

Risk-driven global compliance regimes in banking and accounting: the new Law Merchant

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Powerful, technically complex international compliance regimes have developed recently in certain professions that deal with risk: banking (the Basel II regime), accountancy (IFRS) and the actuarial profession. The need to deal with major risks has acted as a strong driver of international co-operation to create enforceable international semilegal systems, as happened earlier in such fields as international health regulations. This regulation in technical fields contrasts with the failure of an international general-purpose political and legal regime to develop. We survey the new global regulatory systems in the actuarial, banking and accounting fields, with a view to showing how the need to deal reasonably with risk has resulted in an international de facto law solidly based on correct abstract principles of probability.

Keywords: compliance regimes; Basel II; IFRS; global regulation.

1. Introduction: international risks and international regimes

Risk is a great motivator for co-operative action. If the prospect of hanging concentrates the mind wonderfully, the threat of an avertable hanging channels the concentration into planning in concert with others facing the same risk. The risk of invasion has time and again been the spur to heroic efforts by a united citizenry. The threat of terrorism has seen the creation of international alliances and co-operative efforts by police and intelligence services that would never have come into being in more stable times. In contrast to international problems that do not seem to pose an urgent threat to powerful international actors—the refugee and African poverty problems e.g.—risk that could strike at home produces concerted action in distant parts.

The risk driver has been strong enough to produce what are in effect international legal regimes covering a range of risks, that achieve compliance in most countries. Though there is no overall world government and United Nations decrees are in general voluntary and ignored when convenient, it is otherwise in particular areas where international legal systems protect against risks of death. Maritime safety has perhaps the longest history, no doubt because of the international nature of the high seas and the obviousness of the risks there. Piracy has attracted international efforts to suppress it for centuries¹ and in the 19th century the main maritime nations, after nationalizing their own provision of lighthouses, competed as a matter of national pride in making their own coasts safe for international shipping and in building lighthouses in far-flung colonial

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¹ LAMBERT, F. (2005) *The Barbary Wars: American Independence in the Atlantic World*. New York: Hill and Wang; TARLING, N. (1963) *Piracy and Politics in the Malay World: A Study of British Imperialism in Nineteenth-Century South-East Asia*. Melbourne: Cheshire.

outposts.² Rescue at sea has been facilitated by a system that has developed through rapid changes in communication technology, from the standardization of distress radio frequencies at the 1906 International Radiotelegraph Convention to the present Global Maritime Distress and Safety System.³ Epidemics too are not confined by national boundaries, and from the mid-19th century international health measures have been negotiated in response to them, such as the International Sanitary Convention of 1892 aimed at preventing the spread of cholera.⁴ The World Health Organization now maintains a long-term system of International Health Regulations and, for emergencies, the Global Outbreak Alert and Response Network.⁵ There is a good deal of de facto international jurisprudence arising.⁶ There was a similar process with the regulation of testing for pharmaceuticals, where there is effectively a single international standard (although there is not a single international market).⁷ In more recent decades, environmental concerns have resulted in further international regulation, such as the Montreal Protocol that successfully banned CFCs because of concerns about the ozone hole,⁸ though later efforts with the Kyoto Protocol on global warming have not been so successful (and there is rather little on natural disasters⁹). Among the most recent but most developed systems is the computer security incident response system directed by the Forum of Incident Response and Security Teams (FIRST), which handles both computer intrusions and software vulnerabilities.¹⁰

By contrast, there are many areas where the globalization of regulation might in principle be desirable but where there are no important risks motivating the sense of urgency that standardization would require. Examples include antitrust regulation,¹¹ media ownership and content rules, labour law, agricultural subsidies and gambling.

² SCHIFFER, M. B. (2005) The electric lighthouse in the nineteenth century: aid to navigation and political technology. *Technology and Culture*, **46**, 275–305.

³ THOMPSON, J. L. (1992) The Global Maritime Distress and Safety System: history of maritime safety communications. *Telecommun. J.*, **59**, 26–31; <http://gmdss.com>; PALMER, S. (2006) Safety regulations for shipping. *Oxford Encyclopedia of Maritime History* (J. B. Hattendorf, ed.) (to appear).

⁴ FIDLER, D. P. (1999) *International Law and Infectious Diseases*. Oxford: Clarendon Press (ch. 2); GENSINI, G. F., YACOB, M. H. & CONTI, A. A. (2004) The concept of quarantine in history: from plague to SARS. *Journal of Infection*, **49**, 257–261; AGINAM, O. (2002) International law and communicable diseases. *Bulletin of the World Health Organization*, **80**, 946–951.

⁵ <http://www.who.int/csr/ihr/en/>, <http://www.who.int/csr/outbreaknetwork/en/>.

⁶ FIDLER, D. P. (2000) *International Law and Public Health: Materials on and Analysis of Global Health Jurisprudence*. Ardsley, NY: Transnational Publishers; FIDLER, D. P. (2004) *SARS, Governance and the Globalization of Disease*. Basingstoke: Palgrave; FIDLER, D. P. (2002) A globalized theory of public health law. *Journal of Law, Medicine and Ethics*, **30**, 150–161.

⁷ CECCOLI, S. (2002) Divergent paths to drug regulation in the United States and the United Kingdom. *Journal of Policy History*, **14**, 135–169; ABRAHAM, J. & DAVIS, C. (2005) A comparative analysis of drug safety withdrawals in the UK and the US (1971–1992): implications for current regulatory thinking and policy. *Social Science and Medicine*, **61**, 881–892; similarly for food safety in MOTARJEMI, Y., VAN SCHOTHORST, M. & KÄFERSTEIN, F. (2001) Future challenges in global harmonization of food safety legislation. *Food Control*, **12**, 339–346.

⁸ <http://www.undp.org/montrealprotocol/montreal.htm>; see DESOMBRE, E. R. (2000/2001) The experience of the Montreal Protocol: particularly remarkable, and remarkably particular. *UCLA Journal of Environmental Law and Policy*, **19**, 49–81.

⁹ BIRKLAND, T. A. (1997) *After Disaster*. Washington, DC: Georgetown University Press.

¹⁰ <http://www.first.org>, also Organisation for Economic Co-operation and Development, Committee for Information, Computer and Communications Policy (1996) *Guidelines for the Security of Information Systems*. Paris: OECD; SPRINKEL, S. C. (2002) Global Internet regulation: the residual effects of the “I Love You” computer virus and the Draft Convention on Cyber-crime. *Transnational Law Review*, **25**, 491–514.

¹¹ PILOLA, A. (2003) Assessing theories of global governance: a case study of international antitrust regulation. *Stanford Journal of International Law*, **39**, 207–251.

The developments that have been successful form part of a wide international process whereby urgent globalized risks are taken in hand by global agencies whose directives based on technical expertise have wide applicability via a network of national affiliates and hence have a status as de facto global law. The highly technical nature of these developments has caused them to be somewhat overlooked by humanities-oriented legal and political theorists. It has also meant that the development of these regimes has not been much hindered by concerns about loss of national sovereignty. The apparently non-legal and semivoluntary nature of the standards has also contributed to their ease of acceptance by those concerned about threats to sovereignty, while their being based on technical expertise gives them credibility as relevant solutions to the problems.¹² The role of committees of experts means that the setters of the standards are to some degree accountable to the body of relevant experts (though not to other stakeholders such as the general public or national governments).

No view of the legal aspects of international co-operation can be complete without taking account of these widespread and rapid developments.

2. International finance and global risks

The financial system does not have the same urgency in its risks as e.g. health and terrorism since the risks in question are rarely life-threatening. On the other hand, commerce is naturally international. International trade has always been a large part of all trade and diversity of regulations is a major impediment to it. The ‘liquid’ nature of money means that financial crises easily spread and that capital can fly from one country to another. Commerce and finance have therefore had a very long experience in international co-operation in dispute resolution, standardization and regulation. Among the competing systems of medieval law—royal, imperial, ecclesiastical, urban, feudal, merchant—the Law Merchant had some special features that made it important for the future.¹³ It was run by merchants for merchants, constituting temporary courts at fairs. It could thus consider technical commercial matters, the ‘custom of merchants’, possibly beyond the understanding of mere lawyers. Hence, any technical developments in merchant practice, such as bills of exchange, implied warranties and patents, were immediately available to the courts, free of any legal technicalities. The Law Merchant was supra-national, in that the international merchant community was presumed to have the same practices everywhere. Though it kept few records, some of its discussions are preserved in the ethical-legal compliance system imposed on medieval commerce by the Church, the ecclesiastical law of usury; it contains e.g. the first extended analyses of risk in insurance, annuities and forward contracts.¹⁴ The achievements of these laws in regulating commercial practice were eventually incorporated into the commercial law of individual states.¹⁵ A passage in Blackstone’s *Commentaries* contains a still-applicable explanation of how international commercial technicalities require some accommodation on the part of national laws: ‘The affairs of merchants are regulated

¹² KERWER, D. (2005) Rules that many use: standards and global regulation. *Governance*, **18**, 611–632.

¹³ TRAKMAN, L. E. (1983) *The Law Merchant: The Evolution of Commercial Law*. Littleton, CO: Rothman (ch. 1); BERMAN, H. J. (1983) *Law and Revolution: The Formation of the Western Legal Tradition*. Cambridge, MA: Harvard University Press (ch. 11).

¹⁴ FRANKLIN, J. (2001) *The Science of Conjecture: Evidence and Probability Before Pascal*. Baltimore: Johns Hopkins University Press (ch. 10).

¹⁵ TRAKMAN, *The Law Merchant*. (ch. 2); LOWRY, S. T. (1973) Lord Mansfield and Law Merchant: law and economics in eighteenth century. *Journal of Economic Issues*, **7**, 605–622; also GORDLEY, J. (1991) *The Philosophical Origins of Modern Contract Doctrine*. Oxford: Clarendon (ch. 6).

by a law of their own, called the law merchant or *lex mercatoria*, which all nations agree in and take notice of. And in particular it is held to be part of the law of England, which decides the causes of merchants by the general rules which obtain in all commercial countries; and that often even in matters relating to domestic trade, as for instance with regard to the drawing, the acceptance, and transfer of inland bills of exchange.¹⁶

The global harmony of the Law Merchant did not entirely survive the fragmentation of Europe after the Renaissance, but later developments with similar causes resulted in international standardization of e.g. intellectual property law under the Berne Convention¹⁷ and the International Chamber of Commerce's Uniform Customs and Practice for Documentary Credits and its court of arbitration.¹⁸ The parallels with the Law Merchant are close.¹⁹

3. The international actuarial compliance regime

The actuarial, banking and accountancy professions have long been highly regulated at the national level but only recently at the international level.

The actuarial profession has had a century and a half of national legal regulation. That is made necessary by the time structure of the risks involved in life insurance. The insurer takes in money many years in advance of paying out claims, so there is a temptation to live off the money received in the early years and offer competitive but unsustainable rates, undercutting more responsible competitors to the ultimate disadvantage of customers. The unregulated situation of the early 19th century satirized by Dickens in his invention of the fraudulent Anglo-Bengalee Disinterested Loan and Life Assurance Company²⁰ made it impossible for life insurers to gain the trust of customers without heavy regulation of the industry.²¹ The interest of the public coincided with that of the more responsible parts of the profession, so there were few political obstacles to some form of regulation. There were, however, ideological and practical objections to explicit detailed legislation and government inspectors. Issues that have surfaced many times since, in various professions, on the relation of legal regulation and professional standards were evident in the hearings of the 1853 British Select Committee on Assurance Associations. While everyone agreed that the scandals in the industry demanded action, there were doubts about the effectiveness of regulation. The Committee's report set out the still-relevant opposing arguments:

Even admitting the general wisdom of the principle of the non-interference on the part of the Government in matters of trade, it has been contended that the question of life insurance differs so materially in its general character from ordinary trading transactions, that it may fairly be considered as an exception to that rule. This exceptional treatment has been justified and supported, on the ground that the obligations undertaken by such

¹⁶ BLACKSTONE, W. (1765) *Commentaries on the Laws of England*, standard pagination vol. I, p. 273 (W. Morrison, ed., 2001; London: Cavendish, vol. 1, p. 208).

¹⁷ <http://www.wipo.int/treaties/en/ip/berne>.

¹⁸ <http://www.iccwbo.org/policy/banking/id2424/index.html>.

¹⁹ Parallels between the Law Merchant and modern regulation drawn in DRAHOS, P. & BRAITHWAITE, J. (2001) The globalisation of regulation. *Journal of Political Philosophy*, 9, 103–128, and COOTER, R. D. (1996) Decentralized law for a complex economy: the structural approach to adjudicating the new Law Merchant. *University of Pennsylvania Law Review*, 144, 1643–1696.

²⁰ A capital idea 'in one sense', DICKENS, C. (1843–1844) *The Life and Adventures Of Martin Chuzzlewit* (ch. 27).

²¹ HICKMAN, J. (2004) History of actuarial profession. *Encyclopedia of Actuarial Science*, Vol. 2 (J. L. Teugels & B. Sundt, eds). Hoboken, NJ: Wiley, pp. 831–838 (www.wiley.co.uk/eoas/pdfs/TAH012-.pdf).

associations have reference to a very remote and uncertain period; that the object which persons have in view in effecting insurances upon their lives, is generally of an important and solemn character, viz., the provision for widows and orphans after the death of their natural protectors; that, unlike any ordinary transaction of trade, a contract once entered into cannot be changed or abandoned, if doubts of the stability of an office should arise, without a great sacrifice of premiums paid in past years . . . and that in the present state of uncertainty which arises from the imperfect knowledge as to the real condition of assurance offices, persons are thus placed in the anxious and unhappy dilemma of being compelled to persevere in paying premiums from year to year, with some suspicion as to the ultimate advantage of doing so . . .

On the other hand, it has been contended, with equal ability, that insurance business forms no exception to ordinary trade in these respects . . . that an apparent compliance with the provisions of an Act of Parliament . . . have afforded facilities, under the sanction of Parliamentary authority . . . for the formation of companies and the perpetration of frauds which could not otherwise have been accomplished. And it has been further contended that it is impossible to make such regulations, consistent with the free development of private enterprise, which, so far as the public is concerned, will not prove more prejudicial by lulling private prudence and vigilance, than beneficial in respect to any increased security they can confer.²²

The actuarial experts who gave evidence to the Committee insisted on the need for their own professional judgement, in such complicated questions as to the quality of lives insured by an individual insurer.²³ As the government also wished to avoid complicated legislation and expensive bureaucratic machinery, it was decided that there would be regulation to protect the public, but that it would not be imposed directly by legislation and a government inspectorate. Supervision would be outsourced to the actuarial profession, who would provide reports in a reasonably standardized format and would at the same time ensure their own expertise in difficult mathematics and integrity through a rigorous system of examinations.²⁴ Actuaries (and later accountants) had therefore to constitute themselves as a self-regulating respectable profession after the model of the older professions, the clergy, lawyers and medical men. A professional was ‘an expert whose relationship with his client, a layman unable to judge the competence of his services except in the long run, was fundamentally based on trust’.²⁵

Collapses of large life insurers in the 1860s led to renewed demands for action, resulting in the Life Insurance Act of 1870, but it kept to the principle of ‘freedom with disclosure’, i.e. minimal formal external control but with public disclosure of accounts prepared by recognized experts with statutory duties. Life insurance companies had to publish an actuarial investigation into their affairs

²² SELECT COMMITTEE ON ASSURANCE ASSOCIATIONS. *Report, British Parliamentary Papers, 1852–1853*, p. v.

²³ PORTER, T. M. (1995) *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*. Princeton: Princeton University Press, pp. 106–113.

²⁴ ALBORN, T. L. (1994) A calculating profession: Victorian actuaries among the statisticians. *Science in Context*, 7, 433–468.

²⁵ Barrington Kaye, discussed in JONES, E. (1981) *Accountancy and the British Economy, 1840–1980: The Evolution of Ernst & Whinney*. London: Batsford, p. 72.

every 5 years.²⁶ The United States also saw what was in effect the devolution of legal power to appointed actuaries.²⁷

During the 20th century, the actuarial profession remained one of the most heavily regulated and institutionalized of the professions based on risk. But its lead in those developments was gradually lost and it has not been to the fore in the globalization of regulation. One reason is that because life insurance customers are individual persons the market is not naturally international. But it is also true that the early lead in national regulation led to divergences in national styles that themselves impeded globalization. For example, education and accreditation are controlled by professional associations in English-speaking countries but universities are much more important in continental Europe. The actuarial profession has been slow to adopt new theoretical perspectives and has been criticized for ‘rule-book’ approaches that ignore newer understandings of risk evaluation. The UK Morris Report of 2005 found that the self-regulation of the actuarial profession had proved inadequate to protect the public, especially in keeping the profession abreast of technical developments, and proposed an independent body to monitor the profession’s self-regulation.²⁸ International standardization through the activities of the International Actuarial Association²⁹ has not been particularly fast by the standards of other industries. The lead in regulation of risk has passed to the industries that were once followers of the actuaries, banking and accountancy.

4. The international banking compliance regime

In banking, a history similar to that in life insurance has resulted in a much more powerful international body, the Committee on Banking Supervision of the Bank for International Settlements (BIS) in Basel, which enforces the Basel II standards.³⁰

As in the case of the long time scale on which actuaries work, there are special reasons why banking should be regarded as a prime candidate for regulation, for reasons that do not apply to business in general. Quite apart from the centrality of banking to the economy and demands by socialists and Keynesians for its regulation, there are problems with risk that motivate regulation both from outside the industry and within. There is a problem with information asymmetry, in that customers have little ability to evaluate the risks banks face, and for the same reason a failure of a bank affects the whole industry since customers cannot easily distinguish one bank from another.³¹

²⁶ HORTON, J. & MACVE, R. (1994) The development of life assurance accounting and regulation in the UK: reflections on recent proposals for accounting change. *Accounting, Business and Financial History*, 4, 295–320; KENELEY, M. (2005) Control of the Australian life insurance industry: an example of regulatory externalities within the Australian financial sector 1870–1945. *Australian Economic History Review*, 45, 1–22; TAPP, J. (1986) Regulation of the UK insurance industry. *The Economics of Insurance Regulation: A Cross National Study* (J. Finsinger & M. V. Pauly, eds). London: Macmillan.

²⁷ GRUBBS, D. S. (1999) The public responsibility of actuaries in American pensions. *North American Actuarial Journal*, 3, 34–41.

²⁸ MORRIS REVIEW OF THE ACTUARIAL PROFESSION (2005) *Final Report*, pp. 4–5 (http://www.hm-treasury.gov.uk/independent_reviews/morris_review/review_morris_index.cfm).

²⁹ <http://www.actuaries.org/>, International Actuarial Association. *Encyclopedia of Actuarial Science*, vol. 2, pp. 924–927; on global regulation of the wider insurance industry, <http://www.iaisweb.org/>.

³⁰ BANK FOR INTERNATIONAL SETTLEMENTS, BASEL COMMITTEE ON BANKING SUPERVISION (June 2004) *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework*. Available at <http://www.bis.org/publ/bcbs107.htm>; survey in MARRISON, C. (2002) *Fundamentals of Risk Management*. Boston: McGraw-Hill (ch. 23).

³¹ THOMSON, D. & ABBOTT, M. J. (2001) Banking regulation and market forces in Australia. *International Review of Financial Analysis*, 10, 69–87; NEAL, P. (1997) The Wallis Inquiry: financial regulation and systemic instability. *Economic Papers*, 16, 19–27.

The global reach of banks means that any regulation needs to be international to be fully effective, as otherwise banks can evade regulation through offshore operations.³²

Banks are regulated in various ways, but from the point of view of risk the most important target of regulation is banks' reserves against risk. The nature of a bank is to take in funds, then lend most of them out for profit while reserving some against risks. The risks are varied of default by creditors, of movements in exchange rates, of the disappearance or devaluation of assets and of 'operational risk', a grab-bag of unusual and extreme events ranging from massive internal fraud to tsunamis, runs on the bank, incompetent CEOs and major technological change.³³ A prudent bank must quantify all these risks to reasonable accuracy and reserve sufficient funds against them (or against all but the most huge and uncontrollable of them). A cartel of prudent banks has an interest in regulating the banking industry so that would-be imprudent 'fly-by-night' banks do not grab market share by offering favourable rates of interest at the expense of under-reserving. Needless to say, quantifying the risks and their interactions is not easy, while alternatives to quantifying such as a rule of thumb like reserving some fixed percentage of deposits is far from adequate (though common in the past). There are further subtleties over what is to count as reserved funds (gold in the vault should count, but what about likely future tax breaks?). The industry has an interest in international as well as national comparisons, not only because banking is now international but in order to discover if the banking conditions in some countries are more stable than in others.

At the time of the earliest actuarial legislation, the U.K. Joint Stock Banks Act of 1844 required the provision to shareholders of profit and loss accounts³⁴ and it came to be generally accepted that some sort of regulation of risky investments by banks was necessary to the stability of the banking system.³⁵ The Bank of England, followed by other central banks, gradually took on a supervisory role in ensuring the stability of the banking system as a whole.³⁶ Mid-20th century banking was highly regulated in such matters as interest rates, exchange rates and entry to the industry. A period of deregulation in the 1980s removed many of these restrictions, but reserving against risk did not go through the same process and was generally thought to be in need of stricter regulation, ideally undertaken on an international scale. This was the background to the Basel initiatives undertaken by the Committee on Banking Supervision of the BIS, the original Basel Capital Accord of 1988 ('Basel I'), replaced by the more elaborate but flexible Basel II (final version released in 2004, with implementation in many countries by 2006).³⁷ Formally, the Committee represents only the central banks of the G10 countries, and has no legal standing or legal backing of its own (nor is it subject to the control of any elected body which might influence it to take account of desiderata other than banking stability³⁸). The Basel Committee operates on the premises of the BIS, an international organization, but is not an organ of the BIS,

³² EATWELL, J. & TAYLOR, L. (2000) *Global Finance at Risk: The Case for International Regulation*. New York: New Press.

³³ Summary in MARRISON, *Fundamentals of Risk Management*, pp. 4–7.

³⁴ 7 & 8 Victoriae c. 113 (1844), p. 473.

³⁵ HICKSON, C. R. & TURNER, J. D. (2004) Free banking and the stability of early joint-stock banking. *Cambridge Journal of Economics*, **28**, 903–919.

³⁶ MORGAN, E. V. (1965) *The Theory and Practice of Central Banking, 1797–1913*. New York: Kelley.

³⁷ SHAH, A. K. (1996) The dynamics of international bank regulation. *Journal of Financial Regulation and Compliance*, **4**, 371–385; KANE, E. J. (1981) Accelerating inflation, technological innovation, and the decreasing effectiveness of banking regulation. *Journal of Finance*, **36**, 355–367; HERRING, R. J. & LITAN, R. E. (1995) *Financial Regulation in the Global Economy*. Washington, DC: Brookings Institution.

³⁸ PAULY, L. W. (1997) *Who Elected the Bankers?* Ithaca, NY: Cornell University Press.

nor do its decisions need to be ratified by the BIS or by any national governments³⁹ (though in 2005 directives that in effect implemented Basel II were approved by the European Parliament⁴⁰). Nevertheless, compliance with its standards by major banks in the major banking nations is almost total. In 2002, 90% of the countries claimed to be following the Basel I capital adequacy standard.⁴¹

The essential difference between Basel I and Basel II with regard to risk is that the latter permits banks to evaluate their risks using any internal models and sophisticated statistical technology they wish, provided they disclose them to the (national) regulator (such as the Federal Reserve Board in the United States and the Bank of England) and the regulator approves. This naturally allows free rein for statistical expertise, both on the side of banks and on the side of the regulator. It promises to bring evaluation of risks much more in line with true risk. We will choose here a few examples to illustrate the synergy between correct mathematical principles of risk and the development of the principle-based Basel international semilegal regime—the implementation, Platonists would say, of the world of abstract forms in a working real-world system.

An example of a widely applicable technical tool in risk analysis that is not much used elsewhere in statistics is the value-at-risk formalism. It is a method of measuring monetary risk of all kinds. The value-at-risk in an investment, at a given confidence level of $x\%$, is the amount such that that amount or more would be lost $x\%$ of the time. For example, if a portfolio manager has a daily VaR of \$1m at 1%, the chance of losing more than \$1m in a day is 1%. (The time period is important: under these conditions, the chance of losing more than \$1m on *some* day during a year is very high—around 92%.)⁴² The formalism is pictured in a diagram such as Fig. 1, where the graph expresses the distribution of losses and the ‘tail’ (shaded) the losses larger than the VaR.

The formalism and its diagram encourage a standardized approach to all kinds of risk, e.g. credit risk (of defaults of loans) and exchange rate risk (of losses from changes in currency exchange rates); the method is equally applicable to all. It also encourages concentration on features that are crucial

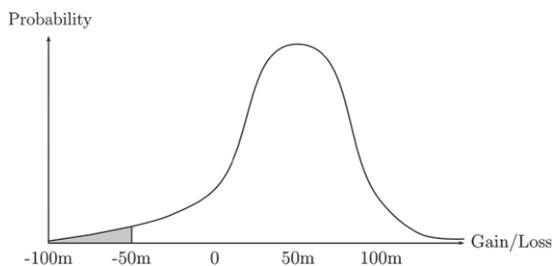


FIG. 1. Value-at-risk is the value such that larger losses have low probability

³⁹ GHOSH, S. (2005) Evolving international supervisory architecture: design, rationale and policy reform. *Journal of Banking Regulation*, **6**, 246–260.

⁴⁰ http://europa.eu.int/comm/internal_market/bank/regcapital/index_en.htm; for implementation via the German Banking Act see ANGERMÜLLER, N. O., EICHHORN, M. & RAMKE, T. (2005) New standards of banking supervision: a look at the German implementation approach for the Second Pillar of Basel II. *Journal of International Banking Law and Regulation*, **20**, 45–55.

⁴¹ HO, D. E. (2002) Compliance and international soft law: why do countries implement the Basel Accord? *Journal of International Economic Law*, **5**, 647–688.

⁴² HOLTON, G. A. (2003) *Value-at-Risk: Theory and Practice*. San Diego: Academic.

to evaluate what one's risk really is, such as the detailed shape of the tail, which often has to be modelled in the absence of adequate data on large loss events, and the correlations between different large risks, which are very difficult to extract reliably from data.

There are inherent problems in the Basel II regime. It is in danger of being 'procyclical', i.e. tending to deepen downturns and fuel booms. The system depends at one point on private actors: the ratings agencies Moody's and Standard and Poor's. They issue credit ratings (through a less than transparent process)⁴³ which are meant to be interpretable as absolute probabilities; e.g. a triple-A credit rating should mean a chance of one in 10 000 of failure in 1 year.⁴⁴ In a downturn, the probability of defaults increases, leading to downgrades of credit ratings across the board. The amount of capital that has to be reserved is very sensitive to these ratings and so can increase dramatically; but an increase in the need to reserve capital will force banks to lend less, deepening the recession.⁴⁵ There is also a statistical problem with time, well-known in the actuarial context: taking data over too short a run means that one's estimates ignore longer term risks, but data over a longer run may no longer be relevant to the current situation. There are related concerns as to whether the net transfer of risk out of the banking sector (to e.g. the insurance sector and private households) may have negative consequences for the stability of the financial system as a whole. Where has the risk gone?⁴⁶ Nevertheless, it is a strength of the Basel II system that problems such as these can be identified and considered.

Basel II has also forced banks to give more direct attention to risks that outsiders might first think of under the term 'risk', but have traditionally been thought of as too hard to quantify. It is agreed that while credit, market and insurance risks are relatively tractable as to methodology and the availability of necessary data, this is not the case for 'operational risk'. Operational risk ('the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events') is a grab-bag of kinds of risk, mostly of a rare and/or extreme nature.⁴⁷ They include the risks that may cause complete collapse of a bank. Merely classifying its kinds and establishing who has expertise in those various areas is a substantial intellectual exercise. In Table 1 are listed a number of kinds of operational risk along with some examples where these risks have been realized, some applicable methodologies.

It is widely agreed that there are unusual difficulties in the way of a bank's quantifying its operational risks adequately, or even of getting a 'ballpark' figure for many of them. Availability of data is a major challenge. Internal frauds e.g. are rarely reported by individual banks unless they are catastrophic. Therefore, an individual bank has very little data on past events of the sort it fears may affect it severely in the future. It is not usual for individual banks to hold data on public events

⁴³ KERWER, D. (2005) Holding global regulators accountable: the case of credit rating agencies. *Governance*, **18**, 453–475.

⁴⁴ MARRISON, *Fundamentals of Risk Management*, pp. 16–17; some doubts in SCHULTE-HERBRUGGEN, W., FISCHER, A. & BECKER, G. M. (2004) Basel II ratings: are they really comparable? *Banking Law Journal*, **121**, 430–454.

⁴⁵ DANIELSSON, J., SHIN, H. S. & ZIGRAND, J. P. (2004) The impact of risk regulation on price dynamics. *Journal of Banking and Finance*, **28**, 1069–1087; ILLING, M. & PAULIN, G. (2005) Basel II and the cyclicity of bank capital. *Canadian Public Policy*, **31**, 161–180; KING, M. R. & SINCLAIR, T. J. (2003) Private actors and public policy: a requiem for the new Basel Capital Accord. *International Political Science Review*, **24**, 345–362.

⁴⁶ HAUSLER, G. (2005) Risk transfer and the insurance industry. *Geneva Papers on Risk Insurance—Issues and Practice*, **30**, 121–127.

⁴⁷ BASEL COMMITTEE ON BANKING SUPERVISION (2002) *Sound Practices for the Management and Supervision of Operational Risk*, December 2001, revised July 2002; KING, J. L. (2001) *Operational Risk: Measurement and Modelling*. New York: Wiley.

TABLE 1 *Types of operational risk for banks*

Type of risk	Example	Methodology
Acute physical hazards	Tsunami, hail	Reinsurers' data + extreme value theory
Long-term physical hazards	Climate change	Climate modelling + work on effects on banking system
Biorisks	SARS, animal plague	Biomedical research + quarantine expertise
Terrorism	Bombing, Internet attack	Intelligence analysis
Financial markets risk	1997 Asian crisis, depression	Macroeconomic modelling, stock market analysis + extreme value theory
Real estate market risk	Home loan book loses value	Real estate market modelling
Collapse of individual major partner	Enron	Data mining on company data
Regulatory risk	'Basel III', nationalization, government forces banks to pay universities for graduates	Political analysis
Legal risk	Compensation payouts for misinformed customers	Compensation law and likely changes
Managerial and strategic risk	Payout unwanted CEO, dangerous management decision	
Internal fraud and human error	Barings rogue trader	Model pooled anonymized data, fraud detection
Robbery	Electronic access by thieves	Model pooled data, IT security expertise
Reputational risk	Run on bank, spam deceives customers	Goodwill pricing theory + marketing expertise
New technology risk	Technology allows small players to take bank market share	'Futurology'
Reserve risk	Reserved funds change value	
Interactions of all the above	Depression devalues real estate and reserves	Causal modelling of system interactions

like tsunamis; banks are not in the business of environmental modelling.⁴⁸ Therefore, there are opportunities for bank regulators to encourage a public centre to warehouse shared and if necessary anonymized data, and to broker the expertise of environmental and economic modellers on risks from external sources that can be studied with publicly available data.

It is generally agreed also that the diversity of operational risks creates methodological difficulties both in quantifying the individual risks and in estimating their interactions. Given that the (downside) tails of the distribution of events are crucial and that there are little data on tail events, it is necessary to avoid assuming that the events follow a standard distribution (such as the normal distribution) even if it fits the middle range of events well. Extreme value theory is the study of the extrapolation of the tails of distributions beyond the range of existing data, and is a specialized

⁴⁸ See generally ROSEN, R. A. & COREGGIA, A. (2004) The New Basel Capital Accord: Part I: environmental risks for banks. *Environmental Claims Journal*, **16**, 93–101.

topic in statistics that still needs further study and wider dissemination of what is already known.⁴⁹ The paucity of data on operational risks also means that it is essential to combine what data there are with expert opinion. The calibration of expert opinion by small data sets is itself a difficult theoretical area.⁵⁰

The possible applications of risk analysis to bank risk are thus very diverse. The Basel II compliance regime encourages investigation into all of them, and in principle mandates that any real and substantial risk identifiable by any method should be disclosed to the regulator.

5. The IFRS international compliance regime in accountancy and risky assets

Accountancy is still in the process of developing a truly international set of standards, the International Financial Reporting Standards⁵¹ and an international compliance regime. IFRS are promulgated by the International Accounting Standards Board of London and are planned to converge with the standards of the Financial Accounting Standards Board of the United States in due course.

The standards promise to deliver excellent prospects for the employment of statisticians, as they provide for some degree of realism in the pricing of assets whose value depends on a probability. These include options (especially those with complex conditions such as executive stock options with bars, e.g. an option to buy stock that may be exercised when the stock reaches \$10⁵²), insurance contracts,⁵³ unproven ore bodies⁵⁴ and goodwill, all of which have given endless trouble as to how they should be counted on balance sheets.

Accountancy went through a similar history of scandal-driven regulation as its sister professions. As with life insurance and banking, there was British legislation in the 1840s to force joint stock companies to disclose to the public some basic facts about their financial positions.⁵⁵ For many decades, most of the work of accountants arose from legal requirements, mostly audit and bankruptcy (as opposed to any innate desire by company managements to understand their internal finances).⁵⁶ The 20th century saw gradually increasing (national) regulation, with a dialectic between state

⁴⁹ EMBRECHTS, P. (ED.) (2000) *Extremes and Integrated Risk Management*. London: Risk Waters Group; EMBRECHTS, P., KLÜPPELBERG, C. & MIKOSCH, T. (1997) *Modelling Extremal Events for Insurance and Finance*. Berlin, Springer.

⁵⁰ CLEMEN, R. T. & WINKLER, R. L. (1999) Combining probability distributions from experts in risk analysis. *Risk Analysis*, **19**, 187–203; BEDFORD, T. & COOKE, R. (2001) *Probabilistic Risk Analysis: Foundations and Methods*. Cambridge: Cambridge University Press.

⁵¹ INTERNATIONAL ACCOUNTING STANDARDS BOARD. *International Financial Reporting Standards*. Available at <http://www.iasb.org/standards>

⁵² MUN, J. (2004) *Valuing Employee Stock Options*. New York: Wiley; CARPENTER, J. N. (1998) The exercise and valuation of executive stock options. *Journal of Financial Economics*, **48**, 127–158; AMANN, M. & SEIZ, R. (2004) Valuing employee stock options: does the model matter? *Financial Analysts Journal*, **60**, 21–37.

⁵³ DICKINSON, G. (2003) The search for an International Accounting Standard for Insurance: report to the accountancy task force of the Geneva Association. *Geneva Papers on Risk and Insurance—Issues and Practice*, **28**, 151–176.

⁵⁴ ELLIS, T. R. (2003) Reporting standards—the USA experience: achieving true globalization—problems and solutions. *CIM Bull.*, **96**, 37–48; LAWRENCE, R. D. (2001) Should discounted cash flow projections for the determination of fair market value be based solely on proven or probable reserves? *Mining Engineering*, **53**, 51–56.

⁵⁵ EDEY, H. L. & PANITPAKDI, P. (1956) British company accounting and the law 1844–1890. *Studies in the History of Accounting* (A. C. Littleton & B. S. Yamey, eds). London: Sweet & Maxwell, pp. 356–379; JONES, S. & AIKEN, M. (1994) The significance of the profit and loss account in nineteenth-century Britain: a reassessment. *Abacus*, **30**, 196–230.

⁵⁶ JONES, E. (1981) *Accountancy and the British Economy, 1840–1980: The Evolution of Ernst & Whinney*. London: Batsford (ch. 2); questions on the effectiveness of the process in POWER, M. (1999) *The Audit Society: Rituals of Verification*, 2nd ed. Oxford: Oxford University Press.

control and the development of standards by the industry to avoid state control. The U.S. Securities and Exchange Commission was an imposed bureaucracy intended to restore investor confidence in the Depression. Its tendency was to demand rigid, uniform and easily understood reporting rules, such as valuing assets at what they cost. The accountancy profession through the American Institute of Accountants gradually regained some initiative through a system of reporting standards, which have expanded to the present and forthcoming combined U.S. and IFRS system.⁵⁷ This system is now being implemented in all developed countries. It has the legal backing of EU directives.⁵⁸ Meanwhile, companies such as Enron, WorldCom and Parmalat have continued to supply scandals that suggest that still tighter international accounting regulation is needed.⁵⁹ Without this regulation investors and the overall financial system will remain exposed to large risks.

Accountancy has had an inherent problem with how contingent assets should appear on a balance sheet. Pure-minded probabilists would advise them to value birds in the bush strictly by their expectation: the full value of the asset multiplied by the chance of acquiring it. Any approach to a strict adherence to that standard would make accountancy a nightmare, by requiring the valuation of endless speculative goods of low probability and inherently flexible value, from rumours of goldmines in the hills to tentative business relationships that might pay off somehow sometime. It would also result in considerable volatility in the reports of a company's position.⁶⁰ On the other hand, requiring certainty in assets before they appear on a balance sheet would grossly distort the balance-sheet picture of companies whose assets consist largely of, e.g. chances of future profits from options and patents.

The general solution to the problem has been a gradual move from requiring near-certainty that the asset is in hand and then valuing it at some non-probabilistic way (such as what it costs or its market price) to a scheme of recognizing probable assets and chancy ones where there are standard probabilistic valuation procedures. The new directions require a much greater familiarity with probability than the old, and are only coming into being under pressure from the setters of industry standards.

We will illustrate the issues and the current position on them through the problem recognized as probably the most difficult, the accounting valuation of intangible assets, especially goodwill.

Typically, when a company is bought by another, the price paid by the buyer is much more than the value of the 'tangible assets' of the acquired company, such as physical plant and stock on hand. The difference is traditionally put down to 'intangible assets and goodwill'.⁶¹ 'Identifiable intangible assets' such as copyrights, trademarks, licences and patents are not always easy to price but at least there is often a market in them which allows some estimate of a market price. It is much harder to know how to value the remainder, the goodwill.⁶² Goodwill includes e.g. established customer

⁵⁷ ZEFF, S. A. (1984) Some junctures in the evolution of the process of establishing accounting principles in the USA: 1917–1972. *Accounting Review*, **59**, 447–468.

⁵⁸ http://europa.eu.int/comm/internal_market/accounting/index_en.htm.

⁵⁹ MUCHLINSKI, P. T. (2005) Enron and beyond: multinational corporate groups and the internationalization of governance and disclosure regimes. *Connecticut Law Review*, **37**, 725–763.

⁶⁰ DAY, J., ORMROD, P. & TAYLOR, P. (2005) The adoption of International Financial Reporting Standards: implications for volatility and uncertainty in relation to accounting earnings and valuation. *Journal of International Banking Law and Regulation*, **20**, 120–128.

⁶¹ ELLIOTT, B. & ELLIOTT, J. (2000) *Financial Reporting and Accounting*, 4th ed. New York: Financial Times Prentice Hall (ch. 20); BEUTEL, P. A. & RAY, B. (2004) Grasping the value of intangible assets. *International Tax Journal*, **30**, 35–45.

⁶² HENNING, S. L., LEWIS, B. L. & SHAW, W. H. (2000) Valuation of the components of purchased goodwill. *Journal of Accounting Research*, **38**, 375–386; CHAUVIN, K. W. & HIRSCHHEY, M. (1994) Goodwill, profitability and the market value of the firm. *Journal of Accounting and Public Policy*, **13**, 159–180; GRÖJER, J.-E. (2001) Intangibles and accounting classifications: in search of a classification strategy. *Accounting Organizations and Society*, **26**, 695–713.

loyalty that will continue to bring customers through the door, ‘brand strength’⁶³ or recognition, and possibly the human capital of a company, such as loyal and skilful employees and a positive corporate culture. All these are real entities: they are dispositions that will probably cause future profits and as Plato says, power is the mark of the real.⁶⁴ It does make some sense to value goodwill separately since it is in principle a factor that will bring in business—e.g. the ‘goodwill’ of a family delicatessen includes its location and the loyalty of its customers based on the friendliness of its staff and reliability of supply of quality products, and is affected by whether there are other delicatessens nearby; the resulting probability of customers entering is in principle capable of independent evaluation. With the expansion of knowledge-based service industries, the proportion of assets that are intangibles is much higher and ignoring or misestimating them is a correspondingly larger distortion of financial reality. Microsoft has comparatively few tangible assets but it has ‘intellectual capital’ in the sense of a team of researchers with a track record of successful innovations, who can be expected to generate future profits. Microsoft’s share price can be taken as an estimate by the market of what it is worth (after tangible assets, licences, etc. are subtracted). On one estimate, 94% of Microsoft’s worth is represented by such intangibles.⁶⁵

But such items are not normally saleable as separate items because they operate to produce benefit only in the context of the whole company. So there is no clear or accepted methodology for valuing them (other than reverting to what was paid for them in fact or would be paid in the estimation of experts). The problem is even worse when the intangibles are ‘internally generated’ (as opposed to ones bought as part of the purchase of a whole company), where there has been no sale.

It is not surprising that standard accounting practice took a defeatist attitude, calling the valuation of goodwill ‘the most perplexing problem in accounting, and one that is almost certainly irresolvable’.⁶⁶ Despite these difficulties, the need for realism led to the imposition of some standards for the treatment of at least the goodwill visible in takeovers and mergers. Unfortunately, there was considerable diversity in international practice, with e.g. Australian free-to-air television licences being valued at billions of dollars when they would have been completely disallowed in the United States.⁶⁷ Despite the difficulties, IFRS requires a separate and much more exact valuation of these kinds of assets. Its rules for mergers require an estimate to be made of the goodwill at the time of merger, and then estimates of changes or ‘impairments’ to goodwill in the years afterwards, under the rule that ‘amortisation of goodwill and intangible assets with indefinite useful lives is prohibited. Instead they must be tested for impairment annually, or more frequently if events or changes in circumstances indicate a possible impairment.’ This has the laudable purpose of identifying acquisitions for which

⁶³ SMITH, G. V. & PARR, R. L. (1994) *Valuation of Intellectual Property and Intangible Assets*, 2nd ed. New York: Wiley, pp. 289–296; BARTH, M. E., CLEMENT, M. B., FOSTER, G. & KASZIK, R. (1998) Brand values and capital market valuation. *Review of Accounting Studies*, **3**, 41–68; TOLLINGTON, T. (2001) UK brand asset recognition beyond ‘transactions or events.’ *Long Range Planning*, **34**, 463–487.

⁶⁴ PLATO, *Sophist*, 247e.

⁶⁵ LEADBEATER, C. (1998) Time to let the bean-counters go. *New Statesman*, **17**, 30–31; rather less on Microsoft’s published balance sheet, but still more than property and equipment: http://www.microsoft.com/msft/ar05/staticversion/10k_fr_bal.html.

⁶⁶ STAMP, E. (1980) *Corporate Reporting: Its Future Evolution*. Toronto: Canadian Institute of Chartered Accountants, p. 19.

⁶⁷ RADEBAUGH, L. H. & GRAY, S. J. (2002) *International Accounting and Multinational Enterprises*, 5th ed. New York: Wiley (ch. 7); WHITTRED, G., et al. (2004) *Financial Accounting: Incentive Effects and Economic Consequences*, 6th ed. South Melbourne: Thomson, pp. 280–290.

too much was paid, but the valuation required is not easy. The amortization of intangible assets like trademarks and patents requires difficult probabilistic judgements as to their useful life: the trademark of a leading soft drink probably has an indefinite life, but a patent for an invention needs a reasonable estimate of the time between first sale and obsolescence of the product.

Internally generated intangibles, on the other hand, are not estimated, on the grounds that there is no consistent method of doing so. Since the worth of major world players like Google and Microsoft consists mostly of internally generated intangibles, the mismatch of accounts with reality is severe. Any statistician who can discover a reliable method of valuing them stands a good chance of a Nobel Prize for Economics.

6. Conclusion

Bankers and accountants now need to be experts in probability as actuaries always have been, or if not they need to employ such experts.

All three of the risk-based professions—actuarial, banking and accounting—have moved in the direction of ‘principle-based’ standards, as opposed to relying on detailed and formal rules. This means e.g. that individual firms are encouraged to evaluate their risk positions correctly, using sophisticated statistical methodology if necessary, and the methodologies are actually or in principle overseen by a regulator. The international regulator that sets the standards for each industry represents the industry’s practitioners, not any national government or international political organization such as the United Nations. However, it is represented in individual countries by regulators that do have legal force. The strength of the systems lies in the high level of agreement between national governments and the organizations of practitioners on the need to found stability of the industries on standardized international practice based on expert knowledge.

The result is a system of international legal or semilegal regimes based on sound abstract principles, free of the idiosyncracies endemic to individual legal systems. Legal scholars should be aware of this developing process, and perhaps consider its advantages for other types of law that deserve to be based on abstract probabilistic principles. These types include the law of evidence (which should be based on the degree to which the available evidence logically supports the verdict) and compensation law (which should be based in large part on the probability that the identified cause was responsible for the harm and the probable losses arising); later articles will treat these topics. Statisticians should consider the area as a source of work and of research problems. They should develop courses in the area, both at the undergraduate level for future experts and as professional development courses for existing practitioners; these courses will need to combine traditional quantitative statistical methodologies with the more qualitative evaluation of evidence familiar to lawyers. Managers in banking and accounting and the lawyers who advise them will need to increase their understanding of the statistics of risk. Political theorists will benefit from understanding the international reach of technical experts and the reasons why compliance with their directives is so high.