SOCIETY OF ACTUARIES

Article from:

International News

April 2009 – Issue No.47

Javier Campelo, ASA, is director of actuarial services at Re Consulting in Buenos Aires, Argentina. He can be reached at *jcampelo@re-consulting.com.ar.*

Agribusiness Reinsurance in Argentina—A "David and Goliath" Tale

By Javier Campelo

Agribusiness insurance shows a very promising growth potential in Argentina. Reinsurance plays a key role in the development of this type of insurance, being a source of capital for the industry. However, there are just a few reinsurers in the country working in the agribusiness field.

This leads to a situation resembling an oligopoly market. Proposals from different reinsurers have almost identical terms and conditions. Reinsurance premiums are much higher than those arising from technical actuarial calculations.

This is a story of a small insurance company in Argentina ("David") that attempted to determine optimal retention levels and the cost of different reinsurance programs by using actuarial techniques. The techniques used are those recommended by different actuarial organizations, such as those of the Society of Actuaries and Casualty Actuarial Society in United States and the Institute of Actuaries in England.*

INTRODUCTION

"David" is an insurance company located in a small city in Argentina. The company, with an 85-year-long experience in the insurance field, operates exclusively in hail insurance. As a legal entity, it constitutes a cooperative society. Both partners and members of the administration, representing the group of associates, are agricultural producers.

The insurance products that "David" offers to its associates include traditional insurance with a basic hail coverage and additionals for fire and replanting. Insurance policies with the same coverage but with decreasing deductibles are also provided. The products require a simple underwriting process and are oriented to small and medium agricultural producers.

The appraisal team is made up of more than 60 associates, highly trained, with wide-ranging experience and access to the latest technology. The appraisal manuals used by the company are continually reviewed by professionals of the National Institute of Agricultural Technology ("INTA") and foreign universities.

The company is very well-known within the insurance market and by agricultural producers. Its reputation comes from the number of hectares covered, the carrying out of its activities and its

* For those readers interested in further analysis, we recommend the DRM Research Handbook developed by CAS. The current draft of the Handbook is on the Dynamic Risk Modeling Committee Web Site (*http://www.casact.org/research/drm*).

CONTINUED ON PAGE 30

Agribusiness Reinsurance | from Page 29

capitalization level. In that sense, "David" is one of the few companies in the market with an AA rating from the local agency "Evaluadora Latinoamericana S.A."

Together with the expansion of agricultural activity in Argentina, "David" embarked on its own expansion process, with the aim of incorporating new agricultural producers into the cooperative system and, at the same time, diversifying its portfolio. This expansion allows for significant risk diversification, both in terms of different zones and crop cycles.

THE DYNAMIC RISK MODEL

"David" developed a risk model for use as a decision-making tool within the process of setting governing policies and strategies. The model was built within the theoretical framework identified as 'Dynamic Risk Modeling' or 'Dynamic Financial Analysis.'

The loss model, one of the main components of the risk model, had these characteristics:

- Its structure comprised the definition of several random variables, taking into account frequency and severity functions for each crop in each zone. The crops considered for model building were the significant ones in the portfolio: wheat, sunflower, corn and soya.

- All the selected loss distributions, as well as their parameters, arose from "David" empirical experience and that of the global market. In each case, a goodness-of-fit test was performed to show that both selected distribution and parameters were adequate.

- The model specifications included a provision for modeling the association between losses arising from same-season crops (winter crops and summer crops) and the association of losses in different risk zones. The loss model features contemplated the use of 'Copula´s' for multivariate random variable treatment.

- Results were obtained via Simulation. This served to determine the loss distribution function for a certain crop in a given zone and for the total portfolio.

REINSURANCE PROGRAM CONSIDERATIONS

"David" envisions reinsurers as long-term partners. The company seeks to maintain strong ties with its reinsurers, considering mutual needs and benefits and a commitment to strengthening the relationships.

Bearing in mind the company's lengthy experience in agricultural insurance activity, the technical capacity developed and the company's profile, the use of a Quota Share reinsurance mechanism to administer the underwriting risk seemed unnecessary.

Reinforcing this statement is the consideration that, with the expansion of activities in new areas, the total loss distribution function was reshaped, and probabilities for the loss process yielding extreme values dramatically reduced.

In this sense, the company decided to continue with the long-standing Stop-Loss reinsurance program. The main point to be reviewed was the program's structure (priority, limit) and other terms and conditions applied for risk transference.

The loss quantitative model was used for measuring the value of the reinsurance agreement. The company's goal was to optimize the reinsurance program's efficiency, considering aspects such as: (i) the company's risk aversion level, (ii) the impact of reinsurance on its capital needs and (iii) the price of the reinsurance coverage.

CAPITALIZATION AND REINSURANCE

The company's capitalization level is one of the main variables to be considered when making reinsurance-related decisions. "David" established a target capital, taking into account its degree of risk aversion. That is, the target was defined as having a capital level such as to allow a certain probability to be sufficient to cover possible unfavorable losses.

"David" considers different methods for determining the capital required for its insurance activity. One of the measures used by "David" is the Tail Value at Risk. The TVAR (alpha) varies according to the distribution and the parameters selected for the risk and to the reinsurance program. Bearing this in mind, "David" calculated different values that would correspond for different levels of retention, as shown in the following table:

	TVAR (99%)	Expected Loss Ratios	
		Retained	Ceded
No Reinsurance	2.1	35.5%	0%
Limit 60% xs Priority 95%	1.61	33.6%	1.9%
Limit 60% xs Priority 75%	1.48	31.8%	3.7%

David's final decision paid a great deal of attention to i) its degree of risk aversion; ii) its present capital level and iii) its ability to support premium growth. Taking these into account, "David" selected the following program: Stop-Loss Cover. Limit 60 percent xs Priority 75 percent.

TECHNICAL COST OF REINSURANCE PROGRAMS

"David" attempted to determine the cost of different reinsurance programs by using actuarial techniques. This analysis was used by "David" in negotiating with its reinsurer ("Goliath") on terms and conditions for the renewal of its reinsurance contract for period 2007-2008. The following table compares the present value of the expected reinsurance premium arising from the reinsurer's different quotes:

Prior to analysis submission	Following analysis submission	Reduction
USD 485.000	USD 291.000	40%

CONTINUED ON PAGE 32

Agribusiness Reinsurance | from Page 31

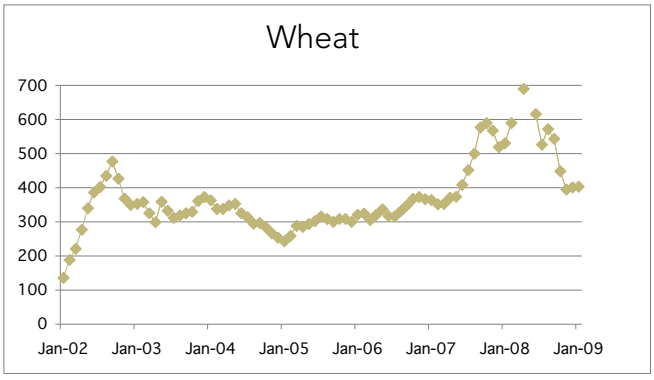
CONCLUSIONS

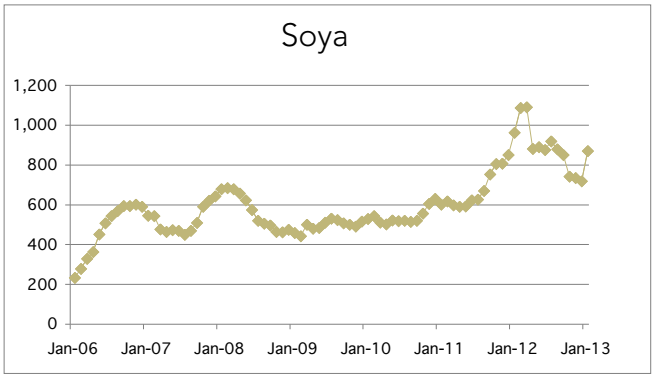
Agribusiness is the most important industry for the Argentine economy. About 37 percent of the GDP and 65 percent of exports in this country arise from agro-related activities.

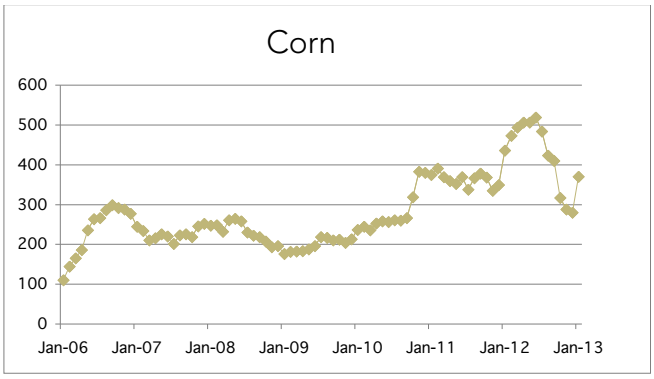
The national budget highly depends on this industry as well. Retentions on exports of agro-commodities are very high, reaching 35 percent for soya-related products.

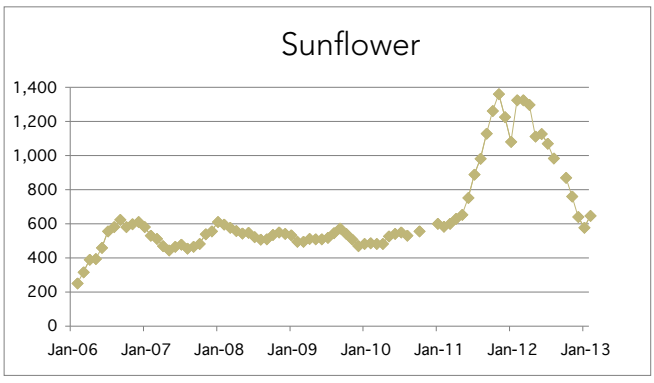
The prices of the agro-commodities exported by Argentina have shown very high growth rates in the last years, reaching record levels in January 2008, as shown in the following charts. This fact has contributed significantly to the recovery of the Argentine economy from 2002 to date, following the 2001/2002 crisis.

Argentine Pesos per Ton
(Source: "Rosario Stock Exchange")









"Insurance plays a key role in the industry's development."

Insurance plays a key role in the industry's development. Many small and medium agricultural producers would go bankrupt if they themselves had to afford hail-related damages in a bad year.

Reinsurance is vital in the development of this type of insurance, being a source of capital for the industry. We, consultants specialized in this field, have the responsibility to continue collaborating with our clients in providing effective tools for decision-making and for negotiating reinsurance terms and conditions.

This is a story of a small company in Argentina that determined optimal retention levels and the cost of different reinsurance programs by using the aforementioned actuarial techniques. □