"Finalising Basel III: Coherence, calibration and complexity"

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Good morning, and thank you to the Superintendency of Banks and Financial Institutions (SBIF) for inviting me to give the keynote speech at your conference today on banking development, stability and sustainability. Let me thank Eric in particular for the warm welcome, and for his and the SBIF's efforts to host a number of important meetings earlier this week.

The Basel Committee is well on track to finalise by the end of this year its reforms related to reducing excessive variability in risk-weighted assets. Looking forward, research-based contributions – be they conceptual or empirical, academic or policy-based in nature – will be invaluable inputs to the Committee. Indeed, research contributions have already played a key role in developing the Basel III framework.

The importance of research for the Basel Committee is premised on two key principles on which the Committee conducts its work: a focus on rigorous evidence-based analysis and an extensive consultation process. At times, the policymaking process is viewed as a restricted bilateral discussion between regulators and banks. This is untrue and would be a poor approach to policymaking. The Basel Committee actively consults a wide range of stakeholders, including academics, analysts, central banks and supervisory authorities, industry participants and the general public. Research-based contributions are most effective in producing compelling, unbiased, evidence-based analysis.

So the Basel Committee has relied, and will continue to rely, on research as part of its work. As the Bank of England's Andy Haldane recently noted, "the academic debate about prudential standards for banks is not closed; it has only just opened".[1] I would like to focus my remarks today on three areas related to the Committee's work where research is particularly welcome: coherence, calibration and complexity. Such work would build on the literature review conducted by the Basel Committee's Research Task Force earlier this year.[2]

Even though the start of the global financial crisis dates to almost nine years ago, there continues to be a rich policymaking and research agenda on financial regulation. This is unsurprising, given the immense scale of the financial crisis. To give just one example, economic output for Basel Committee member countries is still 30% below its pre-crisis trend (Chart 1). Put differently, based on current exchange rates, the loss in output for BCBS member countries as a result of the crisis amounts to over $76 trillion.

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[1] Haldane (2016).
[2] BCBS (2016a).

On the policymaking front, the Basel Committee's reforms have been wide-ranging (Chart 2), and the Committee has made substantial progress towards finalising its post-crisis reforms. These reforms have had a visible impact in strengthening the resilience of the banking system. Since 2010, the leverage ratio of internationally active banks has increased by over 50% (Chart 3), while risk-weighted capital ratios have increased by over 70% (Chart 4). The Liquidity Coverage Ratio (LCR) is being phased in and banks' ratios continue to strengthen (Chart 5). Holdings of high-quality liquid assets have increased by over 20% over the last few years (Chart 6).

Coherence

The post-crisis regulatory framework has shifted from a framework which was centred on a single regulatory constraint – the risk-weighted capital ratio – to one with multiple constraints. In addition to the risk-weighted ratio, the post-crisis framework also includes a leverage ratio, large exposure limits and two liquidity standards (ie the Liquidity Coverage Ratio and the Net Stable Funding Ratio). And supervisory stress testing is playing an increasingly important role across a number of jurisdictions.

Why have we moved to a "multiple metrics" framework? Simply put, each regulatory measure has strengths and weakness. The multiple metrics framework is more robust to arbitrage and erosion over time, as each measure offsets the shortcomings and adverse incentives of the others. For example, the leverage ratio provides an absolute cap on leverage, but, by itself, could incentivise banks to increase their holdings of higher-risk assets. The risk-weighted framework compensates for this as it constrains banks that materially increase their risk profile without any commensurate regulatory capital to fund their balance sheets. And the liquidity standards require banks to maintain a prudent buffer of high-quality liquid assets and restrict the degree of maturity mismatch.

All too often, I hear from some stakeholders that the post-crisis framework is incoherent because different regulatory metrics could result in different behavioural responses by banks. But this is precisely the point of a multiple metrics framework. If all of the constraints were to lead to the same behavioural response, then I could understand assertions that the measures are redundant. Risk is multidimensional, and this is better reflected in a multiple metrics framework.

Nevertheless, further research is warranted on the interactions and impact of multiple regulatory constraints on banks' investment and pricing strategies.

When discussing the Basel Committee's standards, it is worth noting that they comprise a set of minimum standards. Jurisdictions are encouraged to adopt a more rigorous version of the global minimum and many often do.[3] Quite a bit of concern has been expressed about the cumulative impact of the Committee's multiple post-crisis reforms, which leads me then to the next area of the Committee's work for which research has played an important role, and this is calibration.

Calibration

Of all the areas of the Committee's post-crisis reforms, research-based contributions have been particularly influential in shaping the calibration of the Committee's standards. Indeed, academics were at the forefront for calling for higher capital and liquidity requirements when Basel III was being finalised in 2010.[4] And perhaps the most notable example of research influencing the Committee's work is the Committee's long-term economic impact analysis of capital and liquidity requirements.[5] This work was firmly grounded in

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[3]   Coen (2016).
[4]   I remember a particularly timely letter by 20 esteemed economists to the Financial Times in 2010 (Financial Times (2010)).
[5]   BCBS (2010).

rigorous analysis, and pointed to clear macroeconomic net benefits of higher capital and liquidity requirements. A wide range of academic studies have produced similar results. And several of my colleagues at the BIS, including Hyun Song Shin, have recently provided further compelling evidence of the benefits of higher capital requirements.[6]

While the Committee has made it clear that, in finalising its outstanding reforms, it will not be significantly increasing overall capital requirements, this should not constrain further research on the calibration of capital and liquidity requirements. There are at least two reasons:

First, while we do not intend to significantly increase overall capital requirements, this does not mean avoiding any increase for any bank. Indeed, one of the objectives of the Committee's reforms is to explicitly target banks with aggressive modelling techniques, resulting in low risk weights.

In that regard, an area of further research which would be welcome relates to how we should think about the capital benefits of allowing banks to use internally modelled approaches, and therefore the appropriate calibration of capital floors to such models. What are the pre-conditions for such models to produce better outcomes than, say, simpler standardised approaches? And to whom do the benefits of improved modelling accrue? If a bank using a model can lower its capital requirements by, say, 30%, what are the financial stability and real economy benefits of such an approach? To what extent do the benefits of modelling accrue to lower-risk borrowers as opposed to the parties being compensated for developing and using the models?

The second reason is, as recently noted by Andy Haldane, "academic challenge…is an essential ingredient of a healthy financial and regulatory system". So we will continue to look to researchers and academics to provide their ongoing perspectives on the calibration of our standards.

Complexity

The third topic I wish to touch on today is the issue of complexity. The issue of complexity in the capital adequacy framework arises mainly from banks' use of internal models, which itself stems from a desire for risk sensitivity. However, risk is multifaceted and far from straightforward to measure. While a risk-sensitive regulatory framework offers a number of benefits, the resulting complexity also has potentially adverse consequences. In addition, the framework has to produce outcomes that are comparable over time and across banks. The Committee is well aware of the need to strike this careful balance between risk sensitivity, simplicity and comparability.[7]

The use of models as a means for a more risk-sensitive capital framework is often cited as the price to pay for complexity. Risk-sensitive capital requirements have many advantages. For example, the use of models could encourage better risk management by banks and to allow them to manage their businesses more efficiently in terms of the use of scarce capital. From a supervisory perspective, internally modelled approaches can allow supervisors to better identify banks' risk exposures and their individual risk profiles. A risk-sensitive framework should work in both ways: compared with the standardised approach, a modelled approach could lead to capital that is below the supervisory prescribed minimum level *as well as* above that level.

These benefits, however, come with a cost. While the Committee's post-crisis reforms have undoubtedly enhanced the resilience of the banking system, the resulting regulatory framework continues

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[6]   See, for example, Gambacorta and Shin (2016) and Fender and Lewrick (2015).
[7]   BCBS (2013b)

to be quite complex. For example, the calculation of regulatory capital requirements typically requires several thousand parameters.[8]

Moreover, if models are used to set minimum requirements, banks may have incentives to underestimate risk. Several Basel Committee studies have found substantial variation in risk-weighted assets across banks for a set of identical hypothetical portfolios. This wide degree of variation was identified across all aspects of banks' risk categories.[9]

What does research tell us about this issue? Complex rules can result in a number of undesirable outcomes. First, they could undermine the ability of supervisors and banks' own management in overseeing risks. Second, they restrict the ability of a wider set of stakeholders to contribute effectively to the policy development process. And they undermine banks' own ability to effectively implement the rules – witness the number of reports and studies on the challenges for banks to develop the necessary systems and controls to implement the range of post-crisis reforms.[10] It is perhaps not surprising that the Committee's *Principles for effective risk data aggregation and risk reporting* is one of the most downloaded Basel Committee publications.

Research has shown that simple rules can often produce more prudent and robust outcomes. For example, several studies have shown that the complexity of rules impact the ability and effectiveness of overseeing them.[11] In contrast, simpler rules may increase the incentives for enforcement, both by regulators and market participants. Simple rules are also more robust to changes in the incentives of regulated institutions. As banks change in scope and structure over time, models estimated on internal past data may have less validity going forward, regardless of their complexity.[12] And an increasing number of studies have found that simple rules can outperform more complex rules in determining bank failure.[13] Put differently, simple rules can sometimes be more risk-sensitive and robust than complex ones, and can better meet supervisory objectives. I would encourage further research to develop this point.

More generally, some research has questioned the perceived benefits of using internal models in regulation to enhance banks' risk management. For example, a recent study found that banks using internally modelled approaches for regulation were charging higher interest rates for loans relative to other banks while simultaneously applying lower risk weights for them.[14] This striking disconnect between banks' internal risk management and their approach to prudential regulation merits further research.

Conclusion

While the Basel Committee is nearing the finalisation of its post-crisis reforms, its demand for research-based contributions on the various dimensions of its regulatory framework will continue to grow. The three areas on which I focused – coherence, calibration and complexity – are critically important. Further research in these areas will help inform the Basel Committee's policy development, the implementation of the global standards and bank risk management.

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[8]   Haldane and Madouros (2012).
[9]   BCBS (2016b), BCBS (2015), BCBS (2013a), BCBS (2013c).
[10]   For example, Gartner (2016), Finextra (2015) and McKinsey (2010).
[11]   For example, Glaeser and Shleifer (2001) and Becker and Stigler (1974).
[12]   Rajan et al (2015).
[13]   For example, Haldane and Madouros (2012).
[14]   Behn et al (2014).

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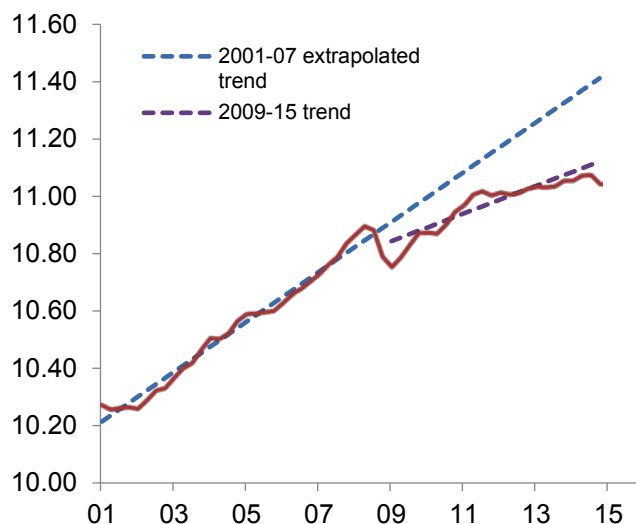
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Annex: charts

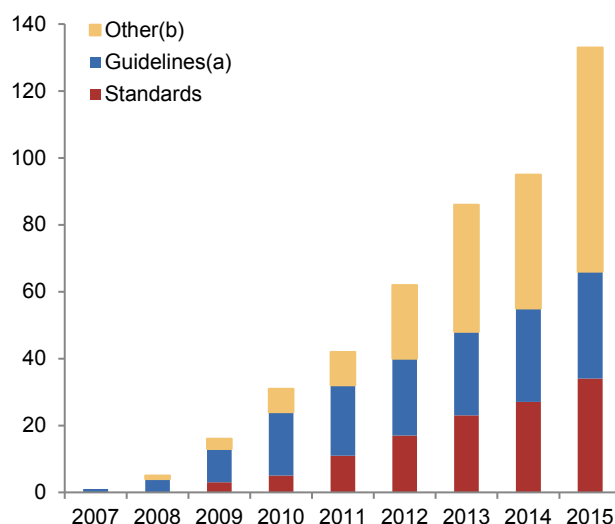**Chart 1:** Real GDP level (USD bn)[a][b]

Source: National data and BCBS calculations.
(a) Seasonally adjusted quarterly data, on a logarithmic scale, in billions of current US dollars.
(b) Sample consists of BCBS member countries: Argentina, Belgium, Brazil, Canada, China, France, Germany, Hong Kong SAR, India, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Singapore, Spain, South Africa, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

Chart 2: Cumulative number of finalised publications by the Basel Committee[a][b]
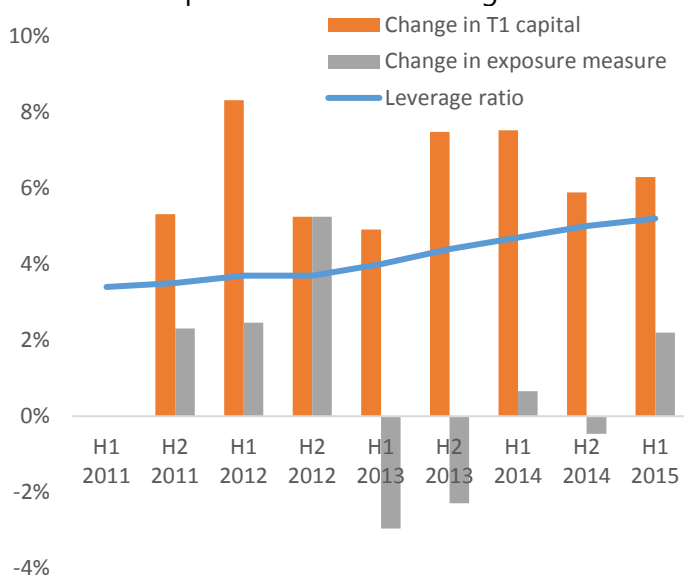

Source: Basel Committee website and Secretariat calculations.
(a) Includes principles, sound practices and guidance.
(b) Includes implementation-related reports and ad hoc publications.

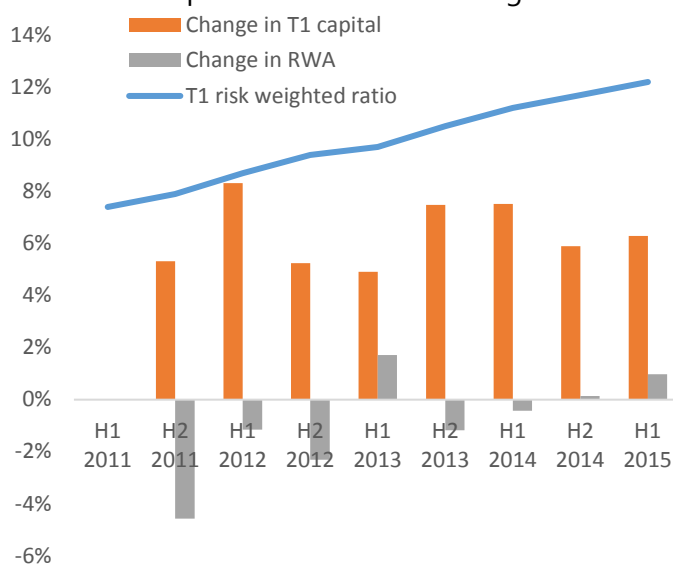**Chart 3:** Group 1 banks' Tier 1 leverage ratios[a][b]

Source: Basel Committee and Secretariat calculations.
(a) Group 1 banks are those that have Tier 1 capital of more than €3bn and are internationally active.
(b) Weighted average. Consistent sample of banks.

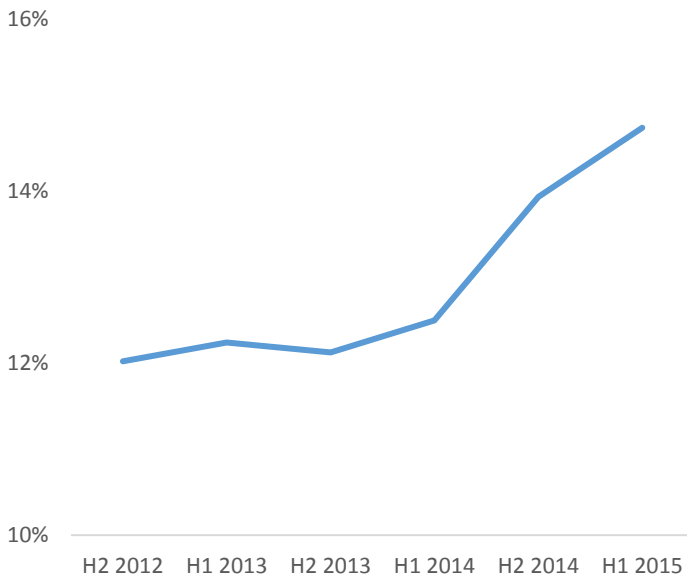**Chart 4:** Group 1 banks' Tier 1 risk-weighted ratio[a][b]

Source: Basel Committee and Secretariat calculations.
(a) Group 1 banks are those that have Tier 1 capital of more than €3bn and are internationally active.
(b) Weighted average. Consistent sample of banks.

Chart 5: Banks' holdings of high-quality liquid assets[a][b]

Source: Basel Committee and Secretariat calculations.
(a) Expressed as a percentage of the leverage ratio exposure measure. HQLA includes total liquid assets and inflows (post-factor, after cap). Outflows include the impact of the cap on Level 2 assets.
 (b) Weighted average. Sample size varies and includes all Group 1 and Group 2 banks participating in the Committee's half-yearly monitoring exercises.

Table 1: Approximate number of estimated parameters for a typical large international bank [a][b]

	Probability of default	Loss given default	Number of models	Range of parameters
Retail mortgages	10 15	10 15	40	400 600
Credit cards	10-15	3	15	100-140
SME retail	10 15	3	6	40 50
Wholesale	5-15	5-15	100	500-1500
SME corporate	5-15	5-15	2	10-30

Source: Haldane and Madouros (2012).
(a) Number of parameters required to determine credit risk capital charges under the internal ratings-based approach.
(b) The number of parameters used to estimate PD and LGD, as well as the number of models used for each portfolio, have been estimated based on a large representative bank, so they are a broad approximation only. To calculate the range of total parameters, the authors have assumed that half the models are used to estimate PD and the other half are used to estimate LGD.