

June 20, 2018

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Secretariat for the Basel Committee on Banking Supervision
Bank for International Settlements
CH-4002 Basel
Switzerland

Re: Revisions to the minimum capital requirements for market risk

Ladies and Gentlemen:

The Goldman Sachs Group, Inc. ("Goldman Sachs") welcomes the opportunity to comment on the Basel Committee on Banking Supervision ("Basel Committee") Consultative Document entitled "Revisions to the minimum capital requirements for market risk" ("the Revisions").

We would note that the first major successful step the Basel Committee undertook following the financial crisis was to increase market risk capital requirements materially. This was done in a manner that allowed a relatively immediate increase but did not tackle various shortcomings in the framework. We welcome the efforts to address these shortcomings and improve the coherence of the framework (e.g. by reducing the overlaps between VaR, stressed VaR and Incremental Risk Charge) in what is now commonly referred to as the Fundamental Review of the Trading Book ("FRTB").

As part of our firm's activities we seek to deliver to our clients leading market insight, risk management and execution, helping them to raise money, invest, and transfer risk across financial asset classes. While the Revisions are of a technical nature, nevertheless we would like to emphasise our main concerns to the Basel Committee because they could have implications for our ability to facilitate and service our clients' transactions and needs and could affect our ability to provide liquidity and efficiency to the markets. In addition, we wish to share our insights given our close supervision and model review experience within the US and UK. We have also participated in the preparation of the comment letter written by IIF, ISDA and GFMA (the "Industry Letter"), and support its comments and recommendations¹.

Broadly speaking we welcome the significant steps and improvements proposed in the Revisions, particularly the P&L Attribution test ("PLAT") and the Standardised Approach ("SA"). The frequent dialogue between the industry and the Basel Market Risk Group has led to significant improvements in these areas. Nonetheless several concerns remain in these two areas and in the treatment of sovereign default risk which we address in Appendix A. Furthermore we believe significant changes are still required for the Non-Modellable Risk Factor ("NMRF") rules which we highlight in the main body of this letter, with further detail and evidence provided in Appendix B.

¹ Institute of International Finance (IIF), International Swaps and Derivatives Association, Inc. (ISDA) and the Global Financial Markets Association (GFMA). "BCBS-FRTB Consultation Paper (March 2018) Industry Response", dated 20 June 2018.

Without incorporating the recommendations, we believe that it remains likely that significant increases and/or re-allocations of capital will occur across different market-making activities. In addition, the high degree of uncertainty inherent in introducing powerful tests (NMRF and PLAT), and how these will behave over time, will potentially introduce significant volatility in a firm's capital requirement which may not be commensurate with risk and will decrease comparability across firms.

We acknowledge the Basel Committee's desire to balance risk sensitivity, simplicity and comparability, and commend the Basel Committee for having achieved this balance for the most part. We consider it important that as part of the process of developing the new market risk capital requirements, the objective to create a set of theoretically coherent rules which are responsive to the underlying market risks, remains the overall goal of FRTB. However, regarding the treatment of NMRF within the Internal Models Approach ("IMA") we do not believe that the Basel Committee has found the right balance. The NMRF capital contribution has the potential to overwhelm other components of IMA and be a major source of variation of IMA over time not reflective of actual risk profile changes, which in itself will confuse users and at times distract management from focusing on managing risk itself. At the same time NMRF will create vast amounts of data mapping and storage exclusively for the purposes of the NMRF requirements, which will be in addition to those we already undertake for existing data modelling practices and supervisory standards.

We understand the Basel Committee's desire to have a global standard with appropriate safeguards in place to ensure firms that model risk do so carefully, making use of all available relevant data in a prudent way. However we believe that selecting which parts of a firm's portfolios can be included on the basis of a single frequency metric (referred to as the Risk Factor Eligibility Test (RFET)²), goes against years of development on enhancing data quality standards post-crisis under the close eye of – and in some cases expressly required by – our predominant supervisors. We note the clarification made that risk factors need to be "liquid and observable to be amenable to modelling" but basing eligibility on a test measuring transaction frequency alone permits only a small subset of the data that we currently use to independently verify our trading inventory. The result is that many positions that we believe have good observability will nevertheless be classified as non-modellable. We argue that there is no need to restrict RFET in this way, given liquidity is already adequately addressed by the liquidity horizon capital multipliers in the framework.

We welcome the introduction of the data usage principles added to the Revisions³, noting that the Basel Committee recognises that when modelling there is more to sufficient and accurate data than a single frequency metric. However, rather than serving as a backstop, these principles should become the predominant test of data usability so that risk factors are only identified as NMRF where they fail these principles. This would go a long way to simplify the framework while fulfilling the objective of improving data quality and model accuracy. If RFET remains, it should act as a guide to liquidity but should not form the key or only decision point in whether a risk factor is modellable for capital purposes. We would further recommend that alternative forms of evidence used in Independent Price Verification ("IPV") processes – another area significantly developed post-crisis under close supervision and auditor oversight – be included in the RFET. In particular collateral valuation data should be a permitted form of evidence.

In addition, to deal with the uncertain capital outcome of NMRF, we also propose in Appendix B a set of "calibration levers" in calculating the NMRF capital requirement which would allow the regulators to calibrate the capital impact of NMRF on an ex-post basis.

² The RFET requires a risk factor to be corroborated by no less than 24 real price observations per year with no more than 1 month gap between any 2 consecutive observations. This is meant to ensure are risk factors are only included where they are "sufficiently liquid and observable to be amenable to modelling". Those which fail this test are classified as NMRF.

³ "Annex D – Guidance for evaluating the sufficiency and accuracy of risk factors for IMA trading desk models"

We believe these recommendations would significantly reduce uncertainty that NMRF will cause in initial and future capital levels and improves the risk sensitivity of IMA as well as provides incentives to improve risk management. We provide further detail and evidence on the above recommendations in Appendix B.

In closing, we would like to reiterate our support of the efforts of the Basel Committee with respect to FRTB. The risk-sensitive allocation of capital plays an important role in allowing capital markets to drive growth in the global economy. Reflecting the importance of allocating capital to business activities in a manner that is commensurate with risk, we believe it is critically important to continue the monitoring period up until go-live and to make material changes to the remaining areas of concern. We would be pleased to assist in any way helpful.

Sincerely,

A handwritten signature in blue ink, appearing to read "R. Vince".

Robin Vince
Chief Risk Officer

Appendix A

In this appendix we highlight our concerns and recommendations with the Profit and Loss Attribution Test ("PLAT"), the sovereign probability of default ("PD") floor and the Standardised Approach ("SA") calibration. Our recommendations in this Appendix are consistent with the recommendations made in the Industry Letter.

PLAT

A key enhancement made in FRTB is the new PLAT, which is a new tool to ensure that risks are adequately captured in the risk engine, made all the more significant as the test has the power to invalidate models used to generate capital requirements at the trading desk level. Given its importance, we welcome the significant improvements that have been made since January 2016. However, further attention is required in the following 3 areas.

Firstly, we strongly recommend that the Basel Committee continues to assess the behaviour of the PLAT, under both the measurement techniques posed in the paper⁴, using actual firm data across a broad range of banks, rather than hypothetical data mostly used to date. Allowing a proper monitoring period will allow the Basel Committee to defer selection of the best measurement method and the thresholds under which to pass/fail models, with a much better understanding of the impacts of these decisions.

Secondly, in calibrating the final threshold levels of the test, particular attention should be given to ensuring that the "amber zone", where models are showing signs of weakness and are receiving internal attention, should not be set too narrow so as to allow sufficient flexibility for firms to recover their models to full compliance.

Thirdly, the Revisions propose an asymmetric treatment whereby a desk that falls into the Red zone (and hence will invoke mandated use of the SA) will only be able to move back away from the Red zone once all PLAT metrics are green. We believe that it would be preferable to reflect model improvements made by a firm sooner i.e. when metrics fall back to Amber, in order to reduce jumps in capital requirements.

Sovereign PD floor

The imposition of a PD floor for high-quality sovereigns in the trading book, without valid or adequately explained policy reasons, creates an undesired inconsistency between the banking and trading book rules. Furthermore a 3 basis point PD floor has not been adequately justified. In fact, turnover in liquid sovereign trading inventory through economic cycles points to even less need for a floor or a very low floor as default risk is not material for short hold horizons. A floor may have significant consequences for banks' appetite for holding trading inventory, as it will result in increased capital requirements for sovereign exposures and therefore considerably impact the liquidity of trading of sovereign debt and negatively impact funding costs. We recommend that the PD treatment be brought in line with the banking book, where there is no sovereign PD floor. Should the Basel Committee persist with the inconsistency, the floor should be materially reduced to reflect the high turnover of liquid sovereign inventory.

SA

We welcome the improvements made in the SA on risk weights and the treatment of curvature. We would recommend that the Basel Committee continue to monitor the impacts of FRTB and the SA within that. We strongly support a calibration of the FRTB in a way which delivers a broadly unchanged level of capital across the industry (weighted average or aggregate bank basis), and that the SA is calibrated so as to achieve a 1.5x multiple between the IMA and the SA at each of the five asset class levels. This calibration will ensure the Basel Committee's objective of having the SA act as a credible fallback to failing models is met, and will help mitigate against volatile and unexpected jumps in capital requirements, due to the introduction of desk-level tests.

⁴ The Revisions include two proposals in regard to the model eligibility test metrics - Spearman Correlation with either Kolmogorov-Smirnov or Chi-squared statistical measures.

Appendix B

In this Appendix, we provide more detail and evidence to support our recommendations with respect to Non-Modellable Risk Factors (“NMRF”). While we support the industry recommendations for the most part, we believe the data modelling standards set out in Annex D of the Revisions, and/or the evidence collected for the Independent Price Verification (“IPV”) process, should play a primary role in determining which risk factors should be considered modellable.

Modelling standards

In the Revisions, a new section (Annex D) setting out principles for data modelling standards was added. Aside from a few refinements to the language as put forward by the industry, we support its inclusion as these principles are those that define best practice for locating and selecting data used for modelling purposes. In fact, given a clean sheet of paper, we believe these principles would better act as the way to identify NMRF, without the need for a single, and therefore by nature blunt, Risk Factor Eligibility Test (“RFET”) as defined in the Revisions which will never be able to capture the individual nuances of individual markets. We give examples below of certain risk factors that would fail the blunt test but, under more nuanced approaches currently adopted by regulators, would be considered modellable. As such these would benefit from more risk based sensitivities within the capital calculations.

These principles serve as a powerful tool to address any risk factors that are truly non-modellable, thereby capturing those risk factors as NMRF. Firms have made a number of improvements since the financial crisis, such as better control over the use of proxies and monitoring of stale data, which are principles addressed in Annex D. Using these principles to capture NMRF in place of the strict RFET will better capture the true modelling and economic risks.

IPV

If we continue to apply the RFET as defined in the Revisions instead of allowing the principles to take over, we remain concerned that the NMRF test will result in a very large number of risk factors that will fail modellability, even though we strongly believe these risk factors can be modelled well and are corroborated by other market data sources not explicitly permitted by the NMRF test. This disconnect can be seen in the set of risk factors that have been approved for model based capital after detailed regulator review but fail the NMRF test.

We therefore believe that if the NMRF test remains as a blunt test of modellability it should more closely follow the approaches followed in firms’ price verification processes. At Goldman Sachs we have an IPV process that has been developed over many years given our experience of marking trading inventory through different economic cycles and market events. The objective of price verification is to have an informed and independent⁵ opinion with regard to the valuation of financial instruments under review. Instruments that have one or more significant inputs which cannot be corroborated by external market data are classified as unverified, are reported accordingly and are subjected to additional review given the lack of directly comparable external data. Price verification strategies utilized by our independent control and support functions include:

- Trade Comparison. Analysis of trade data (both internal and external, where available) is used to determine the most relevant pricing inputs and valuations.
- External Price Comparison. Valuations and prices are compared to pricing data obtained from third parties (e.g., brokers or dealers, Markit, Bloomberg, IDC, TRACE). Data obtained from various sources is

⁵ Market makers and investment professionals in our revenue-producing units are responsible for pricing our financial instruments. Our control infrastructure is independent of the revenue-producing units and is fundamental to ensuring that all of our financial instruments are appropriately valued at market-clearing levels.

compared to ensure consistency and validity. When broker or dealer quotations or third-party pricing vendors are used for valuation or price verification, greater priority is generally given to executable quotations.

- Calibration to Market Comparables. Market-based transactions are used to corroborate the valuation of positions with similar characteristics, risks and components.
- Relative Value Analyses. Market-based transactions are analyzed to determine the similarity, measured in terms of risk, liquidity and return, of one instrument relative to another or, for a given instrument, of one maturity relative to another.
- Collateral Analyses. Margin calls on derivatives are analyzed to determine implied values, which are used to corroborate our valuations.
- Execution of Trades. Where appropriate, trading desks are instructed to execute trades in order to provide evidence of market-clearing levels.
- Backtesting. Valuations are corroborated by comparison to values realized upon sales.

In the Revisions, the Basel Committee has clarified the rationale for RFET by explaining that is meant to “provide assurance that the risk factors that a bank models are **sufficiently liquid and observable** to be amenable to modelling” (emphasis added). However RFET permits only a small subset of the data that we currently use to independently verify our trading inventory. The result is that many positions that we believe have good observability will nevertheless fail the NMRF test.

We wish to highlight credit indices as an example of risk factors that we think unnecessarily fail. First, credit indices are rolled every six months. Although liquidity is concentrated on the new on-the-run series, a strict RFET would classify the new series as non-modellable due to not having a 12 month history of data. In addition, by virtue of the focus on on-the-run indices, off-the-run indices will have much less liquidity, meaning these will often fail too. However on-the-run and recent off-the-run indices in the same index family tend to have many similarities which make them amenable to modelling. Finally, analysis using the firm’s own transaction data shows that a number of index constituents fail the RFET based on a maximum gap exceeding 30 days during Dec 2017 to Feb 2018 due to holiday or seasonality. The indices go through the IPV process based on a combination of data sources described above, and the majority of indices will be classified as “Level 2” i.e. they are regarded as “observable”⁶. This further corroborates that these risk factors should not be classified as non-modellable.

While we understand that IPV consensus data (i.e. estimate data that is sent by dealers into a central service) without any supporting trade or other information should not necessarily count as good data for the purposes of NMRF, we believe it forms a good bridge between trade observations and therefore its usage in NMRF should be more nuanced than the current prohibition would suggest. Further we believe that collateral valuation data should be allowed to count, with conditions described below.

Collateral valuation

Although we believe that the principles in Annex D should suffice to capture NMRF, if RFET were to be retained, two sophisticated financial intermediaries agreeing collateral movements at a granular level should be allowed to count as a real price observation.

Collateral valuation data has features that lead to risk mitigation, settlement and pertain exactly to an institution’s risk position. Collateral valuations are produced as a result of actual transactions that have taken place and have

⁶ Level 1 inputs are quoted prices in active markets for identical positions. Level 2 inputs are not quoted but are observable either directly or indirectly e.g. for quoted prices on similar positions. Level 3 inputs are unobservable. IFRS (IFRS13) and US GAAP (FAS157/ASC820) classify these levels in very similar ways. See <https://www.ifrs.org/issued-standards/list-of-standards/ifrs-13-fair-value-measurement/> & https://www.fasb.org/pdf/aop_FAS157.pdf

economic impact to the institution due to the funding implications of the variation margin exchange. Furthermore, the transaction and its valuation can be evidenced and verified by comparing versus the counterparty's valuation, supporting its use as a "real" price. Collateral valuations data is a rich source of data for performing IPV. We have been using collateral valuation data as an integral part of our IPV processes for many years. Given the Basel Committee has focused on both liquidity and observability, we see compelling reasons to include certain data points from collateral valuations, according to the following strict criteria. In practice, the criteria will serve to limit the set of eligible risk factors to those that are observed within transactions that are with other sophisticated financial counterparties.

- Data must be available at the trade level
- Trade terms must match across counterparties
- There should be independent submission of data by each counterparty
- Counterparties must be of sufficient sophistication to give comfort that the data is a knowledgeable indication of market clearing levels

Alternative bucketing methodologies

In addition to the recommendations above, we support the direction the Basel Committee has taken in allowing alternative bucketing methodologies. We support the industry position, and wish to emphasise the need for flexibility. This is because for a risk factor that is marked in a parameterised manner the proposed "Alternative 2" creates meaningful mapping challenges. In limited cases, and where firms can justify to the satisfaction of their supervisors e.g. where these risk factors continue to be assessed under the PLAT test, firms should be permitted to utilise alternative bucketing. We highlight for example the case of options where strike/maturity bucket definitions have been proposed, but where firms may model smile/skew risk factors instead.

Data pooling and calibration levers

The Revisions clarify that data-pooling using third party vendors is an accepted solution for risk factors to pass the RFET, subject to certain conditions. While we welcome the Basel Committee's confirmation, it remains highly uncertain whether such solutions will deliver positive results. In the event that few firms contribute data, or the data contributed cannot be utilised to derive risk factors by the bank in question, the NMRF capital requirement may remain overly punitive.

Therefore, to address the uncertainty that the NMRF test introduces (unknown present impact plus its behaviour in the future is unknown), we would recommend that the Basel Committee retain at its disposal one or two levers that allows the Basel Committee to adjust the impact of NMRF during the normal half-yearly Basel monitoring exercises, should the results not be as expected.

One such tool to address this would be a simple matrix summation of the risk factors identified as NMRF, using a single correlation parameter that can be tweaked by the Basel Committee in future periods. The correlation parameter could also be empirically supported by the banks, similar to what is already allowed for idiosyncratic credit spread risk.

Another such tool is to treat the number of days between observations in the 30-day gap rule as a dial to adjust the volume of risk factors that are identified as NMRF. As noted in the industry response, the 30-day gap rule is a highly sensitive driver of the volume of NMRF and is therefore a powerful tool for the Basel Committee to make ex-post calibration adjustments.