Title of the presentation: Actuarial Intelligibility vs Actuarial Precision

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Abstract:

In this paper, we'll take an enlightening look of what constitutes the actuarial (or any) profession and how performance within the profession is achieved. On that ground, we shall make a clear distinction between detached calculative rationality (leading to indifferent precision) and intelligible expertise (leading to the dynamic evolution of the dominated paradigm). As a result, the role of the actuary and of our actuarial community can only be the support and safeguarding of such an intuitive performance.

Key words:

actuarial intelligibility, intuitive expertise, calculative rationality, indifferent precision, professionalism, paradigm

EXECUTIVE SUMMARY

It is a question of tackling questions related to the role of the actuary in the certification of the accounts, the application of the actuarial standards and more generally all questions of a professional nature asked to the actuary by the new developments in the field of accounting standards and solvency. The response of the actuaries should be to provide expert advice. But expertise may be lost over reliance on detached calculative rationality, thus leading to indifferent precision. The responsibility of an actuary should be the manifestation of actuarial intelligibility through involved and intuitive expertise.

INTRODUCTION

A small history

The ancient predecessor of the actuary was actuarius: His main role was to take minutes in public assemblies and the Roman Senate. Time went by and the role of actuarius in the Byzantine Constantinople evolved to the account keeper of the Byzantine Emperor.

Later on, in the 17th century, the Latin word "actuarius" transformed to "actuary", and inevitably their role changed dramatically. Actuary was exclusively devoted to life insurance problems: the precise calculation of premiums for annuities, endowments and whole life insurances as well as calculation of reserves. These tasks characterize life actuary even nowadays, but it is only the way these tasks are performed that provides the framework of traditional actuary's main features. As a first approximation, these features may be included in the words "determinism" and "risk-adjustment". We all are aware of, and most of life actuaries have acted at least once as, traditional actuaries: performing valuation of product cash flows using deterministic calculations and providing for risk assessment by discounting at a risk-adjusted rate.

Actuaries, in the early years of the previous century, succeeded in getting their methods applied to non-life insurance also. By making this step, they had to master the skills of probabilistic thinking. But this resulted in more than a superficial modification in the actuarial education syllabus or a detached addition of one more qualification. The main consequence that should get the focus is the movement to actuarial intuition and professional judgement. A quote from Arthur Bailey in 1957, referring to the history of credibility, stresses this consequence appropriately:

"It is at this point in the discussion that the ordinary individual has to admit that, while it seems to be some hazy logic behind the actuaries' contentions, it is too obscure for him to understand. The trained statistician cries 'Absurd! Directly contrary to any of the accepted theories of statistical estimation.' The actuaries themselves have to admit that they have gone beyond anything that has been proven mathematically, that all of the values involved are still selected on the basis of judgement, and that the only demonstration they can make is that, in actual practice, it works. Let us not forget, however, that they have made this demonstration many times. It does work!"

In today's environment, the actuary's task can be summarized with a few words as to a) develop appropriate models and procedures, b) formulate the optimal (not perfect) solution to the business problem and c) consider all constraints, whether they seem reasonable or not (yet the actuary should not hesitate to break the constraining bounds of the environment, that is to recommend new models, new classification dimensions and even new marketing procedures). Finally, the ultimate judge of the actuary's task is the marketplace either of goods and prices or of business practice. What clearly differentiates today's actuary are the simple facts of the availability of massive data coupled with the growth of computer processing power, which have brought forward all actuarial procedures on a day-to-day basis management, aspiring stochastic financial models, cash flow pricing models and intricate reserving procedures to be applied routinely. The response on these developments come from local and international authorities, in the form of increasing volume of constraints that impose additional compliance requirements, such as legal and regulatory requirements, financial reporting principles, standards of conduct and practices etc.

Today, more than ever, an actuary belongs to a profession, the actuarial profession. The result of being recognized as a profession is that actuaries are granted a monopoly over an area of work and are also given control over their work. The main responsibilities that result from this fact are that the actuaries should: a) provide a solution to the problem of imperfect information on the part of consumers as to quality of service offered by any particular individual and b) ensure higher quality services than would otherwise be provided. The most common roles that actuaries are called to play are a) prudential supervision b) non-legislitated regulatory-type roles c) independent, competent and conscientious actuarial consultation d) solvency estimation and e) determination of distributable earnings of insurance companies.

METHODOLOGY

Up to now, we have routinely used two concepts: "(actuarial) profession" and "actuary". The quest for the role of the actuary should begin by exploring in a broad philosophical ground (a) the concept of profession itself and (b) how the actuary acquires his skills and takes his place in his profession. In our discussion with regard to profession, we shall follow the thoughts of Thomas Kuhn's most renown work "The Structure of Scientific Revolutions" (B 4). Later on, our effort to gain an understanding of how an actuary finds his place in his profession, shall inevitably lead us to a discussion of human skill acquisition process, as developed by Hubert L. Dreyfus (E 1). In the light of our findings, we shall conclude with regard to the role of the actuary in the modern scene.

DISCUSSION

1. The profession

Here's the deal: A science, say astronomy, is dominated for a long period by a "paradigm," such as Ptolemy's theory that the sun and planets revolve around a stationary earth. Most work is on "normal science," the solving of standard problems in terms of the reigning *paradigm*. But anomalies— results the paradigm cannot explain—accumulate and eventually make the paradigm unsustainable. The science enters a revolutionary phase as a new paradigm such as Copernicus's heliocentrism comes to seem more plausible. Defenders of the old order, who cannot accommodate the change and usually cannot even understand the concepts in which it is expressed, gradually die out and the new paradigm is left in control of the field. Then the process repeats (B 13).

Let us clear things and more closely track "profession": Kuhn is responsible for popularizing the term paradigm, which he described as essentially a collection of beliefs, a set of agreements about how problems are to be understood, shared by those who participate in a particular community, which can be a science, a **profession** or at least a discipline (B 10). According to Kuhn, paradigms are essential as a minimum implicit body of intertwined theoretical and methodological belief that permits selection, evaluation, and criticism. Indeed, a paradigm guides all efforts of the members of a science (or a profession). Replicating the fundamental theme of Kuhn's thesis, we may argue that the typical developmental pattern of a mature profession is the successive transition from one paradigm to another through a process of revolution. When a paradigm shift

takes place, the member's world is qualitatively transformed and quantitatively enriched by fundamental novelties of either fact or theory (B 10).

The mere existence of a paradigm transforms a group into a profession. From this point, we see to follow the foundation of professional societies (and/or specialized groups within societies), the formation of specialized journals with scholarly articles intended for and addressed only to professional colleagues, whose knowledge of a shared paradigm can be assumed and who prove to be the only ones able to read the papers addressed to them (B 6), the claims to a special place in academe with academe's curriculum, the writing of textbooks etc. A paradigm helps all members to bound their discipline in that they are guided to create avenues of inquiry, to formulate questions, to select methods with which to examine questions and to define areas of relevance. In this context, students study these paradigms in order to become members of the particular community in which they will later practice (B 11). At this point, a very interesting feature becomes apparent: since students largely learn from and are mentored by members who learned the bases of their field from the same concrete models, *there is seldom disagreement over fundamentals* (B 6). Subsequently, men whose beliefs are based on shared paradigms are committed to the same rules and standards for their professional practice (B 11). Therefore, in the "normal" course of a professional activity, you find yourself as an active member (and not a student anymore) working in the inside of a paradigm, under its unconscious guidance, which automatically defines the nature and the essence of the problems you should commit yourself to solve, the methodology to follow and the results you should accept. In other words, members are ontologically "haunted" by the paradigm, acting as the worker bees who are credulously doing the hard work of extending its explanatory powers and its precision.

And yet, according to Kuhn, young practiocioners who are not so deeply indoctrinated into accepted theories, can manage to sweep an old paradigm away. Such revolutions come only after long periods of tradition-bound normal science (B 10), for frameworks must be lived with and explored before they can be broken (B 6). However, crisis is always implicit in normal practice because every problem that normal practice sees as a puzzle can be seen, from another perspective, as a counterinstance and thus as a source of crisis. All crises begin with th*e* blurring of a paradigm and the consequent loosening of the rules for normal practice (B 10). As this process develops, the field begins to look quite different and competing articulations of the paradigm proliferate. Transition from a paradigm in crisis to a new one from which a new tradition of normal

practice can emerge is not a cumulative process. It is a *reconstruction of the field from new fundamentals*. This reconstruction leads to changes of the main field's fundamental theoretical generalizations, methodologies, rules and applications. As a result, the profession changes its view of the field, its methods, and its goals. A new era begins under the reign of a new paradigm after its total victory over the older one. Be aware that Kuhn does not imply a new paradigm supplementing an older one. In fact, Kuhn talks about a noncumulative developmental episode in which an older paradigm is replaced in whole or in part by an incompatible new one (a "gestalt shift") (B 10). This is why many old members, unable to tolerate the new disclosed world, may leave the profession. In addition, as their number decreases over time, the new paradigm strengthens its position – carrying, on the other hand, along the way, the seed of its own doom.

2. Skill acquisition (E 1)

What do actuaries do? In fact, the interim between the skills of the very young student to the oldest grey-haired expert constitutes the actual actuarial performance in the framework of the profession. But how does this performance differ in each level? From a philosophical point of view, as developed by professor Hubert Dreyfus (E 1), a person (i.e. not just an actuary) usually passes four stages of qualitative different perceptions of his task and/or decision-making as his/her skills improve.

(a) *Novice* is standing first in the row of skill acquisition. Novice starts to learn through instructions, learning to recognize various different objective facts and features relevant to the skill and acquires rules for determining actions based upon those facts and features. Context-free elements dominate in their thinking, as elements of a situation are so clearly and objectively defined for the novice, that they can be recognized without reference to the overall situation in which they incur.

The student automobile driver learns to recognize such domain-independent features as speed (indicated by his speedometer) and is given the rule "Shift when the speedometer-needle points to 10". By lacking any coherent sense of the overall task, novice performance is mainly judged by how well s/he followed the learned rules.

(b) As novice copies with real situations and accumulates experience, s/he starts to show an improvement in performance. Novice, then, starts to consider more context–free facts and to use more sophisticated rules and, most importantly, gains an enlarged conception of the world of skill. After seeing a

sufficient number of examples, the student learns to recognize them. Instructional maxims can then refer to these new situational aspects. Novice has been transformed to an *advanced beginner*.

Of course, if the beginner follows the rule "Shift at 10 miles an hour" the car will stall on a hill or when heavily loaded. So the advanced beginner learns to use (situational) engine sounds as well as (non-situational) speed in deciding when to shift. S/he learns the maxim "Shift up when the motor sound like it is racing and down when it sounds like it is straining".

(c) As experience accumulates, context-free and situation elements become overwhelming and the advance beginner becomes now *competent*. The competent performer learns to device a plan of hierarchical procedures of decision-making and then, having a specific goal in mind, sees a situation as a set of facts. By devising a plan (or at the minimum, choosing a perspective) the competent performer can restrict his attention to only a few of the vast number of possibly relevant features and aspects and decide which elements of the situation should be treated as important and which ones should be ignored. The competent performer thus seeks new rules and reasoning procedures to decide upon a plan or perspective. But such rules are not as easy to come by as are the rules and maxims given to beginners. There are just too many situations differing from each other in subtle, nuanced ways. More, in fact, than can be named or precisely defined, so no one can prepare for the learner a list of what to do in each possible situation. Competent performers, therefore, must decide for themselves in each situation what plan to choose and when to choose it without being sure that it will be appropriate in that particular situation.

Prior to this stage, if the learned rules didn't work out, the performer could rationalize that s/he hadn't been given adequate rules rather than feel remorse because of his mistake. Now, however, the learner feels responsible for disasters. Of course, often at this stage, things work out well, and the competent performer experiences a kind of elation unknown to the beginner. Thus, learners find themselves on an emotional roller coaster.

A competent driver leaving the freeway on an off-ramp curve, after taking into account speed, surface condition, criticality of time, etc., may decide s/he is going too fast. S/he then has to decide whether to let up on the accelerator, remove his foot altogether, or step on the brake and precisely when to do so. S/he is relieved if s/he gets through the curve without being honked at and shaken if s/he begins to go into a skid.

(d) With enough experience from a variety of situations, all seen from the same perspective but requiring different tactical decisions, the competent performer seems gradually to decompose this class of situations into subclasses, each of which share the same decision, single action, or tactic. This allows an immediate intuitive response to each situation. The *expert* not only sees what needs to be achieved but thanks to a vast repertoire of situational discriminations s/he sees how to achieve his goal. The ability to make more subtle and refined discriminations is what distinguishes the expert from the other performers. The expert has learned to distinguish among many situations, all seen as similar by the previous performers, those situations requiring one action from those demanding another. That is, with enough experience in a variety of situations, all seen from the same perspective but requiring different tactical decisions, the brain of the expert performer gradually decomposes this class of situations into subclasses, each of which shares the same action. This allows the immediate intuitive situational response that is characteristic of expertise.

The expert driver, generally without paying attention, not only feels in the seat of his pants when speed is the issue; s/he knows how to perform the appropriate action without calculating and comparing alternatives. On the off-ramp his foot just lifts off the accelerator or steps on the brake. What must be done, simply is done.

It is important to note that according to Dreyfus, a beginner calculates using rules and facts, but that with talent and a great deal of involved experience, the beginner develops into an expert who intuitively sees what to do without recourse to rules. If we accept that an expert performs more intelligible than a beginner, then the basis of intelligibility cannot be sought to the use of explicit rules or standards (to detached calculative rationality). These seem to be features of a lower level of performance which can at best lead to augmented precision – the way for example, a heuristically programmed computer works. But the performance of an expert cannot be achieved by a programmed computer (which at top can achieve competence): an expert does not calculate, does not solve problems and does not even think. S/he just does what normally works and, of course, it normally works.

Dreyfus's skill acquisition description can easily explain the common sense knowledge problem. We are all experts with regard to everyday common sense. Its basis is our skill for coping with everyday materials. It is basically a knowing-how, not a knowing-that skill. We know when and how to be polite, when and how to begin or continue a conversation, when to be in a hurry or wait and relax, what to wear and how to wear it! We

do not think of any rules or explicit standards: each of us is doing what is to be done in an effortless and yet, wonderfully unique way.

3. The role of the actuary

Let us see where our journey has taken us:

We have touched the grounds of professionalism. We have been told that a paradigm dominates. We cannot articulate it explicitly but we know it's there, between the lines of our textbooks when we were studying to be prominent actuaries; every time we talk with clients and prospects, explaining to them our services and their needs; every time we talk to each other, seeking information or even arguing and disputing; in the tone and the look of our mentors, every time we seek guidance and experience. Then, we have touched the grounds of our performance within the framework of our profession. The road from novelty to expertise is nothing more but the mirror image of the path from detached calculative rationality to intelligibility. And yet we are asked: what is the role of the actuary in today's environment?

The overall purpose of this paper is not to provide a specific answer in an alleged unambiguous question, but rather to let reveal by themselves the presumptions of every specific answer that will be provided. What do we mean by that? We mean that this simple question is addressed to actuaries, i.e. to members of a specific community who are dominated by a here-and-now tacit paradigm, shared in a day-to-day practice through different levels of proficiency. Therefore, every answer provided by each member of the actuarial community can only be a product of the already present paradigm and the degree of the specific member's performance. Hence, every answer can only indicate and reproduce the "essential tension" between form and content, i.e. between indifferent actuarial precision (reliance on calculative rationality) and involved actuarial intelligibility (performance in the level of expertise).

Our actuarial community looks for the preservation and the growth of the actuarial profession. In doing so, it has successively established a rigid system of education and a method of subsequent practice. As we have argued, future actuaries study the dominated here-and-now paradigms in order to become members of the actuarial community in which they will later practice. If their education combined with their subsequent practice cannot reach a level of performance beyond competency, then their contribution to the dominated paradigm would be nothing more than indifferent actuarial precision (the same way average people are lost in the every day tasks acting in a banal, ordinary way of public standards). On the other hand, if their professional

lives achieve a breakthrough towards the level of expertise, then their endowment would be either an expansion of the already present paradigm or, in extreme cases, a revolutionary push of the dominated paradigm to another. In both cases, a new actuarial world will be revealed, stemming from involved actuarial intelligibility. This is not just philosophical nonsense; this is the only way for a community to stay active and alive: through their members' achievement to a point of intelligibility, where new meaning can be created.

Then, we ask: if the role of the actuary is to intelligible perform, how can our community ensure and proliferate such a kind of performance? Unfortunately, no one can provide such a guarantee. The path from the competence performance to the level of expertise is not straightforward but rather a noncumulative personal evolution, the same way Kuhn argued that a scientific revolution is a noncumulative developmental episode in which an older paradigm is replaced by an incompatible new one (B 11). The best our actuarial community can do is establish an environment that attracts the best minds and favours such an evolution. And when such a performance is achieved, how can we recognize it? Again, no rules or set of standards may exist. But before we panic, let us remind us that we have already encountered it as it has already been manifested quite successfully in the past: the fact that the actuarial profession has survived and effectively transformed through time is the major proof that our preceding fellows have wonderfully demonstrated intelligible expertise, without hesitating to break with tradition and reorientate their actuarial perceptions.

Performance in the level of expertise, we argued, constitutes a noncumulative development. It cannot be the product (although encouraged) of the most rigid or inspiring educational system, nor the mere accumulation of practice and experience. Performance on the level of expertise can only be a destiny. As a destiny it involves a personal resolution to deviate from the banal, average and public actuarial standards. Furthermore, it implies among others, the fulfilment of two conditions: (a) the repeated risky experience in the everyday (actuarial) world in order to master the discriminations that constitute the actuarial (or any) skill and (b) the anticipation of proper time. It is quite symbolic the fact that Greek language uses two different words for time: "chronos" signifies the mere passage of time (which constantly wrecks its own children), but "kairos" indicates the subtle arrival of the right moment (which call for a rise and action despite the wreckages of "chronos") (B 7). If the ultimate role of the actuaries is the venture to perform intelligible in the level of expertise, then the role of our community would be to assure that their members shall not negate their destinies.

CONCLUSION

Towards a new paradigm?

We believe that a new paradigm lies before the gates. The developments in the fields of accounting standards and solvency coupled with the responsibility of actuaries in the certification of the accounts and the application of specific actuarial standards, have already disclosed a set of radical different requirements. The solvency issue for example, has already gone beyond the traditional simple deterministic approach, involving the quest for a "red thin line" between protection of the policyholders' rights and equity holders' distributable claims. Accounting standards have by now altered the notion of financial reporting, aiming at providing the ground for sound financial analysis in the comparative measurement of risk and return as it relates to investment choices or credit decisions.

The actuary of the 21st century faces tones of massive available data, accounting standards, particular rules, legal restrictions, ethical commitments – there are just too many to consider, making performance a nerve-wracking and exhausting task (B 14). All our previous discussion aimed at revealing that even though the nature of our society may take the road of growing bureaucracy, skill and expertise should be preserved and not let lost through over reliance on procedures and calculative rationality (B 14). Copying with this complex overload should not frighten us and should not be attempted to overcome merely in the level of technical competence. As the poets who, from a universe of different words and diverse meanings do not just pick and put the "nicer" words in a row but, with surprising simplicity, create language and through language new worlds, actuaries under the same spirit should aim not at putting numbers in a row that are just consistent with requirements but rather at going beyond numbers, to the simplicity of meaningful totalities. If actuaries have to find their place in the modern financial world, we believe that a different actuary should emerge, moving things intuitively to a level of totality, without crudely (and rationally) isolating the actuarial from the accounting, the accounting from the financial and so forth.

ENDNOTES (E)

1. All extracts and examples of this section come from the book "Mind Over Machine" (B 4) and the paper "Could anything be more Intelligible than Everyday Intelligibility?: Reinterpreting Division II of Being and Time in the light of Division II" (B 5) of professor Hubert L. Dreyfus.

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