

Briefing

ANNalytica™ Visualisation

RISK | PENSIONS | INVESTMENT | **INSURANCE**



Developed specifically for the insurance market, **ANNalytica™** is a visualisation and reporting platform used for analysing the output of stochastic models. Communication of complex and highly technical work remains a challenge that visualisation can help overcome. This briefing note will show how **ANNalytica™** can be used to visualise data.

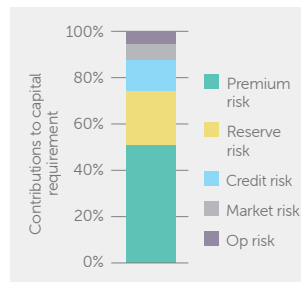
Risk ranking - contribution to capital

Tables can summarise a lot of information but miss the full picture and do not highlight important points.

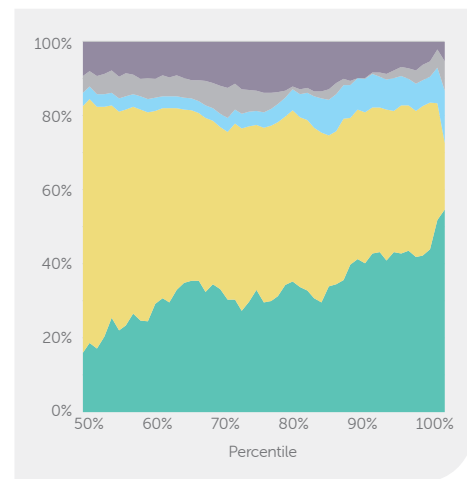
Consider the following capital allocation table:

Risk category	1 in 200
Premium risk	51.1%
Reserve risk	23.0%
Credit risk	13.4%
Market risk	7.0%
Op risk	5.5%

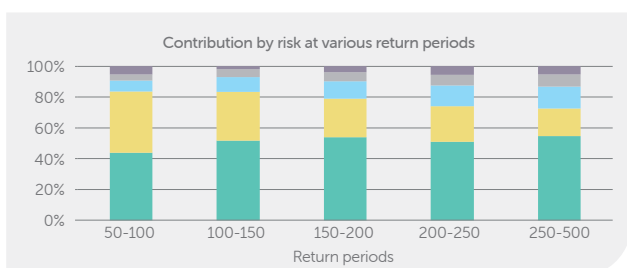
The information in the table can be represented in a stack chart in ANNalytica™:



An extension is shown below which completes the whole story.



In comparison to the table, the stack chart shows the mix in a more impactful way. We see instantly the sum is 100% and that premium risk is the key driver. We can take this further and show stack charts at multiple return periods.



A reviewer may notice the market risk (light grey) seems to disappear at certain percentiles. This could be a feature, or a validation finding, which was hidden in the charts above. ANNalytica™ has taken us a long way from our original table which would just be one vertical line at the 99.5th percentile in the continuous chart above.

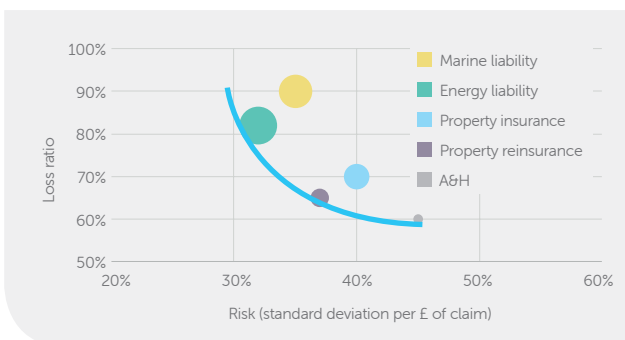
ANNalytica™ can also present our risk ranking in a different way altogether - using a sunburst chart:



In an instant, the reviewer is able to assess what the key contributors to the overall capital number are. ANNalytica™ allows you to drill down further into each sub-risk on this chart and also further subdivisions of each of the sub risk types in a dynamic way. Furthermore, you are able to select from a range of capital allocation routines at any percentile.

Risk and reward

Bubble charts are a useful way of visualising data. Consider a business with five classes or income streams. In the ANNalytica™ chart below, the bubble size represents the exposure to the income stream. In this example we use Gross Written Premium. Some 70% is between marine and energy liability and roughly 30% is across property. We want to consider this split against a measure of risk (say, standard deviation) and a measure of return (say, expected loss ratio).



The chart shows that Property and A&H (Accident & Health) are relatively more risky and also more profitable. This stands to reason as you expect a greater return when taking on more risk. The blue line shows a possible efficient frontier; i.e. the business we want to write where there is low risk and high reward.

ANNalytica™ enables the user to review any variations to the expected returns, measure of risk or exposure measure. The chart below shows one possible variation, using the VaR as the risk metric:



The standard deviation chart showed that Property and A&H were relatively more risky than the others, and more profitable, which we thought stood to reason. Conversely, this chart shows that the liability classes are more risky and less profitable!

With ANNalytica™ being able to dynamically change the measures to the user's need, we are able to reach a view that is consistent with how we define the performance indicators of our business.

Model fitting and back testing

Imagine we've performed back testing and want to assess whether the model has been good at predicting the historical data. Will we get engagement from the key stakeholders if we show them this?

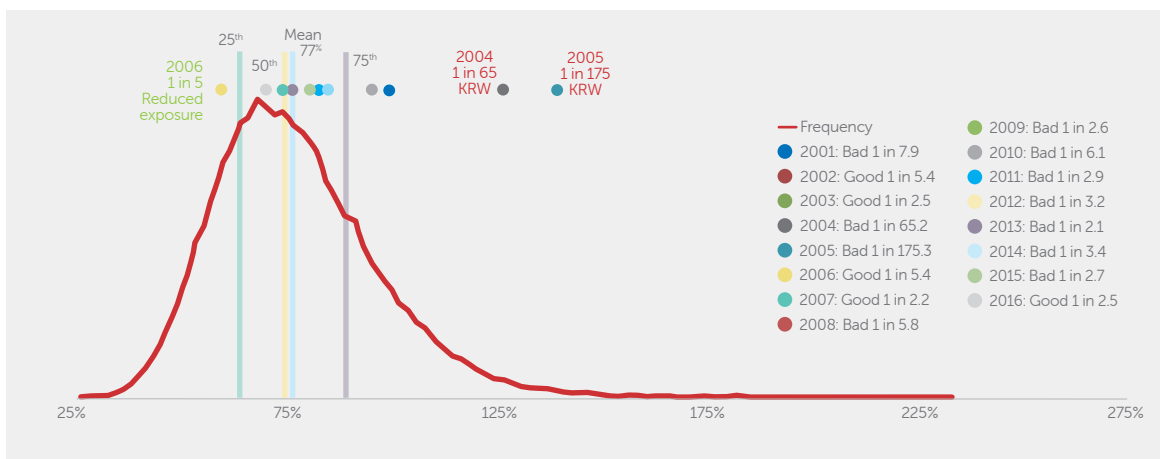
UWY	GNLR	Percentile	Return period
2001	99%	87.4%	1 in 7.9
2002	60%	18.5%	1 in 5.4
2003	70%	39.7%	1 in 2.5
2004	127%	98.5%	1 in 65.2
2005	140%	99.4%	1 in 175.3
2006	60%	18.5%	1 in 5.4
2007	73%	46.3%	1 in 2.2
2008	94%	82.6%	1 in 5.8
2009	80%	61.1%	1 in 2.6
20010	95%	83.7%	1 in 6.1
2011	82%	65.1%	1 in 2.9
2012	84%	68.7%	1 in 3.2
2013	76%	53.0%	1 in 2.1
2014	85%	70.4%	1 in 3.4
2015	81%	63.1%	1 in 2.7
2016	70%	39.7%	1 in 2.5

Why ANNalytica™?

Overcoming visualisation challenges will allow you more time in assessing why things behave the way they do. ANNalytica™ can quickly and efficiently provide insight into complex data, making it more interesting and easier to process. You are able to present results in seconds, on the fly and in important meetings. ANNalytica™ is a powerful tool for effectively communicating our often complex messages to a wide range of stakeholders.

For more information and to request a demonstration, please visit our [website](#).

ANNalytica™ can take the table and transform it into a distribution with our results plotted, as shown in the chart below. We can clearly see that two years are outliers, 2004 and 2005, and that there are generally more bad years than good years. The chart enables us to consider quickly if the model is a good predictor.



Please contact your Barnett Waddingham consultant if you would like to discuss any of the above topics in more detail. Alternatively get in touch via the following:

✉ annalytica@barnett-waddingham.co.uk

☎ 0333 11 11 222

www.barnett-waddingham.co.uk/annalytica

Barnett Waddingham LLP is a body corporate with members to whom we refer as "partners". A list of members can be inspected at the registered office. Barnett Waddingham LLP (OC307678), BW SIPP LLP (OC322417), and Barnett Waddingham Actuaries and Consultants Limited (06498431) are registered in England and Wales with their registered office at 2 London Wall Place, London, EC2Y 5AU. Barnett Waddingham LLP is authorised and regulated by the Financial Conduct Authority and is licensed by the Institute and Faculty of Actuaries for a range of investment business activities. BW SIPP LLP is authorised and regulated by the Financial Conduct Authority. Barnett Waddingham Actuaries and Consultants Limited is licensed by the Institute and Faculty of Actuaries in respect of a range of investment business activities.