

Financial securitization in the reinsurance industry

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Analysis of the intellectual capital and the creation of value is a very important part of management accounting. However, the financial accounting recognized as some of the limitations of financial statements, presented the book value of the assets and liabilities, quantifiable reliably in accordance with the rules of financial information and are not intended to present the fair value of the entity as a whole. Therefore it is vital that companies, in addition to creating knowledge, can generate additional information supplementing that contained in the basic financial statements so that the same user a complete vision of the company and has the elements for proper decision-making. This theoretical work carried out within the framework of an investigation, analyzes the relationship of financial accounting and the creation of value through intellectual capital, to seek benefits present and future sources in organizations, complementary to information emanating of the basic financial statements.

Creation of value, Accounting and financial reporting standards

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Introduction: reinsurance and securitization justification to transfer risks concept.

The objective of this work is expose the way in which reinsurance, a classic method in risk management of insurance and reinsurance companies, is being complemented by assets securitization, technique thoroughly developed in financial markets, allowing this combination (reinsurance-securitization) to transfer risks into capital market in order to be able to secure risks of high amounts. To illustrate and justify its using, several actual application examples of securitization in reinsurance companies are exposed, concluding that it is and effective alternative for risk transfer. With the application of securitization, products linked to financial securities are being produced (ILS, insurance links securities), issued and negotiated in the capital markets and that allows to transfer to this, part of the supply risks assumed by the reinsurance companies in the development of the assurance management of an event. The ILS are created with the assets securitization and its financial structure is varied: bonds, receipts, cat bonds, etc.

Like it has been said in the objective of the work, to illustrate this way of risk transfer, examples of the ILS market linked to different underlying assets: non-life insurance (AXA), life insurance (Aurigen Reinsurance) and catastrophe bonds (Parametric Re). This article started introducing the reinsurance like a type of insurance for insurers. Whose main functions are:

- Help the insurers to manage their risks.
- Absorb part of their loss.
- Stabilize their results and requirements over the own capital making easier their growing.

In short it allows the insurance companies to take very high risks that in other way would be hardly covered. The traditional reinsurance model, as pointed Cummins and Trainar (2009), works in an efficient way to transmit, manage and assume risks, when they are limited and slightly correlated. Besides it diversifies risks coming from differentiated geographic regions, combines different lines (life, non-life, maritime, etc.), producing added value in its advisory work and risk coverage of the insurance sector, by being a data transmitter vehicle between assignors and reinsurances.

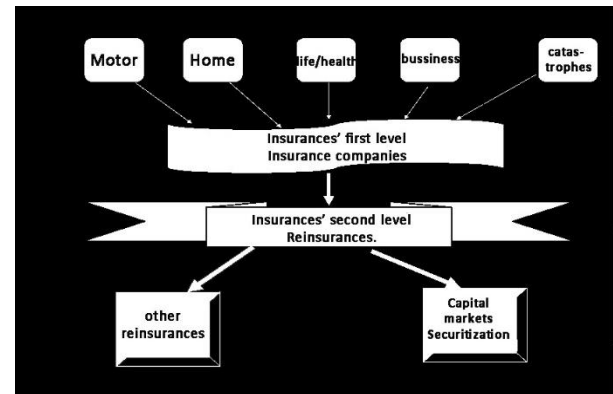


Figure 1

As it can be observed in the previous figure (figure 1), the insurance market has different phases within its process: A first level is established with the insurance contracts (motor, home, life/health or catastrophes).

The holder of these contracts is covered against eventual risks in these concepts in exchange to the payment of the corresponding premium. Being established a first risk transference among individuals or companies with the insurance entities.

The second level, the insurance premiums are set in portfolios or “pools” with similar risk levels that are transferred to reinsurance companies in exchange of the corresponding liquidity. Therefore the primary insurance undertakings use the reinsurance to transfer part of the stock risk assumed by the insurance business to third persons

Third level, the reinsurance companies can continue to apply this technique reinsuring with other companies or assuming financial techniques developed in the capital markets such as financial securitization.

The time to apply the financial securitization process in the insurance field is given by the insurance market itself. The risk transfer mechanism pointed out in the first and second level and that could be considered as “traditional”, changes when we face events leading to potentially very large losses in which diversification alone is not going to take away the risk assumed by reinsurers. We face a scenario in which the model loses some of its efficiency, increasing capital costs necessary to maintain acceptable levels of solvency. To the point that it cannot be profitable for insurers, and in which securitization can help to reduce the underlying risks of the insurance process.

The securitization of insured assets, offers significant opportunities for insurers and re-insurers when financing risk, playing the role of risk transmitter to capital markets through bonds and options. Securitization does not replace the reinsurance market, complements it.

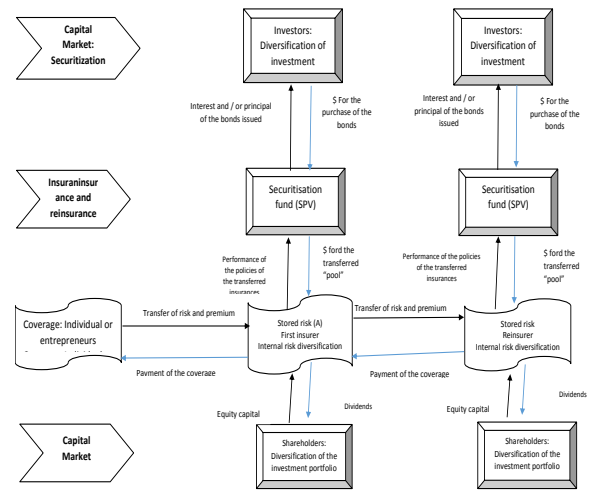


Figure 2

Figure 2 shows how companies and/or individuals are covered from potential losses arising from events through the contract with insurers.

Those, take the risks warehouse, manage them through the diversification, geographic, and offered range. (*Risk warehouse A- almacen de riesgo A*)¹.

However, this is not enough to eliminate the risk. A second level of transfer is used by the insurance companies (*Risk Warehouse B*) which, in turn set risk minimization strategies, by a further diversification and / or transfer to other insurers or reinsurers. Finally, there is the securitization. Insurers and reinsurers can transfer their risks to the capital markets, issuing insurance-linked assets, ILS.

¹ Riesgo de cobertura de un evento, asumido por las entidades aseguradoras en el desarrollo propio de su negocio, a cambio del pago de la prima de seguro correspondiente.

Where the regular cash flows, derived from the insurance and reinsurance contracts premiums, are transformed in assets negotiated in the market. Each ILS has a trigger, an element that determines the conditions under which the transferor may suspend the payment of interest and / or principal either temporarily or permanently. When the public does not know the trigger, this may find difficulty in measuring risk, in the actual amount of risk transferred, since the comparison to the expected loss is not feasible. Each trigger can be linked to one or multiple events or happenings, and becomes effective after the loss of a transferor exceeds a particular value. The triggers (Figure 3) can take any of the following forms:

- Loss: it happens when the actual losses suffered by the issuer on an established segment of the business manage to reach a certain level
- Index: it happens when the values of a previously established indicator, reach a certain threshold.
- Parametric: the suspension of interest and / or principal occurs when a specific metric measure reaches a certain value.
- Compensation: issuer payments are based on a level of compensation for their losses.
- Sectorial: the loss of an economic sector due to the occurrence of a catastrophic event.
- Hybrid: combines more than one trigger.

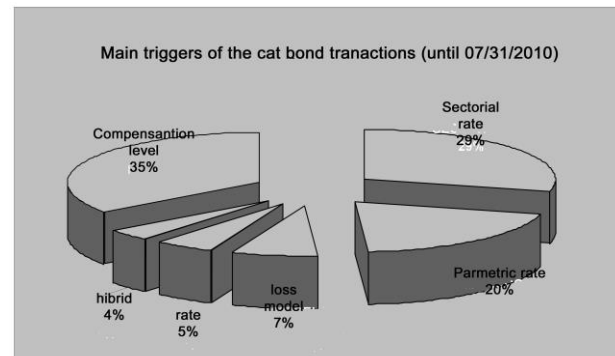


Figure 3

In the next section, the implementation mechanism of the process of financial securitization to the insurance sector exposing three cases as an example. In the non-life, life and natural disasters fields, illustrating the classic way to implement this financial technique and we finish the paper with the conclusions.

Securitization of covered risks

The market for insurance-linked securities (ILS) is growing continuously according to Swiss Re² data.

Enabling governments, corporations, and (re) insurers to access to capital markets, solving their liquidity needs, reducing risks through its output to the financial markets. Insurance companies group in a portfolio or "pool" their insurance policies that are transferred to a securitization fund or special purpose vehicle (SPV) in exchange for the corresponding liquidity, reducing the risk coverage for the insurer. The securitization fund will issue to the market, based on the underlying pooled, ILS to be acquired by investors. The structure of the ILS is varied as well as activators to which they are referenced. The insurance securitization process is outlined above in Figure 4:

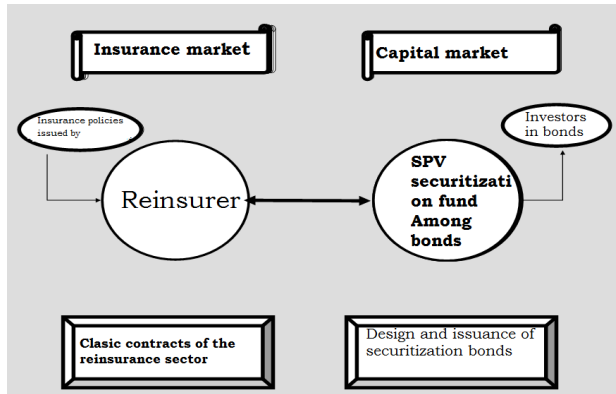


Figure 4

In the next paragraphs, the process of securitization in the insurance sector, in different scenarios developed in the international financial markets, is explained.

Non-life case: securitization of automobile insurances policies of the company AXA.

BAE, KIM and KULPERGER (2009), expose an example in the insurance sector for the nonlife branch.

Specifically on the loss risk management in the automobile insurce of AXA through this process, it transfers part of the part of the risk of their automobile policies, covering about three million vehicles with a premium income of € 1 billion, to the capital market.

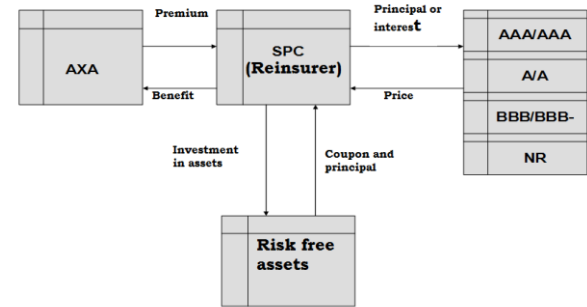


Figure 5

Figure 5 shows how the insurance entity reinsures a pool of insurance policies in the automobile sector to a SPC (*special purpose company*)² in exchange for an economic compensation. The SPC issues, based on the underlying of insurance policies, four courses of assets with different risk levels, to widen the supply to the capital market, with the structure of CDOs (collateralized debt obligation)³.

In this way investors coming from the capital markets are the ones who provide funds for the operation and they assume its risk, according to the rating or ranking of risk associated to acquired securities.

The method called “cash flow waterfall” is used, it involves the segmentation of the issue in different tranches subordinated to among them and with different credit characteristics⁴.

² Companies that are created to develop the securitization process. They acquire the assets that will be used as underlying in the securitization process in exchange of the economic amount and at the same time will be the responsible of carrying the issuing process of the CDOs (Collateralized Debt Obligation), its placement in the market and the payment of principal and interest to investors according to the characteristics of the different sections of issuance.

³ Collateralized debt obligations. Securitization structure in which the portfolio object of it is slightly granular, while the assets that compose it are heterogeneous.

A comprehensive analysis of the securitization structure described in "Structure of securitization: characteristics and implications for the financial system" LOSADA LOPEZ R. CNMV Monograph No. 14, October 2006

⁴ La diversificación en tramos, (*tranching*), implica que existe varias series en la emisión de modo que los inversores en algunas series tengan preferencia en los cobros frente a los de otras. Las series mas senior cobrarán el interés y principal antes en el orden jerárquico que las más junior, que solo lo percibirán una vez que las otras cobren. Esta cascada de pagos, implica que solo se realizan pagos al escalón inferior si previamente se han cubierto los pagos al escalón superior.

The tranches of the issue are distributed in four: three note issuance A, B, C, from highest to lowest rating and the tranche with less risk aversion, equity tranche (non rated). In figure 6, the basic features of ILS issued with base on insurance policies of AXA automobiles are gathered. Where the amount of each tranche, their ratings as well as levels applied trigger by losses are indicated.

Features of notes issued in the AXA Motor Securitization.

	Equity Tranche	C Notes	B Notes	A Notes
Amount	Euro 337 million	Euro 27.0 million	Euro 67.3 million	Euro 105.7 million
Rating (S&P/Fitch)	NR	BBB/BBB-	A/A	AAA/AAA
Risk Transfer Thresholds ^d	Loss ratio trigger -3.5%	Loss ratio trigger	Loss ratio trigger +2.8%	Loss ratio trigger +9.8%
Tranche Size ^e	35 points of loss ratio [-3.5%; 0%]	2.8 points of loss ratio [0%; +2.8%]	7.0 points of loss ratio [+2.8%; +9.8%]	11.0 points of loss ratio [+9.8%; +20.8%]

Figure 6

In the securitization of AXA, the bopnds issued by the SPC had a four-year period of time. During this period, investors received coupons if the loss indicator was not activated. These bonds were centered on a loss ratio trigger determined at level 3 that covered each of the four years of the issue, analyzing independently each year.

The trigger is executed when the loss rate of this non-life insurance rises above the trigger on any of the four annual periods of duration of a bond.

If the level has been passed, the damage above the trigger is deducted to the total amount of contingency deposit, of € 200 million, before the funds are repaid to investors. Therefore, if the damage are increased in an unplanned way, AXA, is partially protected from extraordinary damage to car insurance. The trigger needed to establish the rating for each year, confirmed by the rating agencies, otherwise there would be chances of early redemption of the bonds, according to the different tranches. The activator value is identified by M% and depends on the size of the tranche and the risk transferred.

So in the notes B loss ratio is valued at an interval [2,8%-9,8%]. This means that if the loss ratio is below 2.8%, the notes B are not affected and the return on investment will be the total, coupons and principal. This securitization is characterized by the transferring of high frequency and low severity risk to the markets, even though it is always possible a low frequency and high severity event that will activate the trigger.

Life case: securitization of Canadian life insurances.

Securitization of life insurance is a financial instrument for managing capital for insurers and reinsurers because it makes liquid intangible assets; it is used to manage the capital requirements mandatory by the regulatory authorities, increasing equity yields and transferring risk to markets through the issuance of mortality bonds that protect the reinsurance companies against extreme dramatic events, like for example pandemics or generalized deceases for any reasons.

The ILS constitutes an instrument to transfer insurance risk to the capital market, besides being an instrument of financing. Securitization is made over the flows of future payments of traditional life insurance premiums, maintaining its commitment of the insurance obligations to holders of such premiums, being mortality risks and cancellation for nonpayment assumed by investors. Some life bond function as catastrophe bonds, i.e., they transfer extreme risks to capital markets. They are based on mortgage rates: if mortgage is over the activator value, investors can stop receiving coupons or/and capital, if contrary, they will receive the cash flow established by the issuance. In the classic structure of the ILS, the reinsurance company subscribes with a SPV a financial contract. The SPV in turn, issues life bonds.

The amount of the bonds is invested in high quality shares, generally state debt, entering yields on such securities into a collateral trust deposit.

Finally the SWAP contract counterparties, exchange the investment return for a LIBOR-based interest. Figure 7 schematically outlines the phases discussed.

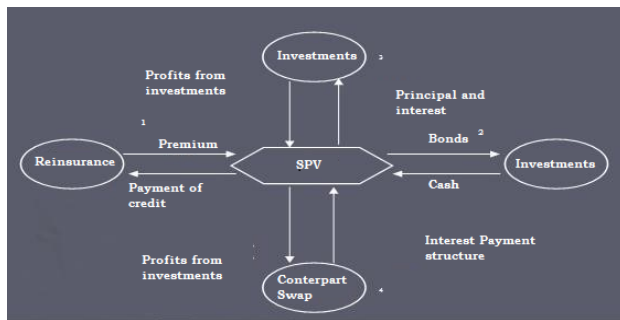


Figure 7

Another component of the securitization process is the credit enhancement applied to ensure the stream of cash flows of the underlying assets to investors in issued bonds. The real case chosen as an example to expose is the Credit Agricole Securities case. In December 2011, Credit Agricole Securities (USA) Inc. issued the first placement of corporate by bonds totaling 120 million Canadian dollars, issued by Vecta I Ltd. and, corresponding to the securitization of Canadian life insurance of intrinsic value. The operation, sponsored by Aurigen Reinsurance Limited, was sustained over a closed pool of policies reinsured by ARL between 2008 and 2010. Includes a single tranche rated BBB+ by Standard & Poors. The bonds have a expiration estimated of 6.25 years and a coupon rate of 8.0%.

Credit Agricole Securities led the structuring of the financing and was the coordinator of issuances along with Swiss Re Capital Markets. The principal payment of the bonds is linked to the emergence of future profits in the business in question, which consists of twelve life reinsurance contracts issued by Aurigen Reinsurance Company, a subsidiary of ARL, from six different insurance companies life.

Natural disasters

A natural disaster is a loss event caused by natural forces, which generally produces a multitude of individual damage affecting many insurance contracts and often several tranches.

Natural disasters and man-made disasters⁵ caused more than 300.000 victims and an economic cost of around USD 218.000 million in 2010. With an increment of 60% in regard the previous year in secured damage, even though staying in the top ranking of the year 2005, with the hurricane Katrina (see chart 1 annexed).

The world insurance sector quantified costs around USD 40.000 million in 2010 as a consequent of natural disasters and around USD 3.000 millions for man-made disasters (see figure 8). Events like hurricane Andrew, the attacks of September 11 in New York or hurricane Katrina generated the bankruptcy of many insurer companies and had caused the search of new elements of risk transfer different from reinsurance.

⁵ Grandes siniestros asociados a la actividad humana: grandes incendios y explosiones; catástrofes de aviación y navegación espacial; navegación marítima, fluvial y lacustre; catástrofes

ferroviales; accidentes mineros; derrumbamiento de edificios /puentes y otros, incluyendo terrorismo. Quedan excluidos los conflictos bélicos y similares.

Following this conception, financing has been searched in capital markets through the securitization of insurable risks, and especially, the securitization of insurances by losses from natural disasters. Also known as “act of God bonds”, they are corporate bonds that require that investors exempt the principal and/or interests in case of a disaster losses exceed a specified level.

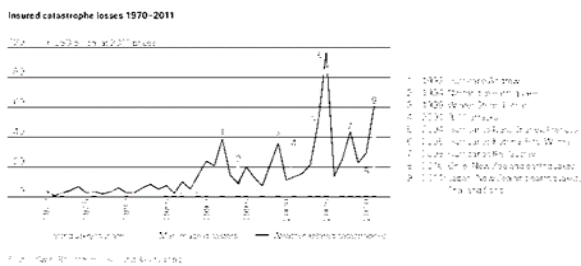


Figure 8

This form of risk transfer by disaster (designed as a development of asset securitization) has been mainly used by insurance and reinsurance companies as a way to obtain complementary coverage in the capital market. Nevertheless, it has been also applied directly by corporative entities that in another way would look for coverage through insurance companies. In regard to it functioning, the usual structure of a transaction follows the steps pointed out in figure 9:

- The owners negotiated policies with insurance companies.
- Insurance companies acquire reinsurance with a Securitization Fund.
- The securitization Fund that offers reinsurance sells bonds.
- Investors purchase those bonds.

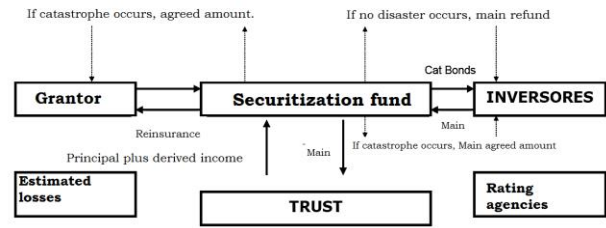


Figure 9

Investors initially pay an amount to the Securitization Fund and take their bonds. Afterwards they will receive coupons and principals if none disaster occurs. The Securitization Fund invests the premium in risk-free assets in order to pay its obligations. These transactions provide an structure for which the price paid by investors in bonds, the reinsurance premium and the investments are adequated to cover the loss by disaster risk with certainty.

One of the advantages of securitization against traditional reinsurance is the elimination of risk of the “hiring part”, in other words, the possibility that the other party does not meet the payments to which he is bound by contract, important risk in case of reinsurance and really low, almost null, with securitization. A characteristic of the catastrophe bonds is the trigger to which it is linked.

Parametric Re chose a parametric rate, more concretely it used the magnitude of the Vulcan activity in Tokyo measured by the Japanese Meteorological Agency and according to it the epicenter will be in an area delimited by Tokyo, Yokohama and Chiba or outside it, with the following structure of the loss percentage of the bond. (figure 10)

- Richter scale	7,1	7,2	7,3	7,4	7,5	7,6	7,8
epicenter in the area	25%	40%	55%	70%	85%	100%	
epicenter out the area			25%	44%	63%	81%	100%

Figure 10

The payment to the Securitization Fund and the corresponding loss for the buyer of cat bond is determined by an objective measure of the specified parameters. The formula that quantifies the value of the payment can be as simple as a binary structure in which buyers loss all principal and interest if the event occurs. Or be complicated by scaled functions that estimate, with less error margin, losses of securitization fund. Valuation techniques are complicated by the fact that, in general, assets based in the insurance risk do not have a single price based only on considerations of free price arbitrage. To see how this assessment is performed, we start with the simplest case in which constant interest types and zero coupon bonds, issued in the moment 0, with a nominal value F and expiration T, are assumed.

The payment of bonds depend on the value it has in the moment T a loss rate I(t) by natural catastrophe occurred during the exposition period that ends at $T' < T$. Final payment is an eventuality, a relationship between the rate value at expiration, I (t), and a threshold trigger value, represented by K.

- If $I(T) \leq K$ the payment is F.
- If $I(T) > K$ K the payment is $F - [I(T) - K]$ nevertheless in this case, a minimum payment of B is guaranteed.

If V(T) is the bond value in the moment T, we can find three possibilities:

$$I(T) \leq K \rightarrow V(T) = F$$

$$K < I(T) < K + (F - B) \rightarrow V(T) = F - [I(T) - K] > B$$

$$I(T) \geq K + (F - B) \rightarrow V(T) = B$$

The value of the bond at the end of the period would be:

$$V(T) = F - \text{Max}[0, I(T) - K] + \text{Max}[0, I(T) - (K + F - B)]$$

It is widely accepted that the price of an asset linked to insurance has to be the sum of a risk-free rate plus a differential that expresses the expected insurance losses, i.e. a reward for the risk taken. The problem arises when the risk is difficult to quantify, so far there is no measure good enough to be useful in all circumstances. The traditional average of risk capital markets, expected loss, probability of default, standard deviation, etc.. do not work properly with the assets linked to insurance. To calculate and evaluate the differential risk, it can be divided into two components:

- A compensation to investor for expected losses (EL)
- A compensation to investor for assuming the risk of investing. It is the amount he demands to deposit his risk capital (EER). In a perfect market without risk, EER would not exist since compensation would not be necessary for taking risks.

Lane (Lane, 2000) considers that this second risk is going to be a function of frequency and severity and that it could get closer to the Cobb-Douglass production through a similar function:

$$EER = \gamma(PFL)\alpha(CEL)\beta$$

Function that if $\gamma = \alpha = \beta = 1$, where the higher possible premium would match the expected loss, resolving the equation we would have:

$$EER = (PFL * CEL) = EL ; CEL = \frac{EL}{PFL}$$

Like $0 < PFL \leq 1$ and $0 < CEL \leq 1$, the result is that PFL is over the expiration period and it could also be used as long as it is consistently linked with the total expected loss of the same period. The mentioned *severity* of the loss would indicate the size of a loss, if happens (CEL). If the total loss is considered a CEL of 100% of principal and coupons then a rational investor will demand more to a bond according to the increase of his CEL. As a measure has two good features: it is relatively easy to measure and it can be divided. For the determination of the severity there are a number of simulation models (see figure 10) that would have the following structure:

Risk model. It defines the degree of stochastic of the potential occurrence of the loss in terms of their physical characteristics and their probability of occurrence.

The inputs of this model are the historical data, terrain features and scientific knowledge. The output is to indicate for each site the probability of occurrence and the characteristics of the potential loss.

Damage Model. Determines the damage caused by a particularly loss in infrastructures, houses, factories, facilities, etc.

For this, sometimes engineering applications are used, other times data from the experience are used in insurers' loss. The outputs of this model are the estimates of damage caused by a specific incident on the structures.

Financial Model. Applies previously calculated damages according to the specifications of the insurance and reinsurance contracts to determine the impact of the estimated loss and calculate final financial losses.

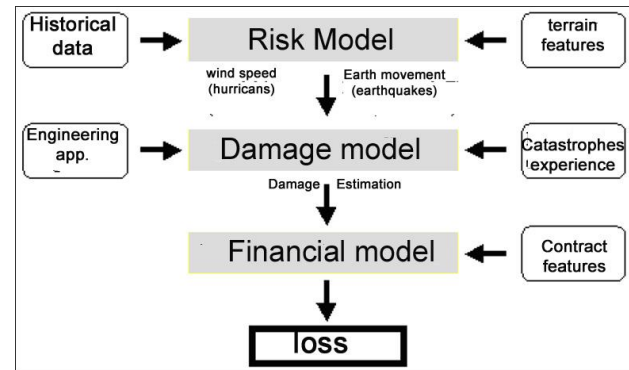


Figure 11

The market development of cat bonds (catastrophe bonds) in 2011, although it was slightly lower than in 2010, is considered robust in the historical development of this sector. Being 2011 one of the most costly years on the ranking of catastrophic losses.

The earthquake in Japan in March 2011 or tornadoes and hurricanes that hit the southern and central United States have been very significant.

Conclusions

This research has exposed how the securitization is an effective mechanism for transferring the risk complementing reinsurance. For that, its operating mechanism has been first explained to later illustrate it in three real examples applied to different cases that may occur.

Therefore, as conclusion we cite the advantages of this process:

First, the securitization of insurance through the ILS provides an alternative model to the traditional one in risk financing. The classic model of reinsurance applied widely to cover small and poorly correlated risks can lose efficiency in a context of major disasters with risks correlated. In addition, securitization allows transferring, through the ILS, the risks of the insurance business assumed by reinsurance companies to capital markets.

Moreover, the application of securitization in reinsurance companies establishes a better management of their solvency ratios by allowing lessening their capital requirements and according to Cummins (2009), securitization reduces moral risk and facilitates the regulation of arbitration in the sector. On the other hand, in countries with large geographical areas subject to natural disasters (see Annex Table I) catastrophe bonds.

Definitely through ILS an alternative or supplement is established, as appropriate, in the management of traditional risk of insurance companies, widening the range of management products in this sector.

However, we should not forget that securitization is a complex financial process that only now is being implemented by major international reinsurers.

Anexes

The 40 most costly insurance losses (1970-2011)

Insured loss (in USD m, indexed to 2011)	Victims	Date (start)	Event	Country
74 686	1 836	25.08.2005	Hurricane Katrina: floods, dams burst, damage to oil rigs	US, Gulf of Mexico, Bahamas, North Atlantic
35 000	19 184	11.03.2011	Earthquake (M _w 9.0) triggers tsunami: aftershocks	Japan
25 641	43	23.08.1992	Hurricane Andrew: floods	US, Bahamas
23 848	2 982	11.09.2001	9/11 attacks	US
21 239	61	17.01.1994	Northridge earthquake (M 6.6)	US
21 141	136	06.09.2008	Hurricane Ike: floods, offshore damage	US, Caribbean; Gulf of Mexico, et al
15 350	124	02.09.2004	Hurricane Ivan: damage to oil rigs	US, Caribbean; Barbados, et al
14 468	95	19.10.2005	Hurricane Wilma: floods	US, Mexico, Jamaica, Haiti, et al
12 000	813	27.07.2011	Flood caused by heavy monsoon rains	Thailand
12 000	181	22.02.2011	Earthquake (M _w 8.3), aftershock (M _w 5.6)	New Zealand
11 625	34	20.09.2005	Hurricane Rita: floods, damage to oil rigs	US, Gulf of Mexico, Cuba
9 583	24	11.08.2004	Hurricane Charley: floods	US, Cuba, Jamaica, et al
9 322	51	27.09.1991	Typhoon Mirille/No 19	Japan
8 292	71	15.09.1989	Hurricane Hugo	US, Puerto Rico, et al
8 248	562	27.02.2010	Earthquake (M _w 8.8) triggers tsunami	Chile
8 036	95	25.01.1990	Winter Storm Daria	France, UK, Belgium, et al
7 930	110	25.12.1999	Winter Storm Lothar	Switzerland, UK, France, et al
7 300	354	22.04.2011	Severe storms, tornadoes	United States (Alabama, et al)
7 050	155	20.05.2011	Severe storms, tornadoes	United States (Missouri, et al)
6 609	54	18.01.2007	Winter Storm Kyrill: floods	Germany, UK, Netherlands, et al
6 135	22	15.10.1987	Storm and floods in Europe	France, UK, Netherlands, et al
6 127	38	26.08.2004	Hurricane Frances	US, Bahamas
5 491	64	25.02.1990	Winter Storm Vivian	Europe
5 454	26	22.09.1999	Typhoon Bart/No 18	Japan
5 300	55	22.08.2011	Hurricane Irene, extensive flooding	United States, et al
5 155	-	04.09.2010	Earthquake (M _w 7.0), over 300 aftershocks	New Zealand
4 870	600	20.09.1998	Hurricane Georges: floods	US, Caribbean
4 577	41	05.06.2001	Tropical Storm Allison: floods	US
4 527	3 034	13.09.2004	Hurricane Jeanne: floods, landslides	US, Caribbean; Haiti, et al
4 288	45	06.09.2004	Typhoon Songda/No 18	Japan, South Korea
3 918	45	02.05.2003	Thunderstorms, tornadoes, hail	US
3 810	70	10.09.1999	Hurricane Floyd: floods	US, Bahamas, Columbia
3 697	59	01.10.1995	Hurricane Opal: floods	US, Mexico, Gulf of Mexico
3 648	6 425	17.01.1995	Great Hanshin earthquake (M 7.2) in Kobe	Japan
3 418	25	24.01.2009	Winter Storm Klaus, wind up to 170 km/h	France, Spain
3 240	45	27.12.1999	Winter Storm Martin	Spain, France, Switzerland
3 055	246	10.03.1993	Blizzard, tornadoes, floods	US, Canada, Mexico, Cuba
2 886	38	06.08.2002	Severe floods	UK, Spain, Germany, Austria, et al
2 840	64	27.02.2010	Winter Storm Xynthia, winds up to 160 km/h	France, Germany, Belgium, et al
no*	167	06.07.1988	Explosion on platform Piper Alpha	UK

Chart 1

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