Global Risk Regulator

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Contents

Will HFT clean-up trigger US market structure reform?

The recent spate of regulatory initiatives and lawsuits aimed at high-frequency trading could light the touch paper for more fundamental US market structure reform. *By Charles Piggott*

Investigations into high-frequency trading (HFT) by the US Securities and Exchange Commission (SEC), the Senate Subcommittee on Investigations, the Federal Bureau of Investigation and THE New York Attorney General's Office among others have not instilled public confidence in US markets.

A 2014 survey by Chicago Booth/Kellogg School shows only 15% of respondents trust the US stock market and research by the Pew Research Centre shows US household stock ownership plummeted from more than 65% in 2002 to 45% in 2013. Even within the industry, some such as Charles Schwab, chairman of retail equities brokerage Charles Schwab, are crying foul over HFT. He described it as a growing cancer that needs to be addressed.

Mary Jo White

To date, the SEC has remained neutral on high speed trading, recognising the benefits cut-throat competition and razor-thin margins bring to investors. At the same time, recent actions make it clear the US securities regulator will enforce aggressively against manipulation at any speed, whether a typewriter or a computer algorithm is used. US regulators are also likely to take action against exchanges if they are found to have colluded with high frequency *to page 4*

Fundamental review still falling short of key aims

Operational challenges raise questions about whether new trading book rules will create more accurate and comparable market risk weightings. *By Philip Alexander*

When the Basel Committee on Banking Supervision (BCBS) published its second consultation on the fundamental review of the trading book in October 2013, the paper emphasised that the task of increasing capital allocated to the trading book had already taken place under the so-called "Basel 2.5" interim reforms in 2009. The fundamental review was therefore not explicitly aimed at raising capital requirements for market risk, but on "designing a new regulatory framework that addresses weaknesses in risk measurement" and on "promoting consistent implementation across jurisdictions".

Following the consultation, the BCBS has undertaken quantitative impact studies, including a hypothetical portfolio exercise (HPE) for which macro-level results were published in September 2014. The Basel Trading Book Working Group has met with industry representatives, most recently in November, and is preparing a third consultation that will potentially be published before the end of 2014. The third consultation will need to address concerns that the new trading book rules may not meet either of the BCBS's key objectives – more accurate and more consistent calculation of market risk-weighted assets (RWAs).

Dr Jon Danielsson

"The comparability between banks is key – reducing the RWA variability. This is one objective of simplifying the framework, because Basel 2.5 introduced a patchwork *to page 6*

Final structural liquidity ratio holds few fears

The Basel Committee's final version of the net stable funding ratio has resolved the concerns of most banks, with equity-secured financing likely to be the main victim.

By Philip Alexander

The Basel Committee on Banking Supervision (BCBS) issued the final version of the net stable funding ratio (NSFR) at the end of October, with a view to implementation at a national level by 2018. The NSFR is intended to complement the liquidity coverage ratio (LCR), which measures a bank's liquidity resilience over 30 days, with a long-term equivalent.

Under the NSFR, banks must hold enough available stable funding (ASF) to finance 100% of the required stable funding (RSF) of its longer term asset base. The initial concept used a one-year time horizon for ASF and RSF. Changes to the NSFR in January 2014 were designed to introduce a more staggered approach, with graded requirements at the six-month point, to avoid any sort of cliff effect at one year. The major changes in the final version concerned the treatment of securities financing transactions such as repurchase (repo) trades in which cash is lent against securities, or securities lending for cash.

David Vander, a co-founder of liquidity risk consultancy Liquidatum, says preliminary estimates suggest the changes to the net stable funding ratio during 2014 taken together will add about 15% on average to a bank's ratio.

"The Basel Committee would appear to have significantly watered down its commitment to reduce long-term structural liquidity imbalances in the banking system. We have reviewed the effect of the changes on our data set of internationally active banks from around the world and bank balance sheets as they were in 2007. Under the latest version, more than 70% of the banks would have NSFRs at 95% or higher. Under the original version, less than 30% would have been at 95% or higher," says Mr Vander.

Marc Saidenberg, a principal in the financial services team at EY and former chair of the BCBS liquidity working group during his time at the US Federal Reserve, says the NSFR was not intended to be a binding constraint for most banks today. In particular, the Basel Committee sought with its January 2014 changes to limit the effects for conventional deposit-taking commercial banks that carry little liquidity risk.

"The regulatory thinking is to maintain the level of structural funding achieved in the industry to date, although some institutions will still find they cannot yet meet this constraint depending on their activities. Together with the LCR, these ratios are meant to lock in the improvements in liquidity that have been achieved by market participants driven by their own interests, and by supervisory intervention," says Mr Saidenberg.

The BCBS has also sought to assuage concerns that the NSFR would be difficult to implement for jurisdictions where long-term wholesale funding is scarce, such as emerging markets or certain developed economies such as Australia.

"The general tone from regulators is that deposit-funded lending should not be penalised under the NSFR. There is also the intention not to disproportionately affect a particular region – the attention is more targeted on specific activities," says Mr Saidenberg.

Mark Bearman
"The removal of the asymmetry for non-banks is possibly good news... but interbank activity could become more difficult"

However, a long-term study of data from about 900 Swiss and German banks by a research team led by professor Andreas Dietrich of the Institute of Financial Services in Zug, Switzerland, suggests that even banks relying on sight deposit funding for a longer term asset base such as mortgages will have to adapt

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VIDEO Zurich Insurance's Axel Lehmann explains what regulators need to do to ensure new rules specifically target systemic risk

their business models. Mr Dietrich says the adoption of NSFR could cut as much as one-third off net interest margins for Swiss banks on average, by stoking competition to attract time deposits.

"The outflow assumptions for sight deposits look unrealistic given historic experience, in Switzerland they have behaved like long-term savings. In theory, the Swiss regulators could use national discretion to introduce different ASF weights on sight deposits, but they generally choose to go the other way and gold-plate international regulations," says Mr Dietrich.

Interestingly, however, his research does not suggest that running a stronger NSFR leads to lower profitability over the long term. Over the 12 years of the study, the banks with the higher NSFRs were not less profitable than their peers on average, and their profitability was also less volatile than banks running with greater inherent maturity transformation.

"The question is if many banks have to react at the same time to the new requirements, will that change the outcome as funding costs become more expensive," says Mr Dietrich.

Wholesale pressures

Mr Saidenberg says the existing commercial pressure to compete for deposits may be reinforced by the NSFR. But the major focus for both regulators and the banks is on the wholesale side of the business.

"The broader challenge is to know what on-balance-sheet capital markets activities will look like in five years' time. For that, banks need to understand the combined impact of the NSFR, the LCR, the leverage ratio and other items such as minimum haircut rules on securities financing transactions. Meanwhile, Fed governor Daniel Tarullo has suggested that wholesale funding levels will also be a factor in calculating systemically important financial institution surcharges, so banks need to know the conjunction of all of these things," says Mr Saidenberg.

One of the most significant concerns among capital markets participants was over the treatment of repo and securities lending. The January 2014 draft of the NSFR contained a structural asymmetry for trades with non-bank entities, in which funding by a bank to a non-bank carried an RSF, but funding from non-banks to the bank did not qualify as ASF. This asymmetry has now been equalised and the RSF for securities financing transactions with non-banks has been reduced from 55% to between 10% and 15%. A previous carve-out for repos with banks, however, has been removed, so they too now carry a 10% to 15% RSF.

"The removal of the asymmetry for non-banks is possibly good news for prime brokerage and corporate hedging business, but interbank activity could become more difficult," says Mark Bearman, a director in the prudential regulation division of the Association for Financial Markets in Europe (AFME).

A further improvement in the final version of the NSFR is the alignment of netting provisions with those in the leverage ratio. This means that at least some repo and derivative trades will be netted out for the purposes of calculating net stable funding.

"It is welcome that there is recognition of netting, but we still need to see how that will play into the numbers. There is also some debate around the scope of the new language on interconnected assets and liabilities, and whether that might be applicable in certain circumstances. We need clarification on what the words mean, then we can compute the significance," says David Hiscock, deputy head of market practice and regulatory policy at the International Capital Market Association (ICMA).

ICMA is still assessing the impact on short-term money markets, however. Commercial paper still appears to carry an RSF of 15% to 50% depending on credit quality, even though it typically has a maturity of three months or less.

"Unless there is an assumption that commercial paper will have to be rolled, then banks would need one-year funding for an asset that matures in less than one year, which would be a disincentive to hold it. Banks should only be required to match-fund commercial paper rather than over-funding it," says Mr Hiscock.

Unintended consequences?

The punitive treatment of equity under the NSFR, flagged up by AFME and the Global Financial Markets Association (GFMA) during 2014, has not yet been addressed. Exchange-traded equities face a 50% to 85% RSF, which industry bodies warn could inhibit hedging solutions for bank clients, market-making in secondary markets, and new issue underwriting.

There is an observation period for the NSFR prior to its intended entry into force at the start of 2018, although the US may want to implement its own version of the ratio earlier. It remains to be seen how much flexibility there is for modifications to the NSFR during the observation period.

"The current RSF does not reflect the liquidity of equities, or the context in which they are likely to be held – equities are often held to hedge market-making or customer business, rather than as part of proprietary trading strategies," says Mr Bearman.

Mr Saidenberg believes that banks will choose based on their business mix whether to allow activities with a more benign treatment under the NSFR to effectively subsidise those that are more heavily penalised, especially on the capital markets side.

"There is likely to be downward pressure on securities financing transactions, especially equity finance. That might be intended, although the Basel Committee has not said so explicitly. The increased requirements on interbank repo will also put pressure on that," says Mr Saidenberg.

Mr Vander suggests it will not be so difficult for banks to find ways to bolster their overall NSFR. In fact, he highlights a loophole that can create the illusion of liquidity. Under the final version of the NSFR, if a bank buys government securities and funds them by short-term repos with a non-financial corporate, the securities will be subject to a 5% RSF haircut while the repo will generate 50% ASF. This will increase the NSFR to the tune of 45% of the value of the repo, yet the bank has not created any liquidity, since it used borrowed money to pay for the securities.

"The mistake is that, with respect to repos and reverse repos, the NSFR focuses on the behaviour of the counterparty rather than the collateral, reflecting the treatment of deposits. Unlike deposits, repos are not available to fund all asset classes and the Basel Committee should look to the underlying collateral first," says Mr Vander. GRR

Marc Saidenberg
"The general tone from regulators is that deposit-funded lending should not be penalised under the net stable funding ratio"

Will HFT clean-up trigger US market structure reform?

from page 1

traders, failed to disclose information or lied to investors.

Announcing settlement charges against New York HFT firm Athena Capital Research on October 16, Andrew Ceresney, director of the SEC's enforcement division, said "what happened here was fraud," before warning that the SEC has the expertise to bring actions against "even the most sophisticated fraudulent algorithmic trading strategies." The SEC claims the small NY firm's trading accounted for more than 70% of Nasdaq trading in certain stocks in the final two seconds before market close and was designed to manipulate prices.

"Pretty much any trading abuse is going to be done using a computer and in this case, traders were using an algorithm to affect closing prices," says Cameron Smith, president of Quantlab Financial, a Houston-based quantitative trading firm.

"Marking the close is one of the things surveillance departments at every exchange have been looking for the past 40 years," says Mr Smith, who worked for six years in the SEC's surveillance department. "If someone is using automation in a bad way, then it needs to be rooted out."

In the post-Dodd-Frank Act era, the penalties for HFT abuses are rising. In October, the US Attorney for the Northern District of Illinois issued criminal charges against high-speed trader Michael Coscia, owner of New Jersey-based Panther Energy Trading, for 'spoofing' (submitting and/or cancelling multiple bids or offers to create artificial price movements).

Order type investigations

Despite historic immunity from litigation due to their regulatory status, stock exchanges are receiving HFT-related legal writs. On September 2, the city of Providence, Rhode Island, along with Boston's state retirement fund and three other plaintiffs, filed an amended complaint alleging that multiple stock exchanges have provided high-frequency firms advantages over ordinary investors, including providing enhanced trading information at faster speeds and order types that gave HFT firms trading advantages that harmed ordinary investors.

The exchange operators, including BATS Global Markets, the Nasdaq Stock Market, the Chicago Stock Exchange and the New York Stock Exchange (and also Barclays' dark pool) are seeking for the case to be dismissed. The exchanges claim their status as self-regulatory organisations gives them "immunity" from prosecution. But the plaintiffs argue the "sale of advanced access to market data has nothing to do with their former roles as market regulators and everything to do with their private business interest".

HFT clean-up

Whistle-blower Haim Bodek, a former Goldman Sachs trader, who has been in eye of the HFT storm since he took his concerns to the SEC three years ago, was one of the first to claim publicly that exchanges gave HFT firms unfair advantages over ordinary traders. He says exchanges have given only selective disclosure of how certain complex order type modifiers can be combined to create functionality that gives a few select traders advantages over most of the market.

"Combining certain modifiers, for example, creates functionality that was never fully disclosed," says Mr Bodek. The SEC is currently investigating allegations against Direct Edge, now part of BATS Global Markets, and other securities exchanges and HFT firms regarding the use of order types. SEC chair Mary Jo White asked US exchanges to conduct a "comprehensive review" of their order types around the middle of this year.

Meanwhile, Mr Bodek says he applauds the SEC's aggressive encouragement of whistle-blowers in the financial industry under the Dodd-Frank whistle-blower programme which brings cases to the SEC that would not otherwise have come to light. "The law is now catching up on an area of finance which it was previously ill-equipped to deal with," he says.

Mr Bodek and his colleague Stanislav Dolgopolov have spent the past six months working on an extended report entitled The Market Structure Crisis in the US Securities Industry, which addresses various legal and regulatory developments relating to the architecture of securities markets.

Among other things, the report, due to be published by Decimus Capital Markets in December, details grey areas in the rules allowing HFT firms to jump the order queue, harvest exchange rebates and side-step regulations such as the ban on 'locked' markets (where a buy order at one exchange has the same price as a sell order at another exchange).

"In the zero-sum game of trading, other investors were disadvantaged by being queue-jumped or losing their priority, having their orders rebooked and repositioned, incurring an access fee instead of collecting a liquidity rebate, becoming subjected to unnecessary intermediation and bearing the downside of sudden price movements," says the report. It also claims there is evidence to suggest that HFT firms actively participated in the order-type design process.

"Although somewhat piecemeal, there can be no doubt that a market clean-up is now happening," says Mr Bodek. Class action lawsuits containing allegations against exchanges relating to their order type practices confirm this trend.

How slow is the NBBO?

In another investor class-action lawsuit against 13 exchanges filed on May 22 in NY's southern district court, the plaintiff Harold Lanier claims exchanges discriminated against investors by providing advanced access to market data to HFT firms. According to the claim: "In today's financial markets, one thousand microseconds is a virtual eon. And given that it only takes the 'preferred data customers' a handful of microseconds to cancel orders and execute trades, it is more than enough time for them to generate tremendous profits from the advance receipt of the market data."

The time lag (or 'latency' in industry speak) between the consolidated market data feeds that provide the National Best Bid and Offer (NBBO) price, and the market data feeds on which HFT firms rely has become critical. Research published in the Financial Review in April by Shengwei Ding, John Hanna and Terrence Hendershott, How Slow is the NBBO?, documents price dislocations between the NBBO displayed by the Nasdaq SIP (the securities information processor that generates the NBBO) and a faster 'synthetic NBBO' generated from direct feeds from various exchanges. Taking Apple stock as their example, researchers found multiple price dislocations per second (50,000 times on some days) between the direct feed 'synthetic NBBO' and the Nasdaq SIP NBBO. Many were greater than $0.10.

SEC Regulation NMS (or National Market System) including the NBBO rule was passed in 2005 to enforce price and time priority across fragmented trading platforms. It requires intermediaries to execute customers' trades at the best NBBO regardless of which trading platform displays it.

Andrei Kirilenko, professor of the practice of finance at the MIT Sloan School of Management and formerly chief economist at the US Commodity Futures Trading Commission (CFTC), says that as markets have moved into trading at 'sub-human' speeds, the dimension of latency has been under-appreciated and has yet to be fully understood. At very high speeds, Mr Kirilenko says orders sent to execute against the NBBO will get to and be processed by a trading platform with some delay.

"By the time the order is executed, it may no longer be at the best bid or offer at that very instant in time. So, in reality, at subhuman speeds, price and time priority are not strict; they are random. Only the fastest traders can achieve price and time priority with certainty," he says.

"Without transparency about the delay between the order and the time of execution, there can be little understanding of whether a particular price that shows up at a particular time is in fact the best price by the time of execution."

Mr Kirilenko says it is too early to tell if there is a breakdown in market practices that needs to be fixed by the regulators. "Let's first mandate that trading platforms introduce transparency into the dimension of time and latency, if only on a pilot basis, so we can at least have a more informed debate."

Richard Prager, head of global trading at leading investment manager BlackRock, raised similar concerns in a panel discussion at the Institute of International Finance's annual meeting in October. "If you are going to have the NBBO, we all must know what it is at the same time," he said.

Consolidated audit trail

The SEC and Financial Industry Regulatory Authority (FINRA) are currently working on a dozen or more initiatives related to HFT and market structure. These include tighter FINRA registration requirements for HFT firms offering the possibility of further trading constraints on certain types of firm. In addition to enforcing transparency for automated trading systems (ATS), widening the reporting structure to include brokers' internal order matching engines and creating an anti-disruptive trading rule similar to the CFTC's Rule 575, the SEC is also working on initiatives to increase transparency both on how client orders are routed and the order types offered by exchanges.

Jamie Selway, managing director of brokerage firm Investment Technology Group, says regulators don't yet have all the tools they need, but cites the cross-market consolidated audit trail (CAT) project as a step in the right direction. "We've seen recent progress, but it's still frustratingly slow given its importance," he says.

The exchanges and FINRA submitted the CAT NMS Plan to the SEC on September 30, although it has yet to be published for comment. Regulators are currently dependent on a patchwork of audit trails lacking adequate market participant identifiers (MPIDs). The CAT initiative will make it easier for regulators to track orders throughout their life cycle, identifying both end customers and broker-dealers handling individual orders down to the level of whether an order was executed by a firms' ATS or its market-making desk. From February 2, 2015, MPIDs must also be included in trades reported to FINRA.

"The CAT could be a treasure trove of data for regulators, both in ensuring policy decisions are grounded in facts and in providing market surveillance," says Manisha Kimmel, managing director of the Financial Information Forum. "Under the current system, regulators can only access customer information by making enquiries using separate systems. But this trading data focuses on customer information related to accounts. It doesn't show who placed the original orders."

Market structure debate

However, some within the industry are pushing for more fundamental reforms and SEC chair White has confirmed a fundamental review of US market structure without 'sacred cows'. One of the first questions for the SEC's Market Structure Advisory Committee announced by Ms White in June will be over the extent to which Regulation NMS has caused market fragmentation and, if so, the extent to which this damages markets or encourages healthy competition.

"In general, investors have enjoyed better execution and narrower spreads, but the market has also become much more complex. Given the obsolescence of some rules, the time has come for a comprehensive review," says Richard Repetto, a principal at independent broker-dealer Sandler O'Neill. He lists several issues for re-examination, including concerns over market stability, proprietary data feeds, the regulation of dark pools, market pricing, maker-taker fees, rebates and the whole issue of payment for order flow. Quantlab's Mr Smith says that market structure and the fact that price discovery is fragmented across multiple trading venues is the real issue that needs to be addressed in order to fix HFT issues.

"If we could get the market structure right, a lot of the problems with HFT would disappear," he says. Mr Smith's firm is one of four HFT firms behind the Modern Markets Initiative (which counts former CFTC commissioner Bart Chilton among its advisers).

Regulation SCI

Another difficult question for regulators is the extent to which HFT and algorithmic trading threaten financial stability. The unexplained October 15 disappearance of liquidity in the US treasuries' market during which traders shut off their computers and dealt only by phone raises difficult questions. If liquidity can disappear in US treasuries, it could happen in a much more serious way in less liquid markets with potentially systemic implications.

On November 19, the SEC voted to adopt rules on Systems Compliance and Integrity (SCI) designed to address systemic risk posed by systems failure at key market participants such as exchanges, securities information processors, ATS and clearing agencies.

But some, including SEC Commissioner Kara Stein, do not think the rule goes far enough. For example, it will not cover broker dealers such as Knight Capital Group, which lost \$450m in 45 minutes in August 2012 due to an internal software error that caused trading in some stocks to gyrate by 150%.

In a written statement released on November 19, Ms Stein said: "Today's rule leaves out over 4400 broker-dealers, 32 alternative trading venues trading equities, and 43 alternative trading venues trading fixed income and other non-equity securities. Put another way, around \$14 trillion worth of equity trades are ignored by Regulation SCI." GRR

Fundamental review still falling short of key aims

from page 1

of different models," says Lars Popken, head of market risk methodology at Deutsche Bank.

The September HPE, however, is inconclusive in terms of whether the fundamental review will reduce the variability of risk weights. The trading book group used the largest and most diversified portfolio (Portfolio 30) to assess variability, and concluded that "the new risk measures proposed in the second consultative document are not likely to increase variability in comparison to the measures in the current market risk framework." But market participants and academics question whether such firm conclusions can be drawn.

"The large trading banks have huge portfolios over many currencies and yield curves. That means even if there are idiosyncratic differences between how firms measure the risk of individual products, those differences should diversify away when we look at the whole portfolio, unless one firm is systematically underestimating risk. You cannot really draw huge conclusions about variance across banks from only looking at simple portfolios like those in the HPE," says the head of risk methodologies for a large US bank.

Expected shortfall

The central element of the fundamental review is the decision to switch banks using the advanced modelling approach from measuring value at risk (VaR) to a 99% confidence level, to measuring expected shortfall with a 97.5% confidence level. Expected shortfall requires banks to incorporate the potential impact of tail-risk events in the final 2.5% of the probability curve.

Dr Jon Danielsson, a director of the systemic risk centre at the London School of Economics, is a sceptic about the value of switching to expected shortfall in an attempt to incorporate tail risk. Given the complexities of Basel, he warns that there is "possibly no statistical technique that would be sufficiently powerful and general to capture the tail risk of the trading book on aggregate".

He says expected shortfall with a 97.5% confidence level will most likely produce a slightly higher risk output than 99% VaR. But he casts doubt on the stated aim of making the capital requirement more accurate and risk-sensitive, especially for tail risk.

"Our sensitivity analysis suggests that expected shortfall estimates have more uncertainty than VaR, so expected shortfall is a less reliable measure," says Mr Danielsson.

Vincent Dahinden, chief executive of derivatives risk management advisory firm Solum Financial, says banks are also anticipating some challenges in managing the risk measure outputs from expected shortfall.

"Banks have realised that the switch to expected shortfall is likely to add unexpected jumps to their risk measures because the tail risk element in its construction is based on fewer relevant data points than the typical VaR framework," he says.

Internal versus external

For Mr Popken, the concern is that two elements of the fundamental review could create a disconnect between market risk reporting requirements for capital ratios, and the methods that banks use internally for risk management.This means banks are likely to construct two different approaches for internal and regulatory reporting, undermining the BCBS objective of simplifying trading book rules.

First, the fundamental review requires banks to calculate expected shortfall based on stressed market periods, rather than current market conditions and associated portfolio assumptions. Mr Popken says banks are likely to continue using conventional VaR on current market conditions for internal risk management, even after the switch to stressed expected shortfall for regulatory reporting purposes.

"The hedge positions that you have today on the portfolio are appropriate for today's risk, but may not be so appropriate for stressed periods. Stressed VaR or stressed expected shortfall give the right order of magnitude capital result, but in detail they may not be so useful for day-to-day risk management. Stressed measures shift the focus onto hypothetical periods dominated by financial crisis, but if the crisis comes from somewhere other than the hypothetical scenario, then conventional measures may be more useful than focusing on a stress that does not play out," he says.

The second major change is the BCBS requirement that banks must apply for approval to use their expected shortfall model for each trading desk individually. This enables add-on supervisory capital requirements for risks on each desk that cannot be modelled. It also allows supervisors a fall-back solution to switch a desk back to the standardised approach if the internal model is being viewed as inadequate – for instance, if RWA results deviate too far from the median. But again, banks are likely to continue using aggregated measures internally – either VaR or expected shortfall.

"[Banks want] an aggregated view of all types of risk in all portfolios across all businesses. Certain types of risk such as credit or interest rate risk are present in several different business lines, so this is a great tool to understand concentration risks that are not otherwise transparent. It is a unifying system that makes risks comparable and enables banks to set aggregated risk limits across different desks," says Mr Popken.

Mr Dahinden says it is too early to know yet whether the new methodologies will make bank RWA outputs more consistent as a whole. He believes, however, that regulators are likely to hold firm on requiring banks to calculate expected shortfall for each desk separately.

"The stated intent of regulators is to be able to dig down into specific risk buckets and compare those specific activities across banks. Requiring individual numbers for each desk will allow progress on that, but it is an operational burden for the banks," says Mr Dahinden.

Operational errors

That operational burden is a further element of uncertainty that bankers believe has undermined the usefulness of the September impact study. The BCBS noted in its report that "the main limitation of this exercise has been the inability to discuss the accuracy of the outliers, data point by data point."

The Global Association of Risk Professionals, which is a qualification awarding body rather than an industry lobby group, undertook a study that concluded operational errors may have played a large – or even the largest – part in the dispersion of results in HPEs. The US head of risk methodologies who worked on this study believes some of these problems will be ironed out when models are used in the production environment rather than a testing environment.

"Banks run their real Basel calculations on production processes with all sorts of controls when transactions are entered by traders, including the exact instrument, currency unit, mark-to-market and so on. And all of that has to be confirmed by the counterparty as well. But in an HPE, these checks are absent, the regulator may send instructions for hypothetical trades in a non-standard or ambiguous format so the risk manager has to approximate the actual trade, or the instructions may be transcribed wrongly. The results on a production system could be very different," he says.

Not all bankers are confident that the operational challenges will be limited to the testing phase. The Basel trading book group referred a number of times to "system constraints," and Mr Dahinden believes this fits into a wider regulatory agenda.

"This is part of a broader point that regulators have been making, that IT systems in banks are not yet responsive enough to the new regulatory environment. Regulators want to be able to ask for risk metrics in a standardised format that suits them, they no longer accept the banks just submitting the numbers in their own desired format," he says.

Since supervisors are seeking to retain the power to switch individual desks back to the standardised approach if the advanced modelling approach results are deemed unreliable, there will be increased pressure on banks to prove their models to the regulator. That touches on another challenge of expected shortfall, which is the difficulty of backtesting the model. The BCBS had so far suggested that banks use VaR for backtesting models, even while using expected shortfall to calculate the capital requirement.

Expected shortfall means calculating the average impact of the 2.5% tail-risk scenarios, but the past, by definition, provides only one scenario outcome each day. Researchers at risk management firm MSCI published a paper in October 2014 suggesting a method for backtesting expected shortfall that can compute how frequently the 97.5% confidence level is exceeded, and by what magnitude.

"It is a small piece of mathematics, but it was a missing piece of the puzzle that opens the door to backtesting the new capital charge measure, and there is therefore a lot of interest from the industry bodies negotiating with the Basel Committee," says Carlo Acerbi, an executive director at MSCI who co-authored the research.

How far this will help banks face the more intense regulatory scrutiny of models remains to be seen. Mr Dahinden says that VaR can be reliably backtested by construction, by seeing how often the 99% confidence level is broken.

"Intuitively, expected shortfall means averaging fewer paths, which means the outputs will be very sensitive and may not be a relevant representation of tail risk," he says.

Liquidity shock

The deeper concern lies inevitably in how new models will affect the overall capital charge on market risks. Even though the BCBS has no explicit aim to raise that charge, nor has it promised that the fundamental review will be entirely capital neutral.

The September HPE indicated that the greatest potential for increased capital charges comes from the implementation of liquidity horizons – assumptions about how long it would take to exit a trading position and therefore how long the bank is exposed to that risk. Most banks had previously calculated VaR using a standard 10-day liquidity horizon assumption. Mr Danielsson believes the introduction of different liquidity horizons could add to the potential for a less accurate risk measure.

"The proposed implementation method for liquidity horizons is overlapping weekly estimation windows each rolling forward one day. But that means you are partly repeating the same daily data in each window, so it looks like a larger sample than it really is. When we looked at this empirically, this also increases estimation uncertainty," says Mr Danielsson.

Mr Popken says the liquidity horizon framework has been improved by basing all correlation calculations on a 10-day horizon rather than different horizons. The approach of having 24 different categories for liquidity horizons between 10 and 250 days depending on the type of underlying risk factor, however, still leaves certain questions to be answered.

"If a client-structured product that has a longer time horizon is hedged by the bank using simpler instruments with a shorter horizon, in the capital model this would lead to a significant open-risk position because of the use of different liquidity horizons, even if there is little basis risk in economic terms. The answer to this would be to allow banks to apply the same liquidity horizon to the hedge as to the structured product," he says.

What alarms bankers the most is that, in the HPE exercise, the application of liquidity horizons to Portfolio 30 increased the resulting risk measure by 67%. But the US risk methodologies head says this will not necessarily lead to an increased capital requirement.

"It is possible that the Basel Committee will use the calibration process to make the implementation of liquidity horizons capital neutral, by reducing capital requirements for very liquid assets and increasing them for less liquid transactions," he says.

Lars Popken

"Some of the most disproportionately affected products are likely to be those with most significance for the real economy"

Mr Popken is not entirely reassured. He acknowledges that calibration can mitigate some of the overall capital impact, but says the dispersion of effects is still his greatest concern.

"Some of the most disproportionately affected products are likely to be those with most significance for the real economy, such as credit, small-cap equities, emerging-market assets and foreign exchange hedges for exporting or importing companies. That has not yet reached the top of the agenda due to the technical challenges of implementation, but it needs to be raised. Less secondary market trading will lead to wider spreads and higher funding costs and we are already seeing that trend in the falling number of banks willing to participate in fixed income and currencies trading," he says.

The next stage after the third consultation will be a quantitative impact study that takes in banks' actual portfolios, with completion of the review planned for end-2015. The study will provide a deeper insight into whether the fundamental review can achieve its objectives, or if the costs will be out of proportion with the benefits. GRR