance and law coverage and Off Premises Theft Coverage is $1067. It is interesting to note that there were 65 observations for the fully bundled HO3 policy while there was 1,457 for the HO5. These are essentially similar polices with different relative demands and different prices. Figure 1 shows the graphical relationship between the bundled contract terms and premiums and mark-ups using the data from Table 3.

III. Methodology of Demand Estimation

We estimate the demand for homeowners insurance in Florida using a three-stage least squares regression approach. We are interested in the results of five equations and thus we estimate a five-equation model: one for price; one for premiums; one for cat loss insurance; one for non-cat loss coverage; and one for the total loss coverage.

A number of interesting problems develop. First is the issue of the level of aggregation one uses to estimate these models. It is possible to estimate the model at the individual contract level, but at some future time we need to be able to calculate cross elasticities of demand for the various contract terms. Thus, if we were to estimate the demand model at the individual contract level, there are no observations for contracts not purchased. Second, the market in which the consumer his purchases is larger than his "house." This means that shopping may occur and that demographic characteristics of the neighborhood (in addition to the consumer's home characteristics) may influence the type of insurance purchased. Because we have the Zip code location of the insured house and we have access to Zip code level information from the Census, we assume, for now, that the market the consumer shops in is the Zip code.[15]

A second problem that arises is that the demand for homeowners insurance is a derived demand of the demand for housing. We account for the demand for housing by including the Census value for the Zip code's median housing cost as an endogenous variable. This variable reflects the value of housing services to the homeowner and is employed in housing demand studies as a proxy for the quantity of housing services demanded. Variables expected to influence housing demand such as median income, median travel distance to work, and Census reported housing characteristics for the Zip code are used as instrumental variables.

We first estimated several models of the form (2) for Premium and PRICE1 in order to understand the statistical association between observed premiums and prices and various explanatory factors in the ISO database for Florida. Our primary interest is to determine which factors appear to vary more or less significantly than the expected losses associated with these factors might suggest. For example, as deductibles increase for a particular property, the expected losses facing an insurer offering coverage for that property will decrease, all else equal. If price and premium levels for policies with different deductible levels exactly tracked these changes in the advisory Indicated Loss Costs facing the insurer, then including further variables, in an estimated demand equation to reflect the level of deductible purchased should have no additional effect. Thus, the direct effect of increased deductibles on reduced loss costs should capture all the observed variation in policy premium and price. We will see that, in fact, this is not the case. A variety of factors beyond expected losses influence the price of and premium for insurance coverage in these markets. Reflecting the structure of (2), the list of factors of interest

[15] We recognize that some Zip codes are quite large geographically and many are diverse demographically, but this is the smallest level of aggregation that will permit analysis of our data. Further work will also attempt to take into account the spatial relationships among the Zip codes or other markets.

is separated into three groups:

F = Policy features and contract terms;

X = Characteristics of the company (in the State) that might be factors influencing demand (company effects);

Z = Characteristics of the structure, location and other factors influencing the expected losses on the policy over the period of insurance coverage (for uniformity, we annualize all period values, such as losses, premium, etc. in what follows) (neighborhood and demographic effects).

Tables A1-A3 provide a list of the potential *(F, X, Z)* variables available for use in this analysis. Note that Table A1 contains both information specific to the policy issued as well as to the type of structure insured. It also includes certain structural and protection features of the structure and the community in which it is located. The information in Table A1 was available for over 1.8 million house-years in New York and nearly 900,000 house-years in Florida, or approximately 450,000 house-years in New York and 225,000 house-years in Florida for each of the four years studied. In the data used below, however, we have a smaller set of usable data. In Florida we have approximately 663,500 house years over the period and in New York approximately 1.3 million. Some of the difference is due to incompatible records, the generation of new Zip codes, missing information, and some unexplained anomalies. The latter category seems to be where we lost a relatively large percentage of the data points.[16]

We estimate five regressions. The first two are hedonic equations that allow us to see how policy terms, neighborhood effects, and firm characteristics influence the price mark-up and the level of premiums per contract. The second three are the Indicated Loss Costs for cat, non-cat coverage and the total coverage (Cat + Non-Cat). The regressions are weighted by the number of contracts per Zip code.

[16] Of course we are diligently trying to get these data to become upstanding and useful members of our data set.

In interpreting these results, it is important to recall what we expect to be measuring with the different dependent variables. We report two sets of results in Table 4: the log of PRICE1 (LPRICE1) and the log of Premium per contract (LPREMS). PRICE1 is the transformed price variable PRICE + 1 = (1+r)[PREMIUM-ILC]/ILC (adding 1 to PRICE simply assures that our price measure in (3) is always positive). PRICE is intended to measure the "loading" received by insurers, which is viewed as the real cost of insurance. However, it also should be noted that we are using ISO-indicated loss costs rather than the indicated or regulator-approved loss costs assumed by each insurer in their pricing. Hence, the effect of a given risk factor (e.g., the type of structure or its location) on PRICE1, as captured in our statistical results below, could reflect deviations in insurers' estimations of expected loss costs from ISO loss costs, and/or differences in the loading factor added by insurers.

PREMS is the premium for a given exposure.[17] When PREMS is the dependent variable, the independent variables also are intended to account for the effect of calculated ISO indicated loss costs on the premium per house. It is important to keep in mind our assumption that this market is workably competitive. However, this does not imply price or premium uniformity since there are still significant quality and service delivery features and some of these can be expected to survive in a competitive equilibrium. Thus, our results reflect a summary of both consumer preferences for various policy features and efficient modes of delivering these features under competition, i.e. the alternatives consumers will actually see in the market.

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[17] When there is more than one house-year reported in a given exposure record, PREMS is calculated as the total premiums for that record divided by the number of in-force house years, i.e., the premium per house covered. Similar adjustments are made for other "amount" fields, such as the total amount of insurance in force (the sum of the Coverage A limits on the homes represented in the data record), to transform all data elements to a per-house basis.

A. Results for Observed Price Regression

Table 4 shows the results of the price equation regression. We examine the various components of the regression results separately. First we will look at the policy form or contract terms, then the neighborhood variables, and then we will finish with the firm specific variables. Since this an exploratory study, we find some relationships for which we do not have a complete understanding of the variables' proper sign in the regression. The ones that seem to be counter to economic theory will be highlighted.

Policy Form Characteristics

Many of the policy form terms have been interacted with one or more of the other policy terms to show the possible effect of bundling the contract terms. If we examine the contract as a bundled good, it is beneficial to examine the combined effects on the price of the average policy. In Table 4 we see that neither the HO3 nor HO5 contract forms had a significant effect on price. The marginal effects (?*ln p*/?*HO3* or ?*ln p*/?*HO5*) are measured at the mean contract characteristics and do not affect price.

The link between deductibles and the price mark-up is hypothesized to be negative. That is, as a deductible increases, the price mark-up should decrease. As the purchaser is buying less insurance, the price should be lower. The marginal effect for the wind deductible (again measured at the mean) is positive for both HO3 and HO5 policies. It is important to note here that price is really a price mark-up over Indicated Loss Costs. Thus, this result implies that contracts with higher wind deductibles have higher mark-ups, all other things being equal. In contrast, the fire deductible for the HO5 policy has a significantly negative marginal effect. Thus, for HO5 policies increases in fire deductibles lower the price mark-up.

The difference between fire and wind deductibles and their relationship to the price mark-up seems contrary to expectations. Butsic (1999) suggests that firms in a competitive environment may desire to allocate surplus by line as well as by layer of coverage. To the extent that higher levels of coverage become more risky (contain more cat risk versus non-cat risk), then insurers have an incentive to reserve more capital to support the class of claims in the more risky level of coverage. Since wind is really the cat coverage in Florida, it may be that as wind deductibles increase, the firm is left with the more risky expected losses. In contrast, fire is not likely to be associated with catastrophes in Florida and thus insurers' incentives to increase the mark-up for fire deductibles do not behave the same way as they would for wind.

The marginal effect of off premises and replacement cost cover are both positive and significant reflecting higher mark-ups. In these cases, the higher mark-up may be related to the transaction costs of adding the coverages. In contrast, the mark-up for the various building types is lower (frame and brick) relative to the omitted category, superior-fire-resistant (SFR). This may indicate the presence of additional certification costs for the SFR home. Finally, the amount of insurance purchased (measured by the log of the Coverage A limit) is negatively related to the price mark-up. This suggests that it is less expensive to write a bigger policy than a smaller one all other things equal.

Demographics

There are a number of demographic variables that seem to influence the mark-up. While the average age of householders in a Zip code has no marginal effect on mark-up, the marginal effect of the log of median income is significantly and negatively related to the price mark-up. The community's protection code reflects ISO's determination of the availability of public services (mostly fire) in a given locale. Thus, as the community obtains a better rating (lower is better), there is an associated decrease in the mark-up. The percentage of homes in the Zip code with a mortgage is also negatively related to the price mark-up. Finally, the percentage of residence in an urban area in a Zip code is also positively related to the price mark-up. Urban communities have different (higher) risk characteristics that may cause insurers to reserve more (See e.g. Klein 1996).

We also control for the housing type in a Zip code from a quality point of view. Given our use of the Census data, this is not an easy task given that the ISO data contains no qualitative data regarding the quality of the home. Rosen (1974) suggests employing the cost of housing services to reflect the value of home services purchased by an individual house owner. We employ the median selected monthly ownership cost as a percentage of household income as our one-dimensional measure of housing services in the Zip code.[18] The log of the price mark-up is significantly related to the log of the median percentage of home ownership costs. Higher quality homes are associated with higher price mark-ups.

Firm Characteristics

There are also a number of firm characteristics that relate to the price mark-up. In fact, the marginal effect of the size of the firm as measured by total assets is positively related to the mark-up. Thus, larger firms (perhaps with higher franchise value) have higher mark-ups. Another interesting variable is the financial strength variable. This variable is a re-coding of the A.M. Best Rating for each company. First, note that it is reverse scored so that 1 is the best rating and 9 is the worst. The price mark-up regression shows that as the rating increases (becomes a lower number), the markup is lower, all other things equal. Thus, lower rated

[18] The selected monthly home ownership costs include the costs of utilities (water, gas, electric, or other heating type), mortgage costs (first and second mortgages, and home equity lines), real estate taxes, and insurance.

companies have higher mark-ups. One would expect higher rated companies to have the higher mark-ups since they are more secure.

We also attempt to measure service quality by looking at the relative speed that claims are paid. Thus, we have two candidates. The first is the ratio of the number of unpaid policy claims that are two years old or older relative to the total number of unpaid claims. The other service quality variable is the ratio of the dollar value of unpaid claims two years or older relative to the total dollar value of unpaid claims. Both of these variables attempt to assess the whether a consumer gets paid sooner rather than later. We find that only the ratio using the number of unpaid claims is related to the price mark-up. In this case the relationship is positive which suggest that companies that take longer to pay claims have a higher mark-up. This seems counter intuitive and needs to be examined further.

Finally, higher homeowner servicing costs as measured by the ratio of underwriting and loss adjustment expenses to direct premiums written in Florida is also positively and significantly related to the log of the price mark-up.

B. Premium Regression Results

Policy Form

The policy terms which seem to influence premiums are the off premises theft coverage, the replacement cost coverage, and the fire deductible. The marginal effect of the off premises theft coverage is positively and significantly related to the log of premiums. In contrast, the replacement cost coverage is negatively related to the log of premiums. This latter result may suggest that there are gains to bundling the products together.

The marginal effect of the fire deductible for HO3 policies is negatively related to the premium. Higher deductibles imply lower premiums. This is to be expected. However, for the mean HO5 policy there is no relationship, nor is there a significant relationship for the wind deductibles for either policy type.

Demographics

First we note that the log of age and income are negatively related to the log of premiums. Older people and wealthier people have negative marginal effects relative to premiums. To understand what this really means, however, we will have to examine the effects of wealth and income on the quantity demanded.

We also see that frame and brick houses have lower premiums all other thing held constant. Our omitted category of housing is the superior fire resistant (SRF) category. It would seem that SFR should have lower premiums. However, since we do not really control for location, it may be that SFR houses are disproportionately located in areas with higher premiums. Zip codes with high percentages of mortgaged homes have lower premiums. Zip codes with higher percentage of urban residents have higher premiums. Home ownership costs have no significant influence on the log of premiums, but the median home value is positively and significantly related to premiums.

Finally, looking at the cat and non-cat loss costs we see that increases in Indicated Loss Costs increase premiums significantly. Note that the coefficient of non-cat loss costs is relatively high compared to the cat loss costs. A 10% increase in cat loss costs will lead to a 4.1 % increase in premiums while a 10 % increase in cat loss costs increases premiums by 0.74 %.

This essentially shows the differential impact on premiums of the different types of potential losses.

Firm Characteristics

The marginal effect of size (as measured by total assets) is negative and significant. This may be an artifact that the mean size firm experiences some economies of scale (See Cummins and Weiss, 1992). The A.M. Best strength variable suggests that, as the firm becomes stronger, the premiums are lower. This seems to contradict what one would expect.[19]

Hypothetically, increases in the two claims ratios should imply that the longer it takes to pay a claim, the lower would be the premium all other things held constant. This is borne out by the dollar value of the claims ratio, but not by the total number of claims ratio. At the same time, the quality of service is admittedly difficult to measure, particularly as perceived by consumers. For example, our current quality measures could be affected by the relative proportion of liability claims, which would be expected to have longer payment periods. Also, payment periods may be longer for high-risk insureds. We will experiment with other measures of quality of service in future work, but any such measure is likely to be imperfect.

Finally, both expense ratios (homeowners underwriting expenses and unallocated expenses) are negatively related to the log of premiums. This also does not seem logical. One would expect companies with higher expense ratios to have higher premiums all other things equal. This result suggests some rate suppression in Florida, which is consistent with anecdotal evidence.

[19] Preliminary evidence using New York shows the expected relationship between strength and premiums. This suggests that something else is likely occurring in the Florida market. We hypothesize that it is the effect of price suppression. We plan on testing this explicitly.

C. Estimation of Quantity Demand

Table 5 shows the results of the demand estimation. We estimated these equations simultaneously because one can think of the amount demanded for homeowners insurance as a joint demand of the demand for cat cover and the demand for non-cat cover. Thus, we will be able to see differences between the demand for cat and non-cat as well as the effect on the overall demand for coverage. Recall that these equations were estimated using 3SLS in conjunction with the premium and price mark-up equations described above. In addition, the log of the median of select homeownership costs is assumed to be endogenous.

In this section we are going to focus primarily on the marginal effects of the price, income, age and contract term variables. It is interesting to note is that the demands for cat and non-cat coverages are quite different. For example, while the marginal effect of the contract form itself is not significant (?*ln q/ ?HO3* and ?*ln q/ ?HO5*), the effect on price is quite significant. Cat related coverage has an elasticity of about 2.86 while non-cat coverage has an elasticity of about 0.18. The cat portion of the homeowners demand is thus quite sensitive while the non-cat portion is very inelastic.[20] Overall, the combined price elasticity is elastic at 1.34.

Initial observations of the data suggested that there was a negative income elasticity associated with the non-cat portion of the model. We initially thought this to be the result of Florida's unique age demographics, so we added an additional interaction term between age and income. The marginal effect of age on cat coverage is negative, thus a 10 % increase in the median age in the Zip code yield a .98 % decrease in demand. This is very inelastic. However, for the non-cat portion, the elasticity is higher in absolute value (but still negative). Overall, the age elasticity is approximately .44. Thus, a ten-percent increase in the median age yields a

[20] Brown and Hoyt (1999) report elasticities for flood insurance of 1.2 (using $flood insurance in force per 1,000 population). This is quite close to the overall price elasticity reported in the total combined output demand.

0.44% decrease in overall quantity demanded.

The income elasticity for cat coverage (even accounting for age) is negative while for the cat cover it is very inelastic, but positive. This suggests that consumers consider cat coverage to be an inferior good. The effect is also negative for the total demand for coverage. Ideally, consumers are obtaining other forms of protection as incomes rise and do not need as much cat coverage in their homeowner's coverage.

The marginal effect of Ordinance or Law coverage on demand is significantly positive for HO3 polices for cat, non-cat, and total coverage. However, the marginal effect is negative for HO5 policies. The marginal effect of Off Premises Theft coverage is positive for both contract types for all cat, non-cat and total coverage. Replacement cost coverage for HO3 policies is also negatively and significantly related to the cat portion while positive and significantly related to the non-cat portion. This makes sense because it is more expensive to replace (rather than repair) a totally destroyed home than a partially destroyed home. Consumers value the replacement cost coverage on the non-cat coverage more probably because the non-cat losses are more likely. Overall, contracts with replacement cost coverage are associated with greater total demand for coverage.

The two deductibles are worthy of some discussion. First the wind deductible is not significantly related to the quantity demanded of cat cover for either contract. However, it is significantly and positively related to non-cat coverage. For the fire deductible, only the HO5 contract experiences a significant relationship between the deductible and the amount of cover demanded for the non-cat coverage. For total coverage, the deductibles are significantly and positively related to the amount of coverage demanded -- thus increases in the deductibles increase the demand for insurance.

Some Anomalies

In the demand analysis, there are also some anomalies. For example, the percentage of people with children is negatively associated with the demand for coverage. We would expect the opposite to be true, all other things being equal. In addition, the log of the median value of the home is negatively associated with the demand for non-cat cover. However, our notion of the ownership cost is positively associated with the demand for cover. Homes with higher ownership costs are likely to demand more cat and non-cat coverage. The overall effect of the percentage of urban residents is almost zero for the demand for total cover, however, the percent of urban residents influences cat cover positively, but non-cat cover negatively. Also the percent of homes in the Zip code with a mortgage is negatively related to the amount of cover demanded for cat and non-cat. One would expect the opposite result.

The A.M. Best strength variable (recall that 1 is best and 9 is worst) seems to be the wrong sign. One could think that better quality firms (in terms of a Best Rating) would be able to sell more coverage. They are more secure and consumers might be willing to pay more for that security. However, it appears the reverse is true. This may be a result of significant regulatory pressures on Florida's homeowner insurers. Finally, the two claims service quality ratios seem to contradict each other. The measure of the total dollar value of the claims unpaid is negative across the board, while the ratio of using the total number of claims unpaid is positive across the board. One would expect both ratios to be negative, that is delay in paying claims would reduce the quality of the coverage and the quantity of coverage demanded. However, it appears that the delay in settling claims using the total number of claims measures something different than the dollar value ratio. We need to explore this further.

IV. Summary and Description of Future Work

This paper is part of an ongoing project to estimate the supply and demand for homeowner insurance in Florida and New York. We examine in an exploratory manner, the demand for homeowners insurance in Florida. We estimate these models with a 3SLS approach to account for endogeniety of a number of important explanatory variables. We first examine the hedonic forms of the price and premium regressions to understand how the policy terms, neighborhood characteristics, and firm characteristics influence price mark-ups and premiums. We also examine the quantity of coverage demanded of cat versus non-cat coverage to show there are have some potentially important differences in the demand for these two coverages. While a number of results make economic sense, a few are contrary to theoretical expectations. These will be examined in the future especially those that seem to be influenced by rate suppression.

In future work we will examine both New York and Florida. This will allow a comparison of two regulatory regimes and two different markets. In addition to homeowners insurance we will also include data on the dwelling and fire contracts sold in each state. These contracts provide limited coverage that is essentially restricted to fire losses. We want to include this potential substitute in our demand analysis. Finally, we are also attempting to estimate the supply of homeowners insurance in the state markets that we would include in a joint estimation of supply and demand.

References

Arrow, Kenneth J., 1971. Essays in the Theory of Risk Bearing, Markham Publishing Co., Chicago.

Bartlett, Dwight K., Robert W. Klein, and David T. Russell, 1999, Attempts to Socialize Insurance Costs in Voluntary Insurance Markets: The Historical Record Journal of Insurance Regulation, 17(Summer): 478-511.

Berger, Allen N., J. David Cummins, and Mary A. Weiss, 1997, The Coexistence of Multiple Distribution Systems for Financial Services: The Case of Property-Liability Insurance, Journal of Business 70: 515-546.

Brown, Mark and Robert E. Hoyt, The Demand for Flood Insurance: Empirical Evidence, Working Paper at SSRN.com http://papers.ssrn.com/paper.taf?ABSTRACT_ID=169448 .

Butsic, Robert P., Capital Allocation for Property Liability Insurers: A Catastrophic Reinsurance Application, Working Paper at The CAS Forum, http://www.casact.org/pubs/forum/99spforum/99spf001.pdf .

Collins Center for Public Policy, 1995, Final Report of the Academic Task Force on Hurricane Catastrophe Insurance (Tallahassee, Fla.).

Cummins, J. David 1990. Multi-Period Discounted Cash Flow Ratemaking Models in Property-Liability Insurance, Journal of Risk and Insurance 57: 79-109.

Froot, Kenneth A. and Paul G. J. O'Connell, in press, On the Pricing of Intermediate Risks: Theory and Application to Catastrophe Reinsurance, in Kenneth Froot (ed), The Financing of Catastrophe Risks, University of Chicago Press, Chicago.

Gal-or, E., 1983. Quality and Quantity Competition. *Bell Journal of Economics*, 14, 590-600.

Grace, Martin, Klein, Robert W. and Kleindorfer, Paul R., 1999, "The Supply of Catastrophe Insurance under Regulatory Constraint", Working Paper, Wharton Managing Catastrophic Risks Project, December.

Greenwald, Bruce C. and Stiglitz, Joseph E., 1990. Asymmetric Information and the New Theory of the Firm: Financial Constraints and Risk Behavior, American Economic Review, 80, 106-165.

Herring, Richard J. and Prashant Vankudre, Growth Opportunities and Risk-Taking by Financial Intermediaries, The Journal of Finance, Vol. XLII, No. 3, July 1987, 583-599.

Insurance Information Institute, 1997, The Fact Book 1998: Property/Casualty Insurance Facts (New York, N.Y.).

Insurance Services Office, 1994a, The Impact of Catastrophes on Property Insurance (New York, N.Y.).

Insurance Services Office, 1994b, Catastrophes: Insurance Issues Surrounding the Northridge Earthquake and Other Natural Disasters (New York, N.Y.).

Insurance Services Office, 1996a, Managing Catastrophe Risk (New York, N.Y.).
Insurance Services Office, 1996b, Homeowners Insurance: Threats from Without, Weakness Within (New York, N.Y.).

Joskow, Paul L., 1973, Cartels, Competition and Regulation in the Property-Liability Insurance Industry, Bell Journal of Economics, 4: 375-427.

Klein, Robert W., 1996, *Urban Homeowners Insurance Markets in Missouri* (Kansas City, Mo.: National Association of Insurance Commissioners).

Klein, Robert W., 1998, Regulation and Catastrophe Insurance, in Howard Kunreuther and Richard Roth, Sr., eds., Paying the Price: The Status and Role of Insurance Against Natural Disasters in the United States (Washington, D.C.: Joseph Henry Press): 171-208.

Kunreuther, Howard, Jacqueline Meszaros, Robin Hogarth, and Mark Spranca, 1995. Ambiguity and Underwriter Decision Processes. *Journal of Economic Behavior and Organization* 26: 337-352.

Kunreuther, Howard, 1996. Mitigating Disaster Losses through Insurance. *Journal of Risk and Uncertainty* 12: 171-187.

Kunreuther, Howard, 1998a, Insurability Conditions and the Supply of Coverage, in Howard Kunreuther and Richard Roth, Sr., eds., Paying the Price: The Status and Role of Insurance Against Natural Disasters in the United States (Washington, D.C.: Joseph Henry Press): 17-50.

Kunreuther, Howard, 1998b, The Role of Insurance in Dealing with Catastrophic Risks from Natural Disasters, in Robert W. Klein, ed., Alternative Approaches to Insurance Regulation (Kansas City, Mo.: National Association of Insurance Commissioners).

Kleindorfer, Paul and Howard Kunreuther, 1999, Challenges Facing the Insurance Industry in Managing Catastrophic Risks, in Kenneth Froot (ed.), The Financing of Catastrophe Risks, University of Chicago Press, Chicago.

Marlett, David C. and Alan Eastman, 1997, The Estimated Impact of Residual Market Assessments on Florida Property Insurers, paper presented at American Risk and Insurance Association 1997 Annual Meeting, San Diego, C.A.

Myers, Stewart and Richard Cohn, 1987. Insurance Rate Regulation and the Capital Asset Pricing Model. In J. D. Cummins and S. E. Harrington (eds), Fair Rate of Return in Property-Liability Insurance, Norwell, MA: Kluwer Academic Publishers.

Risk Management Solutions, Inc. and Insurance Services Office, Inc., 1995, Catastrophe Risk (Menlo Park, C.A. and New York, N.Y.).

Rothschild, Michael and Joseph Stiglitz, 1976, Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information, Quarterly Journal of Economics, 90: 629-650.

Russell, Thomas and Dwight M. Jaffee, 1997, Catastrophe Insurance, Capital Markets, and Insurable Risk, Journal of Risk and Insurance, 64: 205-230.

Scherer, F. M. and Ross, 1990, Industrial Market Structure and Economic Performance, 3rd ed. (Chicago: Rand McNally).

Willig, Robert D., 1976 "Consumer Surplus without Apology", American Economic Review, September.

Figure 1
Average Premiums and Average Mark-up by Contract Type
(Sorted in Order of Increasing Premium)

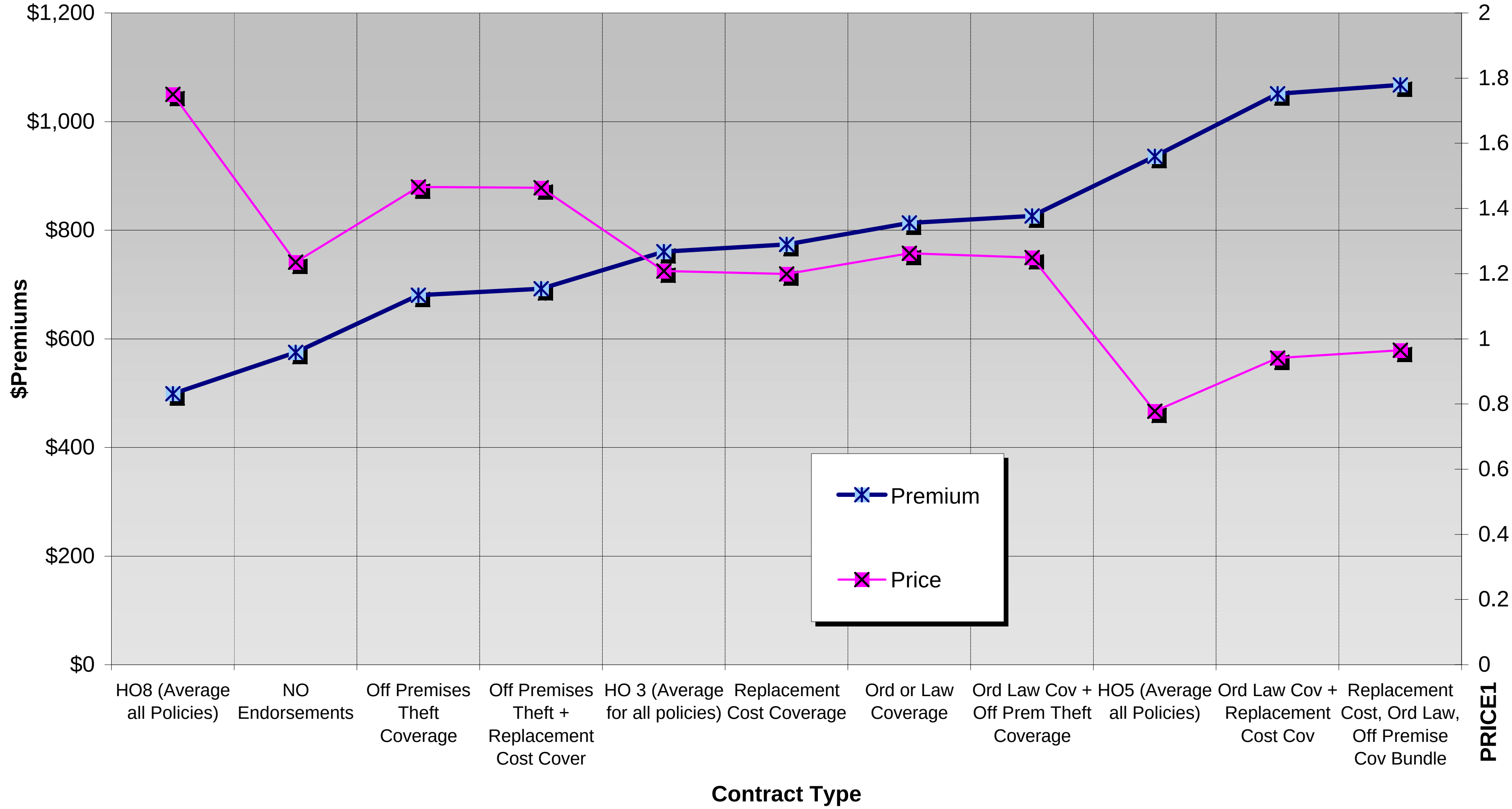

Table 1

Comparison of Florida Homeowners Contracts Basic Terms

	Policy Form		
Contract Terms …	HO3 Typical	HO5 Most Comprehensive	HO8 Least Comprehensive
Insurance Covers …	Everything Except Exclusions (all perils)	Everything Except Exclusions (all perils)	Only Specifically Included Items (named perils)
Home	x	x	x
Other Attached Property and Structures	x	x	x
Personal Property	x	x	x
Loss of Use	x	x	x
Personal Liability to Others	x	x	x
Medical Payments to Others	x	x	x
Replacement cost Coverage or Repair	Repair but Endorsement Available	Replace	Repair
Ordinance or Law Coverage	Endorsement Available	x	Endorsement Available?
Off Premises Theft Coverage	Endorsement Available	x	Endorsement Available?

Source: Authors' analysis of Standard ISO Contracts for Florida

Table 2
Some Descriptive Statistics on Florida Homeowners Contracts with Various Contract Terms
(contracts are summed to the level of the Zip code)

HO 3 Contracts

Variable Label	N	Mean	Std Dev	Minimum	Maximum
Premiums Per Contract In Zip Code	41,089	760.51	1927.20	2.00	17268.18
Log Of Premium Per Policy	41,089	6.44	1.60	0.69	9.61
(Premiums - Indicated Loss Costs)/Indicated Loss Costs	41,089	1.21	1.89	0.00	4.90
Log Of (Price + 1)	41,089	0.04	1.75	-8.10	1.59
Dummy Variable For Off Premises Loss Coverage	41,089	0.06	0.59	0.00	1.00
Fire Deductible In $	41,089	368.65	784.29	100.00	1200.00
Wind Deductible In $	41,089	346.05	1176.77	0.52	5000.00
Dummy Variable Of Ord Or Law Coverage	41,089	0.63	1.09	0.00	1.00
Dummy Value Of Subline = 1 If Replacement Cost	41,089	0.92	1.07	0.00	1.00
Dummy Var =1 If Wind Portion Transf'D To Pool	41,089	0.00	0.00	0.00	0.00
Ratio of ISO ILC for Cats to Total ISO ILCs	41,089	0.46	0.85	0.03	0.91
Log Of Iso Cat Related Indicated Loss Costs	41,089	5.50	4.66	2.03	10.14
Log Of Iso Non-Cat Related Indicated Loss Costs	41,089	5.74	1.45	4.38	9.03
Percent of Total Zip level Policies that are HO3	96.44%				

HO 5 Contracts

Variable Label	N	Mean	Std Dev	Minimum	Maximum
Premiums Per Contract In Zip Code	1,457	934.34	1859.98	18.00	8856.33
Log Of Premium Per Policy	1,457	6.61	1.49	2.89	8.96
(Premiums - Indicated Loss Costs)/Indicated Loss Costs	1,457	0.78	1.24	0.06	3.03
Log Of (Price + 1)	1,457	-0.42	1.71	-4.53	1.21
Dummy Variable For Off Premises Loss Coverage	1,457	0.01	0.11	0.00	1.00
Fire Deductible In $	1,457	490.45	590.17	150.00	1200.00
Wind Deductible In $	1,457	477.84	690.23	1.62	5000.00
Dummy Variable Of Ord Or Law Coverage	1,457	0.00	0.00	0.00	0.00
Dummy Value Of Subline = 1 If Replacement Cost	1,457	1.00	0.14	0.00	1.00
Dummy Var =1 If Wind Portion Transf'D To Pool	1,457	1.00	0.14	0.00	1.00
Ratio of ISO ILC for Cats to Total ISO ILCs	1,457	0.47	0.76	0.03	0.89
Log Of Iso Cat Related Indicated Loss Costs	1,457	6.14	4.68	2.69	9.90
Log Of Iso Non-Cat Related Indicated Loss Costs	1,457	6.34	1.61	4.88	8.63
Percent of Total Zip level Policies that are HO5	3.54%				

HO 8 Contracts

Variable Label	N	Mean	Std Dev	Minimum	Maximum
Premiums Per Contract In Zip Code	60	498.72	143.94	308.00	889.00
Log Of Premium Per Policy	60	6.18	0.27	5.73	6.79
(Premiums - Indicated Loss Costs)/Indicated Loss Costs	60	1.75	0.66	0.64	2.76
Log Of (Price + 1)	60	0.50	0.44	-0.45	1.02
Dummy Variable For Off Premises Loss Coverage	60	0.00	0.00	0.00	0.00
Fire Deductible In $	60	303.72	158.60	250.00	666.67
Wind Deductible In $	60	301.66	161.09	166.96	666.67
Dummy Variable Of Ord Or Law Coverage	60	0.85	0.38	0.00	1.00
Dummy Value Of Subline = 1 If Replacement Cost	60	0.00	0.00	0.00	0.00
Dummy Var =1 If Wind Portion Transf'D To Pool	60	0.00	0.00	0.00	0.00
Ratio of ISO ILC for Cats to Total ISO ILCs	60	0.23	0.22	0.07	0.74
Log Of Iso Cat Related Indicated Loss Costs	60	4.04	1.27	2.81	6.62
Log Of Iso Non-Cat Related Indicated Loss Costs	60	5.44	0.28	5.10	6.42
Percent of Total Zip level Policies that are HO8	0.14%				

Table 3

Bundled versus Unbundled Premiums and Prices: Average for Contract Terms

Variable Label	N	Mean	Std Dev	Minimum	Maximum
Premiums in Zip code (Average for all policies)	41,089	760.51	1927.20	2.00	17268.18
Premiums w/ Replacement Cost, Ord Law, Off Premise Cov Bundle	65	1067.43	1361.86	376.00	7229.50
Premiums with Ord or Law Coverage	14,212	813.56	1387.35	4.00	10442.50
Premiums w/ Ord Law Cov + Off Prem Theft coverage	9,786	826.40	1591.59	11.00	10442.50
Premiums w/Ord Law Cov + Replacement Cost Cov	128	1051.37	1260.94	250.00	7229.50
Premiums with Replacement Cost Coverage	30,630	773.72	2171.53	3.00	17268.18
Premiums w/ Off Premises Theft Coverage	1,477	680.51	756.94	3.00	7229.50
Premiums w/Off Premises Theft + Replacement Cost Cov	1,021	692.00	801.77	3.00	7229.50
Premiums w/NO Endorsements	1,524	574.8606	634.691	2	6293.67
Premiums Per Contract In Zip Code **HO5**	1,457	934.34	1859.98	18.00	8856.33
Premiums Per Contract In Zip Code **HO8**	60	498.72	143.94	308.00	889.00
PRICE1 Average Price (price1=price+1)	41,089	1.21	1.89	0.00	4.90
PRICE1 for Replacement Cost, Ord Law, Off Prem Cov Bundle	65	0.96	0.55	0.32	2.61
PRICE1 with Ord or Law Coverage	14,212	1.26	1.45	0.01	4.71
PRICE1 w/ Ord Law Cov + Off Prem Theft coverage	9,786	1.25	1.61	0.01	4.65
PRICE1 w/Ord Law Cov + Replacement Cost Cov	128	0.94	0.49	0.32	2.61
PRICE1 with Replacement Cost Coverage	30,630	1.20	2.08	0.00	4.90
PRICE1 w/Off Premises Theft coverage	1,477	1.47	0.82	0.00	3.68
PRICE1 w/Off Premises Theft Replacement Cost Cov	1,021	1.46	0.84	0.00	3.17
PRICE1 w/NO Endorsements	1,524	1.24	0.76	0.01	4.36
PRICE1 In Zip Code **HO5**	1,457	0.78	1.24	0.06	3.03
PRICE1 In Zip Code **HO8**	60	1.75	0.66	0.64	2.76

Table 4
Florida 3SLS Results for Lprice1 (Log of (price+1)) and LPREMS (Log (prems))
Regressions Including Contract Interaction Terms

	Florida Summed by Zip code (weighted by number of contracts per zip)					
	LPRICE1			***LPREMS***		
	Parameter Estimate	Standard Error	T for H0: â=0	Parameter Estimate	Standard Error	T for H0: â=0
Intercept	-4.5585	0.5872	-7.7640 ***	-7.2315	0.5990	-12.0720 ***
Dummy For Ho-3 Policy	0.8510	0.2923	2.9110 ***	-0.5443	0.3214	-1.6930
Dummy For Ho-5 Policy	0.3367	0.3473	0.9690	-1.0248	0.3687	-2.7800 ***
Ho3 Policy * Stex	-0.0827	0.0419	-1.9730 **	0.0467	0.0404	1.1560
Ho5 Policy * Stex	0.2261	0.2180	1.0370	0.2622	0.2099	1.2490
Subline Dummy * Stex	0.1727	0.0316	5.4730 ***	0.2175	0.0304	7.1550 ***
Stex * Fire Deductible	0.0000	0.0001	-0.2680	0.0002	0.0001	3.1260 ***
Stex * Wind Deductible	0.0001	0.0000	3.5740 ***	-0.0001	0.0000	-1.7830
Ord Or Law Coverage * Fire Deductible	0.0006	0.0000	16.8350 ***	0.0003	0.0000	7.5360 ***
Ord Or Law Coverage * Wind Deductible	-0.0010	0.0000	-32.5040 ***	-0.0004	0.0000	-13.1910 ***
Ho3 Policy * Ord Or Law Coverage	-0.2677	0.1690	-1.5840	-0.1660	0.2204	-0.7530
Subline * Ord Or Law Coverage	0.0113	0.0151	0.7480	0.0451	0.0145	3.1100 ***
Ho3 * Wind Deductible	0.0106	0.0063	1.6930	-0.0023	0.0061	-0.3730
Ho3 * Fire Deductible	-0.0108	0.0064	-1.6870	0.0032	0.0062	0.5170
Ho5 * Wind Deductible	0.0098	0.0063	1.5600	-0.0027	0.0061	-0.4340
Ho5 * Fire Deductible	-0.0099	0.0064	-1.5550	0.0035	0.0062	0.5570
Ho3 * Subline	0.0764	0.0098	7.8060 ***	-0.0476	0.0095	-5.0370 ***
Fire Deductible * Subline	-0.0001	0.0000	-2.4460 **	-0.0002	0.0000	-7.2830 ***
Wind Deductible * Subline	0.0001	0.0000	3.2860 ***	0.0000	0.0000	0.2870
Log Of Age	4.0745	0.2471	16.4890 ***	2.6617	0.2404	11.0710 ***
Log Of Age Squared	-0.5307	0.0326	-16.2780 ***	-0.2807	0.0317	-8.8460 ***
Log Of Median Income	0.0522	0.0197	2.6550 ***	0.1730	0.0190	9.1020 ***
Log Of Median Income * Log Of Age	-0.0208	0.0049	-4.2440 ***	-0.0860	0.0047	-18.1980 ***
Dummy Variable Of Ord Or Law Coverage	0.4021	0.1683	2.3890 **	0.3556	0.2200	1.6170
Transformed Value Of Protcd	0.0083	0.0010	8.2370 ***	-0.0004	0.0010	-0.4380
Dummy Var =1 If Wind Portion Transf'D To Pool	0.3853	0.1865	2.0650 **	0.3164	0.1796	1.7620
Wind Deductible In $	-0.0098	0.0063	-1.5700	0.0027	0.0061	0.4430
Fire Deductible In $	0.0104	0.0064	1.6360	-0.0036	0.0062	-0.5710
Frame Construction	-0.1541	0.0376	-4.1020 ***	-0.0864	0.0362	-2.3870 **
Brick Housing Type	-0.1014	0.0374	-2.7100 ***	-0.1383	0.0360	-3.8400 ***
Ratio Of Unallocated Exps To Totl Dpw Companywide	0.0001	0.0034	0.0380	-0.0090	0.0045	-2.0160 **
Ratio Of Homeowners Exps To Homeowners Dpw In Stat	0.0000	0.0000	22.8400 ***	0.0000	0.0000	-2.0110 **
Log Of Total Assets	-0.2542	0.0129	-19.7660 ***	0.3708	0.0159	23.3570 ***
Log Of Total Assets Squared	0.0063	0.0003	20.2570 ***	-0.0090	0.0004	-23.4850 ***
Log Of Median Home Value	-0.0159	0.0100	-1.5880	0.0586	0.0097	6.0120 ***
Log Of Coverage A	-0.3984	0.0023	-175.4060 ***	0.5164	0.0030	174.7290 ***
Best Strength Category 1 Is Best	0.0359	0.0009	38.2970 ***	0.0277	0.0009	30.7060 ***
Tot Number Of Claims Unpd/Tot No Of Clm	0.0142	0.0012	12.2670 ***	0.0174	0.0011	15.5270 ***
Ratio Of Unpaid Claims To Total Claims	0.0000	0.0004	0.0720	-0.0038	0.0003	-11.1690 ***
Log Of Iso Non-Cat Related Indicated Loss Costs	-0.0135	0.0064	-2.1200 **	0.4162	0.0077	53.8070 ***
Log Of Iso Cat Related Indicated Loss Costs	-0.3470	0.0013	-259.0070 ***	0.0744	0.0013	56.0690 ***
% Of Homes In Zip With A Mortgage	-0.6526	0.0292	-22.3720 ***	-0.2424	0.0293	-8.2650 ***

Table 4 coninued on next page

Table 4
Florida 3SLS Results for Lprice1 (Log of (price+1)) and LPREMS (Log (prems))
Regressions Including Contract Interaction Terms

	Florida Summed by Zip code (weighted by number of contracts per zip)							
	LPRICE1				***LPREMS***			
	Parameter Estimate	Standard Error	T for H0: â=0		Parameter Estimate	Standard Error	T for H0: â=0	
% Of Population In Urban Areas	0.0009	0.0001	16.6790	***	0.0007	0.0001	13.4730	***
Log Of Median Home Owners Cost	0.4578	0.0194	23.5710	***	0.0094	0.0197	0.4740	
Monroe Co.	0.0502	0.0108	4.6300	***	-0.0420	0.0142	-2.9630	***
Key West	0.0466	0.0118	3.9650	***	-0.0212	0.0154	-1.3810	
Martin Co.	0.0447	0.0109	4.1210	***	-0.0378	0.0142	-2.6650	***
Mid-N.E. Cos	0.0534	0.0108	4.9570	***	-0.0525	0.0141	-3.7290	***
E./S.C. Cos	0.0117	0.0154	0.7590		0.0766	0.0201	3.8120	***
Miami Beach	0.0242	0.0115	2.0970	**	0.0926	0.0150	6.1620	***
E. Dade Co.	0.0041	0.0130	0.3110		0.1013	0.0170	5.9490	***
Miami	0.0213	0.0120	1.7760		0.0383	0.0156	2.4490	**
Hialeah	0.0555	0.0146	3.7920	***	-0.0525	0.0191	-2.7480	***
W. Dade Co.	0.0308	0.0116	2.6460	***	0.0393	0.0152	2.5860	***
Ft. Lauderdale	0.0291	0.0118	2.4660	**	0.0229	0.0154	1.4880	
E. Palm Beach Co.	-0.0069	0.0124	-0.5550		0.0336	0.0163	2.0680	**
Broward Co.	0.0515	0.0140	3.6670	***	-0.0665	0.0184	-3.6210	***
W. Palm Beach Co.	0.0637	0.0122	5.2310	***	-0.0324	0.0159	-2.0360	**
Jacksonville	0.0356	0.0131	2.7130	***	-0.0271	0.0171	-1.5850	
W. Duval Co.	0.0624	0.0142	4.3800	***	-0.0307	0.0186	-1.6490	
E. Duval Co.	0.0225	0.0133	1.6950		-0.0236	0.0173	-1.3630	
W. Pinellas Co.	0.0784	0.0126	6.2060	***	-0.0472	0.0164	-2.8670	***
Rem. Escambia Co.	0.0624	0.0205	3.0350	***	-0.0210	0.0268	-0.7830	
Rem. Brevard Co.	0.0331	0.0115	2.8880	***	-0.0392	0.0150	-2.6160	***
West Cos	0.0210	0.0117	1.7910		-0.0142	0.0153	-0.9300	
St. Petersburg	-0.1947	0.0539	-3.6140	***	0.1440	0.0704	2.0460	**
Tampa	-0.0088	0.0226	-0.3880		0.0191	0.0296	0.6450	
Rem. Pinellas Co.	0.0160	0.0170	0.9410		0.0190	0.0222	0.8550	
Orlando	0.1275	0.0178	7.1740	***	-0.1070	0.0232	-4.6080	***
Polk Co.	-0.0031	0.0126	-0.2430		0.0115	0.0164	0.7040	
Osceola	0.0664	0.0125	5.3090	***	0.0181	0.0163	1.1100	
∂Ln p /∂ log of Total Assets	0.0077	0.0006	12.3693	***	-0.0040	0.0008	5.3759	***
∂Ln p /∂ HO3	0.2446	0.3530	0.6928		-0.1770	0.3386	0.5228	
∂Ln p /∂ HO5	-0.1291	0.5272	0.2449		-0.5661	0.4489	1.2610	
∂Ln p /∂ ln(Age)	-0.0211	0.0262	0.8062		-0.2739	0.0155	17.6918	***
∂Ln p /∂ ln(Median Income)	-0.0239	0.0111	2.1494	**	-0.1415	0.0109	13.0384	***
∂Ln p /∂ ln(Ord cover) given HO3 Policy	-0.3884	0.2151	1.8055		-0.1730	0.2810	0.6158	
∂Ln p /∂ Wind Deductible given HO3 Policy	0.0239	0.0085	2.8125	***	0.0022	0.0016	1.3856	
∂Ln p /∂ Wind Deductible given HO5 Policy	0.0093	0.0033	2.7695	***	-0.0029	0.0021	1.4036	
∂Ln p /∂ Off Premesis Cover given HO3 Policy	0.0961	0.0157	6.1049	***	0.2596	0.0152	17.0587	***
∂Ln p /∂ Replacment Cost Cover given HO3 Policy	0.0950	0.0060	15.8430	***	-0.0734	0.0059	12.3693	***
∂Ln p /∂ Fire Deductible given HO3 Policy	-0.0004	0.0004	0.9165		-0.0004	0.0000	18.6548	***
∂Ln p /∂ Fire Deductible given HO5 Policy	-0.0096	0.0010	9.7862	***	0.0035	0.0074	0.4733	

Table 5
Florida Three Stage Least Squares Results for Demand Equations
(Dependant Variable is Log of Indicated Lost Costs for Cat, Non-Cat, and Total Loss Costs)

	Cat Cover Demand			Non-Cat Cover Demand			Combined Cover Demand		
	Parameter Estimate	Standard Error	T for H0: â=0	Parameter Estimate	Standard Error	T for H0: â=0	Parameter Estimate	Standard Error	T for H0: â=0
Intercept	-19.203	1.343	-14.296 ***	0.012	0.638	0.019	-4.964	0.750	-6.617 ***
Dummy For Ho-3 Policy	-0.311	0.585	-0.533	-0.201	0.278	-0.725	-0.233	0.327	-0.714
Dummy For Ho-5 Policy	-0.712	0.750	-0.950	-0.082	0.356	-0.231	-0.328	0.419	-0.783
Ho3 Policy * Stex	-0.290	0.105	-2.767 ***	0.095	0.050	1.898 *	0.018	0.059	0.307 ***
Ho5 Policy * Stex	0.673	0.545	1.234	0.587	0.259	2.266 **	0.594	0.305	1.949 *
Subline Dummy * Stex	0.556	0.079	7.039 ***	0.078	0.038	2.076 **	0.303	0.044	6.875 ***
Stex * Fire Deductible	0.000	0.000	1.380	0.000	0.000	-1.774 *	0.000	0.000	-1.417
Stex * Wind Deductible	0.000	0.000	0.072	0.000	0.000	-1.439	0.000	0.000	1.810 *
Ord Or Law Coverage * Fire Deductible	0.001	0.000	12.163 ***	0.000	0.000	10.588 ***	0.001	0.000	15.132 ***
Ord Or Law Coverage * Wind Deductible	-0.002	0.000	-26.021 ***	-0.001	0.000	-21.628 ***	-0.001	0.000	-30.968 ***
Ho3 Policy * Ord Or Law Coverage	0.296	0.044	6.710 ***	0.196	0.022	8.975 ***	0.267	0.025	10.726 ***
Subline * Ord Or Law Coverage	0.204	0.038	5.357 ***	-0.021	0.018	-1.165	0.072	0.021	3.383 *
Ho3 * Wind Deductible	0.011	0.015	0.715	0.003	0.007	0.463	0.005	0.009	0.560
Ho3 * Fire Deductible	-0.009	0.016	-0.572	-0.003	0.007	-0.468	-0.004	0.009	-0.494
Ho5 * Wind Deductible	0.009	0.015	0.607	0.003	0.007	0.349	0.004	0.009	0.422
Ho5 * Fire Deductible	-0.008	0.016	-0.486	-0.002	0.007	-0.321	-0.003	0.009	-0.352
Ho3 * Subline	-0.081	0.025	-3.274 ***	0.107	0.012	8.840 ***	0.030	0.014	2.167 **
Fire Deductible * Subline	-0.0003	0.000	-5.461 ***	0.0002	0.000	7.774 ***	0.000	0.000	-0.388
Wind Deductible * Subline	0.000	0.000	1.803 *	0.000	0.000	4.040 ***	0.000	0.000	3.121 ***
Transformed Value Of Protcd	-0.001	0.003	-0.577	-0.001	0.001	-0.835	-0.008	0.001	-5.374 ***
Wind Deductible In $	-0.009	0.015	-0.605	-0.003	0.007	-0.382	-0.004	0.009	-0.434
Fire Deductible In $	0.008	0.016	0.524	0.003	0.007	0.410	0.004	0.009	0.426
Dummy Var =1 If Wind Portion Transf'D To Pool	-0.185	0.467	-0.395	0.110	0.222	0.494	-0.013	0.261	-0.051
Log Of (Price + 1)	-2.829	0.009	-317.615 ***	-0.197	0.004	-45.327 ***	-1.338	0.005	-267.144 ***
Log Of (Price + 1) Squared	-0.187	0.004	-48.471 ***	0.081	0.003	28.612 ***	0.013	0.003	5.200 ***
Log Of Median Income	0.399	0.050	7.931 ***	0.557	0.025	22.324 ***	0.527	0.028	18.534 ***
% Of Married Couples With Children	-0.002	0.000	-5.939 ***	-0.006	0.000	-26.860 ***	-0.005	0.000	-25.094 ***
% Of Homes In Zip With A Mortgage	-0.789	0.069	-11.447 ***	-1.185	0.034	-35.272 ***	-1.274	0.039	-32.835 ***
Log Of Median Home Value	0.036	0.025	1.435	-0.119	0.012	-9.861 ***	-0.030	0.014	-2.172 **
Log Of Median Home Owners Cost	0.489	0.045	10.791 ***	0.914	0.022	41.319 ***	0.785	0.025	30.778 ***
Frame Construction	-0.169	0.094	-1.796 *	-0.160	0.045	-3.591 ***	-0.310	0.052	-5.901 ***
Brick Housing Type	-0.059	0.094	-0.631	-0.101	0.044	-2.265 **	-0.311	0.052	-5.952 ***
% Of Population In Urban Areas	0.002	0.000	14.924 ***	-0.001	0.000	-18.279 ***	0.000	0.000	-1.264
% Of Housing Units Occupied By Owner	0.002	0.000	7.293 ***	0.001	0.000	4.260 ***	0.001	0.000	5.165 ***
Log Of Age	10.977	0.610	17.993 ***	0.086	0.291	0.295	3.455	0.341	10.130 ***
Log Of Age Squared	-1.300	0.081	-16.149 ***	0.136	0.038	3.525 ***	-0.316	0.045	-7.021 ***
Log Of Median Income * Log Of Age	-0.152	0.012	-12.408 ***	-0.138	0.006	-23.636 ***	-0.154	0.007	-22.471 ***
Best Strength Category 1 Is Best	0.071	0.003	27.294 ***	0.023	0.001	15.727 ***	0.050	0.002	32.935 ***
Tot Number Of Claims Unpd/Tot No Of Clm	0.031	0.003	10.090 ***	0.016	0.002	9.909 ***	0.023	0.002	12.863 ***
Ratio Of Unpaid Claims To Total Claims	-0.003	0.001	-3.683 ***	-0.005	0.000	-9.972 ***	-0.004	0.001	-6.991 ***
Transformed Values Of The Year	0.557	0.019	29.932 ***	-0.083	0.015	-5.659 ***	0.159	0.013	12.399 ***
Transformed Values Of The Year	0.196	0.018	11.068 ***	-0.070	0.014	-4.973 ***	-0.009	0.012	-0.710
Transformed Values Of The Year	0.476	0.018	26.904 ***	-0.200	0.013	-15.232 ***	-0.010	0.012	-0.811
Direct Writer Form Of Mktg System	0.191	0.007	26.708 ***	-0.115	0.006	-20.412 ***	0.001	0.005	0.148
Stock Form Of Organization	0.192	0.007	29.395 ***	-0.095	0.005	-19.386 ***	-0.002	0.004	-0.453

Table 5 continued on Next Page

Table 5 (continued)

Florida Three Stage Least Squares Results for Demand Equations (Dependant Variable is Log of Indicated Lost Costs for Cat, Non-Cat, and Total Loss costs)

	Cat Output Demand			Non-Cat Output Demand			Combined Output Demand		
	Parameter Estimate	Standard Error	T for H0: â=0	Parameter Estimate	Standard Error	T for H0: â=0	Parameter Estimate	Standard Error	T for H0: â=0
¶*Ln q* /∂ HO3 Policy	0.193	0.878	0.220	1.293	3.749	0.345	1.787	20.102	0.089
¶*Ln q* /∂ HO5 Policy	-0.308	-1.062	0.290	-0.073	-0.442	0.164	-0.200	-0.593	0.338
¶*Ln q* /∂ ln(PRICE1)	-2.857	-0.012	242.969 ***	-0.184	-0.006	32.062 ***	-1.337	-0.007	201.762 ***
¶*Ln q* /∂ ln(AGE)	-0.098	-0.051	1.914 *	-0.334	-0.020	16.523 ***	-0.437	-0.023	19.000 ***
¶*Ln q* /∂ ln(Median Income)	-0.158	0.030	5.201 ***	0.054	0.016	3.321 ***	-0.036	-0.018	1.946 ***
¶*Ln q* /∂ Ord or Law Cover given HO3	0.152	0.024	6.266 ***	0.381	0.069	5.546 ***	0.647	0.066	9.864 ***
¶*Ln q* /∂ Wind Deductible given HO3 Policy	0.002	0.025	0.071	0.001	0.000	12.431 ***	0.001	0.000	21.264 ***
¶*Ln q* /∂ Wind Deductible given HO5 Policy	0.000	0.003	0.035	0.000	0.000	7.488 ***	0.000	0.000	8.115 ***
¶*Ln q* /∂ Off Premises Cover given HO3	0.218	0.041	5.359 ***	0.076	0.020	3.701 ***	0.237	0.023	10.279 ***
¶*Ln q* /∂ Replacement Cost Cover given HO3	-0.067	-0.037	1.823 *	0.221	0.007	32.894 ***	0.098	0.007	14.908 ***
¶*Ln q* /∂ Fire Deductible given HO3 Policy	0.032	0.026	1.237	0.034	0.046	0.748	0.031	0.004	6.994 ***
¶*Ln q* /∂ Fire Deductible given HO5 Policy	-0.102	-0.096	1.058	0.043	0.004	10.817 ***	0.032	0.004	9.159 ***

System R2 =.88

*** significant at 0.01 level, ** significant at 0.05 level, * significant at the 0.10 level

Table A1
Features of Policies and Structures

Variable	Short Description	Comments and Codings
YEAR	Year (1995-1998)	0 (1995), 1 (1996), 2 (1997, 3 (1998)
ZIP	Zip Code	Zip code
STATE	State	Separate Panels for FL & NY
TERRIT	Territory	Location Identifier for Cat-Losses
POLICY	Policy Form HO1 (NY only), HO3, HO5, HO8	Dummy Variables to Reflect Policy Form Coverages
SUBLINE	Subline	Reflects Loss Settlement Basis(Dummy variable :1 if Replacement Cost Coverage)
EXCIND	Exception Indicator	Dummy Variable: 1 = Wind Transferred to Pool
STEX	State Exception Indicator	Dummy Variable: 1 = Off-Premises Theft Coverage
ORD_LC	Ordinance or Law Coverage	Dummy Variable: 1 = Coverage Pays Additional Cost Required To Repair a Damaged Home According To Current Building Codes
FAM	Number of Families	Dummy Variable: 1 = Multiple Families
TYPECON	Type of Construction Frame Brick Superior Fire Resistant	Dummy Variables to Reflect Different types of Structures
YEARCON	Year of Construction	Dummy Variable: 1 = Constructed after 1960
WIND_DS	Wind Deductible Size ($'s)	Wind Deductible Converted to $'s if Expressed as Percentage of COVA
FIRE_DS	Fire Deductible Size ($'s)	Fire Deductible Converted to $'s if Expressed as
PROTCD	Protection Code	Ordinal Ranking Variable for the Structure (1-10), the Lower the Better
BCEG	Building Code Effectiveness Grading	Community Grading
COVA	Coverage A Limit	Dollar Amount of Coverage A Limit
COVCPCT	Coverage C as Percent of COVA	In Standard Policy, COVCPCT = 50%
COVELIM	Coverage E (Liability) Limit	Converted to $'s if expressed as Percentage of
ILC	Total ISO Indicated Loss Costs	Dollar Amount
ILC_C	ISO Indicated Loss Costs Cat Portion	Dollar Amount
ILC_NC	ISO Indicated Loss Costs NonCat Portion	Dollar Amount
PREMS	Annualized Premium Limit	Dollar Amount
PRICE	Annualized Price	(1+r)(PREMS-ILC]/[ILC]
PRICE1	1 + Annualized Price	Linear Transform of PRICE =PRICE + 1

Table A2
Company Data from NAIC and AM Best

Variable Name	Short Description	Comments and Codings
MKT_CODE	Marketing System Employed by the Firm Agent = 1 if an "agency writer" Direct =1 if a "direct writer"	Dummy Variables to Represent Various Forms of Marketing and Distribution Systems
Company ID	Various Identifiers for the Company and the Group in Which it Operates	Link to AMBest Data
CAPSURP	Capital and Surplus	Total Firm C&S
BCAR	Best Capital Adequacy Ratio	This is a risk-based capital measure
FSC	Best Financial Size Category	Discrete size categories based on Adjusted Policy Holder Surplus
STRENGTH	Best Strength Category	Numeric coding from 1 to 9 Reflecting AMBest Rating, where 1 is the best (A++)
RATING	AMBest Rating	Alpha Numeric Coding of Best Rating
TOTASS	Total Assets	In $
LTOTASS	Log of Total Assets	In Log $
SOBnRAT	State Line of Business Concentration	The % of Total Firm Business in top "n" States in which it does business, a geographic concentration indicator
HOME1	Homeowners is First Line of Business	Dummy Variable if HO is the highest % of Direct Premiums Written (DPW) to Total DPW for the Firm
HOME2	Homeowners is Second Line of Business	Defined as in HOME1
LOBnRAT	n-Line of Business Concentration Ratio	Percent of writings in the top "n" Lines of Business divided by DPW
FLAUTO/ NYAUTO	Total of Personal Auto Lines Premiums in each State	An Indicator of Cross-Marketing potential for the Firm
FLHOTOT/NYHOTO	Percent of Business in State (FL & NY)	Ratio of Homeowners to Total DPW in the respective State

Table A 2 Continues on Next Page

Table A2: Company Data (Continued)

Variable Name	Short Description	Comments and Codings
FLLPREM/ NYLPREM	Total Life Insurance Premiums written by Companies in Same Group as the Firm	An Indicator of Cross Marketing potential for the Firm
HOMEDPW	Sum of HO Premiums in the State	
LHOMEDPW TOTDPW	Log of HOMEDPW Total of Direct Premiums Written Nationwide	
TOTHODPW	Total Direct Homeowners Premiums Written Nationwide	
Organizational Form: Stock Mutual	Organizational form	Dummy Variables to reflect Organizational Form Mutual =1 if a mutual Stock= 1 if a stock
HO_EX	Homeowners Line Expenses	Direct Loss Adjustment Expenses Incurred + Brokerage Fees and Taxes, Licenses & Fees for HO Line
HO_EX_RT	Expense Ratio for Homeowners Line	Ratio of HO_EX to Homeowners DPW in the State
IEE_EX	Unallocated Homeowners Line Expenses	Amount of total Homeowners expense that remains unallocated after allocations to all States.
C_OUT	Total Number of Claims Outstanding for the year in question and the previous two years	
C_REPT	Total Number of Claims Reported during the year in question and the two previous years	
C_RAT	Ratio of total number of claims outstanding to the number of claims (Reported and Outstanding)	A Quality of Service Measure
TOT_PD	Total Paid Claims From Past Three Years, in the year in question and the previous two years	
TOT_UNPD	Total Unpaid Claims from Past Three Years, the year in question and the previous two years	
TOT_RAT	Ratio of Unpaid Claims to Total Claims, i.e. the ratio of TOT_PD to TOT_UNPD	A Quality of Service Measure

Table A3
Census Variables Employed

Avg HHInc	Average Household Income in the Zip code
Median HHInc	Median Householder Income In The Zip Code
MortOwn_	% Of Housing Units That Have A Mortgage
MortO30_	% Of Housing Units In Which Mortgage Is Greater Than 30% Of Household Exps
AvAgeHH	Average Age Of Householder
OwnOcc_H	% Of Housing Units Occupied By Owner
Pl_RtIn	% Of Income That Constitutes Retired Income
Edu_12th	Percentage Of People Above 25 Who Have Completed 12Th Grade
Edu_coll	Percentage Of People Above 25 Who Have A College Degree
P_White	% Of Whites Among The Population In The Zip
MedianYB	Median Year Structures Were Built In The Zip
MedianVA	Median Value Of Structures In The Zip
Pop_Urb	% Of Population That Is In The Urban Areas In The Zip