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ACCOUNTANCY FUTURES

Confidence accounting: a proposal

A joint paper from ACCA, the Chartered Institute for Securities & Investment and Long Finance

Preface

This paper looks at an important area for accountants and, more importantly, users of accounts, namely the accuracy to which numbers in published accounts can be stated. We all know that some figures, such as property valuations, imply more accuracy than is really possible. Most sophisticated users of accounts understand this and will take this into account. The fact remains that accounts should be as precise as possible, but no more. The subject is seldom discussed, probably largely as the problem has been around so long that most people rarely consider it.

This is less of a problem with smaller and simpler companies. Uncertainties behind valuations are usually, although not always, fairly obvious. The problem is greater with larger and more complex organisations and is probably greatest for global financial institutions. The financial crisis highlighted the fragility of valuations of assets and liabilities of large complex financial institutions and that 'profits' could quickly disappear as market mood changed.

Sound financial reporting is fundamental to sound business and it is no exaggeration to say that economic prosperity requires it. It is in the public interest to consider new ideas for improving reporting. The challenge of how best to show uncertainty in valuations is worth consideration. Z/Yen and Long Finance have produced this alternative approach to reporting assets and liabilities for consideration. Their approach is to show the expected range and distribution of likely values for significant balance sheet items. From this they suggest that accounts become more meaningful and that we can be better informed about such matters as 'going concern' and the confidence with which one can express net assets and net income. The result is pictorial rather than columnar and is not what the profession is used to. The approach is novel and does give a different way of seeing things.

AN INVITATION TO COMMENT

ACCA is not endorsing this particular approach but believes that the ideas have sufficient merit to be considered further. More importantly this challenge about reporting uncertainty or confidence in valuations merits informed debate. ACCA wishes to promote and encourage discussion and considers that such discussion would be in the public interest. The hope is that this will result in better understanding of the problem and more, and possibly better, suggestions on how to address it.

The paper is, therefore, issued by the authors as a discussion paper and they would welcome comments: a list of consultation questions can be found in Section 8. Readers may like to respond to any of the questions; ACCA itself would also welcome any comments its members may have on the specific questions. Comments are invited at any time up to 31 December 2012.

Please address your comments to Michael Mainelli at Z/Yen (michael_mainelli@zyen.com) and, in the case of the specific questions for ACCA members, to Paul Moxey, head of corporate governance and risk management at ACCA (paul.moxey@accaglobal.com).

Confidence Accounting: A Proposal

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ACCA, CISI and Long Finance, London, July 2012

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Foreword

Confidence Accounting is a novel proposal for using distributions, rather than discrete values, in auditing and accounting statements. In a world of Confidence Accounting, the end results of audits would be distributions for the profit and loss, balance sheet and cash flow statements of major entities. The proposed benefits of Confidence Accounting include a fairer representation of risks around financial results. That is an essential prerequisite for the effective pricing of risk by end-investors.

I welcome this consultation document, which ACCA, CISI and Long Finance have issued. Confidence Accounting is a big idea. As such, it will benefit from debates and suggestions from the communities of account users, account providers and regulators. I look forward to that discussion. My hope is that this proposal moves our thinking a step closer towards a set of accounting standards for major entities that put systemic stability centre stage. In the light of the crisis, anything less than a radical re-think would be negligent.

Andy Haldane
Executive director for financial stability, Bank of England

Executive summary

The use of a single number for accounting terms such as profit or balance sheet value is clear and simple, but wrong. 'Confidence Accounting' is a term for a proposal to use distributions rather than discrete values in accounting and auditing. The term was coined by Long Finance proponents as part of a shift from using specific values in accounts to the use of interval estimates and confidence levels, making accounting and auditing practices more closely resemble other measurement sciences.

In a world of Confidence Accounting, the end results of audits would be presentations of distributions for major entries in the profit and loss, balance sheet and cash flow statements. Accountants would present uncertainties as ranges to investors and managers, rather than as discrete numbers: 'the balance sheet of Company X is worth £Y, plus or minus £Z, and we are 95% confident that it falls within this range'. Auditors would verify these ranges. This would move auditing towards 'measurement science', in line with the way most laboratories report measurements. Audited accounts would be presented in a probabilistic manner, showing ranges. Over time, investors could evaluate an audit firm on the basis of how closely historic accounts fell within the stated ranges. Such evaluations might conclude that firms were too lax or too strict. Clients would be able to make their own decisions about audit quality on the basis of historic evidence rather than having to rely on assertions of quality.

In 2011, ACCA (the Association of Chartered Certified Accountants) and the Chartered Institute of Securities & Investment (CISI) commissioned the Long Finance community, led by Z/Yen Group Limited (Z/Yen), to provide a proposal setting out the arguments for Confidence Accounting and two worked examples of how audited accounts prepared under Confidence Accounting for two hypothetical firms might look, one for a bank (Banco-UK Plc) and one for a professional services firm (Pro-Co UK Ltd). The two worked examples are presented in the first two appendices.

The proposed benefits of Confidence Accounting include a fairer representation of financial results, shorter and fewer footnotes, measurable audit quality and a mitigation of mark-to-market perturbations. The worked examples show that Confidence Accounting:

- is workable and can be applied to banks and professional services firms, and probably most major firms in other industries
- does result in a fairer representation of financial results
- could reduce the size and complexity of annual reports, in the case of Royal Bank of Scotland, for instance, by between 29 and 99 pages out of 446 pages (2010)
- probably provides a sound basis for measuring audit quality
- probably provides a basis for beginning to reconcile balance sheet valuation and market value, and
- certainly highlights the need for clarity between uncertainty over valuation during the period of going concern versus risk about changes in the state of the economic climate.

The worked examples raised issues of defining 'going concern', mark-to-market valuation and identifying discontinuous environmental change. Those involved in future Confidence Accounting discussions may find that this approach helps to reconcile some of these problems. The authors feel that Confidence Accounting would enhance existing financial reporting. They envisage that Confidence Accounting would be presented alongside traditional accounts, either as part of the notes or as a set of proforma accounts.

1. Origins

This report argues that the use of a deterministic numeric paradigm in accounting and auditing may well be the root cause of many current problems. Accounting methods could use probabilistic inputs and show resultant outputs as distributions of numbers. Accounting and auditing have been subject to much criticism over the past two decades. During the dot.com era, some accountants subjected themselves to needless criticism by putting forward business plans based on deterministic numbers that were incapable of showing the all-too-frequent reality: a small chance of making lots of money and a large chance of losing money. Had accountants submitted plans that showed the distributions, they might well have served investors better, reduced unreasonable expectations and minimised criticism of the accountants' role. Instead, they presented single numbers or played with high, medium or low forecasts to calculate 'average' forecasts, none of which contained the possibility of winding up the business or conversely of wild success.

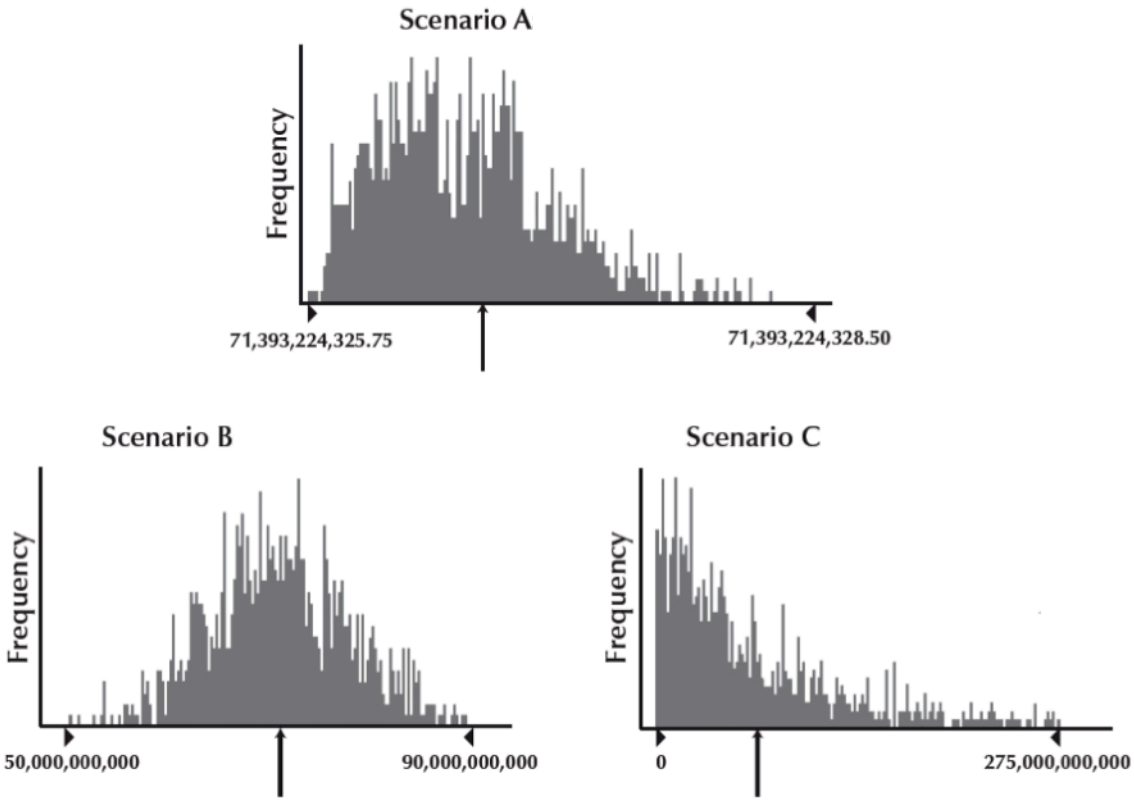
Criticism perhaps reached a peak in the early 2000s after a series of telecommunications and Internet company failures, coupled with Enron's collapse. More criticism has followed the financial crises since 2007. These crises have been systemic failures, where interactions among banks, rating agencies, regulators, governments, financial instruments, and auditors mattered more than the specific behaviour of a particular actor. Still, as important actors, it is incumbent on accounting professionals to explore how auditing and accounting could be improved.

Something akin to Confidence Accounting was raised in 1977 in a letter to the New York Times by Professor Joshua Ronen of New York University's Stern School: 'The myth of certainty, with its accounting for the past, holds the accounting profession to a single number'. In the 1990s and early 2000s, Mainelli and Harris used the term 'Stochastic Accounting' (Mainelli and Harris 2002). In the mid 2000s the term 'Confidence Accounting' was coined by Long Finance (www.longfinance.net) proponents as part of a shift to interval estimates and confidence levels, making accounting and auditing more closely resemble other measurement sciences. In 2006 Gresham College held a symposium in conjunction with New York University, 'Reforming Auditing – Incremental Change or Radical Action?', with Professor Ronen, where the connection to Ronen's earlier thoughts was made.

As Paul Moxey of ACCA observes, 'If auditors practise risk-based auditing, then why can't we see the odds they face?' This simple question raises a number of concerns about the approach to financial statements and auditing by today's accountants. 'Balancing the odds' might well give a truer and fairer picture of accounting than traditional ways of 'balancing the books'. Chenoweth notes that News Corporation reported its profits for 1987 as Aus$364.364 million, 1988 as Aus$464.464 million, 1989 as Aus$496.496 million, 1990 as Aus$282.282 million, 1991 as Aus$391.391 million, and 1992 as Aus$530.530 million, after which it moved to rounded millions. As he queries, 'If this accounting team is so confident that they can make the minor numbers in a profit report say anything they want, then what does this say about the big numbers the company was reporting?' (Chenoweth 2002: 302)

The uncomfortable truth is that accountants have quite a bit of influence over the final number. When Global MegaCorp states its assets as £71,393,224,327 we know this number is a fiction. This is an estimate of the mean of assets but the distribution of values is not actually available to allow the accounts user to know more. Realising the obvious absurdity and statistical improbability of purporting to know a huge corporation's assets to the penny, accounting conventions call for accountants to round things off, but we still do not have an idea of the range of the distribution. One number alone is sought to describe complex distributions. The three frequency charts below (Figure 1.1) all provide the same mean for assets: £71,393,224,327, under today's deterministic, single-number paradigm. In fact, the distribution of possible assets has a very different shape in each of the three scenarios. Anywhere accountants need to build a complicated valuation model, they should probably be considering presentation of the model in a probabilistic way.

Figure 1.1: Three scenarios – assets exactly £71,393,224,327



Scenario A has an insignificant range of possible outcomes. The accountant is grappling with rounding differences of pennies – this is immaterial to the auditor. Scenario B has an unbelievably large range normally distributed around the mean. The accountant is grappling with significant uncertainties when computing assets. Scenario C is heavily skewed, with the most likely outcome being significantly lower assets than the mean outcome. In some respects, spurious precision creates instability by making people seek explanations for movements that were well within expected outcomes if the accounts had been presented more appropriately.

The financial crises since 2007 certainly brought renewed attention to the quality and value of audit work. The audited balance sheets and going-concern statements for many major financial firms over this period were clearly questionable. Virtually all the major financial firms were audited by the Big Four. There was no discernible dissension among the Big Four about the manner or methodology of financial audits. *Audit Policy: Lessons from the Crisis* was published by the European Commission in October 2010. The report pointed to the importance of improving audits to enhance financial stability, questioning how banks could fail just months after successfully passing through audits. This has prompted issues related to Confidence Accounting. Andrew G. Haldane, executive director, Financial Stability and member of the Financial Policy Committee at the Bank of England noted:

For perhaps the first time, it [*Proposed Regulatory Prudent Valuation Return*, published in December 2011] *provides confidence intervals around banks' balance sheets – what some have called 'confidence accounting'. The stage is now hopefully set for such principles to be rolled out across Europe. For example, the European Banking Authority (EBA) is developing binding technical standards on a prudent valuation methodology by end-2012.*('Accounting for Bank Uncertainty', speech given at the 'Information for Better Markets' conference, Institute of Chartered Accountants in England and Wales, London, 19 December 2011)

It is instructive to dwell for a moment on the relationship of auditing to accounting:

The relationship of auditing to accounting is close, yet their natures are very different; they are business associates, not parent and child. Accounting includes the collection, classification, summarization, and communication of financial data; it involves the measurement and communication of business events and conditions as they affect and represent a given enterprise or other entity. The task of accounting is to reduce a tremendous mass of detailed information to manageable and understandable proportions. Auditing does none of these things. Auditing must consider business events and conditions too, but it does not have the task of measuring or communicating them. Its task is to review the measurements and communications of accounting for propriety. Auditing is analytical, not constructive; it is critical, investigative, concerned with the basis for accounting measurements and assertions. Auditing emphasizes proof, the support for financial statements and data. Thus, auditing has its principal roots, not in accounting, which it reviews, but in logic on which it leans heavily for ideas and methods. (Mautz and Sharaf 1961: 14)

Accounting *constructs*, assembling information that helps others form a view. Auditing begins where accounting ends. Auditing *critiques*, expressing an independent opinion on accounts and verifying their freedom from misrepresentation and errors of principle. Suggestions for reform to audit are many and varied, trying to address a variety of problems – audit firm market concentration, lack of independence, principal–agent problems, lack of indemnity, relationships with regulators, mark-to-market rules. Since 2007, Confidence Accounting has also received more attention from theorists and regulators.

Confidence Accounting questions the basis of contemporary audit and accounting in terms of measurement science, or metrology. Metrology deals with the fact that nearly all measurements are inexact. Inexactness is often stated as ‘measurement uncertainty’ or ‘error’. Scientific measurement specifies accuracy and precision. Accuracy is a matter of how closely a stated value is to the actual value. Precision means how likely it is that repeated measurements will produce the same results. A measurement system can be accurate but not precise, precise but not accurate, neither, or both. If your bathroom scale contains a systematic error, then increasing sample size by weighing yourself more often increases precision but not accuracy. If your bathroom scale is very accurate but your weight tends to fluctuate wildly, today’s spurious accuracy is not a good guide to your weight, eg for safety purposes. A faulty scale can give a precise weight with a constant error.

Scientists view measurement as a process that produces a range. Scientists and engineers express a measurement as X, with a surrounding interval. There is a big difference between point estimation and interval estimation. Accounts provide point estimates, scientists intervals. For example, physical scientists report X ± Y. Social scientists report interval estimates for an election poll and state how confident they are in that the actual value resides in the interval. Statistical terms, such as mean, mode, median, deviation, or skew, are common terms to describe a measurement distribution’s ‘look and feel’. The key point is that scientists are trying to express characteristics of a distribution, not a single point. This report argues that financial measurement should be little different from scientific measurement.

2. Concept

Confidence Accounting is a term that covers the use of distributions rather than discrete values in auditing and accounting. In a world of Confidence Accounting, the end results of audits would be presentations of distributions for major entries in the profit and loss, balance sheet and cash flow statements. The value of freehold land in a balance sheet might be stated as an interval, £150,000,000 ± 45,000,000, perhaps recognising a wide range of interesting properties and the illiquidity of property holdings. Next to each value would be confirmation of the confidence level, eg, 95% confidence that another audit would have produced a value within that range. Finally, there would be a picture, a histogram of the distribution, so people can see the shape of things. The proposed benefits of Confidence Accounting include a fairer representation of financial results, fewer and shorter footnotes, measurable audit quality and a mitigation of mark-to-market perturbations.

The banker and financial researcher, John Abbink, relates a story about a banking analyst who had an interview with the CFO of a large European bank. As they were chatting about the accuracy of the financial results, the CFO picked up a copy of the bank's annual report and opened it to the P&L. The CFO ran his finger down the accounts till he reached the bottom and said, 'Ah, yes, Dividends Paid. This number is true'. Perhaps it is, but there are numerous accounting, and thus audit, issues where a range reflects the true situation:

- capitalisation of research and development, where assessments need to be made on the likelihood of a future revenue stream
- intangible assets whose future value may fluctuate markedly, such as long-term contracts, patents, trademarks and licensing agreements, must be recognised, valued, and amortised, yet this may not include all intangible assets – only intangible assets that meet certain criteria according to SFAS 141
- administering pensions and health-care obligations, where actuarial assumptions become crucial
- executive stock options, which may, or may not, be exercised under certain conditions
- off balance sheet items, which may have some effect
- non-cash tangible assets are not even straightforward to value.

The common thread is that the assessment of asset value and revenue requires an assessment of future probabilities, not certainties. Even in less contentious aspects of accounting similar concerns about future probabilities are involved. For example:

- inventory valuation relies on estimates of future sales and prices
- work-in-progress needs careful handling of divergent assessments of earned value
- numerous measures are marked-to-market, but through devices such as an annual average, eg interest calculations, foreign-exchange movements, which could have different results with different assumptions
- using asset valuations every few years on 'big ticket' items such as property assumes inherent stability in prices, yet even supertanker sales prices can fluctuate wildly and rapidly
- all setting of reserves and provisions, eg bad debts, requires estimates of future outcomes.

The search for a single number is intertwined with debates of historic, current or fair value. Accountants and auditors seek guidance from accounting standards, sometimes conflicting guidance, all in pursuit of a single number to describe a distribution. Accountancy's theoretical framework assumes a deterministic system that outputs a single number. Accountants and auditors have different roles, but both draw on virtually the same intellectual frameworks and regulation. In bookkeeping, the focus on an exact single number is important. After all, what is the point of trying to 'balance the books' if 'close enough' is adequate? Without the discipline of 'balancing the books', lower-level mistakes would be missed and misunderstandings would not be resolved. Higher-level interpretations are, however, probabilistic, ie inputs into a higher-level figure such as turnover include many sorts of estimate. Not everything can, or will, balance. Inputs are probabilities and outputs are distributions. At a low level, bookkeeping remains, but the interpretation and presentation of financial information needs to shift to distributions.

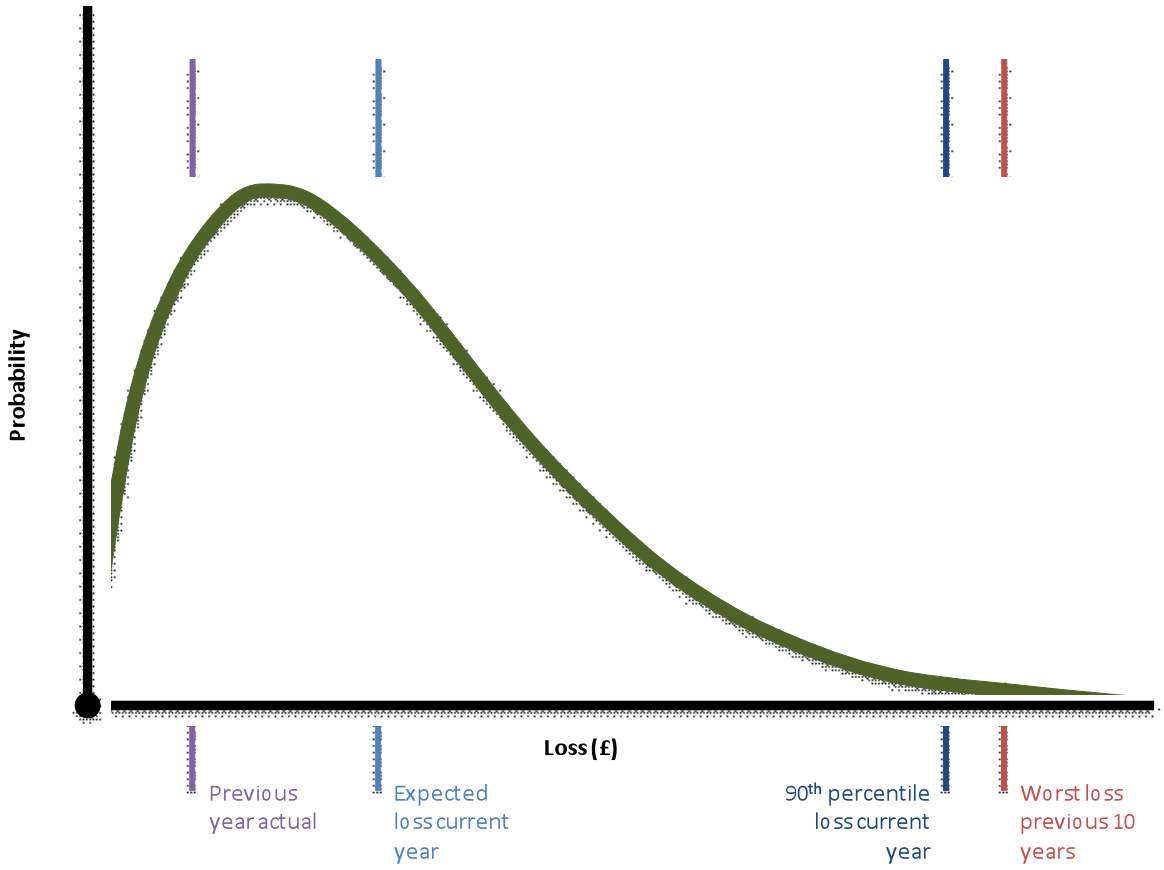
This is not a proposal that traditional accounting should stop or that Confidence Accounting should take its place for all reporting entities. Rather, Confidence Accounting could provide additional and valuable information that is either not in, or difficult to see in, the accounts of some types of entity, not least those in banking or insurance. Initially, at any rate, the authors envisage that Confidence Accounting would be presented alongside traditional accounts, either as part of the notes or as a set of proforma accounts. Confidence Accounting should be evolutionary not revolutionary.

PRESENTATION

If outputs from Confidence Accounting are distributions, then they should materially affect the way financial statements look and feel. The structure of financial statements would remain similar to the three current, primary statements, ie balance sheet, income statement (profit and loss) and statement of cash flows. The accountant would, however, present three distributions as histograms for net assets, profit and cash. These distributions would be built up in turn from underlying distributions, eg in the case of assets – current assets, property, plant, equipment, investments, etc. A standardised reporting format might specify the presentation of the distribution and conventions on representing confidence levels, quartiles or standard deviations.

Standard representations of distribution histograms will have to be specified. Standards for distribution function measures will have to be specified as well, to ensure accurate presentation. Graphical disclosure is important for Confidence Accounting. By showing the four most relevant data elements (previous year's actual loss, current year's expected loss, current year's 90th percentile, and the worst loss over the previous 10 years) most users will be able to make informed judgements about the degree of prudence used in the preparation of the accounts. Assumptions can be easily compared across a sector and with external views, eg those of economic forecasters, rating agencies and equity analysts. Hu (2011) points out that there could be benefits from more comparable practices among auditors and credit rating agencies, allowing each to benefit. Although there would be a substantial volume of disclosures, the format is simple and can be applied consistently (see Figure 2.1).

Figure 2.1: Sample portfolio disclosure



There will be some difficulties acquiring information to determine distributions. Many firms have too few data to give any statistical validity to a distribution. Much can be done to provide data through intra-firm comparisons, benchmarking or auditor input, eg a statement about what constitutes a standard actuarial curve for bad debts in a given business sector. As it is the directors who must prepare annual financial statements that give a true and fair view of the state of affairs, in many cases, they will have to provide a qualitative distribution curve (quite a bit of software supports homemade distribution curves). If this seems artificial, in fact it is quite the opposite. Which is worse, forcing directors to a single number, such as a guesstimated mean when none exists, or asking them to specify their views of the likely range of outcomes?

Some organisations will want to provide extremely wide ranges in their distributions. Where this reflects reality, so be it. In other cases managers will hope that a wide range removes some responsibility of meeting targets. In practice, markets will punish managers who have not invested enough in gathering information to reduce uncertainty. Expect phrases such as 'Global MegaCorp was punished today on release of its results, with a range for ROA of over 15% in an industry where 5% is the norm, much of this attributed to overseas licence problems…'.

Risk-based auditing is another area where Confidence Accounting might help. Some accountants would claim that things have moved on. Auditors will point out that they already use probabilistic techniques in establishing sample sizes. Without getting into a detailed debate on evidence in their working practices, eg whether auditors perform Monte Carlo simulations to establish sensitivities, the crucial evidence of successful Confidence Accounting would be the presentation of audited accounts in a probabilistic manner. Disclosure of materiality would possibly be a sensible accompaniment to a move towards Confidence Accounting. Beneath that evidence one would expect to see methods that established input distributions, determined their interactions (eg sensitivity analysis, Monte Carlo simulations and some statistical calculations) and presented their impact in meaningful statements.

Over a decade ago a large international accountancy firm proudly introduced a risk-based, audit software tool. Despite a lot of marketing press about a 'risk-based approach to audit' and 'advanced techniques', risks were scored on a 'high–medium–low' scale, with not a number in sight. This was not an example of a sophisticated user interface because behind the scenes 'high–medium–low' was converted into '3-2-1' and then added and averaged in a travesty of probabilistic risk. The firm had no mechanism to apply anything other than a deterministic risk rating, hence it was unable to incorporate a distribution of possible outcomes into its working practices.

3. Models

One objective of published accounts must be to allow comparisons between different companies in the same business, and for the same company over time. That means there must be a high degree of consistency in methodology and a relatively high degree of consistency in the way key inputs are determined in pursuit of an objective of informing stakeholders about the uncertainty in the values of assets and liabilities at the reporting date. The only way to ensure that everyone aims at the same objective with a useful degree of consistency is to use a model (in a relatively loose sense of the word 'model').

Models are very useful but they come with limitations and shortcomings since they have to simplify reality. For the kind of model implied by Confidence Accounting, the critical shortcomings are that inputs have to be estimated by a wide range of practitioners in a way that the results, for a given firm, are not unduly dependent on the individual accountant but are overwhelmingly the consequence of data and rules. In turn, inputs must be derived from reliable data sources using more or less standard methods. The obvious consequence is that the accounts are limited to informing the reader about 'known unknowns'. The only way to incorporate 'unknown unknowns' is to imagine them (eg stress testing), but that will always be subjective and should be kept out of accounting.

Confidence Accounting addresses the 'known knowns', current uncertainty, but not the 'known unknowns' of risk lore or the 'unknown unknowns' of which people are inherently ignorant. Edward Nell distinguishes current uncertainty from natural and market uncertainty:
At least two senses of 'uncertainty' can usefully be distinguished – 'natural uncertainty' meaning that the world is nonergodic (the law of large numbers does not apply in a particular situation; the situation is unique) and that in general the future cannot be predicted from study of the past, and 'market uncertainty' which arises from the fact that agents do not know each other's intentions, and/or how the various strategies will work out when played. Neither can be reduced to calculable risk. (Nell 1998: 68)

When uncertainties can be estimated (ergodic) and market uncertainty is assumed to be low (the potential for a large environmental disruption is ignored) then Confidence Accounting applies. Risk techniques such as scenario planning and stress testing are, arguably, suited to analysing the 'known unknowns'. To some degree, the market uncertainties, eg correlated movements, are modelled in the correlation matrix that would accompany a large firm's accounts, and have been created in the Banco-UK plc worked example in Appendix A.

'Current uncertainty' takes a set of observable market prices (roughly equivalent to 'tier 1' capital under FAS – basic regulatory capital, ie common stock and retained earnings) as given, where 'future uncertainty' is all about how those prices might change. In fact all valuations derived from market prices also use assumptions and parameters that are not directly observable, and therefore subject to uncertainty, and it is that uncertainty that Confidence Accounting is intended to reflect. Risk, by contrast, tends to concentrate on future uncertainty about observable market prices, keeping other assumptions and parameters the same. Confidence Accounting focuses on capturing the range of valuation uncertainty at a specific time (ie at reporting date), not future uncertainty. That leads to a table distinguishing Confidence Accounting from risk assessment:

Table 2.1: Distinguishing Confidence Accounting from risk assessment

Paradigm	Situation	
	Current Uncertainty	
	Prices	Assumptions
Confidence Accounting	take as given	modelled
Risk	modelled	take as given
	Future Uncertainty	
	Prices	Assumptions
Confidence Accounting	out of scope	out of scope
Risk	modelled	modelled

Would banking in 2007 have looked different under Confidence Accounting? Yes, very different. Under conventional accounting a CDO or CDO-squared or other structured credit derivative was reported at the best estimate of current market value. Under Confidence Accounting, the assumptions underlying that valuation would have been tested (against historical fluctuations, admittedly) and the resulting uncertainty about values would have been reflected in the accounts.

To illustrate, consider a real position at a real European bank in 2008. The particular synthetic index CLO was a derivative with a portfolio of 115 European public companies as its notional reference portfolio. Its value was extremely sensitive to assumptions about the average correlation of the default risk of those companies. Technically, the correlation was expressed as the correlation between the mean time-to-default of each company. A value of 28% meant a mark-to-market value of about €50m, a value of 27% led to a mark-to-market value of €100m and a value of 29% to a mark-to-market value of €20m. There were no transactions in the five days before the quarter-end from which the bank could derive a market-implied average correlation, so it used its best estimate from other transactions with slightly different reference portfolios. Under Confidence Accounting, the range of such not-identical implied correlations would have been used to give a measurement error for the transaction and that would at a minimum have been 27% to 29%, and probably greater. So instead of €50m this transaction would have been reported at €20m to €100m with a best estimate of €50m. As an aside, the reason most banks' market risk calculations did not show this degree of risk was because most banks treated such CLOs and the like as a single transaction, and looked at past prices of the transaction to calculate volatility.

4. Benefits

The central role assigned to decision making leads straight to the overriding criterion by which all accounting choices must be judged. The better choice is the one that, subject to considerations of cost, produces from among the available alternatives information that is most useful for decision making. (Financial Accounting Standards Board 1980: 1)

Financial information is evaluated by its usefulness and comprehensibility for making financial decisions. Moving to Confidence Accounting improves a number of characteristics of accounting information as Table 4.1 shows.

Table 4.1: Ways in which Confidence Accounting improves accounting information

Characteristic	Deterministic problem	Stochastic accounting
Relevance		
Predictive value	Wide ranges require a single number	The range is fully described
Feedback value	The single number is wrong 99.9% of the time and discussion centres on whether it was close enough	Clear discussion on whether results fell within predicted ranges and if not, why was the certainty factor wrong
Timeliness	Much discussion and prevarication in choosing a single number	Prompt presentation of the 'way things are' and ability to see convergence over time
Reliability		
Verifiability (objectivity)	Difficulty in obtaining consensus among different measurers	Ability to incorporate views of different measurers when necessary
Neutrality	Difficulty in changing standards without affecting certain sectors, eg stock options and high-tech companies, or leases and property companies	Reduction in the number of special standards needed to reflect practices in certain sectors
Representational faithfulness	Poor agreement between real world and measures	Accurate reflection of real world phenomena

Arguably, by presenting a true and fair view of distributions, accountants will gain greater respect by showing the complexity of the situation, rather than losing respect when a single point number turns out to be wildly inaccurate.

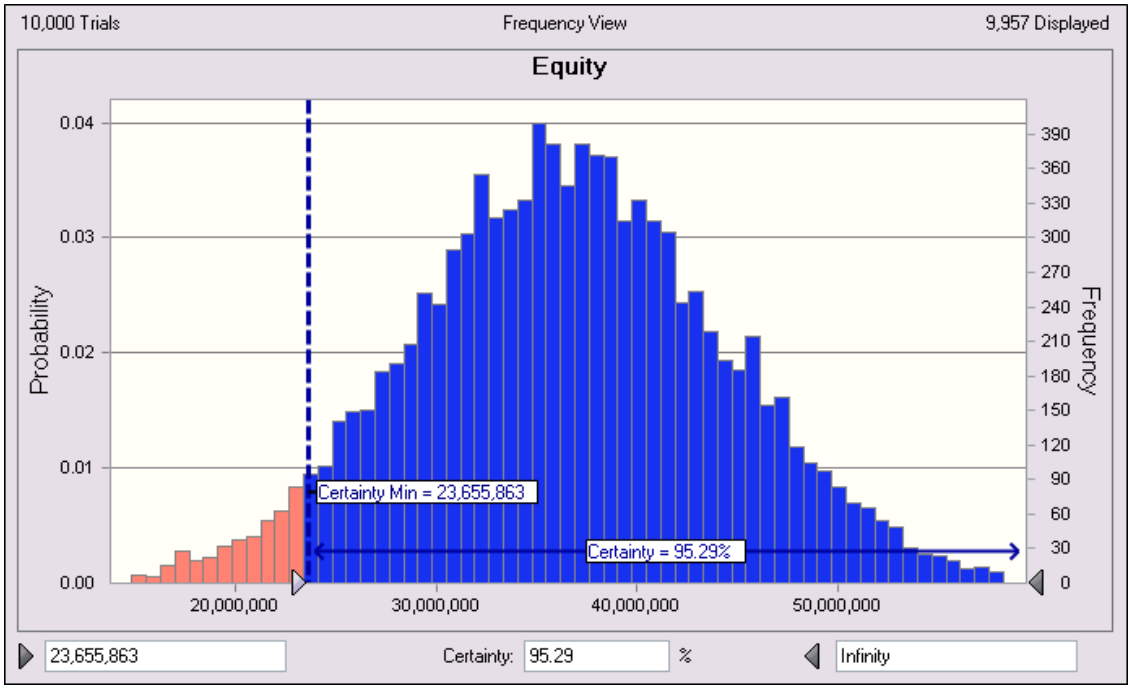
Confidence Accounting should make it easier for clients to evaluate the quality of audit. By implication, this should result in fairer competition. By having the 'confidence levels' of measurements, clients can statistically assess auditors' performances over time. In jurisdictions, eg the US, where restatements are more common, it is to be hoped that restatements would become less common but provide an ability to contrast past estimates with future results. Where restatements are less common, the ability to compare 'going concern' estimates with results would be a less refined comparator. An increased ability to compare auditors' previous year's approved estimates against outcomes provides additional competition on quality. If failures are within confidence levels, then we have a good, or even too prudent, auditor. If not, perhaps a sloppy, or statistically unusual, auditor. Markets will price the value of looser and tighter distribution ranges against auditors known to be prone to wild or too-tight ranges. Any audit firm will have a number of client restatements or failures over, say, a decade.

5. Worked examples

To move discussion further along it would help to be able to show worked examples, ie pro forma sets of accounts based on Confidence Accounting. So, in 2011 the Association of Chartered Certified Accountants (ACCA) commissioned Z/Yen Group Limited (Z/Yen) to provide two short worked examples of how a bank's and a small professional firm's audited accounts might look as prepared under Confidence Accounting.

The first example, Banco-UK Plc takes the form of a presentation by the finance director of a hypothetical UK bank, loosely based on an actual major institution. The Chartered Institute for Securities & Investment (CISI) was pleased to support this work, and ran an afternoon seminar to discuss the draft worked example. The example concentrates on the key line items in the balance sheet and income statement, and draws on disclosures in the annual reports over a five-year period. The example attempts to illustrate the key assumptions that are required to produce a pro forma set of accounts based on Confidence Accounting including a graphical presentation of the results. A sample slide (Figure 5.1) is reproduced below, showing how the finance director works out whether or not the bank retains sufficient equity.

Figure 5.1: Sample representation of equity – from Banco-UK Plc



'The resulting value of equity is shown above, with the 5th percentile value indicated in the left tail of the distribution. The interpretation is that the best estimate of the value of equity is £36 billion, and that there is a 95% probability that the value exceeds £24 billion. The maximum value is £65 billion.

Table 5.1: Summary balance sheet analysis

	Total assets	Total liabilities	equity
Mean	£697 billion	£660 billion	£36 billion
Minimum	£666 billion	£633 billion	£6.5 billion
Maximum	£728 billion	£689 billion	£65 billion
95th percentile	£628 billion	£672 billion	£24 billion

The 95th percentile value supports a 'going concern' assertion since £24 billion is above the minimum regulatory requirement for Banco-UK.

The worked example shows that Confidence Accounting can be applied to banks and results in a fairer representation of financial results. One side benefit of Confidence Accounting is that it could reduce the size and complexity of annual reports, in the case of Royal Bank of Scotland, for instance, probably by between 29 and 99 pages. Further, it provides a basis for beginning to reconcile balance sheet valuation and market value, and certainly highlights the need for clarity between uncertainty over valuation during the period of going concern versus risk about changes in the state of the economic climate.

The second worked example took the form of a presentation by the finance director of a hypothetical professional services firm, Pro-Co UK Ltd, loosely based on an actual small professional services practice. Both worked examples highlight three issues for discussion:

- the need for more definition of 'going concern'
- the interaction between balance sheet values and market values over longer terms, and
- the need to distinguish the valuation of business-as-usual from environmental discontinuities.

6. Discussion – market value, going concern, valuation uncertainty

WHAT IS A 'GOING CONCERN'? UNCERTAINTY VERSUS RISK

In the worked example on bank equity, the finance director points out that the mean value of equity at the balance sheet date is £36 billion, with a minimum of £6.5 billion and a maximum of £65 billion, with 95% confidence the value of equity is at least £24 billion. The 95th percentile value supports a 'going concern' assertion (assuming that £24 billion is sufficient for regulatory requirements). If the state of the world does not change, the realised value of the balance sheet should be no more than £(36–24) = £12 billion worse than the mean. If the net assets over a subsequent period were to fall £12 billion short, and cannot be explained by a change in the fundamental business climate, *or* a very substantial change in the business model and exposures, *or* a very large intra-period event, then the quality of the balance sheet (and audit) must be called into question.

Confidence ranges must not take the place of capital requirements, ie absorb risk. Confidence ranges must be limited to uncertainty over current value, using the current state of the economy, current forecasts of future credit levels, and so on. This implies that confidence ranges for assets estimate the range of values that reasonable buyers would pay, today, for an asset; not how that range might evolve over time. Confidence accounting deals with the uncertainty around current value. Risk disclosure deals with the uncertainty around future values.

This distinction between uncertainty around current value and risk requires a 'measurer' to to determine what period the risk assessment is to cover. 'Current values' are as on the balance sheet date, but must be relevant to the concept of 'going concern'. A sensible period to consider might be one year: confidence ranges in current values should be meaningful over one year if the state of the world does not deviate materially from current expectations. Afterwards,, an external evaluation could assess whether the measurer had, in aggregate, provided a sensible current value. Risk disclosures should deal with longer periods, and also with stress scenarios, ie material changes in the state of the world. Risk stress tests and longer-term scenarios should be disclosed separately so the continuum between confidence ranges on current values, risks to current values calculated on the basis of stress tests, and risks to future values from longer-term scenarios can be evaluated properly. The estimates used for valuation input should, in general, reflect a smaller range than the estimates used to assess risk and (for banks) capital requirements.

Many accountants and managers have a tendency to apply 'conservative' estimates of values. 'Conservative' instead of 'best' estimates create a systematic bias in valuations that runs counter to the concepts behind Confidence Accounting. Under Confidence Accounting, the range is presented and thus the best estimate should be free of conscious systematic bias. Switching from traditional to Confidence Accounting could increase the best estimates of many asset values. 'Conservative' estimates would be presented at the lower end of the ranges in the accounts. Systematic bias in estimates of value would be revealed in subsequent reviews of the confidence ranges, although this would take place over several years.

DIFFERENCE BETWEEN BALANCE SHEET VALUE AND MARKET VALUE

A lot of criticism of audit (see ICAEW December 2009: 6–7 for a reasonable summary) focuses on intangible assets as a root problem in auditing and accounting. A frequent criticism is the need to improve 'sensitivity of critical accounting estimates and judgements' (ICAEW June 2010: 7) Critics seem to want to explain the difference between book value and market value. There is some difficulty with the idea of reconciling book value and market value with a single-number paradigm. In many cases, critics do not seem to recognise that intangibles might be accounted for simply as variations in possible value due to changing conditions or different stakeholders or different 'purchasers'. For example, providing a taxonomy of intangibles, eg intellectual property, management quality, staff morale, brand strength, merely adds someone's idea of how these might contribute to explaining the difference between book value and market value. It is possible that these taxonomic entries are, individually, worthless. If so, then one is simply back with the statement that the company is worth more than the sum of its parts. If reconciliation is possible in a changing environment, then it is most likely to be a statistical reconciliation showing ranges of agreement.

The ICAEW sets out the options for financial reporting measurement as 'historical cost, replacement cost, fair value, historical cost for some items and market price for others – an 'alternative-bases' approach, and within limits, firms choose their own bases of measurement' (ICAEW December 2010: 24). Fundamentally, confidence accounting is linked to the difference between the nominal balances and fair value of assets or liabilities. Nominal balances can generally be measured with limited uncertainty, eg items in transit for cash balances, or unconfirmed derivative transactions, or retail deposit balances. Fair value depends on the expectations of future developments that drive trading markets and transaction prices. Expectations, by definition, are subject to much greater uncertainty. To some degree uncertainty can be reduced by observing transactions for 'identical assets between willing participants in transparent, liquid markets'. It follows that uncertainty or confidence ranges are a function of the way fair value is estimated from observable values, as already recognised in IFRS 7 with its hierarchy of valuation tiers.

Fair value is generally understood to be an estimate of value at the balance sheet date. Uncertainty over that value can arise from a range of factors, from differences between traded assets and the asset being valued, to disparities in transaction prices for very similar assets. The 'willing participant' clause is also important, and is linked to the concept of a going concern. Only a 'going concern' can qualify as a willing participant and use fair value as currently defined, but a going concern would never sell its entire portfolio and so a realistic uncertainty range for selling an entire portfolio is inconsistent with a going concern. The fundamental assumption therefore needs to be that the company can hold assets until maturity, although it may choose not to, and the uncertainty range must therefore take into account the natural maturity of assets, not an artificially shorter period.

'Marking liabilities to market can give strange results' (Sage 2002). One of the peculiarities of current accounting is that banks are able to take write-downs on their debts as profit.

*Try this on your credit card company: your creditworthiness has weakened, so you write down the value of what you owe them to reflect the greater risk that you will not pay it all back and credit the difference to your personal income. That is exactly what accounting requires; the five big US banks – Citigroup, Bank of America, JPMorgan, Morgan Stanley and Goldman Sachs – have just reported gains equivalent to more than four-fifths of their quarterly $16bn net profit as a result of falls in the value of their own debt and credit standing.(*Financial Times 23 October 2011)

Another way of stating this is that the more likely it is that you are not a going concern, the more profit you can make on your debt.

The lower value thus arises from giving a non-zero weight to the scenario that the liability is not paid. This is a fundamental breach of the going concern concept, and so is inapplicable for accounts prepared on the basis that the enterprise will continue to be a going concern. (Sage 2002: 96)

Once going concern is clearly defined along the lines above, then marking down one's own debt has no basis in reality.

VALUATION UNCERTAINTY PROBLEMS

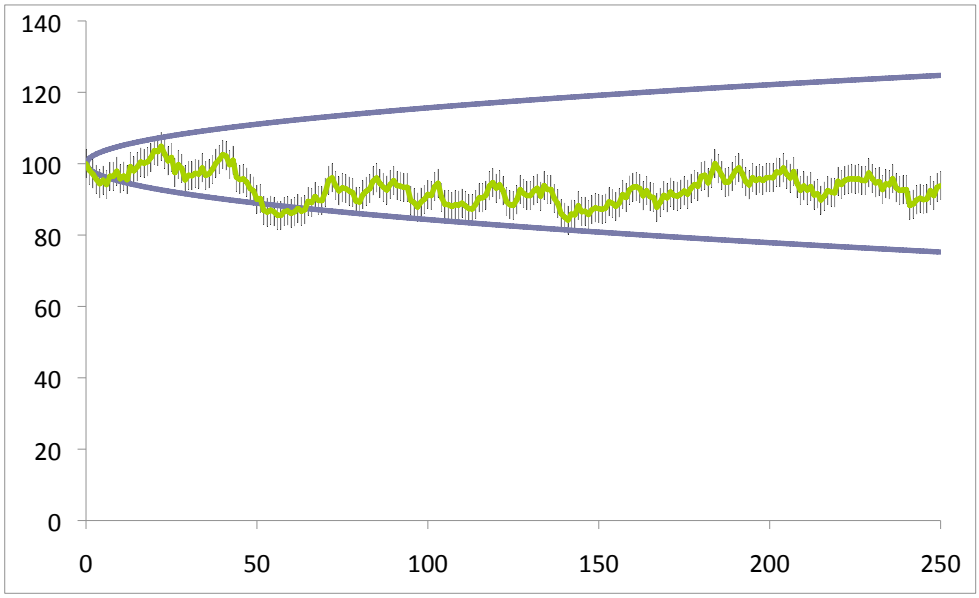
In the graph below, the 'x' axis shows time in days and the 'y' axis shows value (starting at 100 on day zero).

The blue 'cone' shows the range of values within the typical 95% confidence interval looking forward for 250 days (ie, one trading year). It is a 1.65 standard deviation cone so that 5% of all observations should lie above, and 5% of all observations below the cone. The cone therefore shows 'what should happen: 90% of the time the realisation should stay inside the cone'.

The green line is one possible realisation where, looking backward after one year, this is 'what happened'. In this illustration, there are instances, starting around day 50, where the realised change from day zero puts the value outside the confidence interval. There are 19 instances, all on the downside, which is greater than the 5% of 250 or 13 instances. So in that simple back test the realised volatility was higher than anticipated.

But, if we assume a valuation uncertainty of 4%, the error bars (+/- 4%) show that the realised value plus the error is always inside the cone. Therefore, taking into account valuation uncertainty one would not reject the initial volatility estimate. That suggests the valuation uncertainty was estimated appropriately.

Figure 6.1: Illustrating measurement error



The worked examples highlighted a need to be much clearer about 'uncertainty at a specific time' (Confidence Accounting) and 'uncertainty over future extreme changes in value' (risk). One confusing aspect is that much of today's value is about future cash flows, so at some point both current and future uncertainty are closely linked, almost two sides of the same coin. The example attempts to reflect this by making the distinction between a current and future 'state of the world'; the idea being that in the 'current state of the world' one can be more precise about the relationship between current and future uncertainty. In a future state of the world there might be an environmental discontinuity. Much risk is non-quantifiable, but specifying the model assumptions underlying the distribution should help advance this debate. Still, there are limits to disclosure, particularly numerical disclosure. A management that overlooks a particular risk cannot disclose that risk no matter what is done with accounting standards, disclosure requirements or governance rules.

There are many potential sources of uncertainty around the value of assets and liabilities. To be comparable to the current understanding of fair value, the worked examples assume there is a 'true' value but that it is not always possible to observe or estimate this value accurately, a problem akin to measurement error. In general the 'true' value would be the value that would be realised in a liquid and transparent market for the exact asset or liability in an arm's length transaction between a willing and informed buyer and seller. Uncertainty arises from small differences in the characteristics of the reporting entity's asset or liability compared with those traded in the market, or from a presumably narrow range of prices observed over a short period, or from price effects of transaction size, differences in taxation of different buyers and sellers, etc.

A strong underlying assumption of this approach is that the market for the asset or liability is large relative to the exposure being valued, so that a hypothetical transaction would not have a significant impact on the market value. For individual exposures, such as a single loan or a single interest rate swap, this is often a reasonable assumption, but for the entire balance sheet of a major bank it clearly is not. Having to sell everything, or a large part of everything, at once means that the whole may be worth less than the sum of its parts. Environmental discontinuities would appear to need some definition and to be excluded from the 'going concern' definition, but included in risk analysis.

To extend the sources of uncertainty to the consideration of an entire balance sheet, or an entire balance sheet category, would require an estimate of the value of, say, the entire corporate loan book in the situation where that book would actually be for sale. Clearly, the dynamics of the sale process and the precise circumstances would dominate the outcome and the range of uncertainty would be far greater than the uncertainties of individual loans properly aggregated. Valuation uncertainty brings into focus the purpose of Confidence Accounting. There are several reasons for estimating the uncertainty around values, as discussed below.

Underpinning a 'going concern' declaration

Evaluating the uncertainty around values over the entire balance sheet creates a range of possible values for equity, and with that, a probabilistic estimate of a positive equity value, ie a going concern. This would lead to a different going concern declaration that explicitly brings in probability, eg 'On the basis of the results of confidence accounting standards applied to the balance sheet, the directors believe that there is a greater than 95% probability that the company's equity value is in excess of £x million, and a greater than 99% probability that the company's equity value is positive, and thus the directors consider the company to be a going concern'.

Evaluation of the quality of the accounts and audits

After a certain period of time has passed, investors will be able to compare outcomes for individual assets and liabilities with the balance sheet estimates, and so enable back-testing for the balance sheet. An evaluation of the outcomes might result in an accounting quality evaluation, eg 'On the basis of the realised values of x% of the asset and liabilities held by the company as xx/xx/20xx, the directors are satisfied that the central estimates and uncertainty reported at that time were true and accurate to a 95% confidence level'.

Estimating uncertainty in relation to future results

Balance sheet values are ultimately realised through the income statement, albeit over different time periods. By explicitly stating a time period for the uncertainty estimates in the standards for confidence accounting it is possible to link those estimates to uncertainty over future results, eg 'On the basis of the valuation of assets and liabilities the directors estimate that the uncertainty over the income during the next 12 months is within a range of £+/–x at a 90% confidence level'.

This combination of uses for confidence accounting would shape the assumptions used in preparing the accounts. Assuming that the company passes an initial 'going concern' test, the accounts would be prepared with a view that balance sheet values would be realised during the normal course of business.

7. Further research

A number of points arose in discussion among the authors, commentators and workshop attenders. Following its application to banks, many people believed that the next logical application would be for insurance companies. The following issues are of particular note.

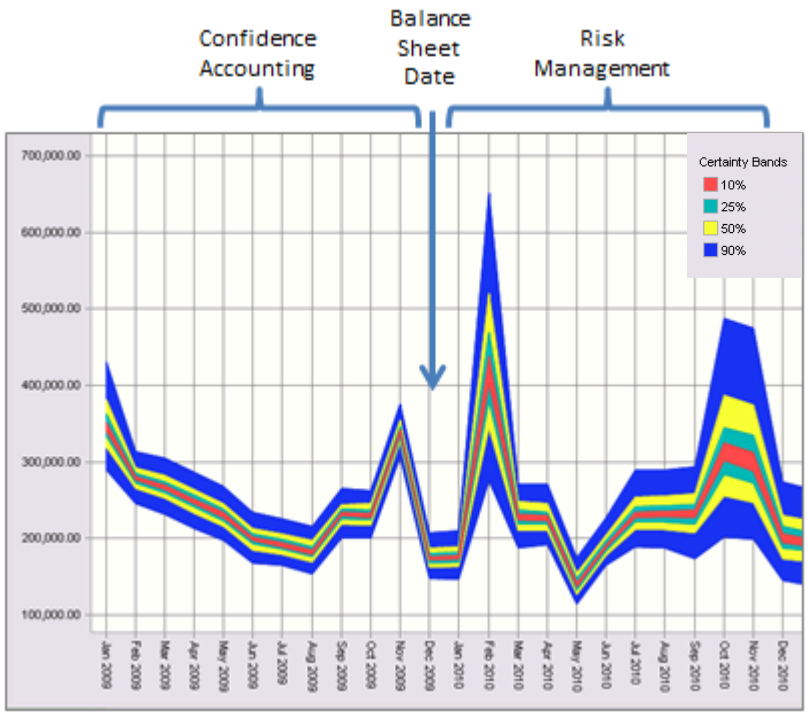
TO SOME EXTENT, MANAGEMENT JUDGEMENT IS ALREADY INCLUDED IN REPORTED ACCOUNTS.

True, but current guidelines stress 'prudent' reporting that creates a systematic bias in values and does not give an indication of uncertainty over the value. Many of the immediate reactions to the draft worked example assumed that the distributions were 'normal', 'Gaussian' or 'bell-shaped' in all cases. After discussion, people realised this was not the case. In the example, loan losses are far from symmetrically distributed. Further, many items in today's banking accounts are at extreme values and not at expected values. Arguably, Confidence Accounting provides a better framework for disclosing the use of extreme values and a strong reason to support Confidence Accounting.

THIS LOOKS LIKE A 'FORWARD LOOKING VALUE AT RISK' (VAR) COMPUTATION ON PROFITS

Confidence Accounting has similarities to VaR but is different in its purpose. VaR is intended to incorporate changes in the state of the world over a short time period, but does not include any uncertainty over value given a specific state of the world (where 'state of the world' is a complete set of rates and prices used to value trading positions). Confidence Accounting is intended to express uncertainty over value in the state of the world as at the reporting date, with most of that uncertainty arising from the need to make assumptions beyond observable rates and prices in trading markets in order to value assets and liabilities.

Figure 7.1: Asset valuation sample – Confidence Accounting contrasted with value at risk (VaR)



The above ‘fan’ diagram attempts to distinguish Confidence Accounting from the realms of risk management and VaR. Fan diagrams have become more widely known amongst financial professionals since the Bank of England adopted them to represent future inflation. However, inflation fan diagrams tend to start from a single point, implying that inflation today is known rather precisely and unlikely to be restated (another debate). The fan diagram above is an idealised valuation of an asset, any asset, eg a commodity, currencies, fuel.

The diagram covers a period before the balance sheet date, and after. Over time asset value fluctuates. For the sake of illustration, this diagram is a bit extreme, showing large and rapid fluctuations ranging from £150,000 to £425,000 over the past year, implying a volatile asset price. The confidence intervals, or bands, surrounding the mean valuation vary in width as the range of valuation possibilities increases or decreases. Confidence Accounting is concerned with the historic uncertainty, the left hand side of the diagram up to and including the balance sheet date. Confidence Accounting recognises that on the balance sheet date there is a range of potential valuation and then presents this range to the user of accounts. The right hand side of the diagram, ‘risk management’, presents management’s view of future valuation. This side is akin to the inflation fan diagram of future guesses at what the valuation might become, particularly after management has incorporated their ideas on future scenarios and stress tests. Confidence Accounting proposals are not intended to turn accountants into risk managers, but the proposals would move accountants and risk managers to work more closely together and share views, particularly on the range of balance sheet valuations.

THERE IS A RISK THIS WOULD FURTHER ENSHRINE THE USE OF ’BLACK BOX’ MODELS IN WHICH PEOPLE HAVE BLIND FAITH, AND SO EXACERBATE THE PROBLEMS IN FINANCE

In fact, assumptions underlying Confidence Accounting are not particularly difficult, with the exception of the distributions and correlation structure. A graphical presentation of assumptions and results means that a lot more people can understand and interpret the key aspects of accounts. The point does highlight how important it is to find the most illuminating graphical presentation, state the assumptions and describe the modelling process.

CONFIDENCE ACCOUNTING MIGHT MAKE IT MORE DIFFICULT TO COMPARE RESULTS ACROSS COMPANIES

There is some doubt about how comparable results are under current rules, but Confidence Accounting does include a new and different set of assumptions. It may be sensible to prescribe certain elements of the assumptions (like the shape of a distribution to be used for a particular kind of uncertainty such as assumptions of credit losses in a corporate loan book), leaving only the calibration of parameters to the reporting entity. On the other hand, companies and investors act on the reported information and herd instincts combined with uniform practice in measuring risk and acting on shocks is partly to blame for turning a problem in one area of the market (US mortgage-backed securities) into a global financial crisis, so perhaps the use of different assumptions has an advantage as well.

DURING EARLY IMPLEMENTATION, CONFIDENCE ACCOUNTING MIGHT DRIVE BANKS TOWARDS THE USE OF SIMILAR MODELS AND VALUATION PARAMETERS

Presumably, users will push for companies to adopt similar models, to facilitate comparisons. The use of the same models, with the same or highly similar calibration approaches and input parameters, is undesirable from a systemic risk perspective. This may, however, already be the case under the current system, exacerbated by the concentration of banking audit standards application within four large audit firms. Ultimately, with more experience of Confidence Accounting-based reports, the emphasis should shift to better presentation and explanations driven by the need to demonstrate audit quality. As graphical presentation, in particular, has the potential to improve comparability across very different models, a greater diversification of models could result. This suggests that the (graphical) representation of assumptions and outcomes is critical.

8. Questions for discussion and comment

The authors and the publishers are keen for this paper to stimulate discussion and invite comment on how financial accounts can better recognise both uncertainty and confidence about valuations.

Listed below are three series of questions (1) general discussion questions, (2) questions specifically for ACCA and CISI members and (3) authors' questions, mainly of a more detailed technical nature. Readers are invited to submit comments and answers to any or all of the questions, or make other general comments to michael_mainelli@zyen.com

ACCA would be grateful if ACCA members could also respond to Paul Moxey, head of corporate governance and risk management (paul.moxey@accaglobal.com), at any time until 31 December 2012.

GENERAL DISCUSSION QUESTIONS

1. Is the degree of precision to which figures in accounts are currently reported a problem? If so, to whom and why?

2. Do you think that 'Confidence Accounting' is worth further consideration or would you suggest a different approach – if so, what?

3. Does this report contribute to the debate about the future direction of financial reporting, even if the exact presentation of the idea has faults?

4. To what extent is there a desire from analysts or investors to find a better way to report precision and uncertainty around valuations?

5. Should an approach such as Confidence Accounting be a supplement to existing reporting requirements or a full or partial replacement.

6. Is corporate reporting suited to the use of more scientific methods of presentation? In particular, how would these methods meet the needs of users and preparers in terms of accuracy (given the limitations of the modelling) and understandability (in view of the need for some knowledge of statistical methods and reporting)? Is there a danger that a more 'scientific' presentation might appear more accurate than it actually is?

7. This report uses frequency distribution diagrams to represent uncertainty, but might other representations, such as error bars or candlestick diagrams, be more easily understood?

QUESTIONS FOR ACCA AND CISI MEMBERS

1. Do you think that Confidence Accounting could enhance conventional accounting?

2. How would you develop further the relationship between Confidence Accounting (uncertainty of current value) and risk assessment (uncertainty of future value)?

3. How could the explanation of the statistics (in particular the distributions used) be enhanced for various users of the accounts, from individual investors to professional analysts and from regulators to accountants and auditors?

4. How does the concept of materiality drive the amount of modelling and calibration that a firm should undertake in implementing Confidence Accounting?

5. How could comparability between firms' accounts be preserved and enhanced?

6. Which type of business or organisation would most benefit from piloting Confidence Accounting? Might it be specific sectors (eg banking, professional services), specific sizes of business? A mixture?

7. Is Confidence Accounting a reporting tool or an audit methodology, or both? If both, which comes first or should both be disseminated at once?

8. What practical difficulties are there in implementing Confidence Accounting for (a) preparers and (b) auditors?

9. How much detail is required of the assumptions on which the confidence estimates are based? How can Confidence Accounting be clearest when trying to balance detail with simplicity?

10. Does Confidence Accounting involve a greater disclosure of judgements made, which would then be subject to audit? If so, will Confidence Accounting affect an entity's relationship with its auditor, given that both parties are wary of adverse public comment and litigation?

11. During periods of undue optimism or pessimism, or where the approach taken is insufficiently questioning or overly prudent, is there any greater chance that an entity or its auditor will provide more objectivity through Confidence Accounting than is currently the case?

12. Should Confidence Accounting be supported as an option only for certain entities (eg those in new industries, or industries subject to high levels of speculative activity) at certain times? Alternatively, would it be preferable for Confidence Accounting to apply only to certain items in the financial statements?

AUTHORS' QUESTIONS

1. How should confidence accounting be used to inform the 'going concern' statement beyond the equity adequacy test?

2. Uncertainty over the 'correct' distribution and correlation structure is itself a source of uncertainty. Giving banks the freedom to use their own distributions leads down a similar path to those resulting from the internal models option under Basel II. A regulator could specify the type and shape of the distribution to be used (eg the 'Weibull' with shape parameter 1.6 for corporate credit portfolios) for simplicity and to obtain consistency, but this would have to be weighed against the benefits for systemic risk that arise from the use of different models and estimates by different banks. Is this an area where further research is required?

3. Specifying a correlation between the various categories of assets and liabilities is likely to be much more problematic than specifying the distribution for any one category. The worked example makes the assumption that all exposures are in the same economy, creating a natural, positive correlation, but what other assumptions should be explored?

4. Traditional accounting is often said to include 'conservative' estimates of valuations. How would confidence accounting (which is based on unbiased best estimates with uncertainty ranges) improve the ability of users to understand whether a company's financial management is 'conservative'? Further research on the psychology and comprehension of distributions, as well as their graphical presentation, would be very helpful.

5. IFRS 7's valuation hierarchy was useful. Will more detailed comparisons of sensitivities disclosed by banks provide better ways of estimating the ranges of values resulting from model risk (including parameter estimation) and liquidity risk?

6. Aggregation of sub-portfolios needs substantial research and validation. Statistical modelling for non-normal distributions may not be easily applicable, although the worked example shows the strength of the central limit theorem: the distribution of equity is much closer to a normal distribution than yielded under several of the key assumptions. Are more robust approaches to aggregation worth research?

7. The role of collateral and other security was not explicitly modelled. How can this be presented in a straightforward fashion?

8. It is difficult to obtain information to generate necessary assumptions, in part because the disaggregation of line items such as loans and advances is not consistent between balance sheet, income statement and notes on impairments and valuation sensitivities. How should current and future disclosures be constructed so that users of the financial statements gain real insight into the risk, and the upside, from a company's business?

9. Confidence accounting overlaps with the current risk disclosures. Does confidence accounting with a graphical presentation of results have the potential to simplify and shorten the accounts, disclosures and notes? Should the risk disclosures concentrate on stress scenarios that are outside the assumptions for confidence accounting?

10. A standard definition of income under fair value is 'change in fair value + net cash flow'. Using Confidence Accounting, fair value is no longer a single number, but a stochastic variable – making income a stochastic variable as well. In general, one would expect fair value at the start and end of a period to be highly correlated (for each asset, not necessarily across an entire balance sheet) and so the uncertainty in income would not be the sum of the uncertainty in each estimate of fair value, but nevertheless the uncertainty over income is likely to be material. A typical bank may have returns in the order of 1% on assets, and the worked example shows that uncertainty over fair value is at least of the same order – so the uncertainty over income is likely to be of the same order of magnitude as the best estimate of income. To implement Confidence Accounting practically some decisions to reduce the resultant uncertainty over income would help. One way, used in the worked example, is to take fair value at the opening date as a fixed (non-stochastic) number when computing net income over the subsequent period. Another way would be to assume 100% correlation at the level of individual assets (or very narrowly defined and highly homogeneous sub-portfolios). What other techniques may be feasible as well and this is another area for further research?

11. Confidence Accounting in banking might reward diversification and scale within narrowly defined asset classes. Because the uncertainty within one asset class (or balance sheet category more generally) depends on both the ability to value each individual asset accurately, and the degree to which idiosyncratic risk is diversified away, a bank with a very large book of simple (ie easy-to-value) assets that are homogeneous in type (eg mid-market working capital facilities, or retail credit cards) is likely to show narrower ranges of uncertainty, which typically reduce uncertainty over future returns and so lead to a lower cost of capital. Might this uncertainty measurement drive increased concentration in banking, which is not desirable from a systemic risk perspective, although the homogeneity of the assets would facilitate a quick resolution should a bank get into trouble?

9. Conclusion

If accountants are to move to a ‘range’ paradigm, much work needs to be done, largely in three areas:

- commitment by the accounting establishment
- restructuring of accounting training, and
- communication to users of financial information.

The starting point is an open debate about extending the conceptual framework of accounting to include probabilistic concepts. This debate ought to lead to commitment from the accounting establishment by recognising that deterministic accounting is the root of many current problems. Confidence Accounting is a change of perspective that resolves inconsistencies, not an attack on the foundations. Evidence of that commitment would be more presentations incorporating distributions rather than single points, a review of accounting standards (GAAP and IASC) to see where replacing a single number with a distribution would simplify statements, and a review of audit methodology to change risk-based auditing to a more rigorous method based on quantitative, not qualitative, evidence of estimation.

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Appendix A: A worked example, Banco-UK Plc

BACKGROUND TO BANCO-UK PLC

The worked example in this appendix is based on a hypothetical UK bank, Banco-UK Plc, which is itself loosely based on a major institution. The example concentrates on the key line items in the balance sheet and income statement, and draws on disclosures in the annual reports over a five-year period. The example attempts to illustrate the key assumptions required to produce a pro forma set of accounts that are based on Confidence Accounting, including a graphical presentation of the results.

The example shows that what, for a particular bank under current financial reporting requirements, would be a net income of £6.7 billion is really a much more uncertain figure. On the basis of reasonable and valid assumptions and modelling of previous years' results of that bank, an income statement prepared using Confidence Accounting suggests that there is only a 15% probability that this figure is correct to within +–10%, ie between £6.0 billion and £7.4 billion. This has implications for dividend and bonus policies.

This appendix is meant to show that Confidence Accounting:

- can be applied to banks
- does result in a fairer representation of financial results;
- probably provides a basis for beginning to reconcile balance sheet valuation and market value
- highlights the need for clarity between uncertainty over valuation during the period of going concern versus risk about changes in the state of the economic climate.

LETTER TO THE BOARD OF BANCO-UK PLC

(Letter from Banco-UK's finance director to the board on the occasion of the first set of accounts prepared using Confidence Accounting)

This paper presents Banco-UK's accounts using the new Confidence Accounting format, promoted by various regulatory and accounting bodies. Confidence Accounting is an attempt to reflect the fundamental uncertainty around particular values for assets, liabilities, revenues and costs. These uncertainties arise from the difficulty of establishing precise values at any specific time, in this case as of the balance sheet date, for balance sheet items such as loans and advances, debt securities, and derivative positions. Uncertainties arising from changes in future market prices and rates, from changes in expected future credit losses and from changes in future tax rates are not shown in the Confidence Accounting balance sheet or income statement; they are reflected in the notes to the accounts in various risk-management disclosures, as has been the case for many years. The disclosures concentrate on the major asset and liabilities items.

Current accounting practice and standards are based on a rarely questioned assumption: that there is single correct number for every asset value, liability value, element of income, etc. Any uncertainty over those values is ultimately ignored in the financial statements, despite the many, often intense, debates over what is the 'right value' that take place in many companies before the accounts are finalised and published, and despite the overwhelming evidence in everyday life that values of assets and liabilities are anything but certain.

There are many reasons for uncertainty over current values. An exact value can be established only in a transaction and, unless there are frequent transactions between many different parties for very similar assets, there will always be uncertainty over the value of an asset or liability. It is a measurement problem, and the uncertainty is a measurement error, and like measurement errors in other disciplines it can be estimated using a combination of statistical techniques and expert judgement.

It is important to note that confidence accounting, and the estimation of measurement error in general, deals with known unknowns: the impact of known sources of uncertainty (such as the range of discount rates used for valuing infrastructure projects) on the values of asset, liabilities, income and expense. Company disclosures can and should also deal with an assessment of the unknown (eg stress scenarios such as war or natural disasters), in discussions about future plans, events, the economic environment, risk levels, etc. but Confidence Accounting does not address those aspects of disclosure. The relationship between Confidence Accounting-based financial statements and disclosures about risk is an area which will need further development.

A second important note is that current accounting standards do not completely ignore uncertainty for financial institutions. Of particular note is the attempt in FAS 157 and IFRS 7 to provide favourable and unfavourable sensitivities for the values of derivative financial instruments. Confidence accounting builds on that concept but extends it to the entire balance sheet and income statement, and emphasises the use of statistical analysis and full disclosure of assumptions.

A traditional set of balance sheets, for example RBS plc, looks like the one below.

Balance sheets at 31 December 2008

		Group		Company	
	Note	2008 £m	Restated 2007 £m	2008 £m	2007 £m
Assets					
Cash and balances at central banks	11	12,400	17,866	—	—
Loans and advances to banks	11	138,197	219,460	27,031	7,686
Loans and advances to customers	11	874,722	828,538	—	307
Debt securities subject to repurchase agreements	30	80,576	107,651	—	—
Other debt securities		186,973	187,005	—	—
Debt securities	14	267,549	294,656	—	—
Equity shares	15	26,330	53,026	—	—
Investments in Group undertakings	16	—	—	42,196	43,542
Settlement balances		17,832	16,589	—	—
Derivatives	13	992,559	277,402	1,168	173
Intangible assets	17	20,049	49,916	—	—
Property, plant and equipment	18	18,949	18,745	—	—
Deferred taxation	23	7,082	3,119	3	—
Prepayments, accrued income and other assets	19	24,402	15,662	489	127
Assets of disposal groups	20	1,581	45,850	—	—
Total assets		2,401,652	1,840,829	70,887	51,835
Liabilities					
Deposits by banks	11	258,044	312,294	1,802	5,572
Customer accounts	11	639,512	682,363	26	—
Debt securities in issue	11	300,289	274,172	14,179	13,453
Settlement balances and short positions	21	54,277	91,021	—	—
Derivatives	13	971,364	272,052	361	179
Accruals, deferred income and other liabilities	22	31,482	34,208	47	8
Retirement benefit liabilities	4	2,032	460	—	—
Deferred taxation	23	4,165	5,400	—	3
Insurance liabilities	24	9,976	10,162	—	—
Subordinated liabilities	25	49,154	38,043	10,314	7,743
Liabilities of disposal groups	20	859	29,228	—	—
Total liabilities		2,321,154	1,749,403	26,729	26,958
Minority interests	26	21,619	38,388	—	—
Equity owners	27, 28	58,879	53,038	44,158	24,877
Total equity		80,498	91,426	44,158	24,877
Total liabilities and equity		2,401,652	1,840,829	70,887	51,835

Look at this balance sheet. A traditional approach means we at Banco-UK might begin with an opening balance sheet that looks like the one below.

Extract 1: Traditional opening balance sheet of Banco-UK plc [1]

Balance Sheet as at T0
in millions

			Nominal
Assets			
	Loans and advances - banks		50,000,000
	Loans and advances - corporate customers		100,000,000
	Loans and advances - retail customers		200,000,000
	Debt securities		
		Level 1 and 2	60,000,000
		Level 3	10,000,000
	Derivatives		
		Level 1 and 2	150,000,000
		Level 3	10,000,000
	Other		120,000,000
	Total		700,000,000
Liabilities			
	Deposits		350,000,000
	Debt securities		75,000,000
	Derivatives		150,000,000
	Other (accruals, tax, short positions)		25,000,000
	Subordinated debt		60,000,000
	Total liabilities		
	Equity		40,000,000
	Total		700,000,000

[1] Level 1, 2 and 3 refer to the convention used in FAS 57 Fair Value Measurement. Level 1: Quoted market prices in active markets. Level 2: Prices other than quoted prices (valuation technique with observable market data). Level 3: Unobservable inputs using estimates and assumptions.

Probably the first thing to note is that this set of accounts has only single value numbers. That is particularly odd as it is known that there are significant uncertainties behind the bank's assets and liabilities. The new set of accounts prepared under Confidence Accounting uses the past five years' accounts to obtain estimates for the various sources of uncertainty. The initial balance sheet is summarised below.

Extract 2: Opening balance sheet of Banco-UK plc, before applying Confidence Accounting approaches and with range assumptions

Balance Sheet as at T0
in millions

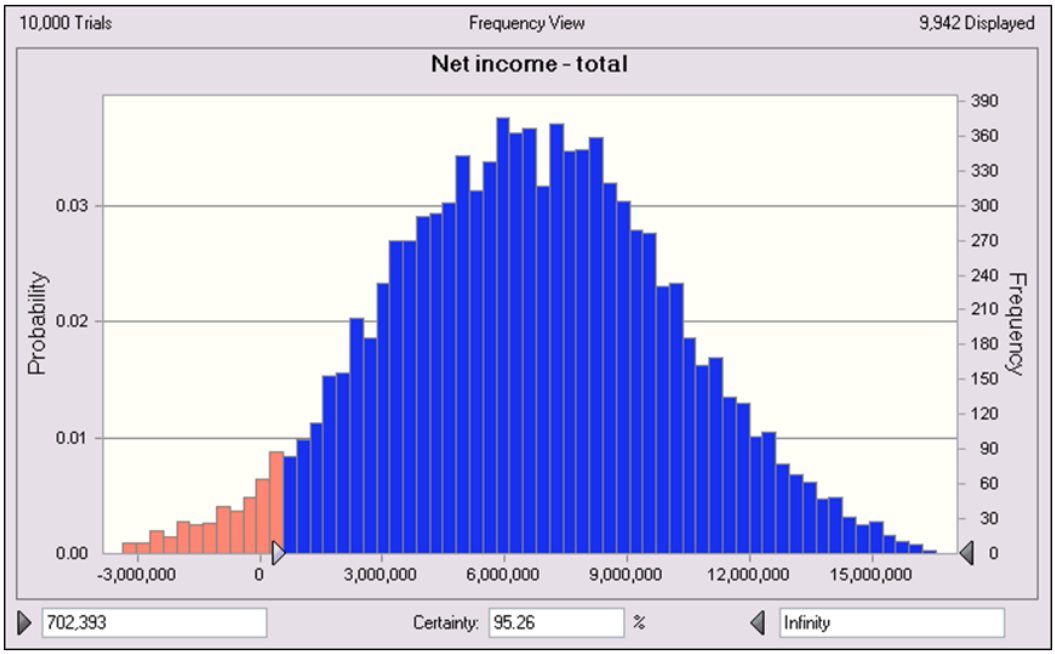
Assets			Nominal		Expected loss	Estimated value
	Loans and advances - banks		50,000,000	0.05%	25,000	49,975,000
	Loans and advances - corporate customers		100,000,000	0.70%	700,000	99,300,000
	Loans and advances - retail customers		200,000,000	1.50%	3,000,000	197,000,000
	Debt securities					
		Level 1 and 2	60,000,000	0.20%	120,000	59,880,000
		Level 3	10,000,000	0.20%	20,000	9,980,000
	Derivatives					
		Level 1 and 2	150,000,000	0.03%	45,000	149,955,000
		Level 3	10,000,000	0.05%	5,000	9,995,000
	Other		120,000,000			120,000,000
	Total		700,000,000		3,915,000	696,085,000
Liabilities						
	Deposits		350,000,000			350,000,000
	Debt securities		75,000,000			75,000,000
	Derivatives		150,000,000			150,000,000
	Other (accruals, tax, short positions)		25,000,000			25,000,000
	Subordinated debt		60,000,000			60,000,000
	Total liabilities					
	Equity		40,000,000			**36,085,000**
	Total		700,000,000			696,085,000

The balance sheet above presents nominal value and the expected credit loss over a one-year period, in line with the regulator's emphasis on a one-year going concern view. In this context, the expected loss on a credit portfolio is the best estimate of credit losses over the next 12 months. The estimates are based on Banco-UK's history as well as long-term losses by a rating agency (Standard & Poor's data, 1982–2007) assuming an equivalent loan-book quality. Expected loss levels are generally agreed with the major regulators.

The objective is to arrive at a view of aggregate net income, taking into account uncertainty. In order to arrive at such a view the nominal values for the expected losses are taken and then a range of suitable distributions of loss are estimated using Monte Carlo analysis. Monte Carlo methods are used in finance to value and analyse portfolios and investments by simulating the various sources of uncertainty affecting their value, and then determining their average value over the range of resultant outcomes. The advantage of Monte Carlo methods over other computational techniques increases as the dimensions of uncertainty increase.

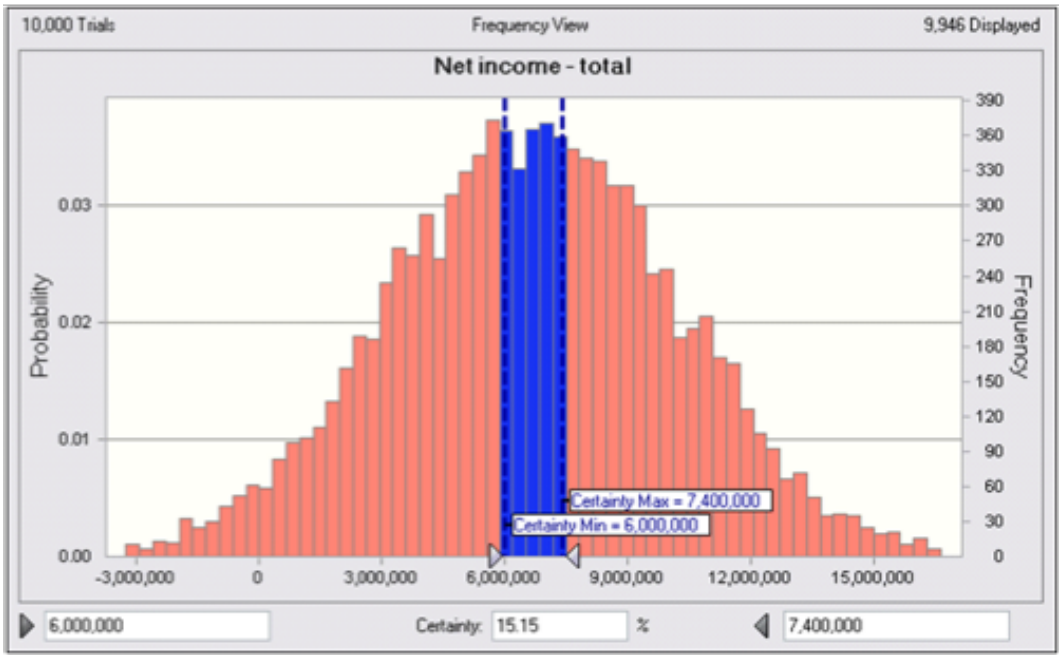
The Monte Carlo method defined possible inputs, then generated these inputs randomly using a probability distribution (see the green graphs below – they are all input probability distributions). The inputs were used to compute one set of accounts. The software ran 10,000 such sample inputs and produced 10,000 sets of accounts (takes about one minute of computer time). The results were aggregated and these are shown as distributions too (see the blue graphs below – they are all output probability distributions). The aggregated output from 10,000 possible sets of accounts provides this end result for net income.

Figure A1: Net income



The range of estimates for net income is from (£3 billion) to £15 billion. The blue area shows the range of values above the 5th percentile, thus it can be estimated that there is a 95% probability that net income is above £702.4 million. The red area shows that there is a 5% probability that net income is between £702.4 million and (£3 billion). The Finance Department's interpretation is that the best estimate of the value of net income is £6.7billion, and that there is a 95% probability that the value exceeds £0.7 billion. The minimum value is (£5.9 billion) and the maximum value is £20 billion (not marked on the graph). Another way to look at the uncertainty around net income is shown in Figure A1a.

Figure A1a: Net income



This chart highlights a range of +/–10% around the best estimate of net income, ie from £6 billion to £7.4 billion. The chart indicates that there is a 15% probability that net income will fall inside this range.

Based upon the stated assumptions[2] about the known unknowns, the net income is not actually £6.7 billion as would previously have been reported. There is a 15% probability that net income is within the range £6 billion to £7.4 billion. Further, given the volatility of markets and risk factors that cannot be modelled, the real probability could be less than this. The implications of this should be considered when making decisions about bonus payments and dividends.
This net income estimate supports the going-concern assertion as there is a 95% probability that the net income, taking into account the possible adverse measurement errors across the balance sheets at the beginning and end of the period, is greater than £0.7 billion.

But how is this position determined? Estimates were made for:

- the assets – value of loans and advances, debt securities, derivatives
- the liabilities – deposits, debt securities, derivatives
- total assets and total liabilities
- equity.

BALANCE SHEET

This section takes the major balance sheet items in turn, examining assumptions about their distributions.

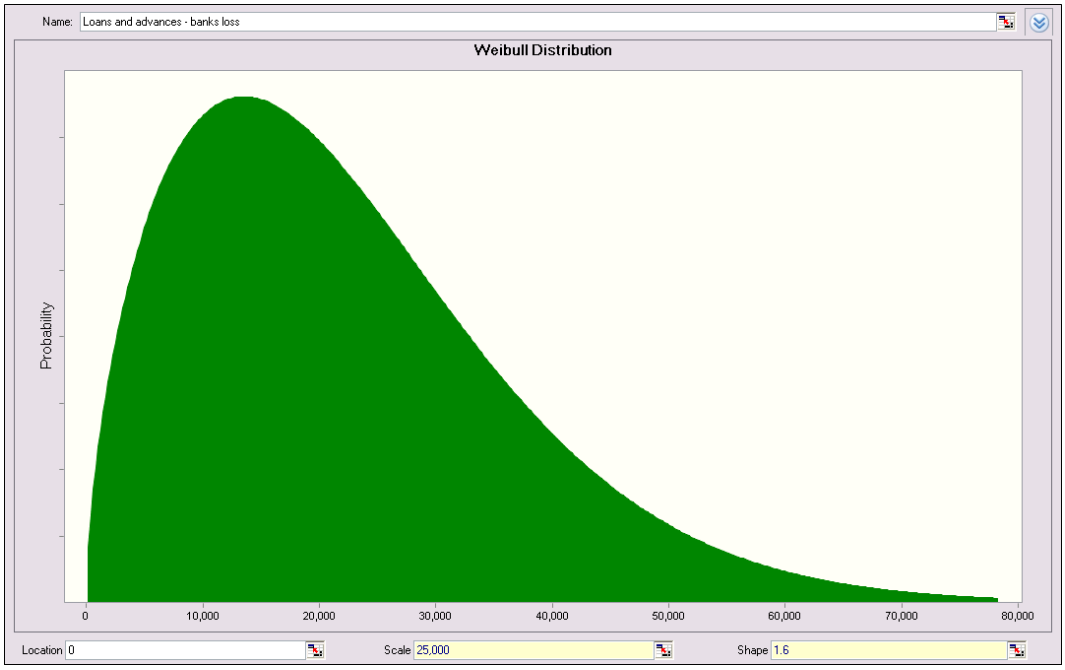
Assets

For each type of 'loans and advances', a distribution was selected on the basis of experience and choices made in industry standard credit models. Empirical distributions of losses tend to show long, fat tails (compared with a normal distribution), leading to use of a Weibull distribution. The Weibull distribution is one of a class of extreme value distributions that are commonly used in the analysis of failures or hazard rates in engineering and insurance. The Weibull distribution is largely determined by two parameters, referred to as 'scale' and 'shape'. The calibration for Banco-UK was based on matching the expected loss (technically the average value of the expected one-year loss[3] in each of the past ten years; this determines the scale parameter), and matching a 90th percentile to the worst outcome over the past decade (this determines the shape parameter).

'Loans and advances – bank's loss' was estimated by taking the nominal £50,000 million loans and advances and adjusting by the expected loss of £25 million (0.05%) using a Weibull distribution. The expected value of loans and advances is £49,975 million, but this could range from £50,000 million down to £49,920 million. Figure A2 below shows the Weibull distribution as input to the computer model used here.

[2] In a real world application, these assumptions could be set out.
3 In each of the past ten years, an estimate would have been made of the most likely level of credit losses in the subsequent year. Such an estimate would have been based on realised losses in the previous years, the state of the economy, market prices of portfolios of loans and bonds, etc. A histogram of those estimates was created, and then a probability distribution was fitted to that histogram – essentially matching the smooth shape of the probability distribution to the histogram.

Figure A2: Loans and advances – Bank's loss – with an expected loss of 0.05% and a Weibull shape of 1.6



Fitting the shape is not undertaken lightly. Extract 3 shows a typical calculation used to determine whether the distribution is appropriate.

Extract 3: Finding a suitable distribution for loans and advances to banks

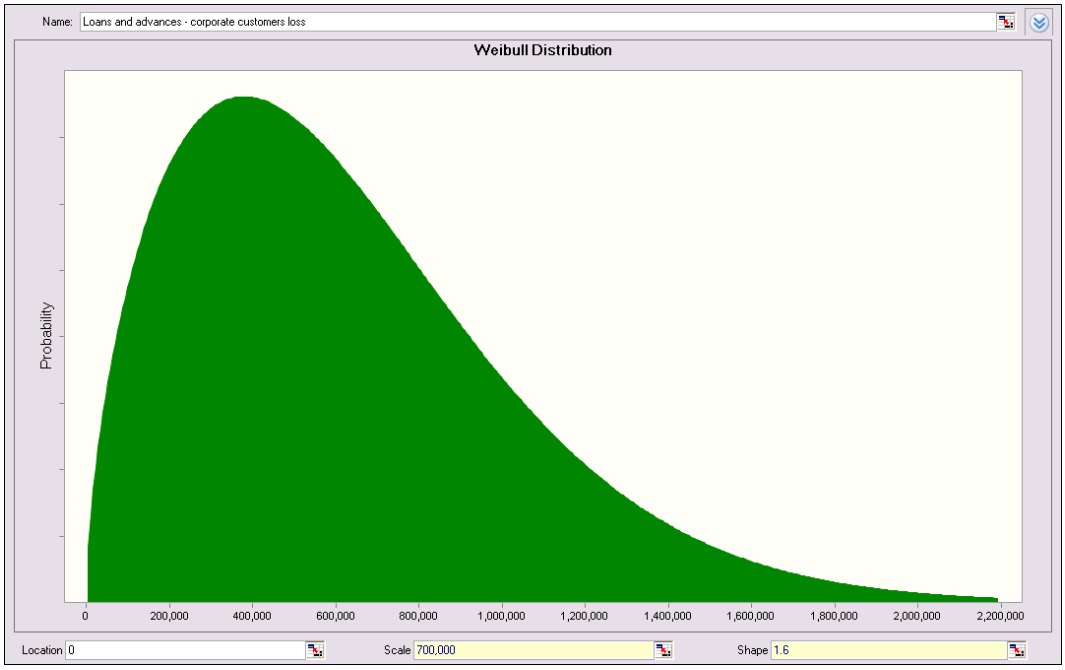
Loans and advances to banks				
	Unsecured	Nominal value		**50,000**
		Expected loss - best estimate	0.05%	**-100**
		best historical lookback	0.02%	**-40**
		worst historical lookback	0.13%	**-260**
		distribution	Weibull	
		shape parameter	1.6	
		scale parameter	1000	

Extract 3 shows the inputs for the calibration of the loss distribution. The 0.05% expected loss is the average of expected losses in each of the past 10 years, with the range being 0.02–0.13%. The shape parameter was selected so that the 10th and 90th percentiles of the distribution match the 0.02% to 0.13% historical range.[4] The scale parameter was selected to ensure that the average matched the 0.05% expected loss on a nominal value of £50,000 million.

Similar efforts were put into determining a suitable mathematical base for all the distributions below. The next two lines show loans and advances, also applying Weibull distributions but with different scales and shapes based on history and ratings.

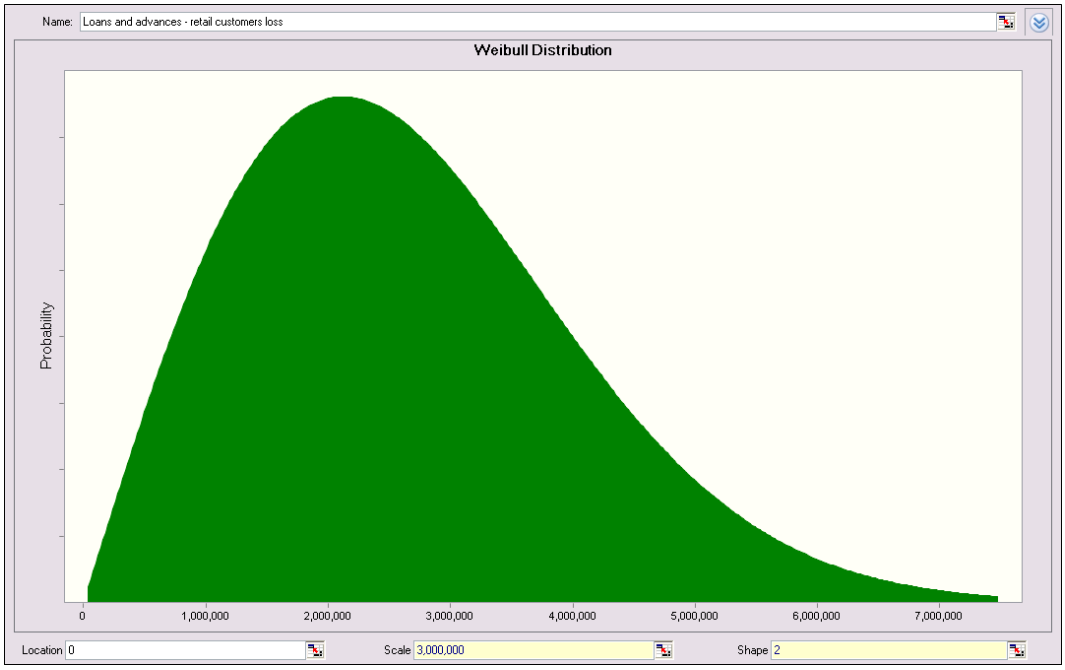
[4] In a real world application, the 0.02% and 0.13% would be the realised losses during the best and worst years in the past ten years.

Figure A3: Loans and advances – Corporate customer loss – with an expected loss of 0.7% and a Weibull shape of 1.6



On the basis of the history and ratings, however, the Weibull shape for retail is 2.0, not the 1.6 used for the two previous loans and advances.

Figure A4: Loans and advances – Retail customers – with an expected loss of 1.5% and a Weibull shape of 2.0

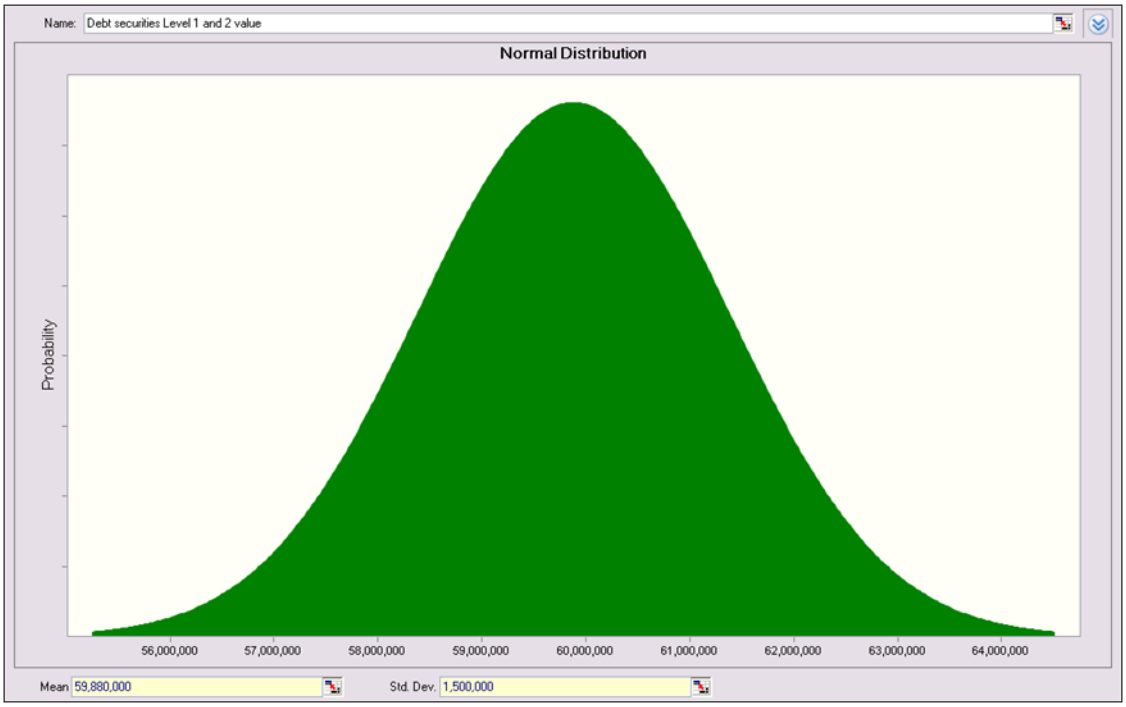


Banco-UK Plc's lending to banks and to corporate customers has a slightly different risk profile from that for its lending to retail customers. This is a consequence of having default rates for banks and corporate customers that are on average lower than for retail customers, but show greater volatility over an entire credit cycle.

Debt securities are marked to market and under IFRS 7 these assets are grouped in three levels. Levels 1 and 2 are assets where fair value is derived directly from market prices (level 1) or from simple and robust relationships to market prices (level 2). Level 3 includes assets where fair value is derived from pricing models that are calibrated to general market prices. This results in greater valuation uncertainty for level 3 assets, reflected in greater ranges published in the accounts. The distributions required for Confidence Accounting were derived directly from the existing IFRS 7 rules[5] by explicitly relating the ranges (IFRS) to the 10th and 90th percentile of the distribution (Confidence Accounting). A 'normal' distribution fits historic data.

Derivatives with a positive net mark-to-market value are shown as assets at fair value using the same IFRS 7 liquidity levels. The same link between IFRS 7 and Confidence Accounting exists as for debt securities. The resulting distributions are shown in Figure A5 below.

Figure A5: Debt securities – Levels 1 and 2 – with an expected loss of 0.2% and a standard deviation of 2.5%



[5] IFRS 7 requires some limited disclosure of sensitivities for financial instruments to market risk.

Figure A6: Debt securities – Level 3 – with an expected loss of 0.2% and a standard deviation of 5%

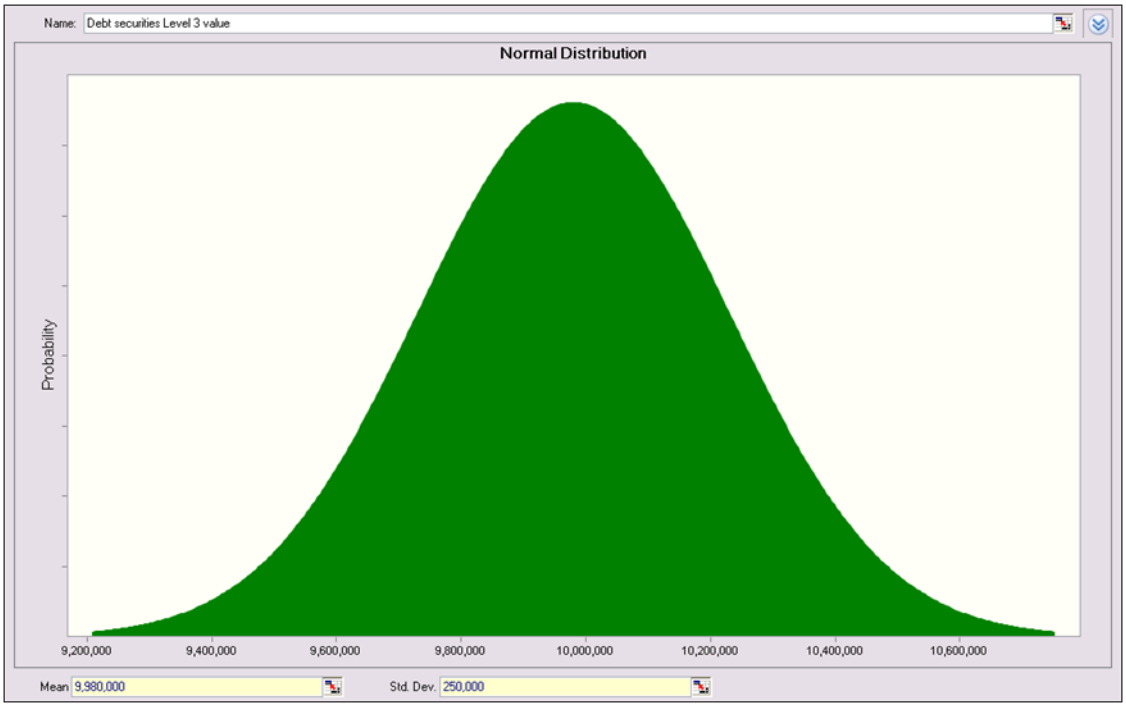


Figure A7: Derivatives – Levels 1 and 2 – with an expected loss of 0.03% and a standard deviation of 2.5%

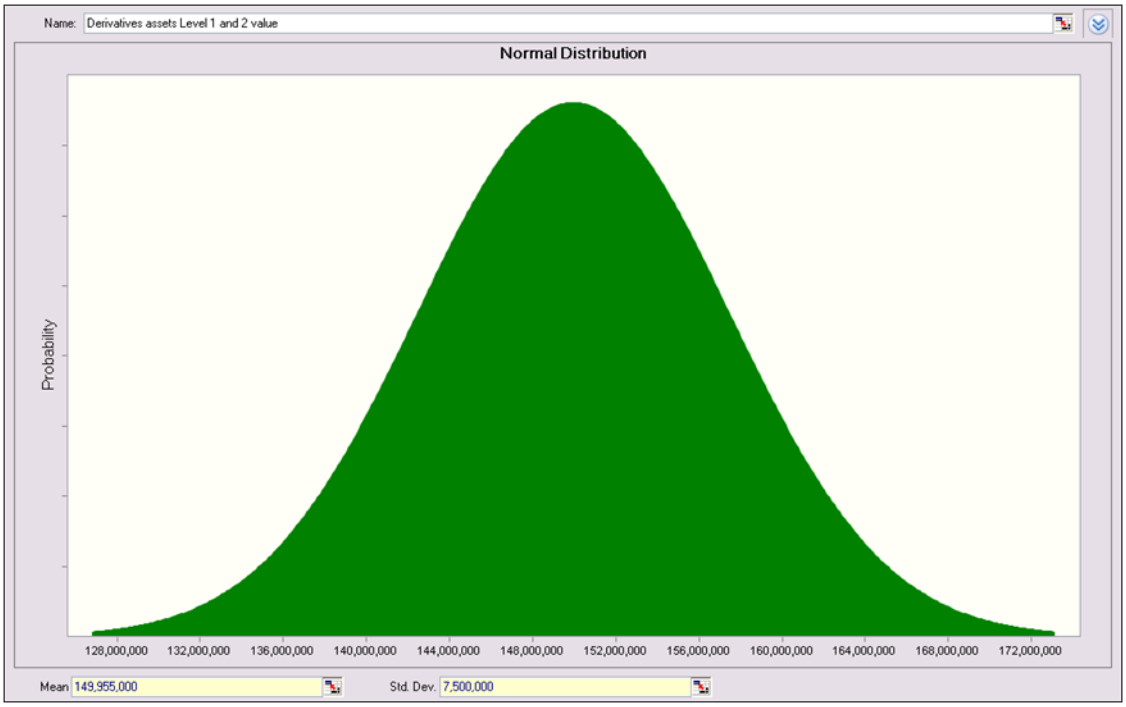
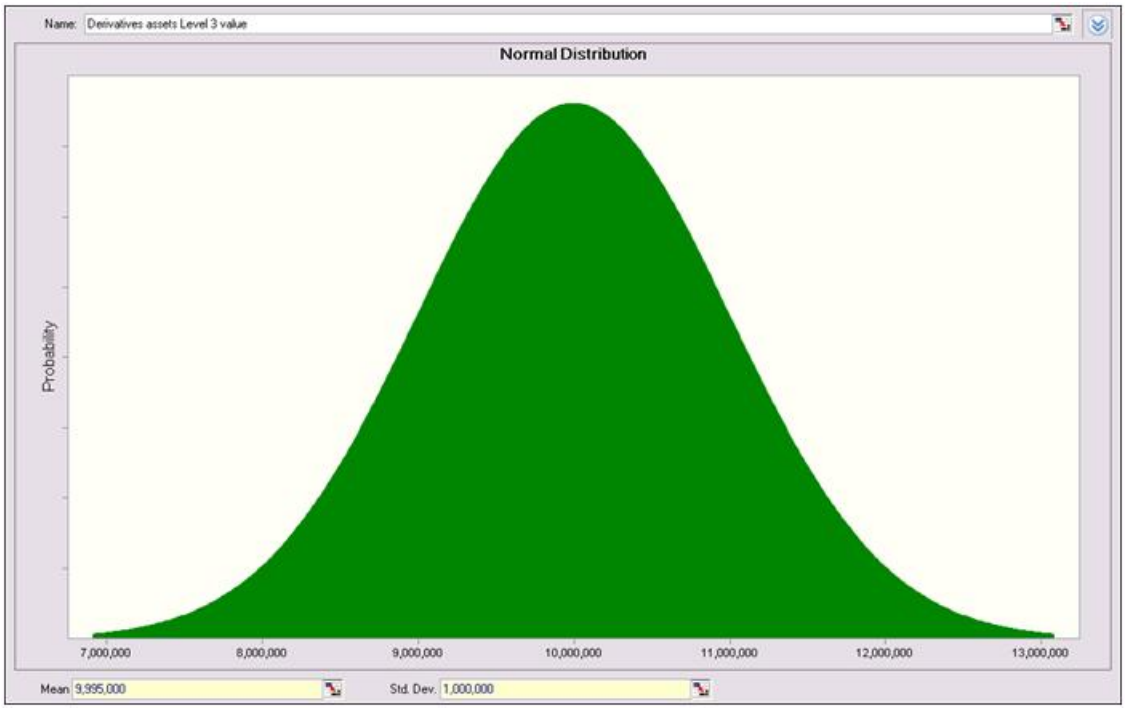


Figure A8: Derivatives – Level 3 – with an expected loss of 0.05% and a standard deviation of 10%



It is noteworthy that despite the greater relative uncertainty over level 3 assets, the total uncertainty for level 1 and level 2 assets is much greater owing to the far larger size of the portfolio. The entire fair value of level 3 assets is, in fact, less than the uncertainty over the fair values of level 1 and level 2 assets, indicating that there is limited risk that the model used leads to an incorrect assessment of the risk to illiquid debt securities and derivatives.

As these derivatives values represent future claims on other banks and companies, there is an element of credit risk associated with their fair value, resulting in the deduction of expected losses, consistent with past experience, from the nominal mark-to-market values. The loss rates are small as over the past 10 years credit losses from derivative transactions have been virtually nil. Note that the risk of future trading gains and losses from derivative transactions is not included in these estimates but is shown under the market risk disclosures in the accounts. The risk that changes in the credit quality of the bank's counterparties will result in changes in fair value is also included in the market risk disclosures to the accounts.

Liabilities

Turning to the major liabilities in the balance sheet, Confidence Accounting assumptions result in valuation at par of Banco-UK's deposits by banks, corporate customers and retail customers, reflecting the going-concern nature of Banco-UK. Debt securities issues are similarly valued at par.

Derivatives with a negative mark-to-market value are shown as liabilities at fair value using the IFRS 7 rules, including ranges for model risk and illiquidity. As these derivatives represent future claims on Banco-UK, and as these accounts are prepared on a going-concern basis, there is no allowance for the credit risk faced by the bank's counterparties. In other words, no gains or losses will arise for Banco-UK from changes in its own credit rating.

Figure A9: Derivatives liabilities value – with an expected value of £150,000,000 million and a standard deviation of 5%

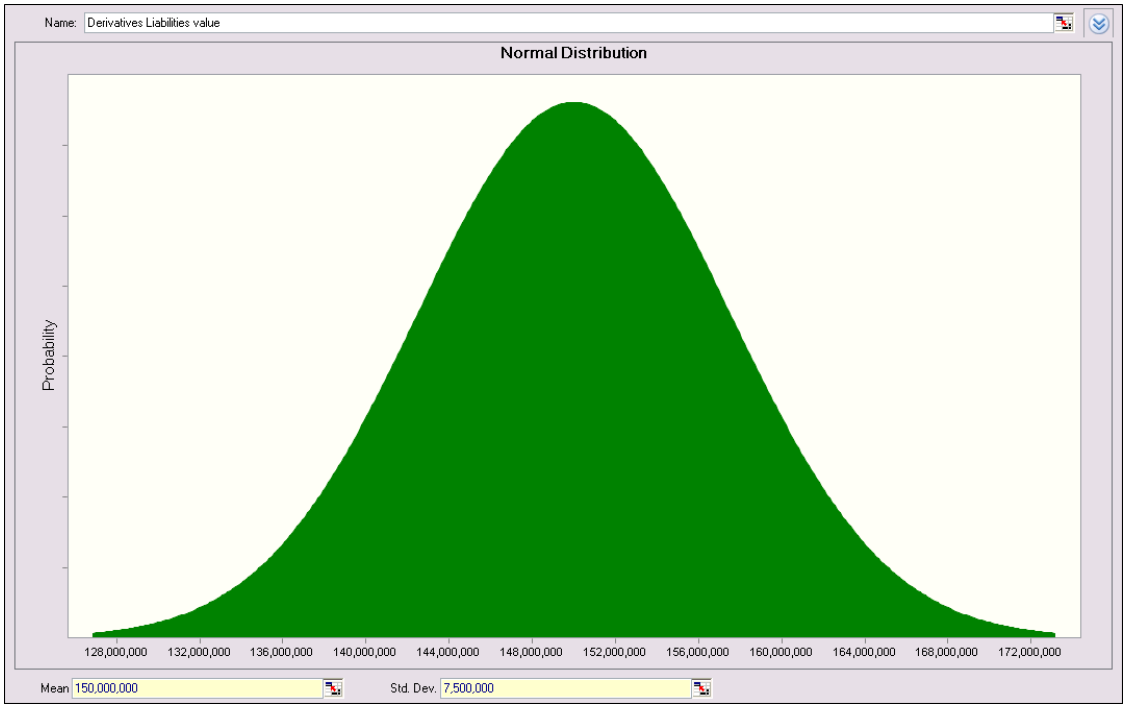
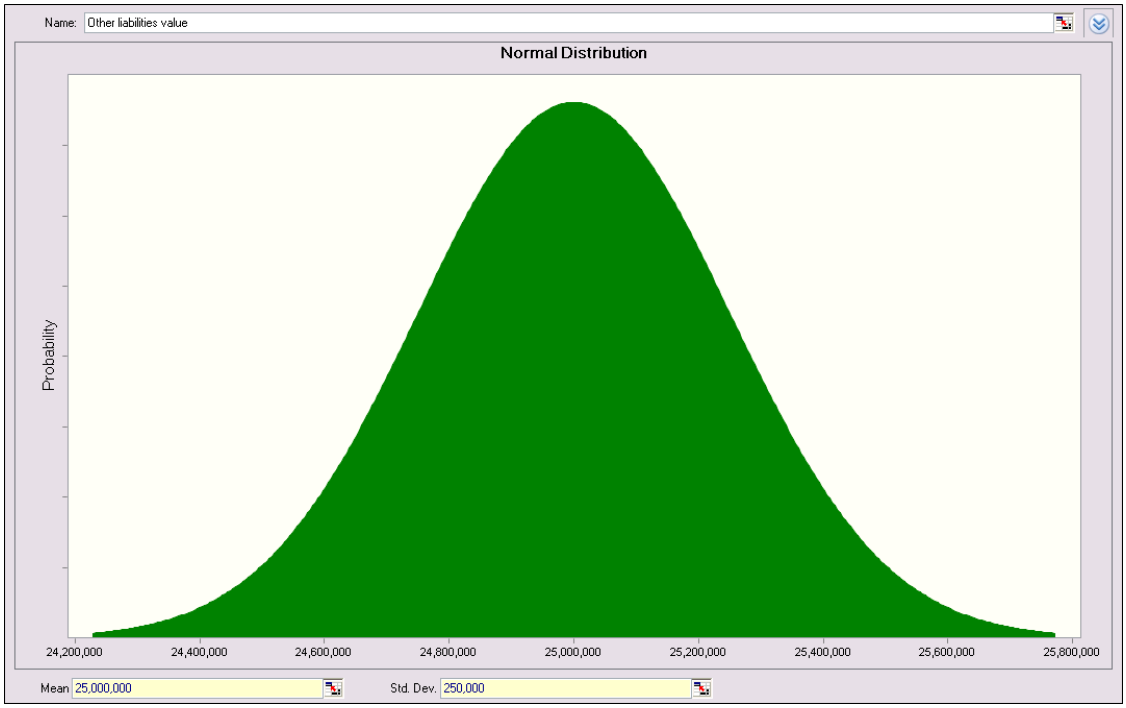


Figure A10: Other liabilities value – with an expected value of £25,000 million and a standard deviation of 1%



Other liabilities include accruals, taxes and short positions in securities arising from securities lending operations. Valuation uncertainty is largely limited to the tax positions and is estimated from expert judgement by internal and external tax experts. The range is not material in the context of Banco-UK's operations.

Equity

After determining the asset and liability values and the corresponding uncertainty ranges or confidence intervals, conclusions can be drawn regarding the equity value of Banco-UK, equity being the difference between the value of all assets minus the value of all liabilities. Adding asset values under Confidence Accounting requires an additional step compared with traditional accounting, to ensure the uncertainty of the aggregate asset value properly reflects the way individual asset values interact. Specifically, an estimate needs to be made about the portfolio diversification effect (a function of the correlation across assets).

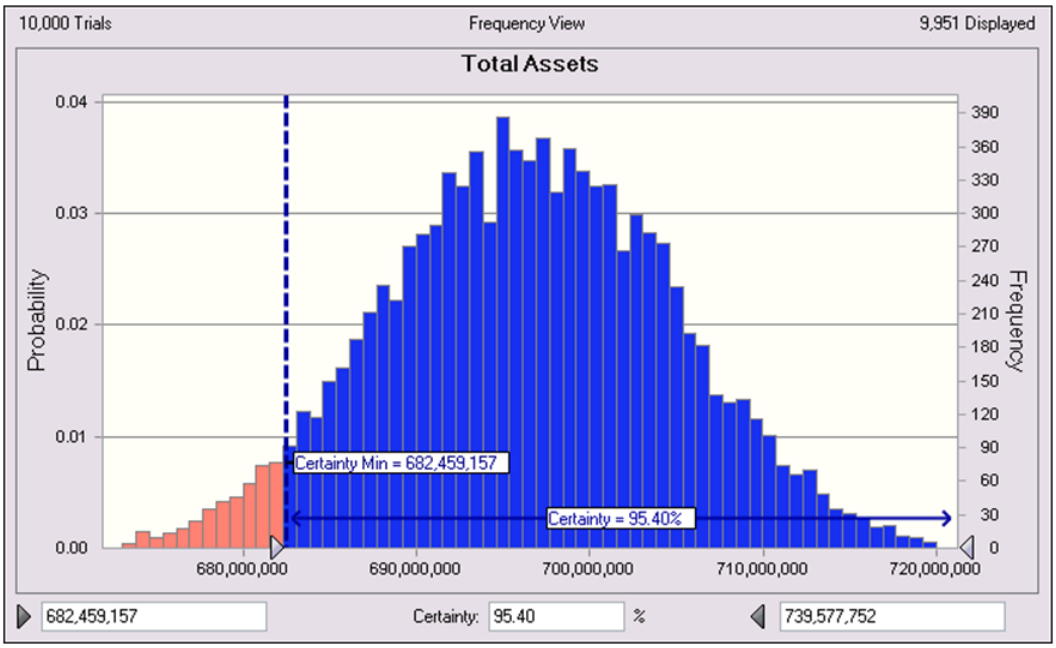
An assumption that there is no portfolio diversification, and that the uncertainty of the aggregate asset value is the sum of the uncertainties estimated for individual asset types, is equivalent to an assumption that all uncertainty across all asset types is driven by the same underlying factor. At the other extreme, an assumption that the uncertainty in each asset type is caused by a different, unrelated, underlying factor, and that there are many unrelated sources of uncertainty, would result in a relatively high diversification effect.

An examination of the underlying sources of uncertainty reveals a few factors that are common across more than one asset type. For example, the fair values of loans and advances are related to assumptions about future credit losses, which are correlated across banks, corporate customers and retail customers. The uncertainty of fair value in derivative transactions is related to model risks (which affect a subset of transactions) and liquidity (which affects most derivative markets).

The mechanism for quantifying these relationships is a correlation matrix; the current matrix for Banco-UK is shown in the notes to these accounts. The correlation matrix used reflects common factors within the major asset and liability types.[6]

Having established the correlation matrix the aggregate value of total assets and total liabilities, and therefore the book value of equity, can be estimated.

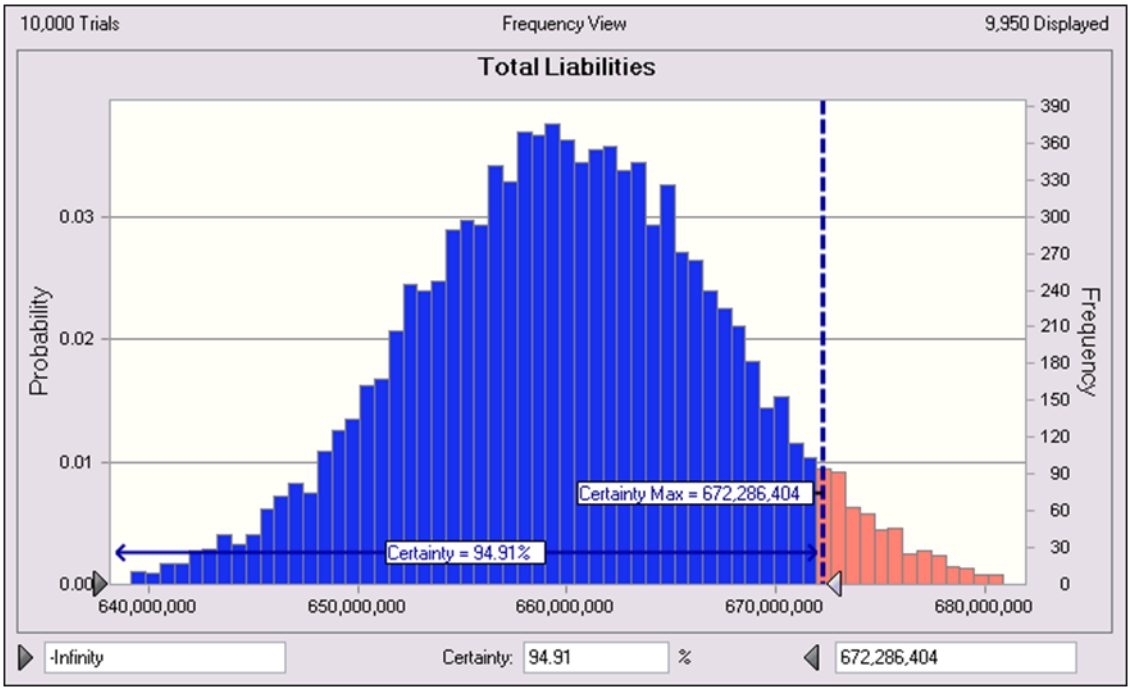
Figure A11: Total assets



The value of total assets is shown above with the 5th percentile value indicated in the left tail of the distribution. The interpretation is that the best estimate of the value of total assets is £696.4 billion, and that there is a 95% probability that the value exceeds £682.5 billion. The maximum value is £728 billion.

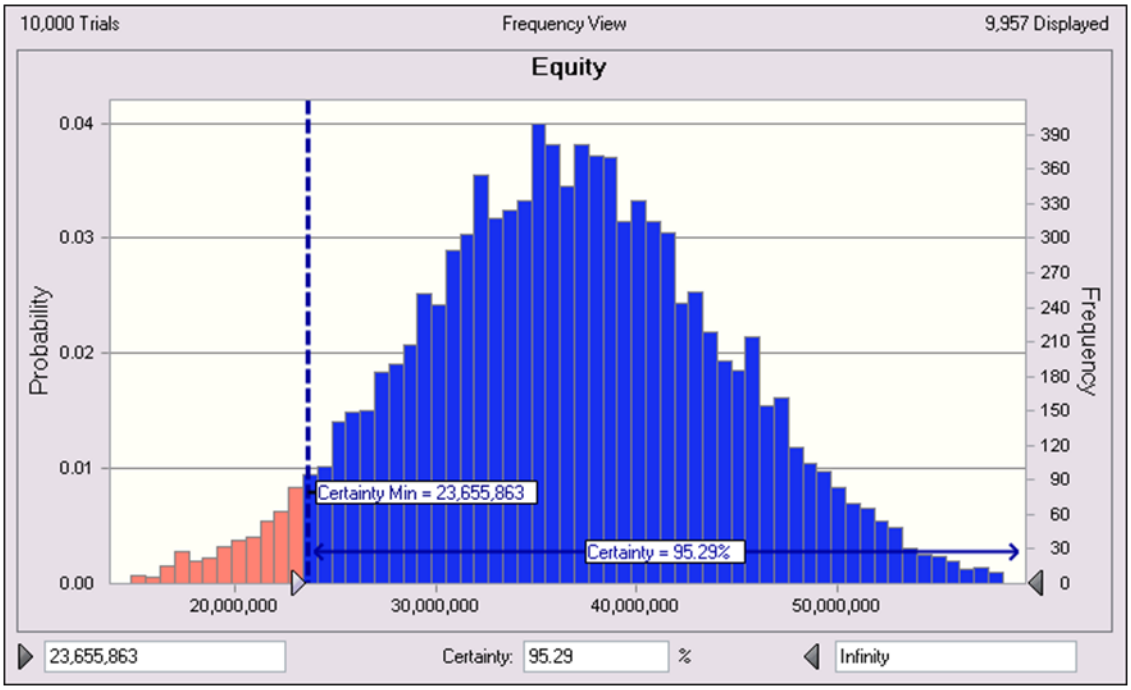
[6] in a real world application the correlation numbers would be derived from history.

Figure A12: Total liabilities



The value of total liabilities is shown above with the 5th percentile value indicated in the right tail of the distribution. The interpretation is that the best estimate of the value of total liabilities is £659.9 billion, and that there is a 5% probability that the value exceeds £672.3 billion. The minimum value is £631.1 billion.

Figure A13: Equity



The resulting value of equity is shown above, with the 5th percentile value indicated in the left tail of the distribution. The interpretation is that the best estimate of the value of equity is £36 billion, and that there is a 95% probability that the value exceeds £24 billion. The maximum value is £65 billion.

Table A1: Summary balance sheet analysis

	Total Assets	Total Liabilities	Equity
Mean	£697 billion	£660 billion	£36 billion
Minimum	£666 billion	£633 billion	£6.5 billion
Maximum	£728 billion	£689 billion	£65 billion
95th percentile	£628 billion	£672 billion	£24 billion

The 95th percentile value supports a 'going concern' assertion since £24 billion[7] is above the minimum regulatory requirement for Banco-UK.

The range from minimum to maximum asset value is roughly +/– 10% of the mean value. Equity has a much greater uncertainty range of almost +/–75%. This relationship is a function of leverage in the balance sheet; the implied Confidence Accounting leverage ratio is 7.5x. An increasing implied leverage ratio would indicate rising risk levels; conversely, a decreasing implied leverage ratio would indicate falling risk levels. A meaningful trend would require several quarters' worth of data.

INCOME ANALYSIS

Turning to the income statement, Confidence Accounting builds on the uncertainty estimates for balance sheet items to estimate the income derived from those activities by comparing the balance sheets at the beginning and end of the year. Income is derived from the change in fair value, plus the cash received, during the year. Since both opening and closing values of assets and liabilities are estimates with uncertainty, the income calculated from the change in values is also an estimate with uncertainty. Confidence Accounting allows the calculation of the certainty range for income as defined above, and allows for a comparison with income calculated using traditional accounting methods.

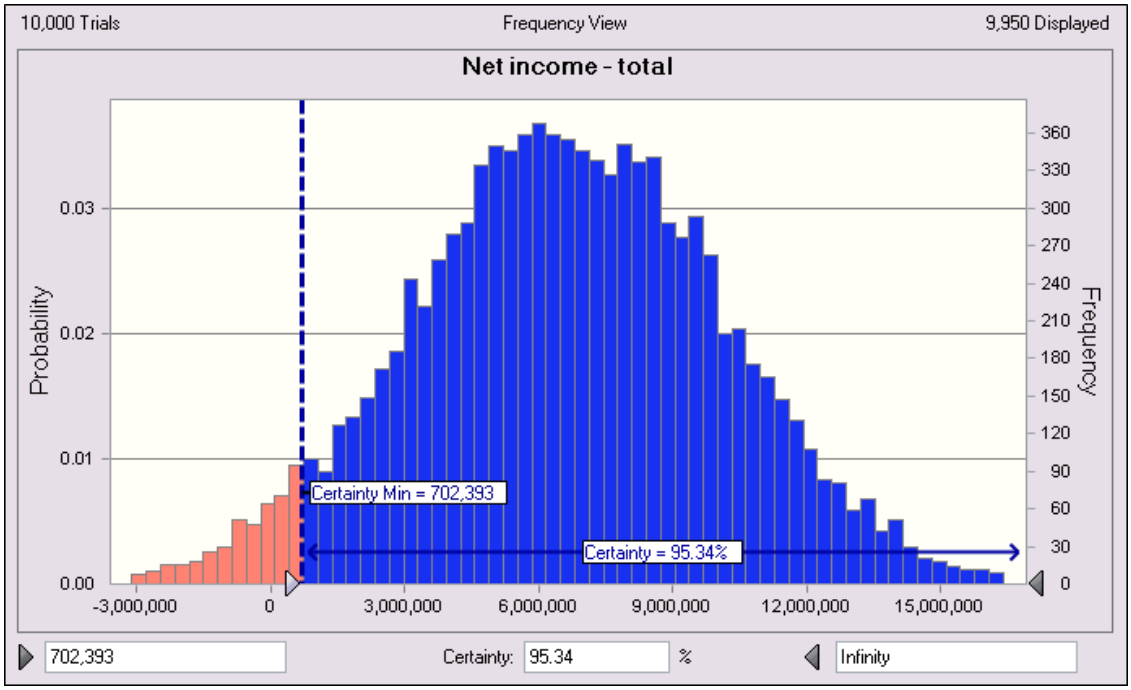
Table A2: Estimated income for major balance sheet assets[8]

	Nominal value	Expected loss (EL) or Expected value (EV)	Net cash (@ annual interest rate)
Loans and advances to corporate customers	100,000,000	700,000 EL	4,000,000 (4%)
Loans and advances to retail customers	200,000,000	3,000,000 EL	15,600,000 (8%)
Debt securities	60,000,000 (T0) 100,000,000 (T1)	320,000 EL	1,600,000 (1%)
Derivatives level 1 and 2	150,000,000 (T0) 140,000,000 (T1)	139,000,000 EV	1,450,000 (1%)
Derivatives level 3	10,000,000 (T0) 8,000,000 (T1)	3,000,000 EV	80,000 (1%)

T0 and T1 denote the opening and closing balances. The net cash is shown with an equivalent interest rate over average balances, for reference. Actual losses, if any, are incorporated in the 'Net cash' element. The graphs below show the changes in income for the major balance sheet items.

[7] The £24 billion is derived from the simulations.
[8] The average interest rate shown is implied from the actual cash flow and the average balances over the period.

Figure A14: Net income



The resulting value of net income is shown in Figure A14 with the 5th percentile value indicated in the left tail of the distribution. The interpretation is that the best estimate of the value of net income is £6.7 billion, and that there is a 95% probability that the value exceeds £0.7 billion. The minimum value is (£5.9 billion) and the maximum value is £20 billion. Another way to look at the uncertainty around net income is shown in Figure A14a.

Figure A14a: Net income

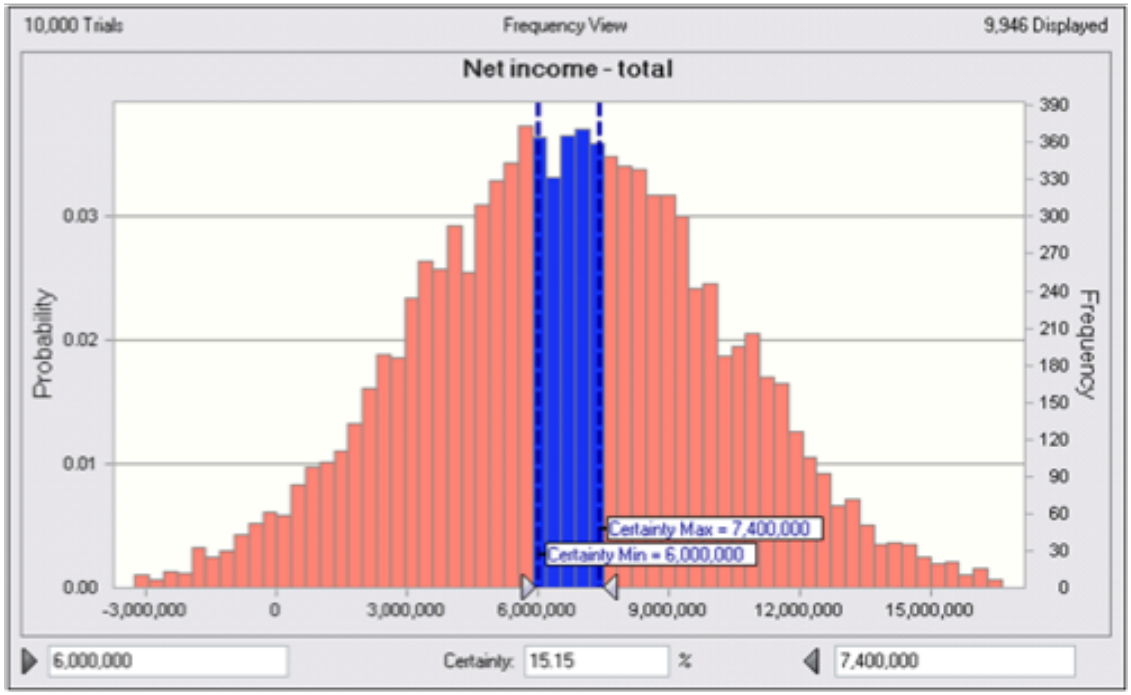


Figure A14a highlights a range of +/–10% around the best estimate of net income, ie from £6 billion to £7.4 billion. The chart indicates that there is a 15% probability that net income will fall inside this range, and again supports the going concern assertion as there is a 95% probability that the net income, taking into account the possible adverse measurement errors across the balance sheets at the beginning and end of the period, is greater than £0.7 billion.

The second conclusion from the net income is that the implied leverage manifests itself in a greater range of uncertainty relative to the mean (+/–90%). Trends in this implied leverage would indicate changes in the risk profile of Banco-UK.

Finally, comparing the range with the income as per traditional accounting (£7.3 billion) suggests that the traditional metric is well within the confidence interval.

DRAFT ANNUAL REPORT

The draft balance sheet for the annual report looks like Extract 4 below.

The mean value of equity at the balance sheet date is £36 billion, with a minimum of £6.5 billion and a maximum of £65 billion, with 95% confidence that the value of equity is at least £24 billion.

The 95th percentile value supports a 'going concern' assertion (assuming that £24 billion is sufficient for regulatory requirements). If the state of the world does not change, the realised value of the balance sheet should be no more than (£36 billion–£24 billion) = £12 billion worse than the mean. If the income over a subsequent period should fall £12 billion short, and cannot be explained by either a change in the fundamental business climate, a very substantial change in the business model and exposures, or a very large intra-period event, then the quality of the balance sheet (and audit) must be called into question.

The balance sheet is classically defined, with equity being the difference between the total value of assets and the total value of liabilities. As asset and liability values are sums of stochastic ('random'[9]) variables, equity becomes stochastic, that is, an estimate with a measurement error. Note that despite the use of extreme value distributions, the distribution of equity is remarkably Gaussian ('normal'). (The skew of –0.03 and kurtosis of 3.01 are very close to the zero and 3 for a normal distribution). This suggests that end results may not be unduly sensitive to assumptions about distributions or shape parameters.

The asset value range is roughly +/–10% and the liability value range is about +/– 5%. Equity has a much greater uncertainty range of almost +/–75%. Clearly, the relationship is a function of leverage and might be used as an implied leverage ratio – which could be used to complement or replace risk-based capital.

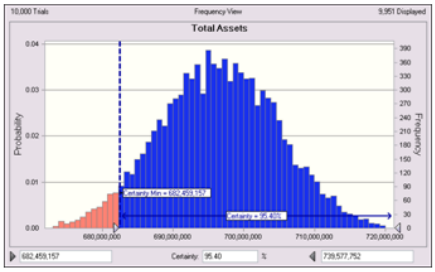
As can be seen from the above, the bank is in a good position to present these accounts for audit. We look forward to confirming with our auditors the underlying assumptions and then moving to final preparation of our accounts.

[9] In a statistical sense 'random' is used as a term for a variable that is not fixed, but whose value fluctuates according to a specified statistical process, eg a Weibull or a Normal distribution.

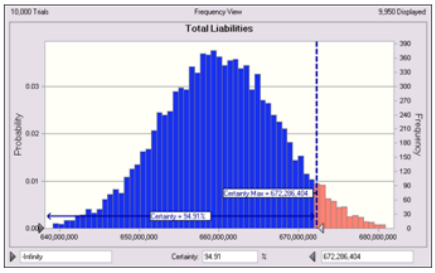
Extract 4: Draft balance sheet

Balance Sheet as at T0
in millions

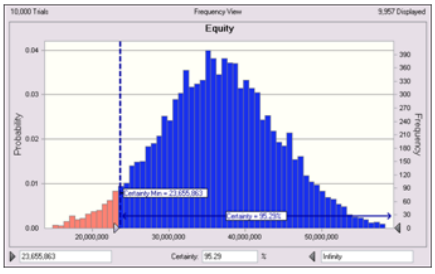
Assets	Nominal	Expected loss	Estimated value
Loans and advances - banks	50,000,000	25,000	49,975,000
Loans and advances - corporate customers	100,000,000	700,000	99,300,000
Loans and advances - retail customers	200,000,000	3,000,000	197,000,000
Debt securities			
	60,000,000	120,000	59,880,000
	10,000,000	20,000	9,980,000
Derivatives			
	150,000,000	45,000	149,955,000
	10,000,000	5,000	9,995,000
Other	120,000,000		120,000,000
Total	700,000,000	3,915,000	696,085,000



Liabilities			
Deposits	350,000,000		350,000,000
Debt securities	75,000,000		75,000,000
Derivatives	150,000,000		150,000,000
Other (accruals, tax, short positions)	25,000,000		25,000,000
Subordinated debt	60,000,000		60,000,000
Total liabilities			



Equity	40,000,000		36,085,000



Total	700,000,000		696,085,000

To provide a bit more detail, the following five notes show income estimate graphs (see Note 1), likely changes in the reporting length (see Note 2), detailed balance sheet (see Note 3), detailed income statement (see Note 4) and the cross correlation matrix used (see Note 5).

NOTE 1: INCOME GRAPHS

The graphs below show the uncertainty ranges for selected asset types.

Figure A15: Loans and advances to corporate customers

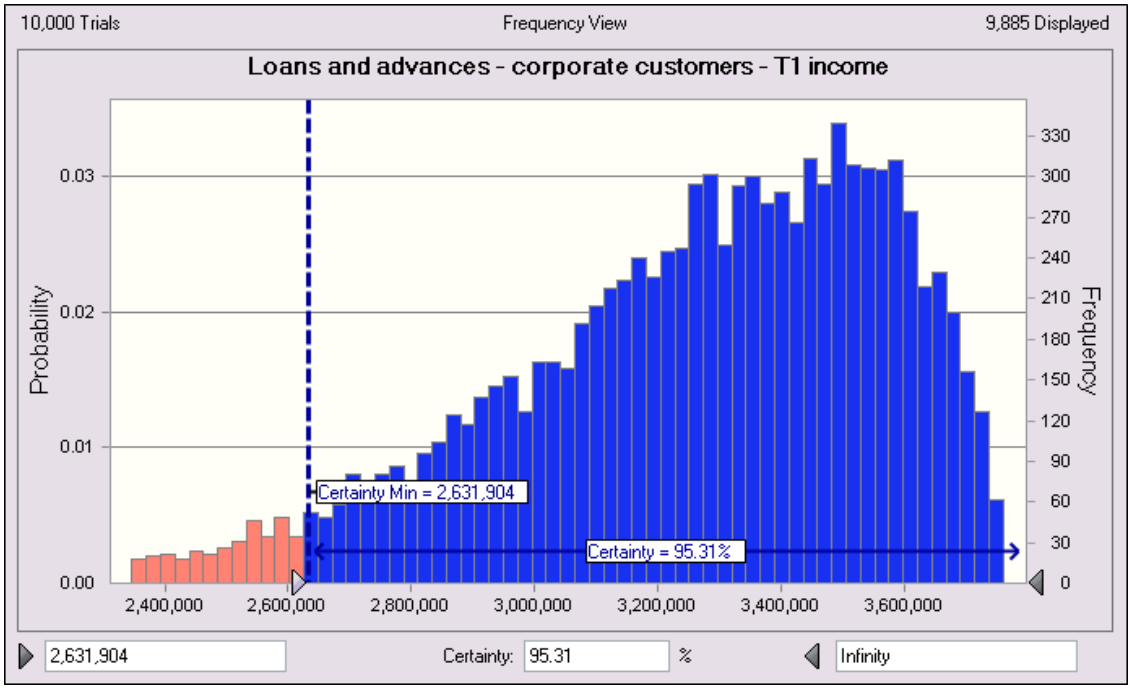


Figure A16: Loans and advances to retail customers

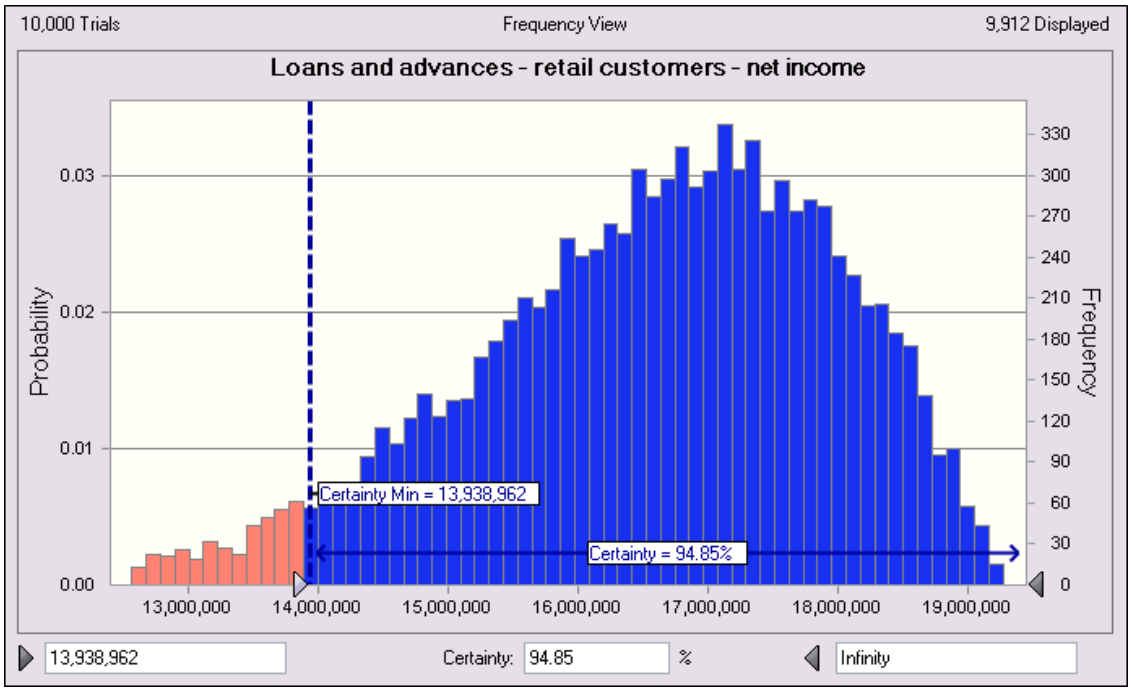


Figure A17: Debt securities – level 1 and 2

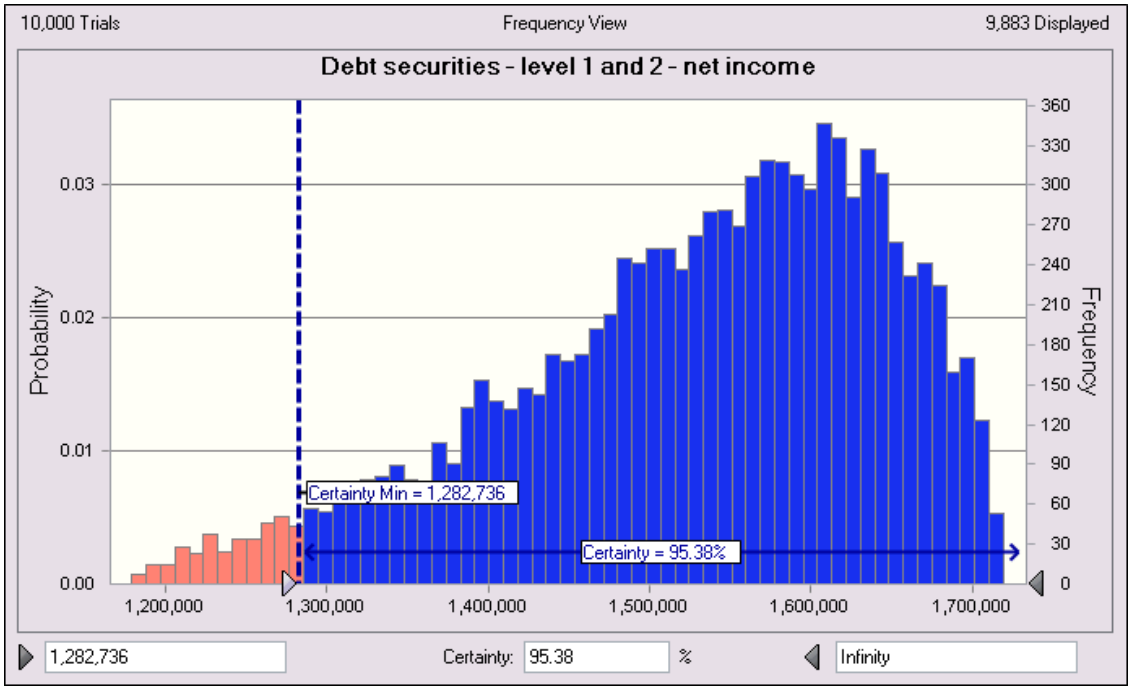
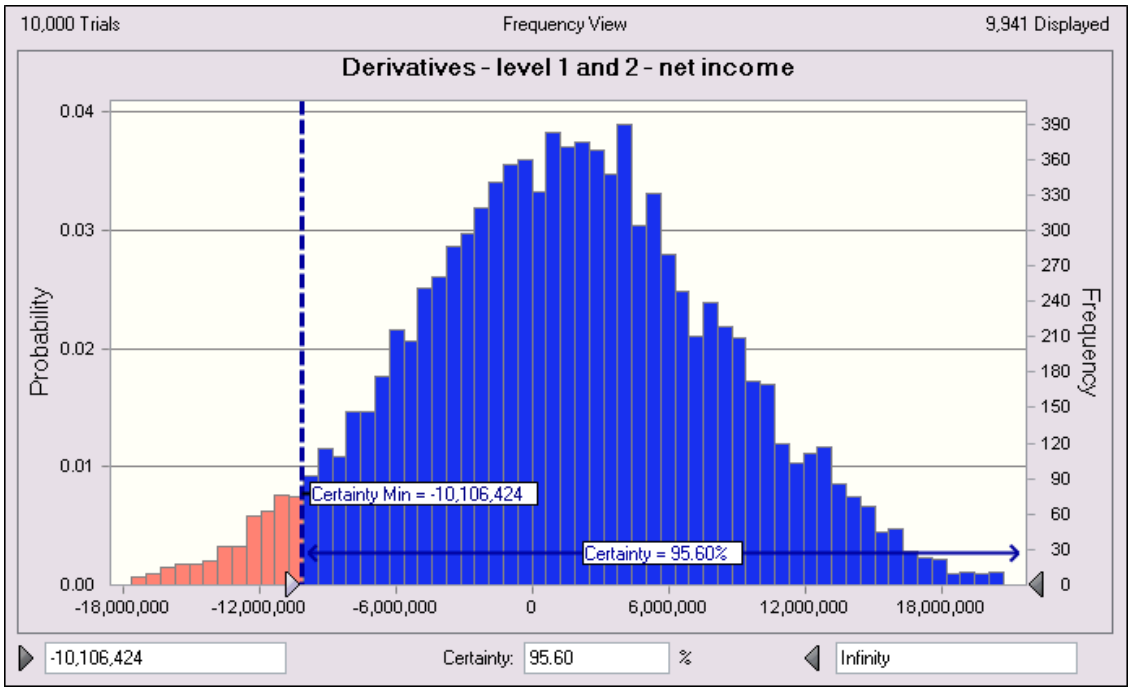


Figure A18: Derivatives – level 1 and 2 – net income



NOTE 2: REDUCTION IN REPORTING LENGTH

Graphical representations of assumptions could reduce current notes. For example, Royal Bank of Scotland's Annual Report 2010 is 446 pages. Using Confidence Accounting and graphical representations, 39 pages would no longer be necessary, while another 70 pages are questionable and could almost certainly be significantly shorter. The replacement pages using the graphical assumptions are estimated at 10 pages. So, in total, page number reductions would be between 29 and 99 pages. Confidence Accounting could make a significant contribution to simpler reporting, though there remains further room for reduction. The Table A3 identifies where the reductions could be made.

Table A3: Estimated reduction in reporting – Royal Bank of Scotland 2010

Element	Description	Length (pages)
Remove/replace		
REIL, provisions and reserves	Credit risk provisions and impairments shown by UK/overseas, industry, geography	11
Note 11	Valuation explanation	15
Note 13	Impairments	4
Note 25	Subordinated liabilities	8
Note 29	Collateral and securitisations	1
Questionable		
Note 10	Classification of financial instruments	15
Note 12	Maturity analysis	3
Note 14	Derivatives	4
Note 15	Debt securities	2
Note 16	Equity instruments	1
Asset quality	Nominal values of credit exposures by rating	8
Risk management: other risk exposures	Nominal values by asset backed security type and credit insurance	15
Risk management: credit risk	Nominal values of credit exposures by geography, industry etc	22

The 2010 report *Making Corporate Reports Readable* by the Institute of Chartered Accountants in Scotland (ICAS) made several recommendations for a shorter form of reporting and set out an example for a short form annual report and results announcement for a bank group. On the basis of the experience of producing this worked example for Confidence Accounting, the following additions to the disclosures in the ICAS report are suggested:

- Financial data should be organised hierarchically by segment (eg corporate banking and markets), sub-segment (eg global markets), business unit (eg fixed income) and portfolio (eg credit derivatives). Portfolios should be broken down into sub-portfolios that are defined as being sensitive to the same major risk factors, eg 'European corporate credit spreads and default rates'. This hierarchy will typically follow that already in use for risk measurement, and should be agreed with the regulator and auditor.
- The hierarchy must remain consistent throughout the report to allow users of the report to link various sections in a meaningful way.
- For section 11, 'Significant notes and judgements'(of the model bank group example), each table should be shown at the business unit and portfolio level in the published accounts, with sub-portfolio-level information available to the regulator and auditor (although there is an argument to take this to sub-portfolio level on the internet).

In section 11, paragraphs (i) and (ii) could be complemented with a graphical disclosure at portfolio or sub-portfolio level. By showing the four most relevant data elements (previous year's actual loss, current year's expected loss, current year's 90^{th} percentile, and the worst loss over the previous 10 years) most users will be able to make informed judgements about the degree of prudence used in the preparation of the accounts.

NOTE 3: DETAILED BALANCE SHEET

Green = Input distribution
Blue = Monte Carlo output

Balance sheet as at T0										
In millions										
Assets	Nominal		Expected loss	Estimated value	Minimum expected loss	Maximum expected loss	Minimum value	Maximum value	Loss (stochastic)	Value (stochastic)
Loans and advances: banks	50,000,000	0.05%	25,000	49,975,000		0.10%			15,000	49,985,000
Loans and advances: corporate customers	100,000,000	0.70%	700,000	99,300,000	0.50%	1.00%			400,000	99,600,000
Loans and advances: retail customers	200,000,000	1.50%	3,000,000	197,000,000	1.30%	1.80%			3,500,000	196,500,000
Debt securities										
Level 1 and 2	60,000,000	0.20%	120,000	59,880,000			95%	105%		58,000,000
Level 3	10,000,000	0.20%	20,000	9,980,000			90%	110%		10,500,000
Derivatives										
Level 1 and 2	150,000,000	0.03%	45,000	149,955,000			90%	110%	5.00%	155,000,000
Level 3	10,000,000	0.05%	5,000	9,995,000			80%	120%	10.00%	8,500,000
Other	120,000,000			120,000,000						120,000,000
Total	700,000,000		3,915,000	696,085,000						698,085,000
Liabilities										
Deposits	350,000,000			350,000,000						350,000,000
Debt securities	75,000,000			75,000,000						75,000,000
Derivatives	150,000,000			150,000,000			90%	110%	5.00%	145,000,000
Other (accruals, tax, short positions)	25,000,000			25,000,000			98%	102%	1.00%	25,000,000
Subordinated debt	60,000,000			60,000,000						60,000,000
Total liabilities										655,000,000
Equity	40,000,000			36,085,000						43,085,000
Total	700,000,000			696,085,000						698,085,000

NOTE 4: DETAILED INCOME STATEMENT

Green = Input distribution
Blue = Monte Carlo output

Income statement as at T1											
		Nominal	Expected loss	Estimated value	Realised loss	Loss (stochastic)	Value at T1 (stochastic)	Change in value	Net cash (x% pa)	Net income	
Loans and advances: banks		50,000,000									
Portfolio as at T0											
	Maturity < 1 year	15,000,000	7,500	14,992,500	12,000		14,988,000	-4,500	75,000	70,500	
	Maturity > 1 year	35,000,000	17,500	34,982,500		20,000	34,980,000	-2,500	350,000	347,500	
Originated during the year		10,000,000	5,000	9,995,000		3,000	9,997,000	2,000	50,000	52,000	
											470,000
Loans and advances: corporate customers	100,000,000										
Portfolio as at T0											
	Maturity < 1 year	20,000,000	140,000	19,860,000	160,000		19,840,000	-20,000	400,000	380,000	
	Maturity > 1 year	80,000,000	560,000	79,440,000		480,000	79,520,000	80,000	3,200,000	3,280,000	
Originated during the year		20,000,000	140,000	19,860,000		120,000	19,880,000	20,000	400,000	420,000	
											4,080,000
Loans and advances: retail customers	200,000,000										
Portfolio as at T0											
	Maturity < 1 year	10,000,000	150,000	9,850,000	140,000		9,860,000	10,000	400,000	410,000	
	Maturity > 1 year	190,000,000	2,850,000	187,150,000		2,600,000	187,400,000	250,000	15,200,000	15,450,000	
Originated during the year		15,000,000	225,000	14,775,000		275,000	14,725,000	-50,000	600,000	550,000	
											16,410,000
Debt securities											
Portfolio as at T0	Level 1 and 2	60,000,000									
	Sold during the year	50,000,000	100,000	49,900,000	200,000		49,800,000	-100,000	500,000	400,000	
	Retained	10,000,000	20,000	9,980,000		18,000	9,982,000	2,000	100,000	102,000	
Acquired during the year		100,000,000	200,000	99,800,000			100,000,000	200,000	1,000,000	1,200,000	
											1,702,000
Portfolio as at T0	Level 3	10,000,000									
	Sold during the year										
	Retained	10,000,000	20,000	9,980,000		18,000	9,982,000	2,000	100,000	102,000	
Acquired during the year		5,000,000	10,000	4,990,000			5,000,000	10,000	25,000	35,000	
											137,000
Derivatives											
Portfolio as at T0	Level 1 and 2	150,000,000									
	Maturity < 1year	20,000,000	6,000	19,994,000	1,000			5,000	100,000	105,000	
	Maturity > 1 year	130,000,000	39,000	129,961,000			125,000,000	-4,961,000	1,300,000	-3,661,000	
Originated during the year		10,000,000	3,000	9,997,000			9,000,000	-997,000	100,000	-897,000	

Income statement as at T1											
		Nominal	**Expected loss**	**Estimated value**	**Realised loss**	**Loss (stochastic)**	**Value at T1 (stochastic)**	**Change in value**	**Net cash (x% pa)**	**Net income**	
Portfolio as at T0	Level 3	10,000,000									
	Maturity < 1year	2,000,000	1,000	1,999,000	5,000			-4,000		-4,000	
	Maturity > 1 year	8,000,000	4,000	7,996,000			7,000,000	-996,000	80,000	-916,000	
Originated during the year		nil									-920,000
Income from assets											17,426,000
			Interest rate								
Deposits		350,000,000	2.5%								-8,750,000
Debt securities		75,000,000	1.0%								-750,000
Derivatives											
Portfolio as at T0		150,000,000									
	Maturity < 1year	20,000,000		20,000,000							
	Maturity > 1 year	130,000,000		130,000,000			125,000,000	5,000,000	-1,300,000	3,700,000	
Originated during the year		10,000,000		10,000,000			11,000,000	-1,000,000	-50,000	-1,050,000	
											2,650,000
Other (accruals, tax, short positions)	25,000,000										
Subordinated debt		60,000,000	8.0%								-4,800,000
Operating expenses											-2,000,000
Cost of liabilities											-13,650,000
Net income											3,776,000

NOTE 5: CORRELATION MATRIX USED FOR BANCO-UK PLC CONFIDENCE ACCOUNTING ANALYSIS

	Debt securities - level 3 - new portfolio loss	Debt securities - level 3 - T1 loss	Debt securities level 1 and 2 - loss	Debt securities level 1 and 2 - new portfolio - loss	Debt securities Level 1 and 2 value	Debt securities Level 3 value	Derivatives - assets - level 3 - T1 value	Derivatives - level 1 and 2 - new portfolio - value	Derivatives - liabilities - new portfolio value	Derivatives - liabilities - T1 value	Derivatives assets Level 1 and 2 value	Derivatives assets Level 3 value	Derivatives level 1 and 2 - T1 - value	Derivatives Liabilities value	Loans and advances - banks - new portfolio - loss	Loans and advances - banks loss	Loans and advances - banks T1 loss	Loans and advances - corporate customers - new portfolio - loss	Loans and advances - corporate customers - T1 loss	Loans and advances - corporate customers loss	Loans and advances - retail - new portfolio - loss	Loans and advances - retail - T1 loss	Loans and advances - retail customers loss	Other liabilities value
Debt securities - level 3 - new portfolio loss	1.0	0.6																						
Debt securities - level 3 - T1 loss	0.6	1.0																						
Debt securities level 1 and 2 - loss			1.0	0.8																				
Debt securities level 1 and 2 - new portfolio - loss			0.8	1.0																				
Debt securities Level 1 and 2 value					1.0	0.5																		
Debt securities Level 3 value					0.5	1.0																		
Derivatives - assets - level 3 - T1 value							1.0						0.7											
Derivatives - level 1 and 2 - new portfolio - value								1.0					0.8											
Derivatives - liabilities - new portfolio value									1.0	0.9														
Derivatives - liabilities - T1 value									0.9	1.0			0.9											
Derivatives assets Level 1 and 2 value											1.0	0.5		0.5										
Derivatives assets Level 3 value											0.5	1.0		0.5										
Derivatives level 1 and 2 - T1 - value							0.7	0.8		0.9			1.0											
Derivatives Liabilities value											0.5	0.5		1.0										
Loans and advances - banks - new portfolio - loss																								
Loans and advances - banks loss																								
Loans and advances - banks T1 loss																								
Loans and advances - corporate customers - new portfolio - loss																								
Loans and advances - corporate customers - T1 loss																								
Loans and advances - corporate customers loss																								
Loans and advances - retail - new portfolio - loss																								
Loans and advances - retail - T1 loss																								
Loans and advances - retail customers loss																								
Other liabilities value																								

	Debt securities - level 3 - new portfolio loss	Debt securities - level 3 - T1 loss	Debt securities level 1 and 2 - loss	Debt securities level 1 and 2 - new portfolio - loss	Debt securities Level 1 and 2 value	Debt securities Level 3 value	Derivatives - assets - level 3 - T1 value	Derivatives - level 1 and 2 - new portfolio - value	Derivatives - liabilities - new portfolio value	Derivatives - liabilities - T1 value	Derivatives assets Level 1 and 2 value	Derivatives assets Level 3 value	Derivatives level 1 and 2 - T1 - value	Derivatives Liabilities value	Loans and advances - banks - new portfolio - loss	Loans and advances - banks loss	Loans and advances - banks T1 loss	Loans and advances - corporate customers - new portfolio - loss	Loans and advances - corporate customers - T1 loss	Loans and advances - corporate customers loss	Loans and advances - retail - new portfolio - loss	Loans and advances - retail - T1 loss	Loans and advances - retail customers loss	Other liabilities value
Loans and advances - banks - new portfolio - loss															1.0		0.9							
Loans and advances - banks loss																1.0	0.8			0.3			0.3	
Loans and advances - banks T1 loss															0.9	0.8	1.0							
Loans and advances - corporate customers - new portfolio - loss																		1.0	0.9					
Loans and advances - corporate customers - T1 loss																		0.9	1.0					
Loans and advances - corporate customers loss																0.3				1.0			0.3	
Loans and advances - retail - new portfolio - loss																					1.0	1.0		
Loans and advances - retail - T1 loss																					1.0	1.0	0.9	
Loans and advances - retail customers loss																0.3				0.3		0.9	1.0	
Other liabilities value																								1.0

Appendix B: A worked example, Pro-Co UK Ltd

BACKGROUND TO PRO-CO UK LTD

The worked example in this appendix is Pro-Co UK Ltd, a hypothetical small professional services company (accounting firm, management consultancy, legal practice, or recruitment agency). The example concentrates on the key line items in the balance sheet and income statement, and draws on disclosures in the annual reports over a five-year period. The example attempts to illustrate the key assumptions that are required to produce a pro forma set of accounts based on Confidence Accounting, including a graphical presentation of the results. The bulk of this appendix takes the form of a letter from Pro-Co UK's finance director to the board on the occasion of the discussion of their first set of accounts prepared using Confidence Accounting.

While supporters of Confidence Accounting often cite its potential use in improving financial regulation, this appendix demonstrates that it:

- can be applied to professional services firms
- does result in a fairer representation of financial results, and
- may not be onerous or complex.

PRESENTATION TO THE BOARD OF PRO-CO UK LTD

(Letter from Pro-Co UK's finance director to the board on the occasion of the first set of accounts prepared using Confidence Accounting)

This paper presents Pro-Co UK's accounts using the new Confidence Accounting (CA) format, promoted by various regulatory and accounting bodies. Confidence Accounting is an attempt to reflect the fundamental uncertainty around particular values for assets, liabilities, revenues and costs. These uncertainties arise from the difficulty of establishing precise values at any specific time, in this case as of the balance sheet date, for balance sheet items such as loans and advances, and work in progress. Uncertainties arising from changes in future market prices and rates, from changes in expected future credit losses and from changes in future tax rates, etc are reflected in various risk-management disclosures, as has been the case for many years. The disclosures concentrate on the major asset and liabilities items.

The traditional management accounts would have an opening P&L as follows.

Figure B1: Opening P&L of Pro-Co UK Ltd

Profit & Loss Account (£ '000)		
Income		2,187
Staff Costs	1,655	
Other Expenditure	248	
Depreciation	36	
Expenditure		1,939
Profit		**248**

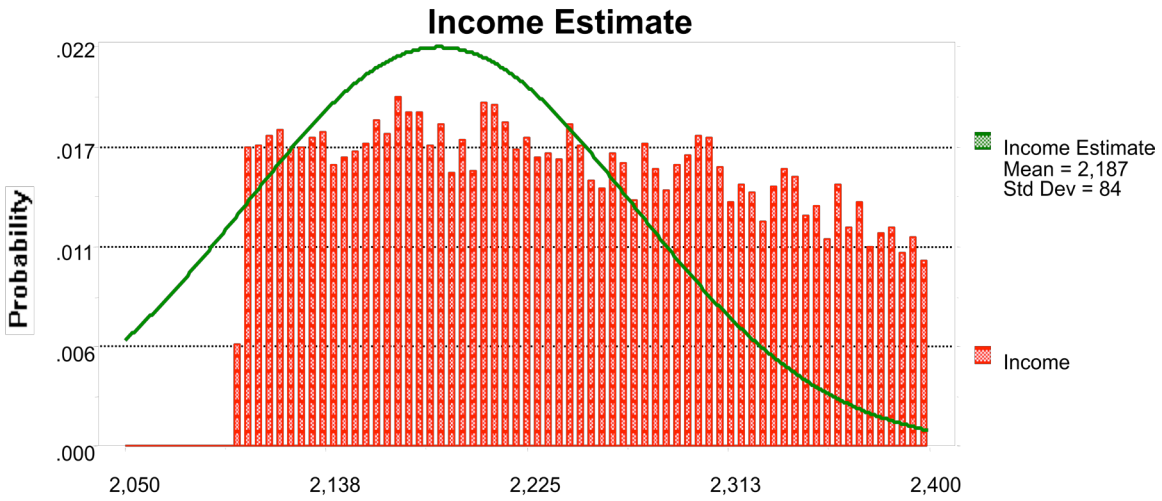
But Pro-Co UK Ltd has a range of estimates for income, staff costs, other costs and depreciation. This range of estimates has been built by simply summing up most of our project costs manager by manager.

Figure B2: Range assumptions for Pro-Co UK Ltd

	Bottom	Expected	Top
Income	£2,100,00	£2,187,000	£2,400,000
Staff costs	£1,600,000	£1,655,000	£1,780,000
Other expenditure	£220,000	£248,000	£350,000
Depreciation	£25,000	£36,000	£50,000

In a traditional profit and loss account, everything is very straightforward, and slightly misleading. The board is aware of the five key contracts that are in trouble, yet each has the potential for very good returns. The possible returns from those five contracts have been modelled, and all other active projects included, in a Monte Carlo simulation. The calculated distribution in Figure B3 shows how various assumptions about the range of income turn out. A crude normal distribution based on an additive range estimate (the green line) is contrasted with a Monte Carlo output of possible income (the red bars). The Monte Carlo predicts a fairly flat distribution that ranges from £2,100,000 to £2,400,000. It looks as if a higher figure of perhaps £2,240,000 is a better fit with the likely outcome, rather than £2,187,000, when project income is added from the bottom up.

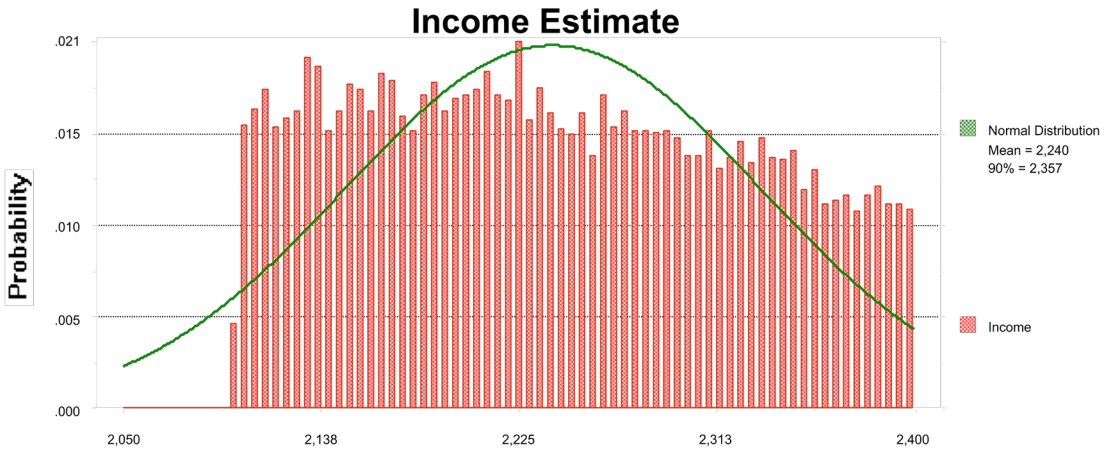
Figure B3: First pass at income



Quite rightly, it is important to understand what may be contributing to this discrepancy between the gross income estimate and the bottom-up estimate, project by project. In this case, there are income uncertainties about the extent to which projects are complete, the extent to which profit might be taken at given stages or the likely out-turns on opportunities. There are also cost uncertainties as some staff and contractors are rewarded on income that depends on income, and there are other expenditure uncertainties such as accruals methods and contingencies, as well as fixed asset valuation uncertainties owing to estimates of longevity or changing market values.

This generated questions for the project managers. It turned out that two of the five troublesome projects had pre-billed elements that were not refundable, making that income more secure. One project manager had overestimated bonuses to subcontractors and had thus under-reported net income. This moved the base estimate up markedly, and oddly more in line with the mid-point that had been grossly estimated at the beginning, to give a better picture indicating an income around £2,240,000.

Figure B4: Second pass at income



Turning to the balance sheet, Figure B5 shows it in its traditional state.

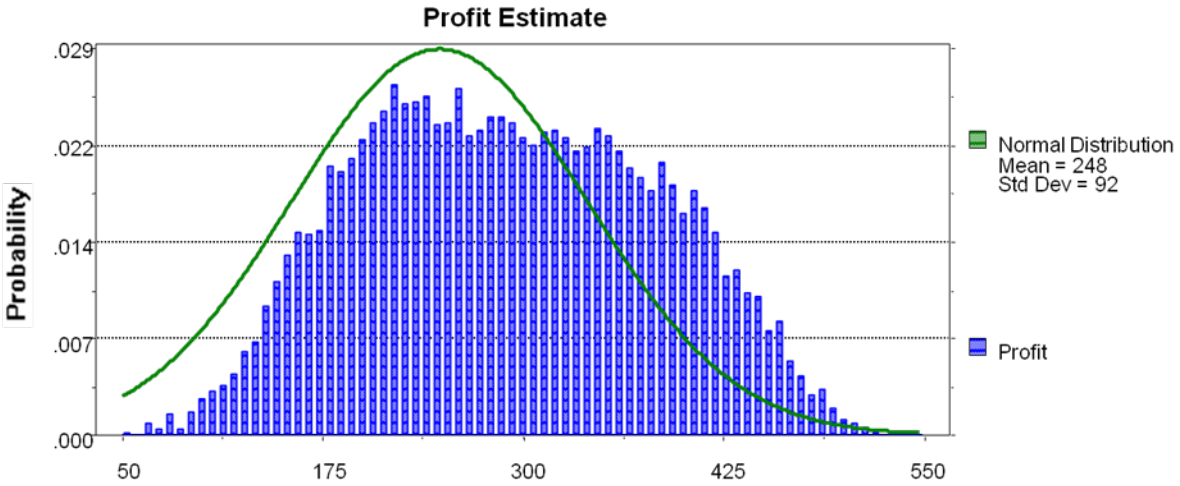
Figure B5: Opening balance sheet of Pro-Co UK Ltd

	Balance Sheet (£ '000)		
Fixed Assets:	**Cost**	145	
	Accumulated Depreciation	103	
			42
Current Assets:	**Cash**	144	
	Accounts Receivable	419	
	Work in Progress	121	
			684
Liabilities:	**Accruals**	70	
	Advanced Sales	241	
	Other Creditors	62	
			373
			353
Equity:	**Brought Forward**		105
	Profit in Year		248
	Carried Forward		**353**

There will be effects on the balance sheet from the P&L stochastic model, such as project completeness affecting credits for advanced sales, or profit taken as work-in-progress, or expenditure uncertainties affecting accruals. A handful of large assets represents most of the asset valuation uncertainty, eg property, major IT systems. Cash flow statements are unchanged as they already incorporate the idea of probabilistic flows.

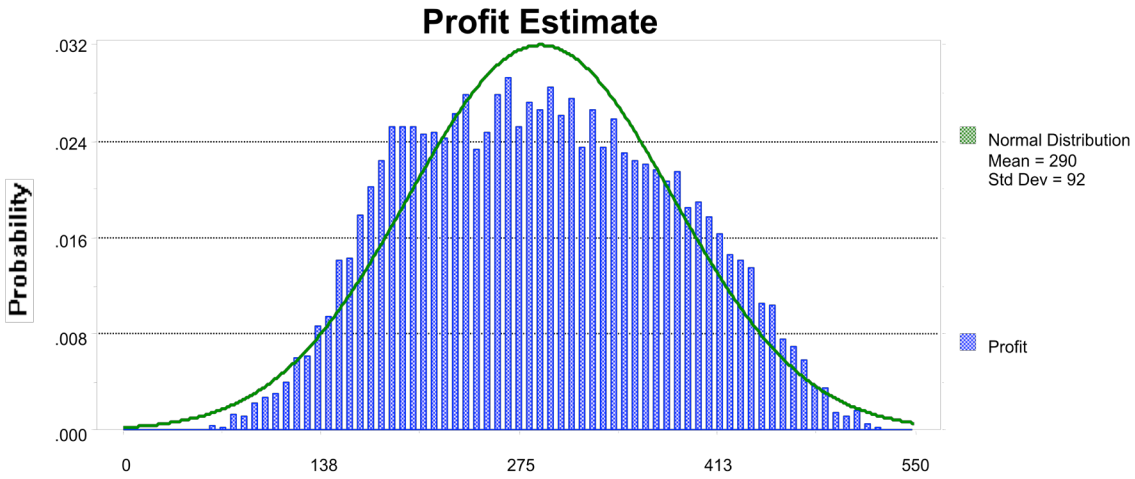
On examining profit, which is most sensitive to net income, one sees a reasonable range of estimates.

Figure B6: First pass at profit



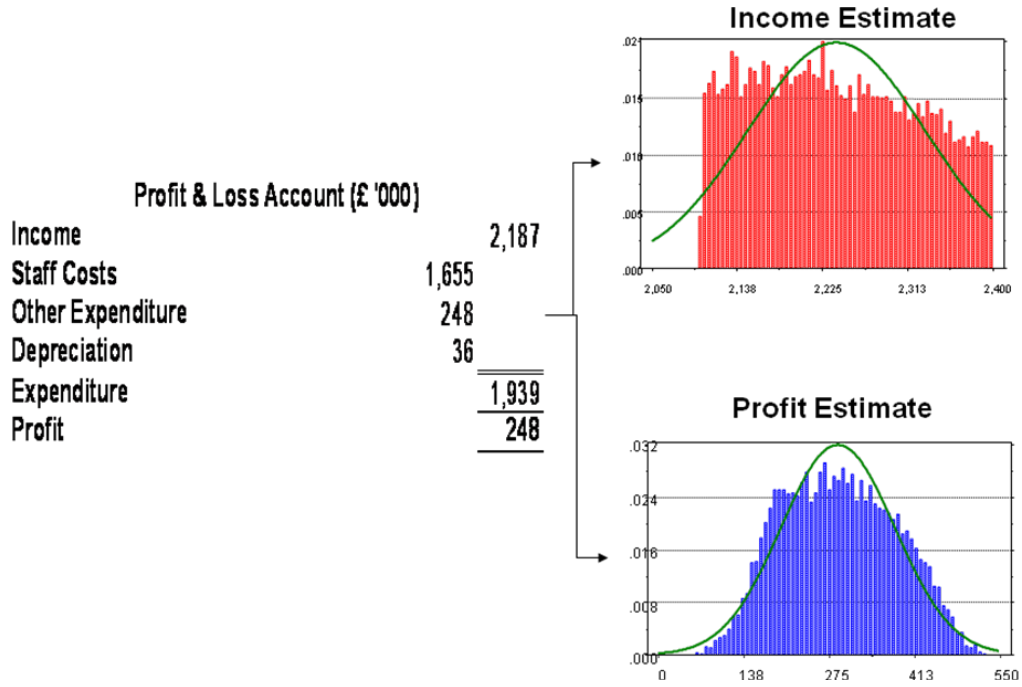
In Figure B6 a normal distribution based on the additive estimate (green line) is overlaid on the Monte Carlo profit estimates (blue bars). Here it can be seen that the 'deterministic' accounts showing a profit of £248,000 were too conservative. A better estimate might be around £290,000.

Figure B7: Second pass at profit



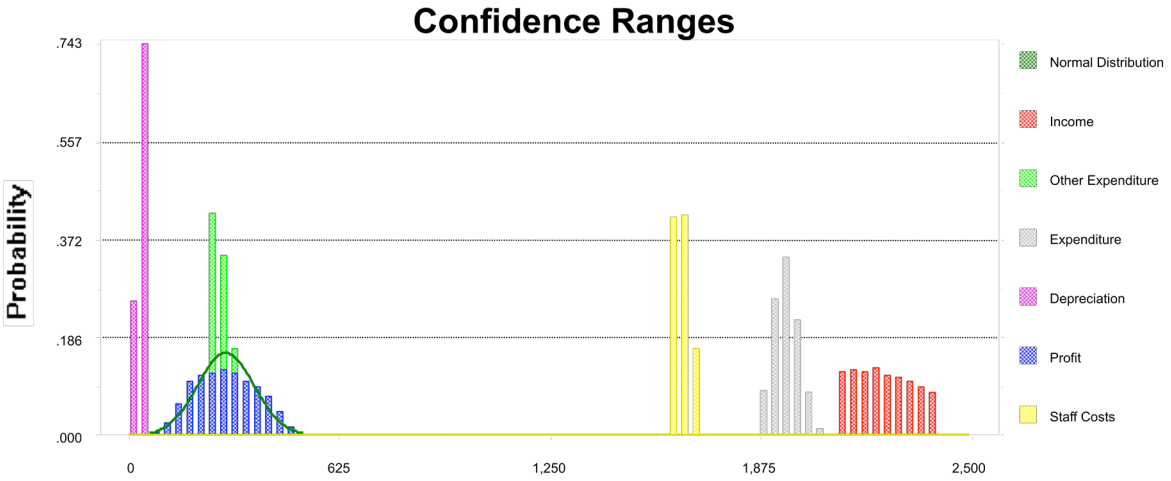
Hence real ranges indicate a better fit of income some £53,000 higher and a profit some £42,000 higher than a standard P&L. These ranges will be presented alongside traditional statements in the company's new published account format in order to give a genuinely true and fair view. This has yet to be discussed in detail with the auditors, but the P&L will probably look something like Figure B8.

Figure B8: Draft published P&L



Confidence Accounting 'purists' might believe that a lot more modelling is needed, but Pro-Co UK Ltd is a small professional services firm and arguably such work is unnecessary. Nonetheless, in order to assuage concerns, Figure B9 considers the sensitivity of these accounts to the major items. As can be seen below, because there are no plans to acquire or dispose of major assets, the above focus on profit (in turn based on income and expenditure) takes into account the majority of uncertainty, ie uncertainties around income and expenditure.

Figure B9: Comparison of sources of uncertainty



As you can see from Figure B9, the board is in a good position to present these accounts for audit. Once the underlying assumptions have been confirmed with the auditors the final preparation of the accounts can go ahead.

Appendix C: About the authors

IAN HARRIS FCA FBCS, DIRECTOR, Z/YEN GROUP LIMITED

Ian Harris has a degree in Economics and Law from Keele University and is a chartered accountant. Before joining Z/Yen, Ian led Binder Hamlyn's management consultancy's financial management systems work. In 1994, he co-founded Z/Yen, the City of London's leading commercial think-tank, to promote societal advance through better finance and technology. Ian specialises in strategic planning, systematic performance improvement, governance and ethics in both the not-for-profit and commercial sectors. Ian helped to conceive the Financial Laboratory (a joint venture that included Barclays Capital, Royal & Sun Alliance, Silicon Graphics and others) for visualising financial risk.

Ian chairs the judging panel for the National Payroll Giving Awards, is a life member of the Gresham Society and is chair of BCS, the Chartered Institute for IT's Ethics Group. He is also a regular contributor of articles for the business and not-for-profit press and is co-author with Michael Mainelli, of the practical book *IT for the Not-for-Profit Sector* and the 2011 book *The Price of Fish: A New Approach to Wicked Problems and Better Decisions*. Ian and Michael's humorous risk/reward management novel, *Clean Business Cuisine: Now and Z/Yen*, published in 2000, was a *Sunday Times* Book of the Week; *Accountancy Age* described it as 'surprisingly funny considering it is written by a couple of accountants'. Recent examples of Ian's lectures on relevant topics include 'Environmental, Ethical and Social Standards: Suitable Cases for the Governance Treatment' at the University of Oxford Said Business School and 'Changing Money: Communities, Longer Term Finance and You' at Gresham College.

PROFESSOR MICHAEL MAINELLI FCCA FCSI FBCS, DIRECTOR, Z/YEN GROUP LIMITED

In 1994, Michael co-founded Z/Yen, the City of London's leading commercial think-tank, to promote societal advance through better finance and technology. This followed a career as a research scientist in aerospace and cartography and then as an accountancy-firm partner. Michael is a qualified accountant, computer specialist and management consultant with a degree in Government from Harvard as well as mathematics and engineering studies at Trinity College Dublin and a PhD from the London School of Economics. Michael has won a Smart Award for prediction systems and a Foresight Challenge award for financial research; he has been named UK IT Director of the Year and served on the board of Europe's largest R&D organisation, the UK Ministry of Defence's Defence Evaluation & Research Agency.

Michael's financial services clients have included every major global investment bank as well as treasuries, information providers, clearing houses, exchanges, insurers, mutual managers, trade associations and alternative risk vehicles. Michael's financial markets experience includes advising dozens of banks on strategy, cost reduction, information systems and risk management; and conversion from building society to banking status. He was responsible for revising one nation's consumer banking sector, has carried out fraud investigations and advised on central bank re-structuring.

With the Universities Superannuation Scheme Michael created the Farsight Award for long-term investment research. He also created the $15M London Accord 'open source' research cooperative into climate change economics, and the world-renowned Global Financial Centres Index with the City of London Corporation. Michael's largest current project is Long Finance, moving towards financial services sustainability by asking 'when would we know our financial system is working?' Michael is Emeritus Professor of Commerce and a trustee at Gresham College, a non-executive director of the United Kingdom Accreditation Service, and a non-executive director of Sirius Minerals Plc, as well as a trustee of the International Fund for Animal Welfare and an almoner of Christ's Hospital School. Michael has a regular column in the *Journal of Risk Finance*.

JAN-PETER ONSTWEDDER MBA, Z/YEN ASSOCIATE

Jan-Peter has over 20 years' experience in risk management across a wide variety of asset classes and global trading markets, both in a banking and a corporate environment. Until March 2011 Jan-Peter was head of risk management for 3i plc, the UK private equity firm, where he was also responsible for the valuation of the unquoted investment portfolio. In 2007 he managed the London Accord, then the largest-ever collaborative research project into the financial aspects of climate change. The report, published in December 2007, placed research by leading investment banks, NGOs, law firms and academic institutions into the public domain.

From 2001 to 2006 Jan-Peter was head of risk for BP's Integrated Supply and Trading business, where he established and managed a global risk function with responsibility for market, credit and operational risk. Before 2001 he worked as head of market risk for the Royal Bank of Scotland, and held various risk and trading positions for Barclays Bank in London and New York. Since October 2009 Jan-Peter was a non-executive director and chair of the Energy Risk Committee for ICE Clear Europe, a UK recognised clearing house. Jan-Peter has an MBA from the Kellogg School of Management, Northwestern University and a degree in Mechanical Engineering from Delft University of Technology in his native Netherlands.

Appendix D: About the publishers

ABOUT ACCA

ACCA (the Association of Chartered Certified Accountants) is the global body for professional accountants. We aim to offer business-relevant, first-choice qualifications to people of application, ability and ambition around the world who seek a rewarding career in accountancy, finance and management.

Founded in 1904, ACCA has consistently held unique core values: opportunity, diversity, innovation, integrity and accountability. We believe that accountants bring value to economies at all stages of their development. We seek to develop capacity in the profession and encourage the adoption of global standards. Our values are aligned to the needs of employers in all sectors and we ensure that, through our qualifications, we prepare accountants for business. We seek to open up the profession to people of all backgrounds and remove artificial barriers, innovating our qualifications and their delivery to meet the diverse needs of trainee professionals and their employers.

We support our 154,000 members and 432,000 students in 170 countries, helping them to develop successful careers in accounting and business, based on the skills required by employers. We work through a network of 83 offices and centres and more than 8,000 Approved Employers worldwide, who provide high standards of employee learning and development. Through our public interest remit, we promote appropriate regulation of accounting and conduct relevant research to ensure that accountancy continues to grow in reputation and influence.
www.accaglobal.com

ABOUT CHARTERED INSTITUTE FOR SECURITIES & INVESTMENT

The CISI's mission is to help members attain, maintain and develop their knowledge and skills and to promote the highest standards of ethics and integrity in the securities and investment industry. Based in the City of London, the CISI is a global organisation with over 40,000 members worldwide and representative offices in financial centres such as Dublin, Singapore, Dubai, Mumbai and Colombo. We work in close cooperation with regulators, firms and other professional bodies worldwide.
www.cisi.org

ABOUT LONG FINANCE

Established in 2007 by Z/Yen Group in conjunction with Gresham College, the Long Finance initiative began with a conundrum: 'when would we know our financial system is working?' Long Finance aims to 'improve society's understanding and use of finance over the long term', in contrast to the short-termism that defines today's financial and economic views. Long Finance is a community which can be explored and joined at **www.longfinance.net.**

ABOUT Z/YEN GROUP

Z/Yen is the City of London's leading commercial think-tank. Z/Yen asks, solves and acts on strategy, finance, research, systems, marketing and intelligence projects in a wide variety of fields, such as developing an award-winning risk/reward prediction engine, helping a global charity win a good governance award or benchmarking transaction costs across global investment banks.
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