Portfolio Allocation and Alternative Structures of the Standard Reinsurance Agreement

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Selected Paper presented at AAEA Annual Meeting
Denver, CO, August 1–4, 2004

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Abstract

This paper analyzes effects of hypothetical changes in the Standard Reinsurance Agreement (SRA) on rates of return of private insurance companies participating in delivery of crop insurance. A computer simulation program is used to model companies' returns under the current and alternative SRA structures. A simple heuristic rule is used in order to simulate company's behavior under counterfactual assumptions about the SRA structures.

Keywords: crop insurance, portfolio allocation, reinsurance, risk modeling, Standard Reinsurance Agreement

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This research was supported through a cooperative agreement with The Ohio State University, University of Georgia, and USDA. The views expressed are the authors' and do not necessarily reflect those of USDA.

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Introduction

An integral feature of the federal crop insurance program is the Standard Reinsurance Agreement (SRA) between the U.S. government and the private insurance companies who deliver crop and revenue insurance to producers (USDA/RMA 1997). Risk sharing is a unique aspect of the federal crop insurance program that distinguishes it from other federally-backed programs such as flood insurance where the federal government assumes all underwriting risks. Through the SRA, crop insurance companies share in underwriting risks in exchange for a share of potential underwriting profits.

The reinsurance provisions of the SRA allow companies to decrease their risk exposure by ceding some liability completely to the FCIC and selectively allocating the retained portions of their portfolios among several reinsurance funds. Over the past 10 years companies have increased the level of retention, with retained premiums growing from $466 million in 1992 to almost $2.3 billion in 2002 (table 1). In part, this increase follows the rapid growth in the crop insurance program over the period, but it also reflects the fact that the companies are retaining proportionately more and ceding less risk to the government. As a consequence, company exposure has increased dramatically as well. As measured by the maximum possible underwriting loss to companies, the total risk exposure has risen from $228 million in 1992 to over $2.0 billion in 2002. As retained risk and exposure have increased, so have the underwriting gains to the companies. Over 1992-2002, net (post-SRA) underwriting gains totaled almost $2.0 billion, with $1.5 billion earned over 1997-2001 alone.

An important characteristic of the SRA is the ability of companies to place policies into separate reinsurance funds with distinct risk sharing characteristics (Ker and McGowan). Under the SRA, if a private company chooses to write crop insurance policies in a state it must offer

crop insurance products to any farmer in that state. Moreover, insurance companies must accept the premium rates and underwriting guidelines established by the Risk Management Agency. Thus, the crop insurance companies face large potential risk exposure without recourse to raising premium rates or declining to offer coverage to high-risk individuals. Therefore, the SRA allows companies to place highly risky business in the Assigned Risk fund where the government assumes most of the risk. Less risky business, on the other hand, can be placed in funds where companies pay more of the underwriting losses but also keep more of the underwriting gains. Underwriting returns thus are related to how well a company classifies its risks and manages its portfolio[2].

The analysis of portfolio allocation under the SRA has received rather little attention in the literature. One notable exception is recent research by Ker and Ergün who analyze the efficiency of companies' allocation decisions using an econometric approach that looks at portfolio allocation relative to the expected profitability of the underlying policies. While they fail to reject the null hypothesis that the insurance companies are efficient in allocation of policies amongst the funds, their analysis is limited by the fact that they use data aggregated across companies.

This paper takes a slightly different approach to the analysis of portfolio allocation. Instead of an econometric model, the paper builds on the recent work of Vedenov *et al.* who construct an SRA simulation model based on disaggregated yield data and individual company fund allocations across crop reporting districts and major crops. Using a similar model, we examine the allocation patterns present in the portfolios of insurance companies participated in delivery of

[2] Company profitability here is restricted to underwriting profits and does not explicitly examine administrative and operating (A&O) expenses. Under the SRA, A&O expenses are subsidized by the government at a fixed percentage of premiums.

crop insurance products in the base year (2001). In addition, in order to analyze effects of potential changes in the SRA, we need to account for companies' reaction to the changes, as the base year allocation may not necessarily represent optimal solution under any SRA other than current. In other words, we cannot expect that the companies would retain exactly the same portions of their portfolios and allocate policies across reinsurance funds, if presented with a SRA structure different from current. Therefore, for the purposes of analysis, we introduce a simple heuristic rule that dictates allocation decisions based on the historical loss ratios for each crop reporting district and crop. The heuristic allocation is compared to the actual fund allocation in the base year in order to examine its efficiency in replicating (or possibly improving) companies' returns under the current SRA. We then analyze how possible alternative reinsurance structures would affect both companies' portfolio allocation decisions and their returns from underwriting crop insurance. Policy implications are discussed in the final section.

The Standard Reinsurance Agreement

This section presents a brief overview of the current[3] Standard Reinsurance Agreement particularly as it relates to the portfolio allocation decisions. Additional discussion and information on the SRA can be found in Vedenov *et al.*, Ker and Ergün, Ker, and USDA/RMA (1997).

Portfolio allocation under the SRA is a two-stage process. First, each contract may be allocated in one of three reinsurance funds — Assigned Risk Fund, Developmental Fund, and Commercial Fund, — which differ by the degree of risk sharing between the insurance companies and FCIC. Second, each company has to decide on the proportions of premiums it wishes to

[3] The Agricultural Risk Protection Act of 2000 mandated that the SRA be renegotiated by the 2005 reinsurance year, which begins on July 1, 2004. As of the time of writing, renegotiation of the SRA was still in progress with no final document available,

retain within each reinsurance fund subject to the required minimum retention limits of individual funds. Thus, a company retains some portion of the risk on each contract that it writes.

The ceded (i.e., not retained) portions of the book of business are completely written off from the companies' balances as the FCIC receives all the associated premiums and also assumes full responsibility for the associated underwriting losses on the ceded contracts. The underwriting gains and profits on the retained portion of business are then shared between the companies and the FCIC in the proportions determined by the SRA.

The Assigned Risk Fund has the lowest required retention rate of all three funds (20%), which makes it an attractive destination for the unprofitable business. In order to avoid concentration of the whole book of business in the Assigned Risk Fund, the maximum cession limits are established for each state ranging from 10% of the net book of business in Hawaii and Vermont to 75% in Alaska, Georgia, Maine, Montana, Nevada, Rhode Island, Texas, Utah, and West Virginia (USDA/RMA, 1997, p. 10).

The Developmental Fund requires the companies to retain at least 35% of the net book premium as well as the associated liability. Within the Developmental Fund, contracts are further designated into CAT Fund, Revenue Insurance Fund, or All Other Plans Fund. The retention percentages for these three funds may differ across states, but cannot be lower than 35%. A company may elect to retain more than 35% of its premium and associated liabilities, in which case the retention level can be chosen in 5% increments up to 100%.

Finally, designation of a contract to the Commercial Fund requires a company to retain at least 50% of the liability and associated net premiums. Just like with the Developmental Fund, the Commercial Fund is further subdivided into CAT, Revenue Insurance, and All Other Plans

funds. Similar to Developmental Fund, a company may select a retention rate higher than 50% in 5% increments up to 100%.

The responsibilities of the companies for the underwriting losses as well as their share of the underwriting gains from the retained business depend on the realizations of loss ratios[4] of each company in a given state for a given reinsurance year. The schedules of shares under different realizations of the loss ratios are shown in table 2 for different reinsurance funds. For each loss ratio range, the percentages in the tables apply to the fraction of each company's loss (gain) within that range.

The general principle is that the higher the loss ratio above one (underwriting loss), the higher the portion of losses assumed by the FCIC up to a 100% of the portion of losses exceeding 500% of the retained premiums. Conversely, the lower the loss ratio below one (underwriting gain), the higher the portion of premiums kept by the FCIC. The degree of sharing is the highest for the Assigned Risk Fund and the lowest for the Commercial Fund.

The SRA Simulation Model[5]

In order to examine the effect of portfolio allocation decisions on rates of return of participating companies, we use a simulation model (implemented as a computer program) that simulates the distribution of the rates of return from underwriting crop insurance by combining historical data on yields and loss costs[6] with base year data on companies' liabilities and premium rates.

The model covers six crops (barley, corn, cotton, soybeans, grain sorghum, and winter wheat) and five types of crop insurance contracts (Catastrophic Risk Protection, Actual Produc-

[4] Indemnities divided by premiums (including premium subsidies).
[5] This section is a brief summary of Vedenov *et al.* where a more detailed description of the model can be found.
[6] Indemnity divided by associated liability.

tion History, Crop Revenue Coverage, Revenue Assurance, and Income Protection). Various coverage levels of the above contracts bring the total number of insurance products to thirty.

For each crop and insurance product, detrended historic yields at the district level and an appropriate price model are combined with a distribution of within-district yields to arrive at simulated distribution of loss costs. The within-district distributions of yields are calibrated so that the observed historical aggregate loss costs for each district/crop combination match the simulated ones. The simulated distributions of the loss costs are then combined with the base year (2001) data on premium rates and liabilities by crop, district, insurance product, company, and reinsurance fund to calculate the distributions of loss ratios. The latter are aggregated by company, state, and fund to correspond to the structure of the SRA.

At the final stage, the shares of gains and losses presented in table 2 as well as data on base year retention rates by company, state, and fund are used to calculate the distributions of the post-SRA rates of return at various levels of aggregation. In addition, the simulation program can be adjusted to output some intermediate results such as simulated distributions of loss ratios and portfolio allocation patterns.

Portfolio Allocation

General Considerations

Assuming that the insurance companies participating in delivery of crop insurance products under the SRA are risk averse, their portfolio allocation decisions should reflect the preference for lower risk exposure and higher expected returns. Given the structure of SRA, these goals can be achieved by placing contracts with high expected loss ratios in the Assigned Risk Fund, while keeping those with low expected loss ratios in the Commercial Fund. Under this framework, the

Developmental Fund functions largely as a "spillover" fund where companies can place contracts with high expected loss ratios once cession limits are reached in the Assigned Risk Fund[7]. The allocation pattern present in the 2001 portfolio is shown in figure 1, which generally conforms with these intuitive considerations.

Obviously, particular composition of insurance companies' portfolios affects how this intuitive approach is implemented in practice. The insurance companies participating in delivery of crop insurance products differ by their size as well as geographic area in which they underwrite the contracts. The results of Vedenov *et al*. suggest that the major portion of pre-SRA underwriting gains comes from a handful of Plain and Midwestern states. Thus a company that underwrites mostly in Iowa and Nebraska will have better pre-SRA distribution of loss ratios than a company underwriting in Louisiana and Mississippi, and therefore would implement different allocation strategy.

Depending on risk attitude and portfolio composition, the formal definition of "high" and "low" risk contracts may also differ among individual companies. For example, a contract with expected loss ratio of 1.1 may be considered "high" risk by a more risk averse company and a "sure bet" by a more risk-loving company. In addition, companies may not have complete information as to the distribution of loss ratios of both individual contracts and their books of business at different levels of aggregation (county, district, or state), which in turn would bias the allocation patterns.

[7] As Ker and Ergün point out, when companies choose to retain the minimum level (35%), the Development Fund resembles the Assigned Risk Fund, while if they retain the maximum (100%), the fund resembles the Commercial Fund.

Heuristic Allocation Rule

Ideally, an optimal allocation rule can be obtained as a solution to a multivariate optimization problem that would determine in what fund to allocate individual contracts underwritten in each specific district, for each specific crop, and for each insurance product, as well as recommend optimal retention rates for each reinsurance fund. However, implementing such an optimization problem poses a significant challenge due to the enormous number of decision variables and the nonlinearity of the objective function. Indeed, a typical company writing in Iowa, for example, may have over 15,000 contracts to allocate across funds. In addition, retention rates need to be chosen for the Developmental and Commercial Funds. Adding more states increases this number even further and makes the computational problem practically impossible to address.

As a more tractable approach, we suggest a simple heuristic rule that companies can use to allocate their books of business. For a given district, crop and type of product (CAT, Revenue, or All Other Products), the expected loss ratio without reinsurance is computed based on historical data. If the expected ratio is higher than a pre-specified threshold, all the business for that district and crop is designated "high risk" and placed in the Assigned Risk Fund. If the maximum cession limit to the Assigned Risk Fund is reached in a particular state, the appropriate Developmental Fund is used as an overflow buffer for the remaining "high risk" business. Conversely, if the expected ratio is below the threshold, all the business for the district and crop is allocated into the appropriate Commercial Fund.

An intuitive rule[8] would set the threshold loss ratio at 1.0. However, given the asymmetric nature of the SRA (companies' shares of gains are higher than shares of losses) and the

[8] Ker and McGowan utilized this approach in their analysis of Texas wheat counties.

skewed nature of losses, the expected return to companies after the SRA may be positive even though the expected pre-SRA loss ratio is greater than 1.0. Consider a company that must decide how to allocate a contract that has a probability of 0.9 that the loss ratio will equal 0.8 and a probability of to 0.1 that the loss ratio will equal 4.8. The expected pre-SRA loss ratio is 1.2 and hence under the intuitive heuristic rule the policy would be placed in the Assigned Risk Fund. However, because of the asymmetric nature of the SRA, the expected post-SRA loss ratio of the contract, if placed in the Commercial Fund, is 0.929, i.e. the contract would bring an expected net return of about 7 percent.

Therefore, our analysis takes into account the post-SRA return in determining the threshold loss ratio. More specifically, we implemented the following algorithm. First, all district/crop/product type combinations within each state have been sorted in the decreasing order of the expected loss ratios so as to ensure that the districts with higher loss ratios go into the Assigned Risk Fund in case the maximum cession limit is reached in a particular state. For simplicity sake, the retention rates across all companies and states have been fixed at 100% for Commercial Fund, 35% for Developmental Fund, and the required 20% for the Assigned Risk Fund.

In order to account for the fact the different companies may have different definitions of "high" and "low" risk, we allowed the loss ratio thresholds to vary by company. In order to determine the thresholds themselves, the following approach was implemented. For each company, portfolio allocations have been generated according to the heuristic rule for values of the threshold between 0.7 and 1.3 at 0.01 increments. The generated allocations were used as data files for the SRA simulator program in order to calculate the corresponding expected values and standard deviations of the rates of return. The "optimal" loss ratio threshold LR_{opt} was then chosen by simple grid search so as to maximize the expected rate of return $\bar{r}$ while keeping the standard

deviation s at the same or lower level s_{2001} as the company achieved under the actual base year allocation, i.e.

$$LR_{opt} = \arg\max \bar{r} \quad \text{s.t. } s \le s_{2001} \tag{1}$$

Validation

In order to evaluate the efficiency of the suggested heuristic rule in allocating portfolios of insurance contracts among reinsurance funds, we compared the returns generated by the SRA simulation program based on the actual 2001 allocation data to the returns generated from the heuristic allocations based on the "optimal" loss ratio thresholds.

Presented in table 3 are the base year portfolio allocation patterns and the post-SRA expected rates of return for the nineteen companies[9] reinsured by the FCIC in 2001. The table shows the proportions of gross premiums companies placed in Assigned Risk and Developmental Fund, percent of gross premiums retained by each company, as well as the expected rates of return and their standard deviations. In addition, the table includes an index that reflects the degree of regional diversification of individual companies.[10] Lower values of the index indicate (typically large) companies underwriting in multiple states, while index values closer to the maximum of 10,000 indicate (typically smaller) companies that underwrite in two or three states. Vedenov *et al.* provide an in-depth analysis of these and other results, including the effect of regional portfolio composition on the rates of return. However, for the purposes of this paper, the

[9] Due to the proprietary nature of some data used in the SRA simulator program, the individual companies are represented in this and subsequent tables by scrambled identifiers and all data are expressed in percent of gross premiums rather than dollar amounts. Note that the gross premiums are not affected by a particular allocation method and thus provide a convenient basis for relative comparison.

[10] For a measure of regional diversification, we use the Herfindahl-Hirschman Index (HHI) — a commonly used measure of market concentration (US DOJ, Vedenov *et al.*).

results in Table 3 are used only to establish a benchmark against which to measure the efficiency of heuristic allocation rule and the effects of alternative SRA structures on the rates of return.

Table 4 shows how the portfolio allocation and expected returns would change if the companies implemented the heuristic rule described in the previous section. The structure of the table is the same as table 3. In addition, the loss ratio thresholds "optimal" in the sense of Eq. (1) are included for each individual company. The results indicate that the suggested heuristic rule works at least as good, if not better than the allocation strategy utilized by companies in 2001. The expected returns of all but one company under the heuristic rule are higher than those obtained under the actual allocation, while the variability of returns is either lower or remains the same. The improvement comes mostly from reallocation of business from Developmental Risk Fund into either Assigned Risk or Commercial Funds.

Note that the seemingly superior performance of the suggested heuristic rule has to be taken with a grain of salt. The rule makes several simplifying assumptions, such as fixing retention rates at the same level for all companies and states, treating all business for given district and crop as a single allocation unit, using the expected loss ratios for the whole district regardless of product composition, setting a single threshold for expected loss ratios for the whole company, and so on. In addition, the rule completely ignores correlation in losses or gains that may exist between contracts written in adjacent districts or on different crops within the same district. In the real world, the companies may be much more selective about allocating their portfolios as they have better information their risk exposure and can make allocation decisions at the level of individual policies.

Nonetheless, the results in table 4 suggest that the heuristic allocation rule does a fairly good job in approximating companies' allocation strategies and thus can be used to imitate companies' reaction to alternative structures of the SRA consider in the rest of the paper.

Alternative Reinsurance Structures

We now consider alternative structures of the Standard Reinsurance Agreement and examine how they would affect portfolio allocation and returns of the companies. First, we examine the effects of truncating underwriting gains under the current SRA at 12.5 percent of retained premiums. The Bush Administration proposed a similar reinsurance structure in its FY 2004 budget. Under the second alternative, a national SRA is examined where underwriting gains are calculated at the national rather than state level.

For each of the alternatives, we applied the same heuristic allocation rule and calculated the "optimal" loss ratio thresholds in the manner described above. The generated allocations were then used as inputs for the SRA simulation program. The resulting allocation patterns as well as expected returns and their standard deviations are presented in tables 5 (12.5% cap) and 6 (national-level SRA). The results in both tables are presented in terms of differences from the baseline of the current SRA. Note also that in order to ensure adequate comparison, the results obtained by using the heuristic rule (table 4) rather than the actual base year allocations are used.

Cap on Underwriting Gains

The cap on underwriting gains truncates overall distributions of each company's returns at 12.5% of its retained premium. As an obvious consequence, the expected returns decrease for all companies along with the variability of the returns, though the reduction in the latter is purely superficial and is caused by the loss of potential gains above the cap.

The magnitude of the drop in expected rate of return appears to depend on the structure of companies' books of business. In general, the drop is greater for the companies with business concentrated in a fewer states (as measured by the Herfindahl-Hirschman Index), with the correlation coefficient of –0.57 between the HHI and the change in expected rates of return in table 5.

The main explanation to this effect seems to be that the companies that underwrite in fewer states have more volatile returns as indicated by 73% correlation between the HHI and the standard deviation of post-SRA returns in table 3. In addition, such companies also tend to concentrate their business in more profitable states, i.e. have disproportionately larger portion of the distribution of returns above the 12.5% cut-off threshold. Thus the cap on underwriting gains eliminates high positive returns, while the provisions of the SRA do not compensate enough on the loss side, resulting in overall higher decrease in expected returns. Conversely, companies with larger and more geographically diversified books of business have smaller portion of their distributions of returns above the 12.5% threshold, and thus stand to lose less under the cap. In other words, the cap leaves companies that underwrite in multiple states with a better distribution of returns than the companies that underwrite only in tow or three states.

The same influence of the degree of diversification is reflected in adjustments of portfolio allocations by individual companies. Under 12.5% cap on underwriting gains, companies that underwrite insurance in multiple states (have lower HHI) would allocate their portfolio more aggressively, i.e. use higher loss ratio thresholds in heuristic rule thus shifting business from Assigned Risk Fund into Commercial and Developmental. Companies with business concentrated in few states (higher HHI) would do exactly the opposite, i.e. use lower loss ratio thresholds for heuristic rule and increase utilization of Assigned Risk Fund. This is further supported by a fairly high negative coefficient of correlation of –0.72 between the HHI and change in loss ratio thresh-

old in table 5, as well as high correlation between the HHI and changes in use of Assigned Risk and Commercial Funds (0.64 and –0.75, respectively).

"National" SRA

Recall that under the current SRA, the shares of gains and losses presented in table 2 apply to companies loss ratios on a state-by-state basis. The alternative "national" SRA would apply the same schedules of gains and losses but to the loss ratios aggregated over the whole (national) book of business for each company. Such structure would limit companies' ability to contain their losses in one state, while enjoying high returns in another. In other words, the natural geographic diversification will be enforced first and only then the SRA would be applied.

Results in table 6 indicate that both the expected returns and their standard deviations would decrease under the "national" SRA, albeit the magnitude of the decrease would be far less than under the cap on underwriting gains. Unlike the cap scenario, however, the companies that would be affected the most are those that underwrite in multiple states (have lower HHI). Indeed, for the extreme case of a company underwriting in a single state, the "national" SRA would be exactly equivalent to the current SRA, since the company's "aggregated" loss ratio would be exactly equal to its state loss ratio. The same principle applies to companies that underwrite in two or three states, especially if returns from those states are highly correlated. Such companies would be barely affected by the switch from current SRA to the "national" SRA, as indicated by results in table 6.

On the other hand, a company that underwrites on a nationwide basis, stands to lose more due to aggregation of its gains and losses across multiple states before the provisions of the SRA are applied. Consider an example of a company that has an equal amount of premiums in two

states and experiences loss ratio of 1.4 in one of the states and 0.6 in the other. Assume for simplicity that all policies are APH products and are placed in Commercial Funds in both states. Under the current SRA, the company would end up with the post-SRA loss ratios of 1.228 and 0.624, respectively, and the average loss ratio of 0.926 or an underwriting gain of 7.4%. Under the "national" SRA, on the other hand, the company's aggregated loss ratio would be exactly 1.0 both pre- and post-SRA, i.e. the company would simply break even. Obviously, geographical diversification would play much bigger role in portfolios of companies that underwrite in multiple states.

The loss of ability to contain losses at the state level and necessity to offset losses in some states by gains in others result in much more conservative allocation patterns. The "optimal" loss ratio threshold decreases for all companies implying higher utilization of Assigned Risk Fund and lower utilization of Commercial Risk Fund.

Conclusion

This paper examines how insurance companies participating in delivery of crop insurance utilize the reinsurance capacities provided by the Standard Reinsurance Agreement. By selectively allocating their books of business between three reinsurance funds with different shares of gains and loses assumed by the FCIC, the companies should be able to decrease variability of their return and increase their expected values.

In order to analyze the effect of alternative SRA structures on returns from underwriting crop insurance, a simple heuristic rule is introduced to imitate portfolio allocation strategies of participating companies. The rule, while not an optimal allocation strategy in the strict sense, allows for variations in risk attitudes among companies and also takes into account the effect of the

SRA. Comparison with the returns calculated under the actual base year (2001) allocation indicates that the rule works fairly well as a proxy to the actual companies' behavior and thus can be utilized to model their reaction to counterfactual SRA structures.

Two alternative SRA structures are considered. Under the first scenario, the underwriting gains are limited to 12.5% of the retained premiums in any single year. Under the second scenario, loss ratios aggregated at national instead of state level are used to determine the shares of gains and losses under the SRA. Both SRA structures would reduce the expected returns, and also lead companies to cede more business to FCIC.

The SRA with the cap affects less the companies with large, geographically diversified portfolios. If implemented, such a structure may lead to higher industry concentration, e.g. through either through mergers between smaller companies operating in different states or through acquisition of smaller companies by larger companies.

The "national" SRA, on the other hand, affects less the companies writing insurance policies in few states. If implemented, this could lead (and may have in the past) to companies splitting the business into separate SRA-holding organizations for each state they underwrite business in.

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Table 1. The Standard Reinsurance Agreement (million dollars)

Reinsurance Year	Gross Premium	Retained Premium	% Premium Retained	Maximum Exposure	Net Underwriting Gain (NUG)	NUG as % of Retained Premium
1992	694	466	67.1	228	26	5.6
1993	702	435	61.9	259	-84	-19.2
1994	919	536	58.3	332	109	20.3
1995	1,270	768	60.5	493	132	17.3
1996	1,627	1,156	71.1	742	288	25.0
1997	1,688	1,262	74.8	810	353	27.9
1998	1,876	1,592	84.8	1,475	279	17.5
1999	2,312	1,837	79.4	1,645	272	14.8
2000	2,536	1,894	74.7	1,669	285	15.0
2001	2,977	2,373	79.7	2,095	348	14.7
2002	2,909	2,294	78.9	2,037	-44	-1.9

Table 2. Shares of Gains and Losses to Private Insurance Companies under the 1998 SRA.

Reinsurance Fund	Loss ratio range	<0.5	0.5 to 0.65	0.65 to 1.0	1.0 to 1.6	1.6 to 2.2	2.2 to 5.0	> 5.0
Commercial	CAT	8.0%	50%	75.0%	50.0%	40.0%	17.0%	0.0%
	Revenue	11.0%	70%	94.0%	57.0%	43.0%	17.0%	0.0%
	All other	11.0%	70%	94.0%	50.0%	40.0%	17.0%	0.0%
Developmental	CAT	4.0%	30%	45.0%	25.0%	20.0%	11.0%	0.0%
	Revenue	6.0%	50%	60.0%	30.0%	22.5%	11.0%	0.0%
	All other	6.0%	50%	60.0%	25.0%	20.0%	11.0%	0.0%
Assigned		2.0%	9.0%	15.0%	5.0%	4.0%	2.0%	0.0%

Source: USDA/RMA 1997

Note: The shares reflect the portions of underwriting gains kept or underwriting losses paid by the insurance companies, with the remaining portions assumed by the FCIC.

Table 3. Portfolio Allocation and Post-SRA Returns, Base Year.

Company	HHI	% Gross Premiums in ARF	% Gross Premiums in Dev. Fund	% Gross Premiums in Com. Fund	% Retained	Exp. Rate of Return	Std. Dev.
1	2259	35.3%	19.8%	44.8%	60.4%	3.1%	8.9%
2	4711	30.8%	37.9%	31.3%	74.8%	5.3%	10.3%
3	716	19.5%	18.0%	62.5%	76.3%	5.9%	13.1%
4	2362	24.5%	22.5%	53.0%	80.3%	6.3%	10.8%
5	857	34.3%	15.7%	50.1%	72.0%	6.5%	10.7%
6	3019	14.9%	20.2%	64.9%	84.9%	6.8%	14.9%
7	1134	25.1%	26.9%	48.0%	66.4%	7.4%	10.6%
8	9897	22.2%	1.6%	76.2%	81.3%	8.6%	24.2%
9	583	13.2%	9.4%	77.3%	89.4%	9.0%	15.8%
10	683	16.9%	16.1%	67.1%	86.5%	9.3%	14.3%
11	796	29.6%	6.1%	64.3%	73.6%	10.0%	13.8%
12	2268	14.7%	29.3%	55.9%	88.3%	10.9%	18.3%
13	940	18.3%	19.5%	62.2%	85.3%	11.2%	17.4%
14	1346	17.7%	8.5%	73.9%	77.5%	14.3%	17.5%
15	1407	13.7%	18.3%	68.0%	87.7%	14.8%	19.9%
16	3342	12.5%	8.1%	79.5%	89.8%	18.7%	27.7%
17	10000	2.8%	0.0%	97.2%	97.1%	19.2%	25.2%
18	9823	0.3%	20.2%	79.5%	99.7%	19.7%	35.5%
19	7461	6.8%	17.2%	76.1%	94.5%	20.2%	32.9%
All	**629**	**20.6%**	**14.9%**	**64.5%**	**81.2%**	**9.4%**	**n/a**

Table 4. Portfolio Allocation and Post-SRA Returns: Heuristic vs. Actual Allocation

Company	HHI	Loss Ratio Threshold	% Gross Premiums in ARF	% Gross Premiums in Dev. Fund	% Gross Premiums in Com. Fund	% Retained	Exp. Rate of Return	Std. Dev.
1	2259	1.01	42.6%	21.8%	35.6%	51.8%	5.6%	7.4%
2	4711	0.94	56.6%	12.1%	31.3%	46.9%	6.1%	7.2%
3	716	1.16	23.2%	8.9%	67.8%	75.6%	11.0%	13.1%
4	2362	1.05	34.2%	4.1%	61.7%	70.0%	8.9%	10.5%
5	857	1.12	25.7%	10.1%	64.2%	72.9%	9.7%	10.7%
6	3019	1.14	18.2%	5.3%	76.5%	82.0%	9.1%	14.8%
7	1134	1.03	25.4%	16.2%	58.4%	69.1%	10.8%	10.6%
8	9897	1.10	23.5%	0.1%	76.4%	81.2%	9.8%	24.0%
9	583	1.19	18.6%	3.7%	77.7%	82.7%	11.8%	13.9%
10	683	1.17	17.5%	3.2%	79.3%	83.9%	11.9%	13.6%
11	796	1.06	21.3%	4.8%	73.8%	79.8%	13.2%	13.6%
12	2268	1.05	27.6%	7.3%	65.1%	73.2%	12.3%	18.1%
13	940	1.07	19.9%	6.3%	73.8%	80.0%	13.6%	17.3%
14	1346	0.96	18.3%	11.0%	70.7%	78.2%	16.9%	17.3%
15	1407	1.04	16.7%	4.9%	78.4%	83.5%	16.9%	19.6%
16	3342	1.04	14.7%	0.4%	85.0%	88.0%	21.0%	26.8%
17	10000	1.04	3.7%	0.0%	96.3%	97.1%	19.7%	24.8%
18	9823	1.03	12.8%	0.1%	87.1%	89.7%	19.8%	34.4%
19	7461	1.20	13.6%	2.2%	84.2%	87.7%	21.9%	30.8%
All	**629**	**n/a**	**21.3%**	**6.2%**	**72.5%**	**78.9%**	**12.3%**	**n/a**

Table 5. Changes in Portfolio Allocation and Post-SRA Returns: 12.5% Cap on Underwriting Gains vs. Current SRA

Company	HHI	Loss Ratio Threshold	% Gross Premiums in ARF	% Gross Premiums in Dev. Fund	% Gross Premiums in Com. Fund	% Retained	Exp. Rate of Return	Std. Dev., %
1	2259	-0.04	0.3%	2.1%	-2.4%	-1.6%	-2.7%	-2.9%
2	4711	0.08	-17.4%	-4.8%	22.1%	17.0%	-2.9%	-0.7%
3	716	-0.08	4.3%	2.8%	-7.1%	-5.3%	-5.8%	-5.1%
4	2362	0.00	0.0%	0.0%	0.0%	0.0%	-4.2%	-3.9%
5	857	0.02	-2.8%	-0.5%	3.3%	2.6%	-4.6%	-4.0%
6	3019	-0.19	8.2%	36.6%	-44.8%	-30.4%	-5.5%	-10.2%
7	1134	0.00	0.0%	0.0%	0.0%	0.0%	-5.7%	-4.5%
8	9897	-0.20	51.4%	7.7%	-59.1%	-46.1%	-7.9%	-20.1%
9	583	0.01	-0.2%	0.0%	0.2%	0.2%	-6.2%	-4.9%
10	683	0.01	-0.5%	-0.1%	0.6%	0.5%	-5.9%	-4.3%
11	796	0.12	-5.7%	-2.9%	8.6%	6.5%	-7.3%	-4.8%
12	2268	0.02	-1.3%	-0.9%	2.2%	1.7%	-7.8%	-3.3%
13	940	0.19	-10.6%	-6.1%	16.6%	12.4%	-8.4%	-3.1%
14	1346	0.22	-9.6%	-8.2%	17.8%	13.0%	-10.8%	-3.2%
15	1407	0.14	-5.4%	-2.9%	8.2%	6.2%	-11.9%	-5.2%
16	3342	-0.18	3.0%	23.8%	-26.9%	-17.9%	-17.4%	-13.8%
17	10000	-0.22	16.3%	14.0%	-30.3%	-22.1%	-15.6%	-15.6%
18	9823	-0.23	7.3%	52.2%	-59.5%	-39.7%	-17.5%	-23.4%
19	7461	-0.33	2.4%	17.7%	-20.2%	-13.5%	-18.9%	-13.3%
All	**629**	**n/a**	**-1.7%**	**1.0%**	**0.7%**	**0.7%**	**-7.0%**	**n/a**

Note: The results in the table are changes relative to the baseline established in Table 4.

Table 6. Changes in Portfolio Allocation and Post-SRA Returns: "National" SRA vs. Current SRA

Company	HHI	Loss Ratio Threshold	% Gross Premiums in ARF	% Gross Premiums in Dev. Fund	% Gross Premiums in Com. Fund	% Retained	Exp. Rate of Return	Std. Dev., %
1	2259	-0.09	-6.9%	20.6%	-13.8%	-7.9%	-1.3%	-0.3%
2	4711	-0.04	-20.9%	35.3%	-14.4%	-6.2%	-1.7%	-1.8%
3	716	-0.21	12.5%	13.0%	-25.4%	-18.4%	-2.1%	-0.2%
4	2362	-0.04	1.5%	18.9%	-20.4%	-13.5%	-0.6%	-2.0%
5	857	-0.18	10.0%	19.1%	-29.2%	-20.5%	-2.4%	-0.5%
6	3019	-0.11	17.5%	8.7%	-26.1%	-19.6%	-0.9%	-1.8%
7	1134	-0.10	10.3%	9.6%	-19.8%	-14.4%	-1.7%	0.0%
8	9897	-0.05	2.1%	-0.1%	-2.0%	-1.6%	0.0%	-0.3%
9	583	-0.21	17.1%	8.1%	-25.2%	-19.0%	-1.5%	0.0%
10	683	-0.20	18.2%	12.8%	-31.0%	-22.9%	-2.1%	-0.1%
11	796	-0.14	14.4%	14.7%	-29.1%	-21.1%	-2.7%	-0.5%
12	2268	-0.04	8.1%	5.2%	-13.3%	-9.8%	0.1%	-0.5%
13	940	-0.11	15.8%	4.3%	-20.1%	-15.4%	-2.5%	-0.3%
14	1346	-0.11	17.4%	1.2%	-18.6%	-14.7%	-2.4%	-0.9%
15	1407	-0.10	19.0%	-1.2%	-17.8%	-14.4%	-2.5%	-0.4%
16	3342	-0.09	13.5%	-0.4%	-13.1%	-10.5%	-2.8%	-0.6%
17	10000	0.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18	9823	-0.05	0.7%	-0.1%	-0.6%	-0.5%	-0.1%	-0.1%
19	7461	-0.11	4.2%	-2.2%	-2.0%	-1.9%	0.7%	-0.3%
All	**629**	**n/a**	**13.7%**	**10.9%**	**-24.6%**	**-18.0%**	**-2.0%**	**n/a**

Note: The results in the table are changes relative to the baseline established in Table 4.

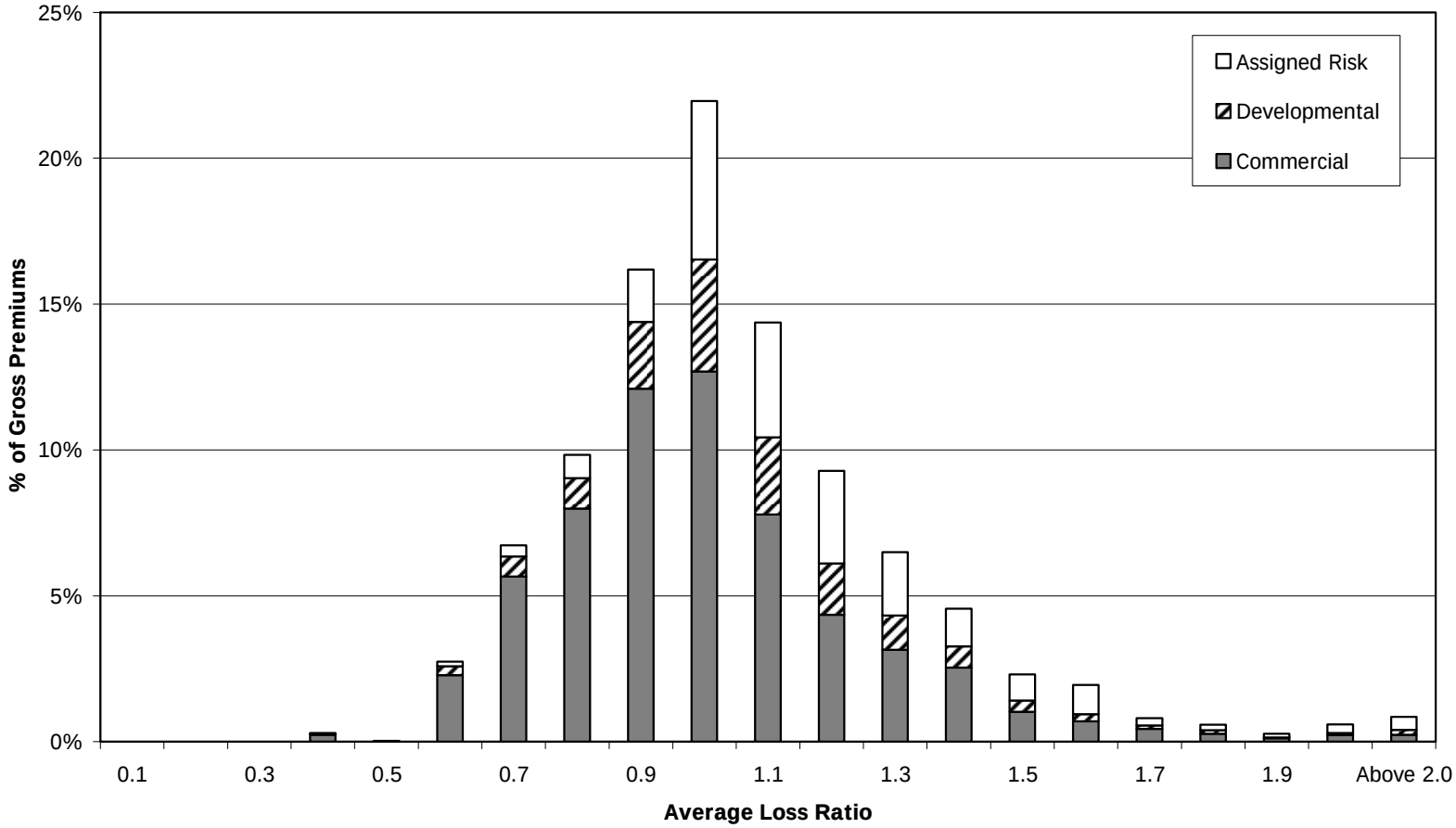

Figure 1: Base year allocation of gross premiums across reinsurance funds.