

# Three Common Rating Pitfalls Found in Underwriters' Benchmarking Models

In this report I will present solutions to three common pitfalls I have found time and again while developing or enhancing benchmarking or rating models for London Market underwriters.

These are only three of the most common pitfalls I have found. I have compiled a longer list of examples both in insurance and reinsurance pricing, which is available in the research and development section of my website [www.matblas.com](http://www.matblas.com).

## Pitfall #1: Basic algebra for rate monitoring

What follows is an example taken from rate monitoring tools that had been used by London Market underwriters. The convention is that a negative % reflects better terms while a positive % reflects broader terms.

The insured had disposed of some operations and thus sought to reduce his limit. This is the result given by the rate monitoring tool:

	Expiring	Renewal	% Change
Premium	950,000	750,000	-21.05% (1)
Exposure Base	150,000,000	60,000,000	-60.00% (2)
Limit	25,000,000	10,000,000	-35.00% (3)
Attachment	10,000,000	10,000,000	0.00% (4)
Deductible	500,000	500,000	0.00% (5)
Terms and Conditions			-10.00% (6)
Total changes			-105.00% (7)
Effective rate change			-1678.95% (8)

(7) = (2)+(3)+(4)+(5)+(6)  
 (8) = (1+(7))/(1+(7))-1

Underwriters rightly expected to see a rate increase, but why was the model producing such large rate reduction? The % changes had been added together in (7) to estimate a total change in terms and conditions when they should have been multiplied.

In case you are wondering, the right answer is:

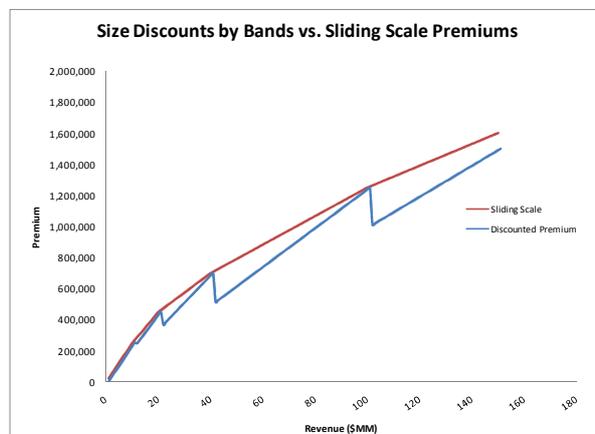
$$\text{Rate Change} = \frac{1 - .2105}{((1 - 0.6) * (1 - 0.35) * (1 - 0.1))} - 1 = 237.4\%$$

**Remember:** if you multiply the rating factors to calculate the premium, you should also multiply to calculate the rate change.

## Pitfall #2: The rationale of size discounts

Size discounts reflect underwriters' view that an increase in exposure base does not represent a proportional increase in expected losses.

The most common approach is to apply an overall premium discount depending on which size band the risk's turnover falls into. This approach produces premium reversals. In other words, as the turnover increases the premium decreases. The following chart speaks for itself!



Size discounts are ok if applied correctly. The right way to apply size discounts is to discount the rate for each additional million or unit of turnover, instead of an overall premium discount. This is most commonly known as a sliding scale.

## Pitfall #3: Should quoting in different currencies affect the final price?

It is increasingly common for companies to purchase their insurance coverage in a different currency, usually stronger, to the currency of their country of domicile. However, benchmark tools rarely have what I call a base currency and thus rates and ILFs are "currency neutral".

For example, assume the basic limit is 1MM and the base rate is 3%. An insured in India has INR 800MM of turnover, and is seeking quotes for GBP 5MM, UDS 10MM or EUR 7MM. Note that with exchange rates of INR 80 = GBP 1 = USD 2 = EUR 1.4, these limits are equivalent.

The benchmark model produces the following premiums:

Limit	ILF		FX to GBP	1.00	2.00	1.40
			Quoting Currency	GBP	USD	EUR
1,000,000	1.0000		Exposure	£10,000,000	\$20,000,000	€ 14,000,000
5,000,000	2.2361		Limit	£5,000,000	\$10,000,000	€ 7,000,000
7,000,000	2.6458		Premium Quoting Currency	£670,820	€1,897,367	€1,111,216
10,000,000	3.1623		Premium Original Currency	INR 53,665,631	INR 75,894,664	INR 63,498,031

Note that because the ILFs do not take into account currencies, the insured benefits from a better premium by buying insurance in a stronger currency. Having the option to buy insurance in any currency should not affect the final premium.

This inconsistency is simply resolved by deciding upfront what the base currency is for the benchmark model. This could be the prevailing currency in the portfolio, for example USD or GBP. All input factors are converted to the base currency, the risk is rated in this currency and at the end of the rating process the premium is converted to the quoting currency.

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