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25 May 2015

Online at <https://mpra.ub.uni-muenchen.de/64559/>

MPRA Paper No. 64559, posted 25 May 2015 13:32 UTC

# How to model the impact of political risk

## Working Paper

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*In this paper the impact of political risk is model through the quantification of the decline in the (net) present value of cash flows due to the occurrence of a political event.*

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**May 2015**

## I. Introduction

Broad definition of political risk include: an unwanted government interference with business; the probability of disruption of the operations of multinational enterprises by political forces or events; and discontinuities in the business environment deriving from political change, which have the potential to affect the profits or the objectives of a firm (Schachter, 1998).

Particularly, for the insurance industry, coverage of political risk is given to: currency inconvertibility and transfer restriction; expropriation and other forms of unlawful government interference; war, terrorism, and civil disturbance; and breach of contract.<sup>1</sup>

Political risk indexes (i.e PRS Group<sup>2</sup>) and political risk maps (i.e AON<sup>3</sup>) can also be found in the web.

For the context of this document, political risk is understood as the occurrence of a political event which have a negative impact on future cash flows.

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<sup>1</sup> Visit [www.miga.org](http://www.miga.org) or [www.opic.gov](http://www.opic.gov) for further information.

<sup>2</sup> See [www.prsgroup.com/category/risk-index](http://www.prsgroup.com/category/risk-index).

<sup>3</sup> See [www.aon.com/2015politicalriskmap/](http://www.aon.com/2015politicalriskmap/)

Political events can be categorized between macro political risk, when economic, society and/or government related factor affects all or most firms within the host country, and micro political risk when the event only affects select industries, firms, or projects. Macro and micro political risks overlap, sharing some of the same determinants (Alon, I. and Herbert, T., 2009).

## II. Political Risk Modeling

Similar to Polednáková (2002) the impact of political risk is model through the quantification of the decline in the (net) present value of cash flows due to the occurrence of a political event.

### II.1. Political Risk Impact

The net present value of a project is given by:

$$-I_0 + \sum_{t=1}^n \frac{CF_t}{(1+r)^t} \quad (1)$$

-  $I_0$  is the initial investment,

$CF_t$  is the future value of cash flow during the period  $t$ ,

$r$  represents the discount rate,

$t$  is the year that the future cash flow occurs,

$n$  is the total number of years of the evaluation period.

As an example, let's assume initial investment of US\$1 million, a 5 year testing period with annual cash flow of US\$500,000, and a 20% discount rate. Next table summarize the net present value of cash flows:

Year	0	1	2	3	4	5
Cash Flow	(1,000,000)	500,000	500,000	500,000	500,000	500,000
Present Value	(1,000,000)	416,667	347,222	289,352	241,127	200,939
<b>Net Present Value</b>	<b>495,306</b>					

If a political event occur at the end of year  $h$ , then the net present value of cash flows will fall to:

$$-I_0 + \sum_{t=1}^h \frac{CF_t}{(1+r)^t} + \sum_{t=h+1}^n \frac{CF'_t}{(1+r)^t} \quad (2)$$

where  $CF'_t < CF_t$

Continuing with the previous example, let's assume that at the end of year 2 new party will gain election and a campaign promise of increase tax duties will materialize, decreasing future cash flows in 20%. Next table summarize the net present value of cash flows if that political event occur:

Year	0	1	2	3	4	5
Cash Flow	(1,000,000)	500,000	500,000	400,000	400,000	400,000
Present Value	(1,000,000)	416,667	347,222	231,481	192,901	160,751
<b>Net Present Value</b>	<b>349,023</b>					

The impact of the political risk will be define as the difference between the net present value of the cash flows without presence of the political event and net present value of the cash flows with the existence of the political event, then equation (1) minus equation (2) is:

$$\sum_{t=h+1}^n \frac{CF_t - CF'_t}{(1+r)^t} \quad (3)$$

For the used example, the impact of the political risk will be US\$146,283 (US\$495,306 – US\$349,023) as it's also presented in the following table:

Year	0	1	2	3	4	5
Cash Flow				100,000	100,000	100,000
Present Value				57,870	48,225	40,188
<b>Net Present Value</b>	<b>146,283</b>					

## II.2. Expected Political Risk Impact

Political risk event follows a Bernoulli distribution, it take place or it doesn't take place.

Therefore the expected impact of political risk is given by:

$$p^* \sum_{t=h+1}^n \frac{CF_t - CF'_t}{(1+r)^t}$$

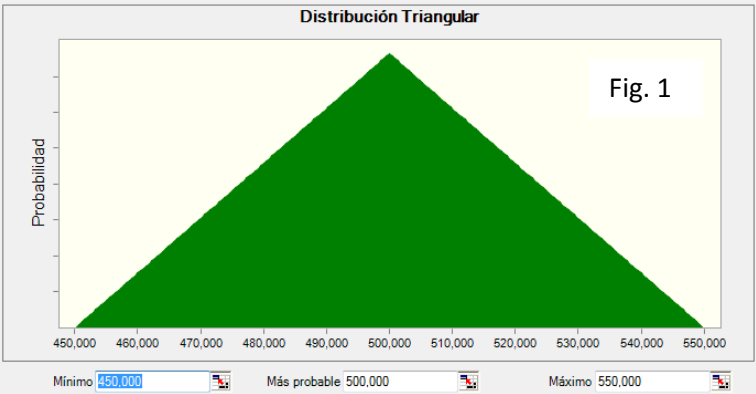
where  $p$  is the probability of occurrence of the political event.

Following original example, let's assume that the political event at the end of year 2 that new party will gain election an increase tax duties is 70%, then the expected impact of the political risk will be US\$102,398 (US\$146,283\*70%).

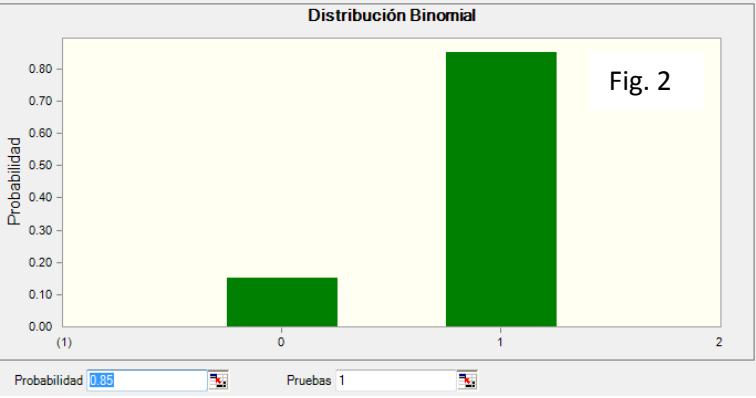
### II.2.1 Political Risk Impact Simulations

We can use Oracle Crystal Ball software to generate Monte Carlo simulations of the cash flows and for the political risk event.

Let's assume that annual cash flow of the original example follows a triangular distribution, as enclosed figure 1 depicts.



Let's assume that political event, expropriation, follows a binomial distribution with  $n=1$ <sup>4</sup>, with an 85% probability of occurrence<sup>5</sup> as enclosed figure 2 depicts.



Suppose that at the end of year 3 expropriation take place, without any compensation, Next table summarize the net present value of cash flows if that political event occur:

Year	0	1	2	3	4	5
Cash Flow	(1,000,000)	500,000	500,000	500,000		
Present Value	(1,000,000)	416,667	347,222	289,352		
<b>Net Present Value</b>	<b>53,241</b>					

<sup>4</sup> Bernoulli distribution is the special case of the binomial distribution where  $n = 1$ .

<sup>5</sup> Alliant's ratings & indices use a 100 point scale reflecting the probability of a specific risk event resulting in a business loss over 5 years.

At 2013 Venezuela registered for Expropriation, Regulatory & Legal a high risk value of 18.29 which is in the scale of probability of 80%>90%.



Applying Monte Carlo simulation, 10,000 trial, the expected impact of the political risk was US\$374,184, as can be seen in next figure:

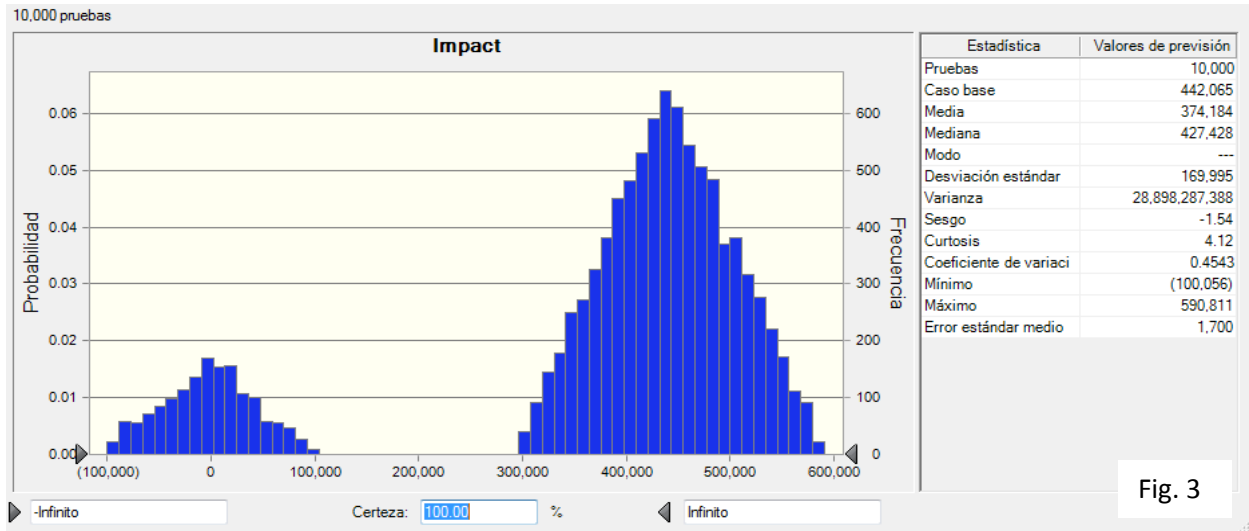


Fig. 3

### III. Conclusions

Risk managers can identify key political risks, measure their potential impact on performance, and determine the best method to manage them. In the measurement stage, armed with a very specific set of political risk scenarios, risk managers assess and quantify the impact of each scenario on the business. Discounted cash flow analysis can be used, for example, to estimate the financial impact of specific events (Accenture, 2012).

This document has provided a methodology description of how to apply the discounted cash flow analysis to measure impact of a political event.

## References

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