

Risk vs Uncertainty: What's the difference

Excerpt from book manuscript under preparation

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The terms “risk” and “uncertainty” are used with many different meanings. In particular, common usage varies in different field. For instance, the words carry quite different connotations for public health officials, for financial investors, for experimental scientists — and for teenagers throwing a party when parents are out of town! Even in management science, decision theory, economics, and the profession of risk management, formal definitions and unspoken connotations vary.

Over the years, I've settled in on pragmatic definitions that work reasonably well for companies and their employees navigating an unpredictable, possibly surprising future. Before I state them, I'll first explore some of the commonly-held (but rarely explicitly stated) distinctions and comment how they sometimes lead us astray.

Thoughtful generalist dictionaries define “uncertainty” quite broadly. For instance, Merriam-Webster suggests “indeterminate”, “not certain to occur”, “untrustworthy”, “doubtful”, “dubious”, and “variable” all as possible definitions or synonyms for “uncertain”. This captures common usage that uncertainty occurs in many different ways. In contrast, dictionary definitions for “risk” are much more concrete, such as “possibility of loss or injury” or “someone or something that creates...a hazard”. (I'm skipping clearly specialized definitions like “volatility of investment returns”). Douglas Hubbard (*How to Measure Anything*¹) has synthesized this distinction with a business/management framing as follows. According to him, uncertainty is “the lack of certainty; a state of having limited knowledge where it is impossible to exactly describe the existing state, a future outcome, or more than one possible outcome”. Risk is “a state of uncertainty where some possible outcomes have an undesired effect or

¹ Hubbard, Douglas W. (2010). *How to measure anything: finding the value of "intangibles" in business*. Hoboken, N.J.: Wiley.

significant loss.”

There’s a clear connotation here that risks are bad. While in line with common usage, this turns out to be unhelpful in business management. Clouds have silver linings. What’s more, the ratio of grey cloud to silver lining can often be proactively changed; this is the goal of risk management. Furthermore, a nasty surprise for one company may be an opportunity for others in its business ecosystem, for instance its competitors, or even suppliers or customers in negotiations. Finally, many surprises just mean life will be different than expected, and it can be quite challenging to figure out whether there might be more upside or downside. Even the old bromide, “there is no reward without risk”, while assuming a risk is likely to be negative, implies that risk-*taking* isn’t always a bad idea. The bottom line is that even if your overall goal is to manage “downside risks” only, you need to broaden the category to allow risks to have opportunity and upside. It’s like negative numbers: most of the time we measure something, we expect and assume the numbers will be positive. But if you’re doing any sort of comparisons or adjustments, sooner or later you will start subtracting numbers, and you need to expand your “numbers” category to include negative ones. (Of course, cynics have accused the risk management profession of growing the “risk” to also include opportunities/upside as a power grab, or at least a way to make their home turf larger and more exciting. I think that criticism is overblown — but I have rolled my eyes at how often risk professionals, with glee in their eyes, point out to anyone who will listen, that the Chinese symbol for “risk” is an amalgam of the symbols for “danger” and “opportunity”.)

A very different distinction comes from Frank Knight, one of the founders of the Chicago School of economics. He wrote in 1921, “The essential fact is that 'risk' means ...a quantity susceptible of measurement... A measurable uncertainty, or 'risk' proper, as we shall use the term, is so far different from an unmeasurable one that it is not in effect an uncertainty at all.”² For Knight, risk is measurable, and ‘true’ uncertainty is what is left, the unmeasurable and unknowable stuff.

Knight’s distinction was an important and pragmatic one, allowing a field of decision

² Knight, F. H. (1921) Risk, Uncertainty, and Profit. Boston, MA: Hart, Schaffner & Marx; Houghton Mifflin Company

science to develop and flourish in a walled garden of quantifiability. Unfortunately, his distinction has also turned out to be actively harmful. Risk practitioners have felt implicitly entitled as a result to focus on what they could measure, and shrug their shoulders at what they could not. This was a crucial contributing³ cause to the financial crisis of 2008-2009: financial institutions were laid low by risks—oops, I mean uncertainties—they could not measure. Their risk management processes felt entitled to silently ignore them, after all they were not Knightian risks. Meanwhile the common person in the streets (or in government or in the boardroom) felt comfortable that their much broader concept of “risk” was being so scientifically quantified. The bottom line is that while there is great benefit to quantifying a certain universe of known, parametrized risks well, it’s too dangerous to form a pact wherein we say our green pastures are safe since we’ve erected a little fence and all the dangerous monsters live behind it, not really “risks”.

I’m being a bit too savage for dramatic effect in the above critique. The concept of risk has evolved over time, a fascinating story Peter Bernstein has told very readably in his book, *Against the Gods*⁴. Terminology has followed this evolution. In particular, the risk management profession, as an independent member of the management science pantheon, has for some time been broadening its remit. For instance, the 2004 COSO industry framework for Enterprise Risk Management (ERM) includes in scope all “potential events that may affect the entity”. The more recent (and in my opinion more useful) ISO 31000:2009 standard defines risk as “the effect of uncertainty on objectives”, where effect is negative or positive. This has generated some debate due to its focus on the effect (versus the event), but in my opinion it is the clear focus on “objectives” which is most important.

With all that in mind, here are my own definitions. The “uncertainty” one simplifies Hubbard, while the “risk” one slightly broadens (and de-jargonizes) the ISO 31000 one.

Uncertainty is a state of having limited knowledge, making it impossible to fully describe the current state and meaningfully predict future evolution. Uncertainty also refers to any specific factor about which one has such limited knowledge, therefore putting one into the

³ Of course, as with any such event, there is a rich rogue’s gallery of “root causes” to choose from.

⁴ Bernstein, P. L. (1996). *Against the gods: The remarkable story of risk*. New York: John Wiley & Sons.

state of uncertainty. Use of the word “uncertainty” unlocks the toolkit of decision theory and related fields, in order to do a better job predicting the future and/or making decisions that will yield good outcomes under a range of different futures. Uncertainty carries no connotations of whether the result might be good or bad.

A *risk* is an uncertainty framed as the (potential) deviation from expected future evolution, therefore affecting the achievements of one’s objectives which assumed the expected future evolution. Risk is always *to* something, namely as a deviation from the expected, base-case future trajectory. Use of the word “risk” unlocks the toolkit of risk management, to identify, assess, evaluate, mitigate or otherwise treat, and monitor such potential deviations. This toolkit is useful primarily when there is concern achievement of objectives be impaired — “at risk”. If the downside is not important, different toolkits, for instance “opportunity capture”, are more useful. But risks can have both a downside and an upside, and therefore we do not require that a risk is bad.

What is important here is that the distinction in terminology is one of context, connotation, and toolkit, rather than one of substance. The same phenomenon can usually fruitfully be considered as an uncertainty or as a risk. It is less about characteristics of the unknown or poorly understood factor itself, and more about the *situation and mindset* of the person talking about it. If the factor is getting in the way of predicting future evolution and making decisions, it is an uncertainty. If a future evolution is being assumed, and the question is how things might turn out differently, then it is a risk.

In view of the Knightian definitions lurking in the shadows, it is worth stating explicitly that whether one is using the language of risk or uncertainty, one will generally try to quantify as much as possible. However, we all need to stay humble about the limitations of our ability to do so—and about the certainty that there are other unknowns that are doubtless being insufficiently considered.