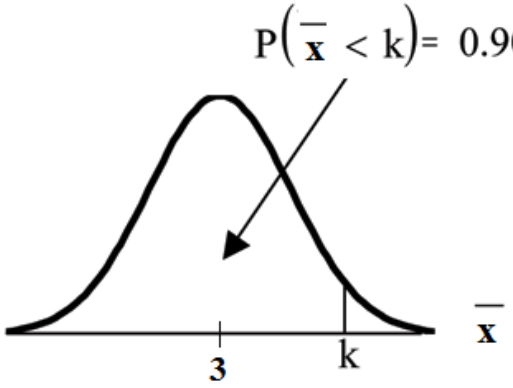
Distributed -v- Consolidated Contingencies
The power of Portfolios

Distributed contingencies are normal in most aspects of project management but often result in sub-optimal use of resources. Typical examples include allowing some safety margin in each CPM duration estimate (eg, setting the durations at an 80% probability), allowing contingencies on a project by project basis for risk, setting budgets with a 90% confidence limit, etc. A better approach may be to build one contingency, similar to the way Critical Chain accumulates all of the 'safety margin' needed for the activities in a 'chain' into one buffer at the end[1].

Let's look at a simple budgeting exercise.

You have 10 teams working on your project and they all estimate completing their section of the work for between $8,000 and $12,000; with the expected average of $10,000 per team. As the PM, you can aggregate these estimates to arrive at a project budget of $100,000 (*I said this was a simple example*…).

However, your team leaders are unlikely to submit an estimate which has only got a 50% chance of being achieved, let's assume we use the 90% probability benchmark common in oil and gas projects…



To achieve a 90% probability of being achieved, each team's estimate will need to be increased to around $11,300 (assuming a normal distribution); this pushes the project budget up to $113,000. How much safety does this give the project manager??

The answer is a surprising 99.998% probability of not exceeding the overall project budget[2]!

---

1 For more on ***critical chain*** see: https://mosaicprojects.com.au/WhitePapers/WP1050_Critical_Chain.pdf

2 The mathematics to derive these values require the use of a calculator of specialist software. One option is at: http://onlinestatbook.com/2/calculators/normal_dist.html

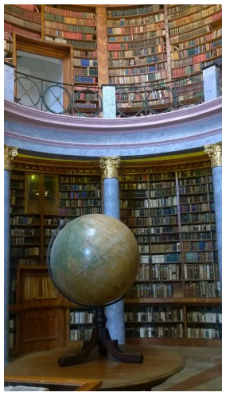
The reason for this is the effect of combining uncertainties into a 'portfolio' is to reduce the overall level of uncertainty in the portfolio; basically, wins on the 'financial swings' can be used to offset losses on the 'financial roundabouts' generating an increase in the overall probability of achieving any given target for the portfolio[3].

So, if your project needs to achieve a 90% certainty overall, the correct budget is around $104,000, not the $113,000 calculated by summing all of the teams '90% estimates'. The extra $9,000 is wasted capital tied up unnecessarily.

The problem compounds when all of the projects in an organisation are wrapped into a portfolio, and the portfolio is wrapped into an overall business budget! The amount of money, time, etc embedded unnecessarily in contingencies can be frightening.

The mathematics of probability are quite daunting (and may not be really needed) you can by-pass the problem by developing 'Critical Chain' type processes that overtly move cost and time contingencies into one overall buffer. Then in the same way most 'Critical Chain' schedules finish with un-used buffer time you may find your projects achieving surprising results!

However, caution is needed – applying statistical processes to a one-off, unique entity such as a project is always risky in itself; if you want to understand more on this topic without doing a MBA, ***The flaw of averages*** by Sam L. Savage, is a good starting point: http://www.flawofaverages.com.



[3] The concept of swings and roundabouts works with money (savings on one part of the project can be used to offset loss on another, the same effect cannot be transferred to time, see: https://mosaicprojects.com.au/Mag_Articles/P011_Risks_dont_add_up.pdf