



## SINGLE AND POLITICAL RISK (RE)INSURANCE

### BRIEF INTRODUCTION AND OVERVIEW

Imagine being an owner or executive of a business, for example one that specializes in building and operating solar power plants. An opportunity comes your way that would enable you to expand your business into another country, an emerging market, where the government wants to jointly invest in the operation with you. While this presents an interesting opening for your business, you are conscious of the risks involved in expanding outside of your home country. These include political risks, i.e. decisions made by the government of the host country, which could negatively affect your business there and lead to financial losses for your company. For example, a situation could arise whereby, at some point in the venture, the government of the host country fully seizes (i.e. nationalizes) ownership of the company that you have jointly established. Such an act is called “nationalization” or “expropriation”, and as an example it happened to the Argentinian subsidiary of the Spanish Energy Company “Repsol” back in April 2012, under the country’s Cristina de Kirchner administration.

**WHILE THIS PRESENTS AN INTERESTING OPENING FOR YOUR BUSINESS, YOU ARE CONSCIOUS OF THE RISKS INVOLVED IN EXPANDING OUTSIDE OF YOUR HOME COUNTRY.**

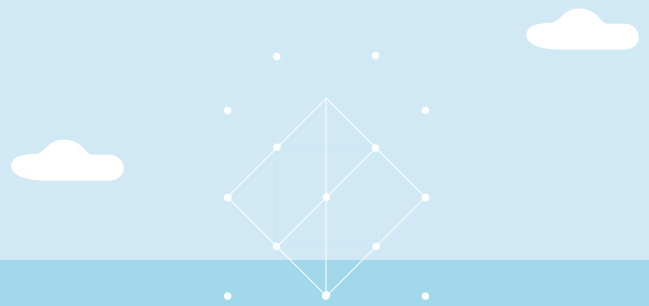
This newsletter aims to provide a brief introduction to a class of (re)insurance that covers both political risks like the one described above, and purely commercial risks such as non-payment by a private counterparty, not necessarily related to political circumstances. This class of highly specialized cover is called Single and Political Risk (re)insurance. Its purpose is to facilitate global trade – including cross-border investment in low- and middle-income countries – in order

to support the development of infrastructure projects for societies around the world, and hence to further advance the development of their respective economies.

While we do not aim to provide a historical context here, it is widely acknowledged that this type of insurance emerged after World War II in relation to the Marshall Plan, which promoted U.S. investment in post-war Europe. Today, this type of coverage is provided by the public sector through Export Credit Agencies, Multilateral Institutions (for instance, MIGA, as a member of the World Bank Group) and also to an increasing extent by private insurance companies. We will give an overview of both the underlying insurance and the reinsurance markets involved in Section 2.

To outline the structure of the paper: we begin with a description of the various types of perils being covered, together with some concrete loss/recovery examples. Then we describe the landscape of single and political risk insurance players, including the estimated size of the market, and comment on the prevailing single and political risk insurance products (including non-trade coverage) and purchasing trends. We conclude by outlining the actuarial approach we take to arrive at the underlying loss distribution, which enables us to price this business from both an insurance and a reinsurance perspective.

Finally, we would like to emphasize that the subject matter of this newsletter is not associated with any particular economic and/or political crisis. However, since the negative economic implications of Covid-19 are still very much present at the time of publishing, we will briefly touch on how this crisis is being perceived and tackled by this class of business, bearing in mind that a conclusive assessment of all its implications for the single and political risk market is still far out of reach (see the remarks at the end of Section 1).



## SINGLE AND POLITICAL RISK PERILS COVERED AND EXAMPLES OF HISTORICAL MARKET LOSSES

In this section, we will start by describing the insured perils associated with single and political risk coverage, as summarized below (please note that the “Non-Honoring” and “Default Comprehensive” perils encompass several other perils).

- ♦ **Confiscation, Expropriation, Nationalization, Deprivation:** these are host government actions that deprive an investor of their rights of ownership and/or control of their assets, applying the outright confiscation of property or funds. There is also the notion of “creeping” expropriation, which is a series of actions taken by the host government (e.g. changes in laws, regulation, increases in taxes or royalty payments etc.), none of which would trigger coverage on a standalone basis but which, in total, represent a *de facto* removal of property rights.
- ♦ **Currency Inconvertibility:** this represents the inability to convert local currency into hard currency (e.g. USD) over a continuous period (predefined in the policy), including the inability to transfer hard currency out of the host country due to a law or government action implemented by the country of the buyer/borrower/subsidiary. This could apply, for instance, to the interruption of scheduled payments, payments of dividends or repatriation of capital.
- ♦ **Political Violence:** this refers to politically motivated acts of terrorism, sabotage, strikes, riots, civil commotion, revolution or war taking place in the host country, destroying or damaging an insured asset or rendering a project asset non-operational for a prolonged, predefined period.
- ♦ **Non-Honoring:** the default by a **public obligor** (i.e. a sovereign, sub-sovereign or sovereign owned entity) for a comprehensive set of reasons (e.g. due to currency inconvertibility).
- ♦ **Default Comprehensive:** payment default by a **private obligor** due to either political risk perils (such as currency inconvertibility, political violence and other miscellaneous contract frustration perils such as embargo, export or import permit cancellation) or commercial risk. Commercial risk is defined as a deterioration in the creditworthiness of the private obligor that is not caused by political risks (i.e. falling outside of the private obligor’s responsibility), resulting in payment default or insolvency.

We should point out that in some instances, describing covered events in enough detail and specification (i.e. reducing subjectivity), but without making the policy wording too narrow (thereby creating potential “gaps” in coverage), is a challenge inherent to political risk insurance. The issue of “creeping expropriation” mentioned above is an example.

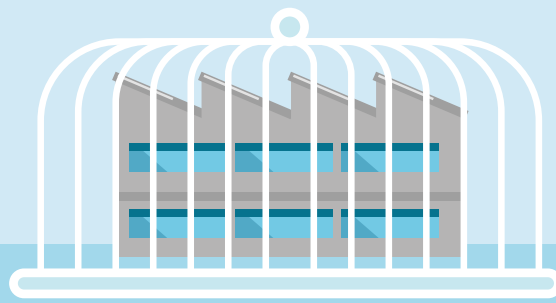
To elaborate further on this point, cases of regulatory action that have a significantly adverse effect on a policyholder’s investment may be viewed differently by the policyholder and the insurer in terms of coverage. The insurer wants to be able to make a counterclaim, take recovery actions, against the host government, which should only be liable for wrongful as opposed to legitimate actions. It is definitely worth asking the straightforward question: “Is this event covered by the policy” and holding a candid discussion on the scope of the coverage before the policy is issued? For those interested in more background on this type of consideration, we refer you to “International Political Risk Management”<sup>1</sup>.

Furthermore, since the early 2000s, there has been a growing market trend towards insuring financial institutions against non-payment of trade and non-trade (e.g. working capital loans, general purpose loans) and related financing agreements, driven in part by regulatory capital relief considerations. With regard to these considerations, while the insured party will have to fulfil predefined obligations, the policy wording has to be such that there is less scope for interpretation on what constitutes the coverage, including events that are outside the insured’s control. We comment on this in greater detail in the next section.

We will now give some **generic loss examples for this class of insurance**, which can be found in the public domain<sup>2</sup>:

- ♦ **Currency Inconvertibility:** A commercial bank made a currency inconvertibility claim on a syndicated loan to a large Argentine corporate. When a scheduled payment on the loan came due in 2002, exchange controls meant that the borrower was unable to convert the Argentinian Pesos to USD and remit the payment outside Argentina. This was due to a decree requiring Central Bank approval for cross-border transfers to pay debt. For a lengthy period

1. The World Bank Group, 2008, Part Three, p.107ff, <https://openknowledge.worldbank.org/handle/10986/6814>  
2. Mina Toksöz, *Guide to Country Risk*, The Economist, 2014; [www.sovereignbermuda.com](http://www.sovereignbermuda.com)



in 2002 and early 2003, such approvals were difficult, if not virtually impossible, to obtain. The commercial lender had bought political risk insurance on the loan and filed a claim under its policy, which was paid in full at the end of the waiting period. The insurer, in turn, took a beneficial interest in the insured loan rather than title to the blocked pesos. The restructured loan is performing well and, some two years after it was paid, the claim has been fully recovered.

- ♦ **Political Violence:** hostilities unfolding in Eastern Ukraine in 2014/15 led to several Political Violence claims from a large European retailer, relating to physical damage to several of its stores located in that region. The stores were damaged by explosives used in combat during the conflict, as well as by looting by rebel forces.
- ♦ **Expropriation:** Iraq expropriated the Kuwaiti Airways fleet during the invasion of Kuwait in 1991, which resulted in a payment of USD 230 million within 30 days to the Kuwaiti government, which had taken out PRI insurance for its aircraft. The insurer managed to fund its payment with the possession and sale of the aircraft after the war.
- ♦ **Default Comprehensive:** while we will not be giving an explicit example, the generic situation regarding the commercial risk component is that the obligor files for insolvency or restructuring (e.g. Chapter 11 in the U.S.)<sup>3</sup>. While there is a payment under the insurance policy, recoveries can be obtained by restructuring the underlying payment obligation (extend tenor and/or repayment schedule) and through pledges on assets.

We will conclude this section with some brief comments and observations on how the prevailing global health and economic crisis relating to Covid-19 has affected and continues to affect the single and political risk (re)insurance market:

- ♦ Following the significant economic consequences of the global lockdown in Q1-2 of 2020, which have led to a decrease in global GDP unprecedented since World War II, there have been swift and decisive economic responses from governments and monetary institutions,

alleviating the impact in terms of stress related to short-term liquidity, incl. “tax holidays”, compensations for furloughed employees as well as loan schemes for SMEs and/or companies in the most affected industries. For an up-to-date overview on a country-by-country basis, we refer you to the “Policy Responses to Covid-19”<sup>4</sup>.

- ♦ For short-term Trade Credit (TC) insurance, many European governments have implemented schemes that protect the bottom line of TC insurers through proportional coverage for risks underwritten in the course of 2020. Such schemes ensure that TC insurance coverage remains widely available and that TC insurers do not cancel credit limits in a massive way, which would put further pressure on the liquidity available and hence on the economy, by further slowing down trade and fueling insolvencies. The purpose of these schemes, therefore, is not to protect TC insurers but rather to support and help the economy by ending the economic aspects of this crisis sooner.
- ♦ Single Risk Insurance policies covering Non-Honoring and Default Comprehensive perils are expected to avoid losses through the restructuring of underlying debt in the case of an *a priori* economically healthy trading relationship. Noteworthy examples in this respect are moratoriums on the repayment of the principle under Export Credit Agency financed asset acquisitions.
- ♦ Because the banking industry has entered this economic crisis with solid balance sheets and in a generally healthy shape, it is perceived as being part of the solution as a provider of liquidity, rather than the source of the problem as experienced during the Global Financial Crisis (GFC).
- ♦ Based on feedback from major single and political risk insurers received to date, the Covid-19-induced global economic crisis is expected to lead to a less severe deterioration of the market loss ratio than experienced during the GFC. However, the ongoing pandemic crisis is exacerbating social inequalities and socioeconomic tensions around the world and within countries and is therefore likely to result in increased in political violence and all its associated risks.

3. <https://www.uscourts.gov/services-forms/bankruptcy/bankruptcy-basics/chapter-11-bankruptcy-basics>

4. Page on the IMF website, <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#U>



## THE SINGLE AND POLITICAL RISK (RE)INSURANCE LANDSCAPE

It is notoriously difficult to estimate the size of the single and political risk insurance market measured in premiums written in any given year. Consulting the annual publications of the “Berne Union”, an international non-profit association founded in 1934, which provides a forum for global export credit and investment insurance and has around 80 members worldwide, you can nevertheless find industry statistics and tables on total as well as new exposures added during a given year, figures on claims paid and recoveries on a calendar year basis, top countries for commitments, and so on<sup>5</sup>.

The players within the industry, however, can be easily categorized into public Export Credit Agencies, Multilateral Institutions and, to an increasing extent over the past few decade(s), private insurers having established highly specialized teams to underwrite this line of business.

One of the difficulties in estimating a market premium is the fact that, at least for specialized private insurers, the line separating short-term trade credit insurance from what is considered single and political risk insurance can be blurred. Take for instance underlying policy tenors: while single and political risk insurance policy tenors can last up to 20 years, there are shorter policies (e.g. 12 months), that the market still considers within the realm of single and political risk insurance rather than as short-term Whole Turnover Trade Credit insurance, for example.

For the purposes of this newsletter, we define the insurance market premium for single and political risk insurance as the premium generated (on an underwriting, i.e. risk attaching basis) by the above-mentioned players purchasing treaty reinsurance.

On basis defined above, our estimate of the **single and political risk market premium for 2019 is around EUR 1.8 billion from Multilaterals and Export Credit Agencies and around EUR 1.5 billion from private market players**. It should be noted that the above-mentioned private market premium includes premium generated through risks placed facultatively by Export Credit Agencies and Multilaterals to the private market.

Furthermore, for the private players, we estimate that around 60% of the market **premium is generated through banks being policyholders**.

Besides the fact that banks have become key customers for single and political risk insurers, there have been other important developments within the single and political risk market:

- ◆ **Export Credit Agencies as well as Multilaterals** have been using the single and political risk private (re)insurance market to manage their respective risk capital and country/peril/obligor counterparty aggregation for some time now. The most common way for Export Credit Agencies and Multilaterals to buy reinsurance is still on a “case-by-case” (i.e. transactional) basis from one or more (re)insurers, otherwise known as “facultative” (re)insurance. Nevertheless, there is an increasing trend towards buying reinsurance on a “portfolio” automatic basis, known as “treaty” reinsurance. The latter is of course subject to pre-agreed reinsurance treaty terms and conditions, while facilitating and smoothing their risk sharing process as well as diversifying their panel of (re)insurance partners. We have yet to see a similar trend for banks, or more precisely their captives, using the reinsurance market.
- ◆ According to regular studies conducted by specialized brokers (e.g. BPL, Arthur Gallagher), since 2008 the **market capacity has more than doubled for private and even tripled for public obligors**, to the tune of USD 2.5 billion and USD 3 billion respectively, with **maximum tenors** of up to 20 years.
- ◆ There have been increasingly positive responses by (re)insurers to longer tenor risks, particularly in relation to **project and asset finance**, including public-private partnerships, mainly when insured with Export Credit Agencies and Multilaterals, except for aircraft financing, coming from markets having further specialized and deepened their underwriting know-how in these areas. **Project financing for the offshore wind sector** is one such example and we refer you to the **Offshore Wind case study described below**.

5. Berne Union, International Union of Credit and Investment Insurers, Industry Report 2019 H1



## OFFSHORE WIND FINANCE CASE STUDY – UK WIND1 ~900MW UK Offshore wind farm



### PROJECT OVERVIEW

UK Wind1 is a consented UK offshore wind farm; located off the coast of Lincolnshire and north Norfolk. The senior secured project finance facility was ~GBP 2 billion with a 4-year construction tenor and a 15-year repayment period.

The project will comprise up to 90 - 9.5MW wind turbines provided by a market leading turbine manufacturer, with a total installed capacity of up to 900MW. Electricity generated will be transmitted through 66kV subsea array cables and linked to the two offshore substation platforms. These will be connected to the grid via 220kV offshore export cables.

The project sponsor is a leading German energy company with a financial strength rating of BBB. The sponsor has a market cap of USD 30 billion and a successful track record in renewables, having been operating offshore since 2004.

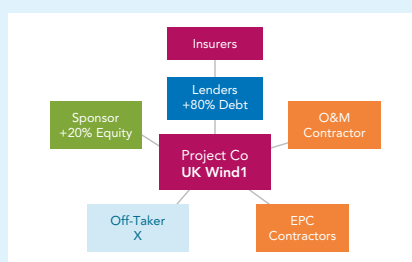
In 2017, the project was awarded a 15-year Contract for Difference in the UK. The resultant impact is the generating assets will benefit from a GBP 75/MWh certain offtake price (backed by the UK government) under the Power Purchase Agreement (PPA) for the full repayment period.

The project offtaker will be an Integrated Danish Energy company with a financial strength rating of BBB+ for 100% of the output for the life of the policy under

a long-term Power Purchase Agreement.

### CONTRACT STRUCTURE

The project is sized on a circa 80% debt to 20% equity ratio. The primary senior debt facilities will be used to fund construction of the Generation Assets and the Transmission Assets. The debt is secured over all material project contracts and assets. Insurers sit behind the lenders providing a comprehensive non-payment product.



### KEY RISKS AND MITIGANTS

**Construction:** Tight budget and timeline given complex multi-contract structure.

- ◆ The Sponsor has significant experience in construction management and has successfully implemented a multi-contracting approach on their offshore projects in Europe.
- ◆ Robust contractual provisions, including fixed prices and delay liquidated damages. In addition, the project benefits from CAR, OAR, DSU and BI insurance.

**Operating Risk:** Unscheduled repairs or maintenance reduce availability of Wind Turbine Generators (WTG).

- ◆ The turbine manufacturer is an established and proven supplier of offshore turbines, being the largest WTG supplier in the world in terms of cumulative installation.
- ◆ The turbine manufacturer provides a yield-based availability warranty of 94%.

**Regulatory:** Changes and amendments to the CfD Strike Price could lead to reduced revenue.

- ◆ The CfD regime is fully implemented in UK national law and would remain in force irrespective of an EU Withdrawal.

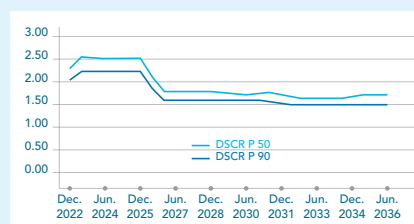
### KEY PROJECT STRENGTHS

**Regulatory Regime:** Strong regulatory regime under the UK's EU-approved Contract for Difference ("CfD") scheme eliminates merchant risk for the Project.

**Sponsor:** Strong experience and track record - they have successfully delivered comparable projects with an installed capacity of more than 900 MW in offshore wind and over 1,900 MW in onshore wind.

**Offtaker:** OfftakerX will be contracted to offtake 100% of UK Wind1 generation under the PPA. OfftakerX is one of the largest companies in the offshore wind sector and a top tier player.

**Cash Flows:** The economics of the project are robust, with a minimum Debt Service Coverage ratio (DSCR) of over 1.50x in the base case P90 analysis. This represents the senior debt comfortably being fully repaid within maturity. Its contract for difference level compares favourably with a strike price of GBP 75/MWh to other projects of the same auction round.



Debt Service Coverage Ratio profile

As mentioned in the last section, it is interesting to note that there is an increasing trend for banks to cede risks in the non-trade category (e.g. working capital loans, general purpose loans etc.). While such transactions can be underwritten profitably, offering a source of diversification including underlying tenors as well as security and industry, they clearly require a great deal of scrutiny to avoid anti-selection. This scrutiny should address

the alignment of interests between banks and (re)insurers, as well as the motivation and long-term strategy of the bank ceding those risks to the insurance market. Some of the bank's motivations in this regard can be summarized as follows:

- ◆ capital management;
- ◆ insurer being a non-competitive partner (as opposed to syndication in capital markets);

- ♦ no “mark to market” using insurance to hedge risk;
- ♦ risk diversification across obligor names, industries and geographies.

To close this section, we would like to highlight the fact that SCOR’s P&C Business Unit supports this line of business, both on the primary insurance side within its Specialty Insurance division and on the reinsurance treaty side within its Reinsurance division through the Credit, Surety and Political Risk Global Line

underwriting team in Asia, America & Europe. The Credit, Surety and Political Risk portfolio accounts for around 8% of SCOR Global P&C’s 2020 reinsurance premiums (as at January 1, 2020) with single and political risk treaty reinsurance representing 17% of that 8%.

The direct team is focused on single and political risk business and makes up 8% of SCOR Specialty Insurance’s direct premiums.

## AN ACTUARIAL APPROACH TO PRICING SINGLE AND POLITICAL RISK (RE)INSURANCE

In this section, we outline an actuarial approach to pricing single and political risk (re)insurance.

In the previous section we presented the political risk mostly covered: CEND, CI, PV, NH and DC. Please note that for pricing purposes, DC is split into CR and CF in order to make the distinction between Commercial Risk (CR) and Country Risk (CF) components.

The purpose of pricing is to generate the Loss Distribution (LD) of a given Portfolio P covering N transactions  $T_i$ .

Our pricing methodology is a two-step process:



In this newsletter, we focus on Step 1: the calculation of a Loss Distribution for each portfolio transaction.

### SINGLE RISK PRICING – GENERAL COMMENTS

Pricing a single and political risk treaty requires a certain amount of information about all the transactions  $T_i$  covered in the portfolio P.

A transaction  $T_i$  covering political risks is characterized by numerous elements, but the minimum required information to determine the Loss Distribution of a portfolio is as follows:

- ♦ the debtor (or obligor) and country(ies) when CR/ CF or NH are covered;
- ♦ country(ies) in case PV and/or CEND and/or CI are covered;
- ♦ limit L per peril;
- ♦ the maximum (total) limit of the transaction;
- ♦ the duration of the transaction.

All this information is summarized in the following table:

Transaction	Obligor	Country	CR	CF	NH	PV	CEND	CI	Maximum limit	Duration
$T_i$	Obligor $O(T_i)$	Country $C(T_i)$	$L(CR;T_i)$	$L(CF;T_i)$	$L(NH;T_i)$	$L(PV;T_i)$	$L(CEND;T_i)$	$L(CI;T_i)$	$L(T_i)$	$D(T_i)$

First of all we need to determine the Loss Distribution  $LD(T_i)$  for each transaction  $T_i$ . Considering the perils covered, we must assign parameters to each.



$$V = \pi r^2 \times h$$

$$\sum_{\lambda=(n-p+1)}^n \sin(3\pi^2 + \alpha) = -\cos\alpha$$

$$||\underline{u}|| = \sqrt{(u_1)^2 + (u^2)^2}$$

## ESTIMATION OF THE LOSS DISTRIBUTION FOR A TRANSACTION $T_i$

For each transaction  $T_i$ , the Loss Distribution is a function of 3 components:

### The frequency

- Estimated using the Probability of Claim (PoC)
- PoC = Probability of occurrence of a covered risk, due to a debtor default or a political event

### The severity

- Corresponds to the amount of loss associated with a claim - the Loss Given Claim (LGC), and can be expressed as a percentage of the underlying sum insured
- The LGC distributions depend on each peril and also vary per cedant (recoveries, type of transaction, etc.)

### The exposure

- Quantifies the extent to which the insurer is exposed to risk
- Can be different for each peril covered in the transaction

For each transaction  $T_i$ , the Loss Distribution  $LD(T_i)$  is:

$$LD(T_i) = f(\text{PoC}(T_i), \text{LGC}(T_i), L(T_i))$$

Next, we define for each risk  $j \in \{\text{CR, CF, NH, PV, CEND, CI}\}$  of a Transaction  $T_i$ :

- $L(j, T_i)$  = limit of the transaction  $T_i$  for the risk  $j$
- $\text{PoC}(j, T_i)$  = Probability of Claim  $j$  in the country(ies) where  $T_i$  is realized (frequency trigger)
- $\text{LGC}(j, T_i)$  = Loss Given Claim of the risk  $j$  in the country(ies) where  $T_i$  is realized (severity trigger)
- $L(T_i)$  = total limit of the transaction

In all cases, for each peril  $j$  of each transaction  $T_i$ , a PoC and an LGC must be assigned, considering that:

- The main drivers of each risk are:
  - Obligor for CR and NH. However, for NH, as obligors are public entities (sovereign, sub-sovereign or sovereign owned entities), the country can be considered as the main driver when no relevant information is available on the obligor
  - Country(ies) for CF, PV, CEND, and CI
- Each risk  $j \in \{\text{CR, CF, NH, PV, CEND, CI}\}$  of each country / obligor has its own limit  $L(j, T_i)$ , its own  $\text{PoC}(j, T_i)$ , and its own  $\text{LGC}(j, T_i)$
- The limits per risk  $L(j, T_i)$  can be cumulated, but cannot be higher than the maximum limit of the transaction  $L(T_i)$ . In other words,  $\sum_{j \in \{\text{CR, CF, NH, PV, CEND, CI}\}} L(j, T_i) \leq L(T_i)$
- $\text{PoC}(T_i)$  is linked to  $\text{PoC}(j, T_i)$ ,  $j \in \{\text{CR, CF, NH, PV, CEND, CI}\}$
- $\text{LGC}(T_i)$  is linked to  $\text{LGC}(j, T_i)$ ,  $j \in \{\text{CR, CF, NH, PV, CEND, CI}\}$

Hence each transaction  $T_i$  is associated with the following parameters:

Transaction	Obligor	Country	CR	CF	NH	PV	CEND	CI	Maximum limit	Duration
$T_i$	Obligor $O(T_i)$	Country $C(T_i)$	$L(\text{CR}; T_i)$	$L(\text{CF}; T_i)$	$L(\text{NH}; T_i)$	$L(\text{PV}; T_i)$	$L(\text{CEND}; T_i)$	$L(\text{CI}; T_i)$	$L(T_i)$	$D(T_i)$
			$\text{PoC}_{O(T_i)}$	$\text{PoC}_{\text{CF}, C(T_i)}$	$\text{PoC}_{\text{NH}, C(T_i)}$	$\text{PoC}_{\text{PV}, C(T_i)}$	$\text{PoC}_{\text{CEND}, C(T_i)}$	$\text{PoC}_{\text{CI}, C(T_i)}$		
			$\text{LGC}_{\text{CR}}$	$\text{LGC}_{\text{CF}, C(T_i)}$	$\text{LGC}_{\text{NH}, C(T_i)}$	$\text{LGC}_{\text{PV}, C(T_i)}$	$\text{LGC}_{\text{CEND}, C(T_i)}$	$\text{LGC}_{\text{CI}, C(T_i)}$		

We redefine  $LD(T_i)$  as:

$$LD(T_i) = \min(\sum_j 1_{\text{PoC}(j, T_i)} \times \text{LGC}(j, T_i) \times L(j, T_i); L(T_i)), j \in \{\text{CR, CF, NH, PV, CEND, CI}\}$$

Finally, via Monte Carlo simulations, we generate  $LD(T_i)$  for each transaction  $T_i$  of the portfolio covered, using:

- Bernoulli distributions for the respective  $\text{PoC}(j, T_i)$
- Beta distributions for the respective  $\text{LGC}(j, T_i)$

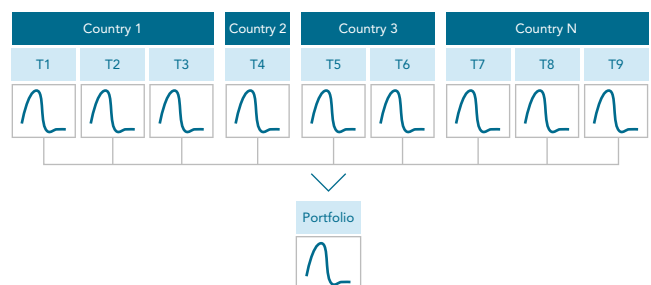
and we obtain a Loss Distribution for each transaction  $T_i$  of the portfolio.

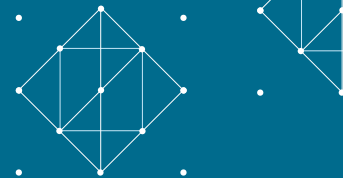
The next step is then to aggregate all the Loss Distributions to arrive at the Loss Distribution of the portfolio, introducing some dependencies.

As several transactions  $T_i$  can be realized in the same country, dependencies inside a given country should be considered. It is also necessary to consider country risk dependencies. For

these reasons, a specific methodology has been developed to introduce and capture those dependencies in the determination of the final loss distribution of a given portfolio.

### Transactions





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