Comments on:

Review of the J-value literature – Final report, **completed for HSE by Michael Spackman, NERA Economic Consulting Report, 31 December 2009, http://www.hse.gov.uk/nuclear/j-value-report.htm (“the Review”).**

By

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Background

As stated on the above website of the U.K. Office for Nuclear Regulation, the Review was written by a one-person ‘project team’

> “in response to a request by the HSE to review the 'J-value approach'. This is a method for objective assessment of health and safety spending, i.e. for comparing the costs and benefits of safety regulation, focusing on its potential contribution to regulatory decision making.”

The cited *website* further states:

> “The report concluded that the [J-value] method is too simplistic to be a competitor to the methods now established in the UK and elsewhere for the valuation of fatality risks.”

This statement is not borne out by the Review.

General

The Review covers the J-value approach as presented in some seven publications by P.J. Thomas, R.D. Jones and others over the period 2006-09. The Review goes into great depth and is in the general highly laudatory of the cited J-Value literature, describing them as

> “useful and impressive papers, illustrating how the valuation of fatality risks varies across different regulatory regimes . . .”;
>
> “. . . the authors have shown exceptional energy and . . . willingness to delve into the economics literature.”; and
>
> “. . . the MOD must be commended for seeking to develop formal analytical tools in an area of decision making that is not well served by current conventional approaches.”; etc.

Nevertheless, numerous conclusions in the Review are very critical, addressing a number of alleged deficiencies. For example,

> ". . . in the [seven cited] papers on risk, the algebraic structure is not always intuitively friendly, and there is little intuitive explanation to support it."

To the contrary, the algebra is elementary and transparent to anyone with a modicum of experience in risk analysis. Algebra, by its nature, does not require intuitive explanation.

Further,

> "The J-value ratios as presented tend to be less transparent and flexible for users than would be required for practical application in government, and on personal decision making."

This again is merely idiosyncratic opinion, unsubstantiated in the Review -- and also contradicted:

> ". . . the J-value format may have helped in some contexts to publicise the issues to a wider audience."

> "[The authors] have not fully recognized the significance of the literature on . . . risk . . . in companies and in government,"

It is moot just how such significance would appear to be recognized (except by copious citation of work outside the scope of the papers), but the remark reflects the expectation that the J-value literature should somehow be descriptive of, or at least compatible with, current risk management practice.

Methodological

The Executive Summary states:

> ". . . for policy analysis the J-value ratio and its presentation offer no clear benefits over other measures. The form of presentation in these and other papers lacks in particular the transparency and flexibility needed by users for practical application in government. Nor does it contribute to the currently more challenging problems of valuing illness and non-fatal injuries."

This is wrong; insofar as it derives logically from the LQI, the J-value offers at least one clear benefit: It is based on an accurate and precise objective measure of aggregate societal human welfare [namely a long life in good health with material means necessary to enjoy it, to the extent reflected by revealed preference]. Specifically, in many applications the outcomes are not merely measured by fatalities but by health states and duration expressed in quality-adjusted life years, QALY. Indeed, this may not be specifically apparent from the cited references. True, the J-Value lacks "flexibility," but this is a plus in comparison with fuzzifiable and muddled alternatives.

Normative approach vs. Intuitive

The J-value approach is not descriptive of established practice. It is clearly not intended to be. The work is *normative* and rests on the LQI, a national statistic. (*Normative* statements affirm how things ought to be, how to value them, etc. Here, in particular, as in the social sciences, the term *normative* also relates to the role of cultural 'norms'; the shared values or institutions constitutive of the

social structure and social cohesion.) The LQI is derived by [the New] Welfare Economics based on the work of Pareto, Kaldor and Hicks. It is calibrated empirically to reflect people's aggregate individual preferences of time allocated to economic activity. This is the fundamental difference from the expectation reflected in the Review, and it renders the Review broadly irrelevant. It seems that NERA is advocating an arbitrary ad-hoc approach based, at best, on subjective judgment not necessarily in harmony with societal norms.

It is a common feature of all these critical conclusions that they represent their author's personal views and value judgments without much benefit of substantiation in the text of the Review. They take no cognizance of the fact that the J-value is an objective measure of the efficiency of a life-saving intervention (provided that all relevant factors are taken into account correctly, of course). It is as objective as other quantified measures, such as temperature or the price/earnings ratio of a stock. Temperature is not the only aspect to consider when heating or cooling a room or diagnosing a patient. Neither is the p/e ratio the only factor to consider when buying a stock. This does not render them useless or irrelevant. Likewise, a measure of a risk intervention such as the J-value provides information that is basic and indispensable.

The website states:

> "The report concludes that the method is too simplistic to be a competitor to the methods now established in the UK and elsewhere for the valuation of fatality risks."

Even as this categorical conclusion is nowhere implied in the Review, it misses the mark: The J-value is not a competitor, but a quantitative measure. Any decision that modifies the public risk to life and health and runs counter to the J-value would need explanation.

Conclusion

In summary, the Review is a conscientious analysis of the approach, but only from a limited perspective committed to risk management based on public perspective and sentiment. The J-value is based on the Life Quality Index as developed by J.S. Nathwani, M.D. Pandey and others. With respect to the underlying LQI formalism the Review presents a rigorous examination of some of the LQI-related research, correctly pointing out several limitations. These issues, such as discounting and the limiting aspects of welfare theory, are generally known to its proponents.

The LQI approach, as O. Ditlevsen has remarked, is *normative*. Results of this method should be seen in that light. As a major, surprising and disappointing deficiency the Review in several locations claims that approaches better than LQI are available; yet it provides no information about (or references to) them.

On the other hand, it is worth noting that the LQI can be seen as a utility function of the type of Cobb and Douglas, transferring concepts from their production

function, based on the relative size of labour and capital contributions, to production. The Cobb-Douglas Production Function is often described as empirical, having a scientific status similar to the dimensionless numbers used in fluid flow and heat transfer such as Reynolds number, for instance. Like them, its properties have been validated, in the case of Cobb-Douglas by the fact the ratio of wages to capital remains nearly constant, which it has done roughly over the more than 80 years since it was published in 1928. From this perspective the LQI and its derivatives may also be regarded as descriptive, and so belong in the domains of positive and normative economics.

The public has a right to rational, as opposed to apperception-based, management of societal risks. Notwithstanding any limitations, an LQI-based methodology offers a plausible standard by which life saving measures can be compared such as to discharge professional duty in administration.

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Some Relevant Committees:
Atomic Energy Control Board: Advisory Committee on Nuclear Safety 1981-95: Task Group on Risk Perception 1982-95; Task Group on Negligible Dose 1983-95; Task Group on Mini Reactors 1986-95; Task Group on Basic Safety Objectives.

Canadian Environmental Assessment Agency: Scientific Review Group for High-Level Nuclear Waste Disposal Concept 1991-96.

Biographical Details: Who's Who in the World, Canadian Who's Who.