

QIS-4

INSTRUCTIONS

October 29, 2004

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U.S. Quantitative Impact Study-4

Instructions

October 2004

I. LIST OF ABBREVIATIONS

ADC	Acquisition, development and construction
AIR	Accrued interest receivable
AMA	Advanced measurement approaches
AIRB approach	Advanced internal ratings-based approach
BEEL	Best estimate of economic loss
BOLI	Bank-owned life insurance
CCF	Credit conversion factor
CDC	Community development corporation
CEDE	Community and economic development entity
CEIO	Credit-enhancing interest-only strip receivable
CRM	Credit risk mitigation
EAD	Exposure at default
EL	Expected loss
GSE	Government-sponsored entity
HELOC	Home equity line of credit
HVCRE	High-volatility commercial real estate
IAA	Internal assessment approach
IPRE	Income-producing real estate
I/O strips	Interest-only strips
LGD	Loss given default
M	Effective maturity
MDB	Multilateral development bank
MSA	Mortgage servicing asset
NUA	Notional undrawn amount

NRSRO	Nationally recognized statistical rating organization
PCCR	Purchased credit card relationship
PD	Probability of default
PFE	Potential future exposure
PFGs	Performance and financial guarantees
PLGD	Potential loss given default for a defaulted exposure
PSE	Public sector entity
QRE	Qualifying revolving retail exposures
RBA	Ratings-based approach
RBE	Retail business exposures
SFA	Supervisory formula approach
SL	Specialized lending
SME	Small- and medium-sized enterprise
UL	Unexpected loss

II. INTRODUCTION

A. Objective

1. The objective of this fourth quantitative impact study (QIS-4) is to help the U.S. bank regulatory agencies (Agencies) better understand the likely regulatory risk-based capital effects of the U.S. implementation of the recently proposed Basel capital framework (the June Framework)¹ on an industry, institution, and portfolio basis. Information submitted in the QIS-4 survey will assist the Agencies in developing future policy positions on a new capital framework.

B. QIS-4 Process and Package

2. The QIS-4 survey, as conducted by the Agencies, consists of three parts:

Worksheets that are to be completed by participating banking organizations using these instructions, which are based on the June Framework;

¹ “International Convergence of Capital Measurement and Capital Standards: A Revised Framework”, June 2004. For a description of the capital calculation and the risk weight formulas used within the worksheets, see Appendix A.

A questionnaire that describes the process used by each participant in generating the data provided in the worksheets; and

Follow-up discussions through which the Agencies can understand better the data, methodologies, and assumptions used by institutions in completing the worksheets.

3. In completing the requested worksheets and questionnaire, survey participants should refer to relevant draft supervisory guidance, where available, regarding the risk measurement processes and regulatory capital requirements that the Agencies expect to require of institutions using the Advanced Internal Ratings-Based (AIRB) approach to credit risk or the Advanced Measurement Approaches (AMA) to operational risk.

C. Differences from QIS-3

4. Participants in QIS-4 will notice a number of changes from the earlier QIS-3 worksheets, most of which are intended to reduce the amount of information requested. Most importantly, QIS-4 solicits information only on the AIRB and AMA approaches, and, therefore, excludes previously requested information on the Basel II Standardized and Foundation approaches to credit risk. Other notable changes are described below:
 - A single worksheet replaces the corporate, bank, and sovereign worksheets found in QIS-3. QIS-4 requests aggregate reporting of these exposures, whereas QIS-3 requested separate reporting for each of these exposure types.
 - Conversely, the retail portfolios are now reported on separate worksheets, rather than combined onto one worksheet, as in QIS-3. In addition, exposures arising from home equity lines of credit (HELOCs) are to be reported separately from other exposures collateralized by residential mortgages.
 - In both the wholesale and retail portfolios, exposure types have been redefined.
 - QIS-4 requests maturity information (for certain portfolios) along both the PD and LGD dimensions, rather than by PD only. This change should produce a more accurate calculation of risk-weighted assets.
 - PD estimates are identified only by a single point estimate; the QIS-3 request for information describing the lower and upper boundaries for each PD band has been eliminated.
 - All exposures relating to securitized assets--whether as originator or as investor--are reported on a single “**Securitization**” worksheet, whereas they were broken out separately in QIS-3. In addition, the “**Securitization**” worksheet requests information in a more aggregate form, unlike QIS-3, which requested exposure-level information.

- The “**Input**” worksheet provides additional quality controls.
- The maximum number of PD point estimates is twenty, and the maximum number of LGD point estimates is fifteen. This change, which maintains more consistently formatted worksheets among all QIS-4 participants, will facilitate analysis of the data.

D. Submission of Completed Materials

5. Both the worksheets and the questionnaire should be submitted by no later than January 28, 2005. Prompt submission of survey materials will permit timely analysis of the results. Submit completed materials to both your primary supervisor and to James Hought, Associate Director, Mail Stop M-199, Federal Reserve Board, Washington, D.C. 20551 or e-mail responses to: james.houpt@frb.gov.

E. Confidentiality of Submissions

6. Information provided in the QIS-4 worksheets and related questionnaire are considered by the Agencies to be information that is "commercial and financial" in nature and, therefore, will be protected from public disclosure to the fullest extent provided by law.

III. GENERAL ISSUES

A. Dialogue with Supervisors

7. Participants are strongly encouraged to consult with their supervisor throughout the QIS-4 process as questions arise, in order to ensure the survey is interpreted accurately and consistently. Each participating institution will have a designated on-site supervisory contact (QIS-4 coordinator). Institutions may channel enquiries through this contact person or may also contact any of the following individuals directly:

Jim Hought (202) 452-3358 (james.houpt@frb.gov)
Fred Phillips-Patrick (202) 906-7295 (fred.patrick@ots.treas.gov)
Andrea Plante (202) 898-7449 (aplante@FDIC.gov)
Roger Tufts (202) 874-4925 (roger.tufts@occ.treas.gov)

B. Web Site

8. Participants should refer to the following QIS-4 web site for frequently asked questions, relevant documents, and administrative notices:
<http://www.ffiec.gov/qis4/>

C. Informed Assessments

9. The Agencies recognize that an institution's current systems may not produce directly all of the risk measurement information (e.g., PDs, LGDs, EADs, etc.) that is solicited in the QIS-4 worksheets. In such cases, however, the Agencies request that each institution make informed assessments for all worksheet input cells on a best-efforts basis, so that the worksheets capture the institution's complete credit risk portfolio and operational risk profile. Where such best-efforts assessments are material, as part of its response to the questionnaire the institution should identify the affected portfolios and the techniques used to develop the worksheet inputs.

D. Units

10. Participants should report exposure data in millions of U.S. dollars, rounded to the nearest million. Percentages should be reported as decimals and will be automatically converted to percentages by the worksheets (for example, 1.2 percent should be entered as 0.012).

E. As of Date

11. In completing the worksheets for credit and market risk, institutions should use data as of June 30 or September 30, 2004 and should specify the reporting date in the “**Input**” worksheet. Information provided regarding operational risk should also reflect the bank's estimated exposure as of June 30 or September 30, 2004. The as of date used for operational risk should be the same as that used for credit and market risk.

F. Consolidated Basis

12. For non-foreign-owned U.S. banking organizations, amounts reported should reflect exposures for their consolidated, worldwide banking operations. In most cases, this consolidation approach will be consistent with practices used in preparing the Federal Reserve's Consolidated Financial Statements for Bank Holding Companies (FR Y-9). The primary exception to a full consolidation approach relates to material insurance underwriting activities. For the purposes of QIS-4, banking organizations should deconsolidate the assets and liabilities associated with such activities, as well as deduct from the consolidated capital the banking organization's investment in the insurance subsidiary. Participants are asked not to reflect the aforementioned

adjustments in their QIS-4 results. That is, the data reflected in the QIS-4 worksheets should be after adjustments for material insurance activities. Participants are encouraged to consult with their regulatory reporting staffs, as necessary, to resolve questions regarding the calculation of permissible regulatory capital and consolidation practices.

13. To the extent possible, QIS-4 participants that are owned by foreign banking organizations should report exposures for the consolidated U.S. bank holding company. These exposures would include those of non-bank subsidiaries of the U.S. parent company, but would exclude those of U.S. branches and agencies of the foreign bank and of other U.S. subsidiaries of the foreign parent that are not owned through a U.S. holding company that also owns the reporting U.S. bank(s). Foreign-owned participants should discuss their anticipated and possible coverage with their primary supervisor to ensure that supervisors understand the activities covered in the survey results.

G. Data Entry and Cell Colors

14. Enter data only in the yellow or green shaded cells. The worksheets calculate risk-weighted assets and related regulatory capital requirements using the information provided by respondents. The yellow cells are essential for the calculation of capital requirements, while the green cells provide supplementary information that will assist supervisors in analyzing the results. Respondents should ignore other cell colors and certain parts of the worksheets that are locked.
15. For many portfolios and within limits, participants have flexibility to specify the number of PD, LGD, EAD, and maturity estimates they wish to use. However, respondents must limit the number of parameter point estimates to the maximum number permitted in the worksheets, that is, 20 PD point estimates and 15 LGD point estimates. Within these limitations, institutions are encouraged to provide a level of detail consistent with that used for internal risk measurement purposes and to avoid unnecessary aggregation of PD or LGD bands. If fewer than 20 rows or 15 columns are needed, respondents should leave the lower rows or right-most columns blank. If your institution uses more than 20 PD or 15 LGD buckets internally, please regroup the more detailed distributions into this maximum number of point estimates in a manner that recognizes both the volume of exposures and the level of PDs and LGDs (i.e., try to avoid undue concentrations). If the permitted number of rows or columns does not allow for adequate differentiation of risk, please consult with your primary supervisor.

H. Data Quality Checks

16. The worksheets have built-in “Checks” (in red) that indicate whether the inputs agree with the relevant data (“Yes” or “No”). Please review these checks to ensure

the inputs are consistent (i.e., the check boxes should display a “Yes”). If they are not, please identify why they are not and make appropriate adjustments. If you are unable to resolve any inconsistencies, please discuss the issue with your QIS-4 coordinator.

IV. OVERVIEW OF WORKSHEETS

17. This section provides an overview of the worksheets contained within the QIS-4 workbook. The first three worksheets (“**Input**,” “**Checks**,” and “**Current**”) in the workbook provide information about the size of the respondent’s current portfolios and components of regulatory capital requirements. Together, they provide a basis for estimating changes in capital requirements as institutions move from the current Accord to the framework described in these instructions, and they also promote integrity of the worksheets. The next thirteen worksheets (“**Sov-Bank-Corp**” through “**Operational Risk**”) provide AIRB information on exposures by business line or portfolio and the AMA. Note that the parameters (e.g., assumed asset correlation) used in the supervisory risk-weight function relevant to the reported exposures are shown in the top left corner of each portfolio worksheet. The final worksheet entitled “**Results**” provides capital ratios using data provided by institutions in the other worksheets.
18. The initial worksheet (“**Input**”) requests information on the amount of on- and off-balance sheet exposures in each AIRB portfolio. The amounts covered for each portfolio are carried to the relevant areas of the “**Current**” worksheet (see below), which calculates risk-weighted assets under the current Accord, and also to the respective portfolio worksheets related to the AIRB approach. As such, these entries provide a control to ensure that capital requirements calculated under the two methods apply to the same exposures. As discussed below, the “**Input**” worksheet also provides selected information from regulatory reports for use in reconciling those reports with the institution’s QIS-4 submissions. For clarification of specific line items requested within the “**Input**” worksheet, see Appendix B.
19. The “**Checks**” worksheet consolidates the edit checks that are contained throughout the workbook. Respondents should investigate all checks for which the indicated response is “No” and correct the data to yield a “Yes” response.
20. The “**Current**” worksheet shows the allocation of exposures among the categories of the current regulatory capital requirements, based on the type of transaction, the borrower or counterparty, and the presence of any collateral or guarantor. This worksheet provides key inputs to the “**Results**” worksheet. This worksheet is divided into sub-portfolios in the same manner as the worksheets requesting AIRB information. *To permit an accurate assessment of the AIRB approach’s impact on*

individual portfolios, it is critical that institutions report exposures in the same sub-portfolio under both the current Accord and the AIRB. For example, if a respondent reports an exposure under the drawn exposures area of the “**Sov-Bank-Corp**” worksheet for AIRB, that exposure should be reported under the same area of the “**Current**” worksheet. Institutions should report trading book exposures in the “**Input**” worksheet as described in Appendix B and should not include them as part of their AIRB portfolio exposures.

21. Sovereign, bank, and corporate exposures use the same risk-weight function to calculate risk-weighted assets and, accordingly, are combined into a single worksheet (“**Sov-Bank-Corp**”).
22. The “**HVCRE**” worksheet requests information on credit exposures related to high volatility commercial real estate lending. HVCRE exposures are those that involve the financing of the land acquisition, development and construction phases of commercial real estate properties for which loan repayment relies on the property’s uncertain sale or cash flows. The “**IPRE**” worksheet requests information on credit exposures related to in-place (i.e., completed) income-producing real estate.
23. For a given set of risk parameters, the June Framework requires less regulatory capital for exposures to small- and medium-sized enterprises (SMEs) than it requires for large corporate exposures. SMEs are defined as exposures to businesses with annual revenues or assets less than \$50 million but exclude specialized lending (i.e., commercial real estate and project, object and commodity finance) and securities. The “**SME-Corporate**” worksheet identifies exposures to this class of borrowers based on whether the obligor meets the size requirement.
24. Information about risk parameters and exposures associated with retail exposures is requested on five separate but similarly structured worksheets: “**HELOCs**”, “**Other Mortgages**”, “**QRE**”, “**RBE**”, and “**Other Retail.**” These worksheets require information for only two exposure types – drawn exposures and undrawn lines. If this presumption is incorrect, please notify your primary supervisor to determine the appropriate QIS-4 reporting for such transactions. Credit exposures for business purposes that are managed by the institution as retail exposures should be reported as retail business exposures in the “**RBE**” worksheet.
25. Exposures acquired from unrelated entities (i.e., purchased receivables) that are subject to material dilution risk, should be reported in the “**Dilution Risk**” worksheet.
26. Exposures arising from traditional or synthetic securitizations should be reported in the “**Securitization**” worksheet, regardless of whether the institution is an originator or sponsor of, or investor in, the securitization exposure. As noted in the corresponding instructions, any tranching of credit risk should be reported in the

“**Securitization**” worksheet. For example, if an institution provides protection on, or purchases protection for, a single loan or a pool of loans, and that protection represents a first-, mezzanine, or senior-loss exposure, the reporting institution’s exposure should be reported in the “**Securitization**” worksheet and in the securitization section on the “**Current**” worksheet.

27. The “**Equity**” worksheet collects information on all equity investments owned by the reporting institution that are not held in the trading account.
28. The “**Operational Risk**” worksheet requests key estimates of the respondent’s operational risk.
29. The “**Results**” worksheet represents the overall “answer sheet” by summarizing the institution’s eligible regulatory capital, risk-weighted assets, and regulatory capital ratios under both the current Accord and the treatment described in this QIS-4. Statistics are provided for each major risk (credit, market, and operational). All of the results on this worksheet are generated from calculations made within other sheets. For a brief overview of the total risk-based capital calculation under AIRB, see Appendix A.

V. INPUT WORKSHEET

30. The “**Input**” worksheet requests information needed to calculate the institution’s regulatory capital ratios and also to identify the amount and nature of the institution’s exposures. Much of the information entered into this worksheet is automatically copied into the relevant portfolio worksheets. Since capital figures are requested only on this sheet, particular attention should be given to the capital and provisioning sections. For information on specific line items, see Appendix B.
31. Data provided on this worksheet define the institutions portfolios for purposes of QIS-4 and help to ensure that the current measurements of exposures recorded in the “**Current**” worksheet are comparable with those reported in the portfolio worksheets under AIRB. Institutions that have notified the agencies of their plan to participate in QIS-4 will be provided selected items from regulatory reports to serve as data quality checks based on the as of date they have selected. This information will be provided in a separate transmittal to each of these participants.

VI. CURRENT ACCORD WORKSHEET

32. The “**Current**” worksheet requests information about the composition of the institution’s current risk-weighted assets, as they are measured using existing U.S. capital rules. In completing this worksheet (as well as the prior “**Input**” worksheet) respondents are encouraged to coordinate their data entries with individuals involved in preparing the institution’s regulatory financial reports and calculating its current regulatory capital requirements.
33. In preparing the “**Current**” worksheet it is critical that within each portfolio type the institution report only those exposures that have been included in the corresponding AIRB portfolio worksheets. For example, if a certain exposure is reported as an undrawn line of credit within the “**Sov-Bank-Corp**” worksheet, it should be reported within the “**Current**” worksheet as a Sovereign-Bank-Corporate Undrawn Exposure. After determining which exposures to include in the “**Current**” worksheet, those exposures must then be allocated among the various risk-weight categories based on current U.S. capital requirements (e.g., 100 percent or 50 percent risk-weighted loans). As stated earlier, *an accurate allocation is crucial to providing sound comparisons between capital requirements produced by the two methods and must include both on- and off-balance sheet exposures.*

VII. THE PORTFOLIO WORKSHEETS: STRUCTURE AND INPUTS

34. This section describes the tables appearing in one or more worksheets. Each table generally represents a separate exposure type. This section also describes the key AIRB parameter inputs used in the worksheets associated with each of the wholesale and retail portfolios. Although discussed briefly below, the equity, and securitization portfolios employ a different structure. Table 1 shows the exposure types / tables found in each worksheet. Instructions for filling out the worksheets are found in Sections V to XIV below, which also provide the definitions of each portfolio type and parameter input that respondents must provide. Note that not all exposure types are relevant to all portfolios.

A. Definitions of Exposure Types

35. Each QIS-4 wholesale and retail worksheet requires that exposures be allocated among several exposure types as described below.
36. **Drawn exposures** (rows 30 through 49 of each wholesale and retail worksheet). Drawn amounts are exposures reported as assets in the institution’s consolidated report of condition.

37. **Undrawn lines** (both committed and advised) (rows 77 through 96 of the wholesale and retail worksheets).² This exposure type includes unused amounts of both committed exposures for which the institution has a contractual, legal commitment to lend based upon payment of a fee or other consideration by the customer *and* advised lines for which the institution has a conditional commitment to lend. Such undrawn lines do *not* include “guidance lines” or other internal authorizations of the institution that are used for credit monitoring by the lender and have not been disclosed to the customer.
38. **Repo-style transactions** (rows 121 through 140 of the “**Sov-Bank-Corp**” worksheet). This exposure type includes transactions such as reverse repurchase agreements and repurchase agreements, as well as securities lending and borrowing transactions, including those executed on an indemnified agency basis.³ Similar transactions such as prime brokerage activities will also be treated as repo-style transactions.⁴
39. **OTC derivative exposures** (rows 165 through 184 of the “**Sov-Bank-Corp**”, “**SME Corporate**”, “**HVCRE**”, and “**IPRE**” worksheets). This exposure type includes all OTC derivative transactions, reflecting the total credit equivalent amounts of counterparty credit risk arising from those transactions, as defined by the current capital regulations. All counterparty credit risk associated with exposures held for trading purposes should be captured in the “**Sov-Bank-Corp**” worksheet.
40. **Performance and financial guarantees** (rows 210 through 229 of the “**Sov-Bank-Corp**”, “**SME Corporate**”, “**HVCRE**”, and “**IPRE**” worksheets). Performance and financial guarantee (PFG) exposures should include all commercial, performance, or financial letters of credit; participations in acceptances; written credit protection using credit derivatives; and other guarantees for which the institution has provided credit protection. Do not include counterparty credit exposures related to OTC derivatives transactions, which comprise a separate exposure type. (See 4, above). Also do not include any credit derivatives that meet the definition of securitization, as described in Section XII.

² Note that in the “**Other Mortgage**” worksheet, this item is labeled “Undrawn Mortgage Commitments” to distinguish this category from revolving home equity lines of credit (HELOCs), which are reported separately.

³ Some banking organizations, particularly those that are custodians, lend, as agent, their customers’ securities on a collateralized basis. Typically, the agent banking organization indemnifies the customer against risk of loss in the event the borrowing counterparty defaults. Where such indemnities are provided, the agent banking organization has the same risks it would have if it had entered into the transaction as principal.

⁴ Margin loans to retail customers generally should be treated within the retail portfolio and reported in the “**Other Retail**” worksheet.

41. **Residual Value of Corporate Leases** (rows 276 to 295 of the “**Sov-Bank-Corp**”, “**SME Corporate**”, “**HVCRE**”, and “**IPRE**” worksheets). Institutions are requested to report the residual values of leased corporate assets in these tables. Residual value risk is the institution’s exposure to possible loss due to the fair value of the leased asset declining below the original (or current) estimate of the value of the asset at the termination of the lease. Corporate residual values should not be included in the “drawn exposures” tables of the portfolio worksheets, but rather should be reported in the “**Input**” worksheet and in this residual value table of the portfolio worksheets. (Information on the residual values of leased retail assets is not being collected within the AIRB retail worksheets. It should be included in the “Other assets” portion of the “**Input**” worksheet.)
42. **Undrawn Lines: Advised Lines Only** (rows 320 to 339 of the “**Sov-Bank-Corp**”, “**SME Corporate**”, “**HVCRE**”, and “**IPRE**” worksheets). In addition to the table for total undrawn lines, several worksheets include a table for undrawn, advised lines, where respondents are requested to disaggregate the amount reported in the undrawn lines table.
43. Table 1 below indicates the exposure types that are found in each portfolio.

Table 1
Exposure Types Included in Each Wholesale and Retail Worksheet

Exposure Type / Table	Worksheet								
	Sov-Bank-Corp	SME Corp	HVCRE	IPRE	HELOCs	Other Mort.	QREs	RBEs	Other Retail
Drawn	✓	✓	✓	✓	✓	✓	✓	✓	✓
Undrawn	✓	✓	✓	✓	✓	✓	✓	✓	✓
PFGs	✓	✓	✓	✓					
Repo-Style	✓								
OTC	✓	✓	✓	✓					
Lease Residual	✓	✓	✓	✓					
Advised Lines	✓	✓	✓	✓					

44. Respondents should consult with their primary supervisor if they are uncertain as to where a particular exposure should be reported.

B. AIRB Parameter Inputs

45. The portfolio worksheets request information on the following risk inputs:

- Probability of default (PD);
 - Loss given default (LGD);
 - For defaulted exposures, the institution’s best estimate of economic loss (BEEL)
 - Exposure at default (EAD), reflecting the credit conversion factor (CCF) assigned to off-balance sheet exposures⁵;
 - For undrawn lines of credit, the notional undrawn amounts (NUA)
 - Remaining maturity (M), and,
 - For SME exposures, a measure of the borrower’s size
46. Because the definitions of these parameters may differ by portfolio type, they are described relevant to each portfolio in the sections below, when applicable.
47. Note that credit risk mitigation (CRM), such as obtaining guarantees, credit derivatives, or various forms of collateral, will affect the PDs or LGDs that would otherwise be assigned to an exposure on the basis of factors pertaining to the underlying obligor. The presence of CRM also may affect the worksheet into which the exposures should be entered. See Section XI for a more complete discussion of CRM treatments.⁶
48. The EAD for credit exposures should include any accrued interest. If operational limitations or materiality considerations make this impractical for QIS-4, the institution may elect to include accrued interest in the “Other assets” portion of the “**Input**” worksheet, which will be risk weighted at 100 percent for both the current and AIRB frameworks. Similarly, some newly originated credit exposures might not be internally rated in a PD/LGD framework by an institution’s systems as of the QIS-4 report date. These exposures may also be reported along with accrued interest in the “**Input**” worksheet. If respondents elect to report such exposures in this manner, difficulties encountered in applying the PD/LGD framework to these exposures should be noted in questionnaire responses.

VIII. WHOLESALE PORTFOLIOS

49. This section describes the types of exposures that should be reported in the institution’s wholesale portfolio worksheets, the relevant definition of default for these exposures, the input parameters that respondents must provide, and specific instructions for filling out the worksheets. The June Framework describes as separate portfolios a variety of exposures (corporate, bank, and sovereign) that use a

⁵ As noted elsewhere in these instructions, the CCF is used to determine EAD.

⁶ For recognition of CRM for securitization exposures, refer to Section XII.

common supervisory risk weight function in calculating risk-weighted assets for regulatory capital purposes.

50. For purposes of QIS-4 sovereign, bank, and the majority of corporate exposures are combined into a single worksheet. Although they are also discussed separately in the portfolio definitions below, respondents are not asked to segregate these exposures in the worksheets. Other parts of the corporate portfolio remain separate in QIS-4, either because they use different risk weight functions or for analytical purposes, as described below. Accordingly, the workbook contains four separate worksheets that are subject to the wholesale portfolio definitions and treatments described below. They are: “**Sov-Bank-Corp**”, “**SME Corporate**”, “**HVCRE**”, and “**IPRE**”.

A. Wholesale Portfolio Definitions

51. Wholesale exposures to corporate borrowers include debt obligations of corporations, partnerships, limited liability companies, proprietorships, and special-purpose entities (including those created specifically to finance and/or operate physical assets). Wholesale exposures also include debt obligations of banks and securities firms (interbank exposures), and the obligations of central governments, state, county and municipal governments, multilateral development banks (MDBs), central banks, and certain public-sector entities (sovereigns). Credit exposures to these counterparties include off-balance sheet credit exposures arising, for example, from letters of credit, loan commitments, and off-balance sheet derivatives. The wholesale exposure category should not include securitization exposures, or business exposures that are eligible to be treated as retail exposures. More specific definitions are provided below.

Sov-Bank-Corp

52. Exposures in each of the following three sub-portfolios are not separately identified and are reported in the same worksheet in QIS-4.
53. The “sovereign” portfolio includes securities issued by, or other direct claims on the U.S. Government, agencies backed by the full faith and credit of the U.S. government, as well as all other central governments that are the governing authority of that country, their agencies, and their central banks.⁷ Claims on the Federal Reserve System, the World Bank, the IMF, and the European Central Bank are also

⁷ Consistent with the general treatment for credit risk mitigation described in Section XI, the guaranteed portion of an SBA loan should be treated as a sovereign exposure and reported in the “**Sov-Bank-Corp**” worksheet, and would not be subject to the three basis point floor on PD. The non-guaranteed portion should be treated as a direct exposure to the obligor and reported in the appropriate worksheet (e.g., “**RBE**”, “**SME Corporate**”, etc).

included, as are GNMA securities. The aforementioned sovereign exposures are not subject to the three basis point floor, as discussed below.

54. The sovereign portfolio also includes claims on state and local governments and their agencies, if these governments and agencies have revenue-raising powers (such as the authority to levy taxes). Examples of such exposures include general obligation bonds of states, counties and municipalities; however, these exposures are subject to the three basis point floor discussed below.
55. The “bank” portfolio includes securities issued by, or other direct claims on all insured depository institutions in the U.S. and any financial institution that is recognized as a bank by the bank supervisory or monetary authority of its home or host country. This category also includes claims on securities firms. Government-Sponsored Entities (GSEs), such as Fannie Mae, Freddie Mac, and Federal Home Loan Banks are included in this portfolio.⁸
56. The “corporate” portfolio includes all other wholesale loan-type exposures that do not fall into either the sovereign or bank portfolios and that do not represent exposures to small or medium-sized entities, as described below.
57. Exposures involving project finance, object finance, and commodity finance also should be reported in the “**Sov-Bank-Corp**” portfolio.⁹ General account bank-owned life insurance (BOLI) should be viewed as an exposure to the insurance company. For separate account BOLI, institutions should look through to the underlying exposures held in the separate account and apply the appropriate AIRB capital treatment. If the underlying exposures are equities, for example, then the AIRB treatment for equities should be applied.

SME-Corporate

58. The QIS-4 workbook contains a separate worksheet (labeled “**SME Corporate**”) to collect data on the sub-portfolio of exposures to small- and medium-sized entities not eligible for retail AIRB treatment. These SME loans receive a lower capital requirement than would be assigned to exposures to larger corporate customers with similar risk characteristics.
59. The precise amount of the firm size adjustment is based on borrower size and applies to a business whose annual revenues (or, if necessary, total assets) do not exceed \$50 million. Where possible, respondents should use the annual revenues of the SME, expressed in millions of dollars. If information about revenues is not available or is

⁸ Note, however, that GSE guaranteed pass-through, collateralized mortgage obligation, and real estate mortgage investment conduit securities should be reported in the “**Securitization**” worksheet.

⁹ For definitions of these types of specialized lending, see the June Framework.

not considered a meaningful indicator of the firm's size, respondents may use its total assets. Note that commercial real estate loans (either completed or in the acquisition, development, and construction stages) and debt securities are not eligible for treatment as SME loans.

60. The Agencies recognize that many institutions may not have current information about either customer revenues or assets in the databases used to complete QIS-4. In these cases, respondents are encouraged to submit data reflecting their best estimates regarding exposures to these firms.

HVCRE and IPRE

61. Commercial real estate (CRE) exposures finance the construction or acquisition of real estate (including land, as well as improvements) where the repayment and recovery depend primarily on the cash flows generated by the lease, rental, or sale of the real estate. CRE exposures are typically non-recourse exposures, often to special purpose vehicles, and are distinguishable from corporate exposures that are collateralized by real estate for which the prospects for repayment and recovery depend primarily on the financial performance of the broader commercial enterprise that is the obligor.
62. CRE exposures are divided into low-asset-correlation CRE, reported in the worksheet for income-producing real estate, "**IPRE**", and high volatility CRE, reported in the worksheet "**HVCRE**".
63. For QIS-4, respondents should report all acquisition, development or construction loans in the "**HVCRE**" worksheet *except* for one- to four-family construction, which should be reported in the "**IPRE**" worksheet.

B. Definition of Default: Wholesale

64. For QIS-4 purposes, an obligor should be considered to be in default when a material exposure of the obligor satisfies one of the following conditions:
- the regulatory reporting definition of nonaccrual;
 - the banking organization has made a full or partial chargeoff or write-down for credit-related reasons or determined that an exposure is impaired for credit-related reasons.
65. For the purposes of this default definition, the materiality of credit exposures is measured relative to the banking organization's overall exposure to the obligor. Chargeoffs and write-downs on material credit exposures include credit-related write-downs on securities of distressed obligors for other-than-temporary

impairment, as well as material write-downs on exposures to distressed obligors that are sold or transferred to held-for-sale, the trading account, or other reporting categories.

C. AIRB Parameter Inputs

- 66. The derivation of risk-weighted assets requires institutions to provide a variety of inputs for each category of exposures. This sub-section describes the inputs for wholesale portfolios and identifies where respondents should place the inputs within each worksheet of the survey. These inputs include PD, LGD, EAD, and in some cases, M, BEEL and the borrower’s size. Note that not all inputs are required for each portfolio.
- 67. As noted above, guarantees, credit derivatives, and other credit risk-mitigating factors may affect the parameters assigned to a particular exposure, as well as the portfolio worksheet to which the exposure should be assigned. See Section XI for a discussion of credit risk mitigation.

Probability of Default (PD)

- 68. *Definition:* PD estimates should represent a long-run average of one-year default rates, capturing average default experience over a reasonable mix of high-default and low-default years of the economic cycle. In general, the same PD should be applied to all exposures of a given obligor.
- 69. *Data entry:* The wholesale worksheets allow respondents to define up to 20 PD buckets in which to aggregate exposures by exposure type. Table 2 shows where the PD point estimates should be entered.

**Table 2
Cell Addresses of PD Point Estimates for Wholesale Portfolios**

Exposure Type / Table	PD Point Estimates
Drawn	C30 ... C49
Undrawn Lines	C77 ... C96
Repo-Style	C121 ... C140
OTC Derivatives	C165 ... C184
Performance and Financial Guarantees	C210 ... C229
Residual Value of Leases	C276 ... C295
Advised Lines	C320 ... C339

- 70. Defaulted assets are automatically assigned a PD equal to 100 percent by the worksheet and are reported in a separate area of each table; therefore, institutions should not use the cells in Table 2 to report defaulted exposures.

71. Respondents should note that, under the AIRB, all corporate, bank (including GSEs), and state and local government exposures are subject to a PD floor of 0.03 percent (3 basis points). Thus, for such exposures the PD entered in the relevant worksheet should not be less than 0.03 percent.

Loss Given Default (LGD) and Best Estimate of Economic Loss (BEEL)

72. *Definition:* LGD is an estimate of the loss severity rate for each credit exposure in the event that the obligor defaults, measured during a period of high credit losses. The LGD is expressed as a percentage of the expected total exposure amount at the time of default (dollar loss amount divided by the exposure's EAD). It is important that the same default definition (defined above) be used for measuring PDs, LGDs, and EADs. The estimate should take into account material recoveries, as well as material costs (direct and indirect) associated with that defaulted loan and its recoveries, using a discount rate appropriate to the distressed state of the underlying obligor. LGD should also reflect adjustments to incorporate transfer risk.
73. As noted, an institution should report an LGD that reflects periods of high credit losses. Thus, the LGD cannot be less than the long-run default-weighted average LGD (based on the average economic loss of all observed defaults for that type of facility).
74. For certain types of exposures, loss severities may not exhibit cyclical variability and LGD estimates may not differ materially (or possibly at all) from the long-run default-weighted average. However, for other exposures, loss severities may be cyclical and institutions will need to incorporate that cyclical variability into their LGD estimates. Therefore, institutions may use averages of loss severities observed during periods of high credit losses, forecasts based on appropriately conservative assumptions, or other similar methods.
75. For QIS-4 purposes, the process of calculating loss severities for defaulted exposures is different from the process used to assign downturn LGDs to non-defaulted exposures. For defaulted exposures, two distinct loss measures should be reported. The first, called the best estimate of material economic loss (BEEL) is the estimate of the economic loss that the banking organization expects to incur, given current economic conditions and the unique characteristics of the defaulted exposure. It should be no less than any prior partial charge-offs or specific provisions already taken against the exposure. The second loss measure, called the potential LGD (PLGD) for a defaulted exposure, should reflect, in addition to the expected losses, the possibility that losses may be higher than the BEEL. The PLGD should include an appropriate buffer that incorporates (where meaningful) any uncertainty in the ultimate recovery on the defaulted exposure. By definition the PLGD cannot be smaller than the BEEL. The amount by which the PLGD exceeds the BEEL should

depend on the unique attributes of the defaulted exposure (e.g., the length of the anticipated recovery period, or the inherent volatility in the realized value of any posted collateral).

76. Under the AIRB approach, the contribution of a defaulted exposure to the aggregate measure of UL-only risk-weighted assets is determined by the amount by which the PLGD exceeds the BEEL. Also, note that both the uniquely assigned PLGD and BEEL should be measured relative to the original “gross” exposure amounts. That is, these loss estimates should be inclusive of any partial charge-offs taken previously. For example, if an original loan of \$100 were in default, the loan might have been written down to \$60. That \$40 partial charge-off might represent the current BEEL for that particular loan (i.e., BEEL = 40 percent). However, because of the uncertainty surrounding both the length of time and the ultimate recovery value, the recovery amount might conservatively be estimated at \$55 (rather than \$60). Thus, the PLGD would be estimated as 45 percent (i.e., \$45 divided by \$100). The capital requirement would equal the difference between 0.45 and 0.40, which is 0.05, multiplied by the original loan amount of \$100. When evaluating the adequacy of general reserves (i.e., the ALLL for U.S. banking organizations) through the comparison of reserves and EL, prior partial charge-offs are added to the book value of those reserves in order to offset the “grossing-up” of defaulted assets by such charge-offs.
77. *Data entry:* Respondents may define up to 15 LGD categories for allocating aggregated exposures within a given PD point estimate.
78. For defaulted exposures, enter the amounts in default and, in the two prior rows, these exposures’ LGDs and BEELs. Also note that the LGD categories entered for defaulted assets relate only to those assets and may be different from the LGD categories entered into the same column for non-defaulted exposures.
79. Table 3 shows where LGDs and BEELs should be entered in the wholesale worksheets.

Table 3
Cell Addresses of LGDs and BEELs for Wholesale Portfolios

Exposure Type / Table	Non-Defaulted Exposure LGDs	Defaulted Exposure LGDs	Defaulted Exposure BEELs
Drawn	AA27 ... AO27	AA51 ... AO51	AA52 ... AO52
Undrawn Lines	AA74 ... AO74	AA98 ... AO98	AA99 ... AO99
Repo-Style Transactions	AA118 ... AO118	AA142 ... AO142	AA143 ... AO143
OTC Derivatives	AA162 ... AO162	AA186 ... AO186	AA187 ... AO187
Performance and Financial Guarantees	AA207 ... AO207	AA231 ... AO231	AA232 ... AO232
Residual Value of Leases	AA273 ... AO273	AA297 ... AO297	AA298 ... AO298
Advised Lines	AA317 ... AO317	AA341 ... AO341	AA342 ... AO342

Exposure at Default (EAD)

80. *Definition:* Estimates of EAD represent the institution's best estimate of its expected gross dollar exposure for each facility upon a borrower's default, giving full recognition to drawn and undrawn credit lines and regardless of whether such undrawn lines are committed or advised lines. Reported EAD is gross of partial provisions. For portfolio securities, EAD is the amortized cost. The EAD should reflect what would be expected during a period of high credit losses.
81. For **drawn exposures**, the EAD should be measured as the amount recorded on the balance sheet as an asset. In the case of defaulted assets, EAD is the asset's current carrying value plus any amount that had previously been charged-off.
82. Exposures on **undrawn lines**, such as loan commitments or lines of credit, are reflected in EAD by multiplying the notional undrawn amount by an estimated credit conversion factor (CCF). Under the AIRB approach, institutions may develop their own factors for converting into credit equivalent amounts any undrawn lines and off-balance sheet exposures that are not assigned a 100 percent CCF under current U.S. capital rules. After multiplication of the notional amount by the CCF, the resultant EAD amount is treated similar to an on-balance-sheet exposure.
83. For **repo-style transactions**, institutions should incorporate the effects of netting arrangements by reflecting the effect of collateral in the EAD measure. That is, as

explained more fully in Appendix C, in a repo-style transaction, a banking organization should add together its current market exposure to the counterparty under a qualifying master netting agreement and a measure for potential future exposure to arrive at a unique measure of EAD.

84. The EAD associated with **OTC derivative** transaction exposures (including those held in the trading book) should be estimated using the "add-on" approach contained in the current risk-based capital regulations, as well as existing U.S. guidance pertaining to credit derivatives, which is modified by ¶ 707-708 of the June Framework. Those modifications relate to the add-on factors assigned to total return and credit default swaps, both purchased and sold, and are shown in Table 4.

Table 4
Potential Future Exposure Add-on Factors from the June Framework

	Protection buyer	Protection seller
Total Return Swap		
Qualifying” reference obligation	5%	5%
“Non-qualifying” reference obligation	10%	10%
Credit Default Swap		
Qualifying” reference obligation	5%	5%
“Non-qualifying” reference obligation	10%	10%

85. Where the counterparty has posted financial collateral supporting OTC derivative transactions, the institution may use one of two methods to reflect the collateral. It may adjust the LGD to reflect the collateral in accordance with the directions set forth for collateral in Section XI for credit risk mitigation, or it may reflect the collateral through an adjustment to EAD. If the institution uses the EAD adjustment method, it should assign an LGD that is appropriate for an unsecured exposure to the counterparty. Whichever method the institution uses to reflect collateral should be used consistently across its OTC derivative transaction exposures.
86. Where the institution uses the EAD approach, it should apply a discount to the collateral to reflect the potential volatility in the market price of the collateral (and, where applicable, in foreign exchange rates) over a ten-day holding period in a manner consistent with the methodology set forth for the own estimates or standardized haircuts in Appendix C for repo-style transactions. Consistent with the repo-style section and current U.S. regulations, these transactions must be executed under a qualifying master netting agreement. Specifically, for QIS-4 purposes, where the bank has the legally enforceable right to immediately seize and liquidate the collateral for its benefit in the event of counterparty default, the bank may offset the exposure using the haircut value of collateral posted assuming a ten-day

liquidation period for the collateral. An institution must have conducted sufficient legal review to verify the enforceability of this right, have a well-founded legal basis to reach this conclusion, and undertake such further review as necessary to ensure continuing enforceability. All other current legal requirements for OTC derivative transactions under the Agencies' capital rules remain in effect.

87. The haircut value of collateral $C_A = (C - H_C)$ may be used to offset current exposure and potential future exposure (PFE). In no case can the computed EAD be less than zero. For example, in the case of OTC exposures subject to a bilateral netting agreement the EAD calculation would be:

$$\text{EAD} = \max \{0, (\text{CE} + .4 * \text{PFE} + .6 * \text{NGR} * \text{PFE} - C_A)\}$$

where,

CE = current exposure: sum of net market-to-market replacement costs

C = current value of collateral

Hc = haircut appropriate for the collateral type, adjusted for minimum holding period, 10-days for OTC derivatives

NGR = net replacement cost to gross replacement cost ratio

88. If the institution uses the EAD adjustment method, it should determine the risk weight of the counterparty by assigning an LGD that is appropriate for an unsecured exposure to the counterparty.
89. Like the treatment of undrawn lines, the notional amounts of **PFGs** should be converted into their credit equivalent amounts using CCFs and reflected in EAD. The institution should use its own estimates for CCFs, except in those cases where a 100% CCF is required under current U.S. capital rules.
90. *Data entry:* Respondents should report aggregate EAD amounts (after the application of CCFs) for each PD/LGD combination by exposure type as shown in Table 5. Respondents should also report NUAs for each PD/LGD combination as shown in Table 5. Note that these cell ranges include areas for EADs and notional amounts relating to defaulted exposures.

Table 5
Cell Addresses of EADs and Notional Amounts for the Wholesale Portfolios

Exposure Type / Table	EADs (after Application of CCFs)	Notional Amounts
Drawn	AA30 ... AO49 and AA53 ... AO53	
Undrawn Lines	AA77 ... AO96 and AA100 ... AO100	CB77 ... CP96 and CB100 ... CB100
Repo-style Transactions	AA121 ... AO140 and AA144 ... AO144	
OTC Derivatives	AA165 ... AO184 and AA188 ... AO188	
Performance and Financial Guarantees	AA210 ... AO229 and AA233 ... AO233	CB210 ... CP229 and CB233 ... CP233
Residual Value of Leases	AA276 ... AO295 and AA299...AO299	
Advised Lines	AA320 ... AO339 and AA343 ... AO343	CB320 ... CP339 and CB343 ... CP343

Remaining Maturity (M)

91. *Definition:* The fourth parameter input to the capital calculation is effective remaining maturity (M), measured in years. For wholesale exposures with determinable cash flows, the value of M should be the weighted-average remaining maturity of the expected cash flows, using the amounts of the cash flows as weights. Institutions may, however, use nominal remaining maturity if the weighted-average figure cannot be easily calculated (e.g., due to data limitations). For repo-style transactions and OTC derivative exposures subject to qualifying master netting agreements, M should be set equal to the weighted-average remaining maturity of the individual transactions, using the notional amounts of the individual transactions as the relevant weights.
92. An exposure's assigned M should be no greater than five years and, with some exceptions, should not be set lower than one year. The exceptions on the lower bound of one year apply to transactions that (a) are not part of an institution's ongoing financing of a borrower and (b) have an original maturity of less than three months – including repo-style transactions, money market transactions, trade finance-related transactions, and exposures arising from payment and settlement processes. When these conditions are satisfied, M may be set as low as five days for repo-style transactions and OTC derivative exposures subject to a qualifying master netting agreement, and as low as one day for other wholesale transactions.

93. *Data entry:* For all of the exposure types, respondents should calculate the exposure-weighted average maturity in years for each bucket in the PD/LGD matrix and enter it into the corresponding bucket in the maturity matrix. For example, a 2-1/2 year maturity would be entered as 2.5, while a one-day maturity would be entered as 0.00274 (=1/365). If weighted-average maturities are not available for each PD/LGD pair, institutions may provide estimated maturities for a given PD or LGD point estimate. Table 6 summarizes the cell addresses for the maturity averages by exposure type.

Table 6
Cell Addresses of Average Maturities for the Wholesale Portfolios

Exposure Type / Table	Average Maturities
Drawn	AT30 ... BH49
Undrawn Lines	AT77 ... BH96
Repo-Style Transactions	AT121 ... BH140
OTC Derivatives	AT165 ... BH184
Performance and Financial Guarantees	AT210 ... BH229
Residual Value of Leases	AT276 ... BH295
Advised Lines	AT320 ... BH339

SME Size Breakdown

94. Within the “**SME Corporate**” worksheet credit exposures should be allocated among six categories of borrowers. This worksheet is almost identical to the “**Sov-Bank-Corp**” worksheet, except that the SME worksheet does not include a separate table for reporting repo-style exposures. Please note that certain business exposures may be treated as retail exposures under the AIRB, and these should be reported in the Retail Business Exposure, or “**RBE**”, worksheet.

95. *Data entry:* For each PD band, the institution should estimate and report the distribution of exposures among six size categories for business obligors that have total revenues of less than \$50 million.

Table 7
Cell Addresses for SME Size Adjustment in the “SME Corporate”
Worksheet

Exposure Type / Table	Weighted Average Turnover	EADs
Drawn	BL26 ... BP26	BK30 ... BP49 and BK53...BP53
Undrawn Lines	BL73 ... BP73	BK77 ... BP96 and BK100...BP100
OTC Derivatives	BL161 ... BP161	BK165 ... BP184 and BK188...BP188
Off-Balance Sheet	BL206 ... BP206	BK210 ... BP229 and BK233...BP233
Residual Value of Leases	BL272 ... BP272	BK276 ... BP295 and BK299 ... BP299
Advised Lines	BL316 ... BP316	BK320 ... BP339 and BK343 ... BP343

D. Lease Residuals

96. The net present value of contractual lease payments should be included in the “drawn exposures” sections of the “**Sov-Bank-Corp**”, “**SME Corporate**”, “**HVCRE**”, and “**IPRE**” worksheets. This present value will have the lessee’s PD, LGD (and maturity) assigned to it as though the cash flows are the same as a drawn balance on a loan.
97. Under the June Framework, the residual values of leased assets are assigned to the 100 percent risk weight category, which is the same treatment as for “other assets” for which the PD/LGD framework is not applicable (e.g., fixed assets, mortgage servicing assets, and other intangibles). Lease residuals should be reported in the “Other assets” section of the “**Input**” worksheet and should not be included in any wholesale or retail worksheets under the drawn exposure type. Lease residual values should be reported separately in the “Lease Residuals” tables for the “**Sov-Bank-Corp**”, “**HVCRE**”, and “**IPRE**” worksheets and in the “**Input**” worksheet. The lease residual values of retail leases should be reported in aggregate form in the “**Input**” worksheet.
98. Institutions are also requested to complete the “Residual Value of Leases” tables of the “**Sov-Bank-Corp**”, “**SME Corporate**”, “**HVCRE**”, and “**IPRE**” worksheets. The residual values should be slotted into the same point in the PD and LGD matrix as the lease’s contractual cash flows. For example, suppose a lease has a net investment of \$100 with \$80 associated with the contractual cash flows and \$20

representing the residual value. If the lessee has a PD of 1 percent and an LGD of 60 percent, then the \$80 portion would be entered into the corresponding cell of the PD/LGD matrix in the “Drawn Exposures” table, and that same \$80 of EAD would be a component of the EAD-weighted average maturity. In the residuals table, the \$20 residual amount would be included in the same PD (one percent) and LGD (60 percent) cell. This decomposition of the residual amounts associated with corporate leases will allow for more in-depth analysis of the appropriate treatment of residual values of corporate leases.

IX. RETAIL PORTFOLIOS

99. Respondents should assign each retail exposure to a pool of exposures having homogeneous risk characteristics, (often referred to as “primary drivers,” such as loan-to-value ratios and credit scores) within each of the five retail sub-portfolios described below. Institutions may use pre-existing segmentation systems, provided those systems adequately differentiate risk and do not group exposures with significantly different values of the risk drivers. These drivers should have a stable relationship to loan performance over time and should also be consistent with the predominant risk characteristics used by the institution in measuring and managing risk. The estimates of the PD, LGD, and EAD should be assigned at the segmented sub-portfolio level. After determining the appropriate PD, LGD, and EAD for each segment, these estimates should be aggregated as necessary to input the values into the worksheets, along with certain supplemental information to assist analysis by the Agencies.

A. Retail Portfolio Definitions

100. Retail exposures should meet all of the following criteria:

- They should be segmented and managed as part of a pool of similar exposures, not on an individual-exposure basis;
- With the exception of certain small business exposures, the obligors should be individuals (e.g., personal credit cards, installment loans, mortgages, etc.)

101. Within this general definition, the QIS-4 distinguishes among five retail sub-portfolios, each contained on a separate worksheet:

- HELOCs,
- Other mortgages,
- Qualifying revolving exposures (QREs),
- Retail Business Exposures (RBEs), and

- Other exposures qualifying for retail treatment (Other Retail).

102. **NOTE:** Capital calculations for FHA- and VA-guaranteed mortgage exposures are based on data supplied within the “**Input**” worksheet. Thus, to avoid double counting, respondents should *not* include any FHA- or VA-guaranteed mortgages within the QIS-4 AIRB retail worksheets or the “**Current**” worksheet.

HELOCs

103. Home equity lines of credit consist of revolving lines of credit that are secured by one- to four-family properties. Owner occupancy is not required for retail treatment. There is no limit on the size of the HELOC exposure.

Other Mortgages

104. This sub-portfolio encompasses all retail loans secured by one- to four-family residential properties, whether used for personal or business purposes, including first and subsequent liens, term loans, and other legally binding commitments to lend, excluding HELOCs (discussed above), FHA- and VA-guaranteed mortgages (which are reported on the “**Input**” worksheet), and lending commitments for FHA- or VA-guaranteed mortgages. Owner occupancy is not required for retail treatment. There is no limit on the size of such exposures.

Qualifying Revolving Exposures

105. Qualifying revolving exposures (QREs) are those for which the amount outstanding fluctuates, determined largely by the borrower’s decision to borrow and repay, up to a pre-established line. The facility must be revolving, unsecured, and unconditionally cancelable. In addition the obligor must be an individual and the exposure must be no greater than \$100,000. Also included are overdraft protection programs (often referred to as bounce check protection programs) that advise customers of an amount up to which overdrafts may be paid. Although the June Framework document specifies an additional eligibility criterion (e.g., relatively low volatility of loss rates), for QIS-4 purposes all revolving retail credit facilities satisfying the above criteria should be treated as QREs. The Agencies expect this to include, principally, unsecured credit card accounts to individuals and overdraft protection programs on individual checking accounts.

106. Unsecured credit card accounts or overdraft facilities not satisfying the above criteria should be reported in either the “**RBE**” or “**Other Retail**” worksheet, depending on whether the facility has a business or a non-business purpose, respectively.

Retail Business Exposures

107. This portfolio includes certain retail exposures to individuals or companies for business purposes, except those primarily secured by one- to four-family properties, which should be included in the retail mortgage categories. For an exposure to a business to be treated as a retail exposure, the loans must be managed as part of a pool similar to retail loans and the banking organization's total consolidated credit exposure to that business may not exceed \$1 million. Business loans extended through, or guaranteed by, an individual are subject to the same exposure threshold. For QIS-4 purposes, institutions may treat loans of less than \$250,000 as retail business exposures, if their systems do not permit a strict application of the one million dollar aggregate credit exposure limitation, as long as such loans are managed on a pool basis.

Other Retail

108. This category encompasses all retail exposures to individuals that are not secured by one- to four-family properties *and* that are not assigned to one of the four sub-portfolios described above. Exclude from this category margin loans to retail customers, which should be excluded completely from the AIRB portfolio worksheets.¹⁰ There is no upper limit to the size of an exposure in this category.

109. The minimum capital requirement for retail leases is the sum of the credit risk capital on the discounted payment stream plus a 100 percent risk weight for the residual value.

B. Definition of Default: Retail

110. For retail exposures (as opposed to wholesale), the definition of default applies to a particular exposure (e.g., a loan), rather than to the underlying borrower. That is, a borrower defaulting on one obligation would not result in an institution having to treat other obligations of that borrower as having defaulted. Respondents should base PD, LGD, and EAD estimates on the retail definition of default that is specified below. The Agencies anticipate that institutions will be able to apply this definition to retail transactions booked in the United States. If relevant information is not available to apply this definition to certain retail transactions booked abroad, institutions may use the default definition adopted by the national supervisor in the relevant jurisdictions.

111. *Definition of default:* A retail exposure should be considered in default for AIRB purposes when any of the following events occurs:

¹⁰ Retail margin loans should be reported in line E113 of the "Input" worksheet, which will incorporate these exposures into the measure of risk-weighted assets under the current Accord.

- Loss recognition as embodied in the Federal Financial Institutions Examination Council (FFIEC) Uniform Retail Credit Classification and Account Management Policy. All residential mortgages and revolving credits must be recognized as defaults at 180 days past due, and all other retail loans must be recognized as defaults at 120 days past due.
- A partial or full charge-off is taken against the exposure.
- The exposure is put on non-accrual status.

112. Note that for QIS-4, retail fraud should be treated as an operational risk loss in accordance with Section XIV, and not as a credit loss.

C. AIRB Parameter Inputs

113. This sub-section describes the parameter inputs for retail portfolios and how respondents should complete each worksheet.

Probability of Default (PD)

114. *Definition:* For a given pool or risk segment that contains fully seasoned exposures or for which seasoning does not have a material effect, the PD represents an estimate of the long-run average of one-year default rates.

115. For segments containing unseasoned loans where seasoning effects are material, the institution should assign a higher PD estimate that reflects the annualized cumulative default rate over the segments' expected remaining life.

116. *Data entry:* The retail worksheets allow respondents to define up to 20 PD buckets in which to aggregate exposures by exposure type. Table 8 shows where the PD point estimates should be entered.

Table 8
Cell Addresses of PD Point Estimates for Retail Portfolios

Exposure Type / Table	PD Point Estimates
Drawn	C30 ... C49
Undrawn Lines	C77 ... C96

117. PDs should be expressed as a decimal, so that a 10 basis point PD would be entered as 0.0010; the worksheet then converts and reports this number as a percentage (e.g., 0.10%). If a respondent assigns a value less than 0.0003, the worksheet will increase the value to 0.0003 when calculating AIRB risk-weighted assets. As noted above, defaulted exposures are automatically assigned a PD equal to 100%.

Loss Given Default (LGD)

118. *Definition:* The LGD for a pool is the rate of economic loss per dollar of defaulted exposure that is expected during periods of high credit losses for that particular sub-portfolio. Economic losses should reflect the discounted value of recoveries and workout costs (direct and indirect), using a discount factor that is appropriate for valuing distressed retail assets of that type.
119. When estimating LGDs and PDs, it is important that both measures employ the same default definition.
120. Under the above definition of LGD, respondents should estimate an LGD for each pool that reflects economic downturn conditions. This LGD cannot be less than the long-run default-weighted average LGD (based on the average economic loss of all observed defaults for that type of facility). For certain types of exposures, loss severities may not exhibit cyclical variability and LGD estimates may not differ materially (or possibly at all) from the long-run default-weighted average. However, when loss severities do vary materially over the economic cycle, respondents should incorporate such cyclicity into their LGD estimate. This might be done, for example, through analysis of averages of loss severities observed during periods of high credit losses, or through simulations or forecasts of loss severities under appropriately conservative assumptions, or through other similar methods.
121. *Defaulted Loans:* The estimated LGD for a defaulted asset should follow the same methodology for defaulted wholesale exposures as described in ¶ 75 and ¶ 76 in the wholesale section of these instructions.
122. **Treatment of Private Mortgage Insurance (PMI):** Respondents should reflect the risk mitigating effect of PMI that applies to individual retail mortgages ('loan-level PMI') solely through estimates of the LGDs for the insured retail mortgages. That is, when calculating expected loss severities during periods of high residential mortgage credit losses the banking organization should recognize the amount of expected PMI benefits. For QIS-4 purposes, no counterparty risk charge will be assessed for this type of PMI (i.e., the risk that the insurer could potentially default).
123. This treatment applies only to retail mortgages carrying loan-level PMI. Pool-level mortgage insurance should be treated as a securitization exposure within the "**Securitization**" worksheet or under credit risk mitigation as discussed in Section XII. For pool-level credit protection, institutions should treat the protected or covered portion of the pool as a direct exposure to the protection provider (generally within the "**Sov-Bank-Corp**" worksheet), unless the provider is a GSE, in which case it should be treated as a AAA-rated securitization exposure within the "**Securitization**" worksheet. The uncovered portion of the pool (having an EAD equal to the EAD of the pool less the covered portion of the pool) would then be

treated as a retail mortgage exposure if the protection covers a fixed proportion of the pool's losses, or a securitization exposure otherwise.

124. Under the June Framework, the LGDs for retail mortgages (excluding those having GSE or sovereign guarantees) are subject to a 10 percent floor. However, to assist the Agencies in assessing the impact of this floor, respondents are requested to input *their own internal estimates* of LGDs for HELOCs and other retail mortgages using LGD bands falling below 10 percent, with a partition at 10 percent. The worksheets will then calculate risk-weighted assets imposing the 10 percent floor for these LGD buckets. No floor is imposed on the BEEL inputs, which should reflect the respondent's best estimates of economic losses on defaulted exposures given current conditions.

125. *Data entry:* Respondents may segregate exposures in a given PD band into as many as 15 LGD categories. Cell ranges for LGDs are shown in Table 9.

Table 9
Cell Addresses of LGDs and BEELs for the Retail Portfolios

Exposure Type / Table	Non-Defaulted Exposure LGDs	Defaulted Exposure LGDs	BEELs
Drawn	AA27 ... AO27	AA51 ... AO51	AA52 ... AO52
Undrawn Lines	AA74 ... AO74	AA98 ... AO98	AA99 ... AO99

Exposure at Default (EAD)

126. *Definition:* In general, EAD is the gross amount due. The EAD for a *drawn retail exposure* should equal the amount by which regulatory capital would be reduced if the exposure were fully written off *plus* any partial chargeoffs that the institution has already recognized (for defaulted exposures). For an *undrawn retail exposure*, the EAD should equal the expected additions to the amount owed the institution (relative to what is owed currently) were the underlying obligor to default within the next year; this amount should reflect what would be expected during a period of high credit losses for the sub-portfolio of interest.

127. For non-defaulted drawn loans, the EAD should be measured as the loan's carrying or balance sheet amount, inclusive of any accrued but uncollected interest and fees. For the undrawn portions of non-defaulted credit lines, the EAD should be measured as the expected additional amount that would be owed the institution if the facility defaulted within the next year during a period of high credit losses, including not only future drawdowns, but also future accruals of interest and fees.

128. For defaulted exposures, the EAD should be measured gross of any partial chargeoffs already recognized by the institution.
129. In the case of undrawn lines, the EAD should be entered after application of CCFs as estimated by the institution. As per the above discussion, the underlying CCFs should be reflective of periods of high credit losses. For this purpose, respondents may use averages of CCFs observed during periods of high credit losses for the relevant product, simulations or forecasts based on appropriately conservative assumptions, or other similar methods.
130. Within the area of each retail worksheet dealing with undrawn credit lines there is a green-shaded input matrix wherein the respondent is requested to enter the notional amounts of these lines, prior to application of CCFs. This supplemental information does not affect the calculation of AIRB risk-weighted assets, and will be used by the Agencies to help interpret differences across institutions in the AIRB capital charges assigned to retail portfolios.
131. Where the drawn balances of revolving retail credit facilities (e.g., credit cards and HELOCs) have been securitized, the EADs associated with the undrawn portions of securitized accounts should be determined as described above. These EADs must then be allocated between the seller (the originating organization) and the investors on a pro rata basis, in the same proportions as the drawn balances of the accounts. The seller's portion of the EAD associated with these undrawn lines should be included in the undrawn lines section of the relevant retail AIRB worksheet. The investor's portion of the EAD associated with the undrawn portion of securitized accounts should be entered into the “**Securitization**” worksheet.
132. *Data entry:* Respondents should report aggregate EAD amounts (after the application of CCFs) for each PD/LGD combination by exposure type as shown in Table 10. Respondents should also note that these cell ranges include areas for EADs and notional amounts relating to defaulted exposures.

Table 10
Cell Addresses of EADs and Notional Amounts for Retail Portfolios

Exposure Type / Table	EADs (after Application of CCFs)	Notional Amounts
Drawn	AA30 ... AO49 and AA53 ... AO53	
Undrawn Lines	AA77 ... AO96 and AA100 ... AO100	CB77 ... CP96 and CB100 ... CP100

X. DILUTION RISK

133. When credit exposures acquired from unrelated entities (i.e., purchased receivables) are subject to material dilution risk, the purchasing institution incurs a separate dilution risk capital charge, in addition to the pool's AIRB capital charge for credit risk.¹¹ Exposures originated by an institution itself are not subject to a dilution risk charge. Respondents should use the “**Dilution Risk**” worksheet to report exposures subject to a dilution risk capital charge.
134. The capital charge for dilution risk is calculated using the large-corporate capital function with the following parameters: EAD set at the pool's EAD; PD set at the pool's annualized rate of expected losses from dilution – denoted EL_D – which is expressed in percentage of the EAD; LGD set at 100%; and M set at the pool's effective maturity, unless dilution losses can be expected to be recognized within one year, in which case M may be set at one year.
135. *Credit risk mitigation:* In many cases the seller or another party will provide recourse or guarantees covering all dilution losses, or those up to some pre-specified amount. The purchasing institution may then treat such guarantees using the same CRM rules (i.e., substitution treatment) as would apply to guarantees for credit risk. Thus, when the guarantee covers all dilution losses, the purchasing institution's capital charge for dilution risk would be the same as a direct exposure to the seller in the amount of the pool's EAD. When the guarantee covers dilution losses only up to an amount less than the pool's EAD, the purchasing institution may calculate its capital charge for dilution risk using the CRM/Securitization rules for tranching guarantees or, the more conservative, but simpler, rules for proportional guarantees. In either case, the resultant capital charge reflects the purchasing institution's residual (i.e., uncovered) exposure to dilution risk as well as its counterparty exposure to the guarantor.
136. *Data entry:* The Dilution Risk worksheet requires that the respondent identify those pools of purchased receivables subject to material dilution risk and then allocate the total EAD among as many as ten risk buckets representing different expected dilution loss rates (EL_D). The respondent should provide point estimates of the EL_D values assigned to each risk bucket in cells C26 to C35. For each EL_D bucket (identified by a particular row), the institution also should input the following information (by column):

¹¹ Dilution refers to the possibility that the receivable amount is reduced through cash or non-cash credits to the receivable obligor. Examples include offsets or allowances arising from returns of goods sold, disputes regarding product quality, possible debts of the borrower to a receivables obligor, and any payment or promotional discounts offered by the borrower (e.g., a credit for cash payments within 30 days).

- (i) The aggregate EAD (input as \$millions) prior to consideration of any guarantees associated with purchased receivables allocated to the risk bucket (cells E26 to E35);
- (ii) The dollar amount of dilution losses covered by guarantees from sellers or other parties (input as \$millions) (cells G26 to G35); and
- (iii) An estimate of the average risk weight (per dollar of guaranteed amount) for use in calculating the guarantee's counterparty risk capital charge (input as decimal, e.g., 0.0010 for a 10 basis point risk weight) (cells I26 to I35).

XI. CREDIT RISK MITIGATION

137. This section discusses procedures for reflecting credit protection provided by guarantees, letters of credit, credit derivatives or by collateral. Note that securitization exposures discussed in Section XII employ a different methodology for recognition of CRM involving collateral, and should all be reported within the “**Securitization**” worksheet.
138. *Guarantees and Credit Derivatives.* For the AIRB approach, there are no limits as to the range of eligible guarantors or guarantees, provided the conditions in ¶ 483-487 (guarantees) and ¶ 488-489 (credit derivatives), as well as in ¶ 213 and ¶ 118 and ¶ 190 (legal certainty), of the June Framework are met. Additionally, in the case of credit derivatives, the conditions set forth in ¶ 191 (although banking organizations may avail themselves of the modification to those conditions set forth in ¶ 192), ¶ 207-210, and ¶ 706 (internal hedges) of the June Framework apply.
139. In general, when an underlying credit risk exposure is hedged with a guarantee (or credit derivative) the original exposure amount must be divided into two parts, a covered (i.e., protected) portion and an uncovered portion. The protected portion is treated as a direct exposure to the guarantor using the so-called “substitution treatment”. Under this treatment, the EAD is the amount of credit protection recognized, the PD is that of the guarantor, and the LGD is that appropriate to the underlying facility provided the credit protection is structured such that the bank has the option to receive immediate payout upon triggering the protection and thereafter has no continuing exposure to the protection provider. Where this is not the case, the LGD is that appropriate to the guarantor, taking into account the characteristics of the guarantee (e.g. seniority). The capital charge is calculated by substituting the appropriate PD and LGD parameters into the risk-weight function applicable to the credit protection provider.

140. For QIS-4 purposes, except as noted below, the covered portion of an underlying exposure should be reported in the worksheet applicable to the credit protection provider. For example, if a \$100 SME corporate exposure is guaranteed by its large corporate parent, resulting in an \$80 covered portion for AIRB purposes, this \$80 exposure should be reported in the “**Sov-Bank-Corp**” worksheet, while the unprotected \$20 exposure should be reported in the “**SME Corporate**” worksheet. The two exceptions to this reporting methodology are as follows: (a) loan-level PMI on residential mortgages should be reported as retail mortgage exposures as described in Section IX; and, (b) the covered portion of a securitization exposure (e.g., a BB-rated asset-backed security benefiting from a separate third-party guarantee) should be reported in the “**Securitization**” worksheet. In all cases, exposures should be reported in the section of the “**Current**” worksheet that corresponds to where the exposures are reported under AIRB. Therefore, when a covered exposure is reported in the “**Securitization**” worksheet, it should be reported in the corresponding securitization section of the “**Current**” worksheet.
141. The AIRB capital charge against the uncovered portion of an exposure depends on whether the credit protection absorbs losses on a proportional basis. When the covered and uncovered portions share losses *pro rata*, the uncovered portion is treated as unprotected exposure to the obligor. For QIS-4 purposes, the uncovered portion would be reported in the worksheet of the underlying obligor (and the corresponding section of the “**Current**” worksheet), with an EAD equal to the uncovered amount, and the same PD and LGD as the underlying exposure prior to CRM.
142. Alternatively, when the protected and unprotected portions do not share losses proportionately (e.g., a guarantee covers only those losses up to, or exceeding, a certain threshold) the covered and uncovered portions are treated as securitization exposures under the framework described in Section XII. For QIS-4 purposes, such exposures should be reported in the “**Securitization**” worksheet (and in the corresponding section of the “**Current**” worksheet).
143. Under the June Framework there are three situations (noted below) in which the amount of credit protection that may be recognized for AIRB purposes is determined by applying a specific discount or haircut to the notional amount of protection provided by a guarantee or credit derivative. The covered and uncovered portions of the exposure are treated as described above.
144. (a) *Term of the guarantee is less than the maturity of the hedged exposure.* If P is the notional amount of credit protection, then the amount of protection that is recognized for AIRB purposes, Pa, is given by the following equation:

$$P_a = P \times (t-0.25) / (T-0.25)$$

where

t denotes the lesser of T and the residual maturity of the hedge arrangement, expressed in years; and,

T denotes the lesser of 5 and the residual maturity of the underlying exposure, expressed in years.

The maturity of hedges for exposures with original maturities of less than one year should be matched to be recognized. Mismatched hedges with original maturities longer than one year will no longer be recognized when they have a *residual* maturity of three months or less.

145. (b) *Credit derivative does not include restructuring as a credit event.* When a credit derivative satisfies all the conditions of ¶191 of the June Framework except that a distressed restructuring is not a triggering credit event under the contract (third bullet of ¶191a), in accordance with ¶192 the amount of protection recognized under the AIRB is reduced by 40 percent:

$$Pa = 0.60 \times P.$$

However, if the notional amount of the credit derivative is larger than that of the underlying obligation, then the amount of eligible hedge is capped at 60 percent of the amount of the underlying obligation, with the remaining portion treated as unprotected exposure to the underlying obligor.

146. (c) *Currency mismatch between underlying obligation and credit protection.* In the event of currency mismatch, institutions should use their own internal estimates of foreign exchange volatility over the term of the protection to determine an appropriate discount to reflect any potential decline in the value of protection provided due to exchange rate movements.
147. Where an institution uses a credit default swap or total rate of return swap, whether in the banking book or the trading book, to provide credit protection against a banking book exposure that is recognized for risk-based capital purposes in the manner described above, it need not hold capital against the counterparty credit risk on the credit default swap or total rate of return swap. However, credit default and total rate of return swaps that do not provide credit protection against a banking book exposure, whether held in the banking book or the trading book, will incur a counterparty credit risk charge as described in the section on OTC derivatives.
148. *Collateral.* In completing the QIS-4 worksheets, institutions should reflect collateral in their LGD estimates with the exception, as described below, of repo-style transactions and, at an institution's option, OTC derivatives. Unlike exposures subject to guarantees or credit derivatives, collateralized exposures should be

recorded in the portfolio associated with the obligor under both the AIRB approach and the current Accord.

149. In recognizing collateral, institutions should follow these guidelines:
- Internal requirements associated with documentation and legal reviews should be generally consistent with ¶ 118 of the June Framework.
 - Institutions should consider the relation (i.e., dependence) between borrower risk and collateral risk.
 - Institutions should consider any currency mismatch between the underlying obligation and the related collateral.
 - LGD estimates should be grounded in historical data, using historical recovery rates wherever available, and not based solely on the collateral's current market value. LGD estimates should be fully reflective of the time needed to realize the liquidation proceeds and reflect fully the potential for a decline in the collateral value over this time period.
150. Financial collateral posted against OTC derivative transaction exposures may be reflected through an adjustment to LGD as discussed above or, alternatively, through an adjustment to EAD as discussed in Sub-Section VIII.C. Whichever method an institution uses should be used consistently across all its OTC derivative transaction exposures.
151. Financial collateral associated with repo-style transactions (i.e., repurchase and reverse repurchase agreements, securities lending and borrowing, and similar transactions like prime brokerage) that are conducted under qualifying master netting agreements, may be reflected through an adjustment to EAD and reported in the repo-style transaction section, as discussed above and in Appendix C. If master netting agreements do not cover such transactions, or if the institution is not able to adjust the EAD, respondents should use the notional amount of the transaction for EAD and take the collateral into account through LGD, without recognizing any netting effects.
152. Regardless of whether a repo-style transaction is or is not covered by a master netting agreement, it should be reported as a repo-style exposure type if the institution manages it as such. The treatment of collateralized securitization tranches is described in Section XII.

XII. SECURITIZATION EXPOSURES

A. Scope

153. The scope of the securitization rules under the June Framework, and for QIS-4, is generally consistent with that for current U.S. capital rules. Institutions should include exposures arising from traditional and synthetic securitizations or similar structures within the “**Securitization**” worksheet. More generally, under the AIRB a securitization exposure includes any instrument whose credit risk reflects the tranching of credit risk for an underlying pool of exposures (which could involve a single asset or multiple assets). Thus, for a securitization exposure the payments to an investor depend upon the performance of the specified underlying pool of exposures, as opposed to being derived from an obligation of the entity originating those exposures, *and* the investor’s share of credit losses differs from its pro-rata interest in the underlying pool.
154. Examples of securitization exposures include asset-backed securities, mortgage-backed securities including those issued by Fannie Mae and Freddie Mac, stripped mortgage-backed securities, credit enhancements, liquidity facilities to ABCP programs, guarantees and credit derivatives that provide tranching (i.e., non-proportional) credit protection against banking book exposures, and reserve accounts and other retained residual interests in securitizations. Examples of underlying instruments in the pool being securitized include loans, commitments, asset-backed and mortgage-backed securities, corporate bonds, equity securities, and private equity investments. The underlying pool can be composed of one or more exposures.
155. For QIS-4 purposes, credit protection on a securitization exposure, whether purchased or provided, should be reported within the “**Securitization**” worksheet.
156. Because securitizations may be structured in many different ways, the capital treatment of a securitization exposure must be determined on the basis of its economic substance rather than its legal form. Institutions should consult with their primary supervisor if there is uncertainty about whether a given exposure should be included in the “**Securitization**” worksheet.
157. ABCP programs requiring consolidation under FIN 46 may be deconsolidated for purposes of QIS-4, subject to the same limitations contained in the recently issued final rule (FIN 46 final rule).¹² Therefore, institutions that deconsolidate ABCP program assets should apply the AIRB securitization treatment described below to any exposures to those programs, such as credit enhancements and liquidity facilities. Similarly, if the assets are not eligible for deconsolidation under the FIN

¹² See 69 Fed. Reg. 44908 (July 28, 2004).

46 final rule, those assets should be included in another worksheet based on asset type.

B. General Rules

158. As under current U.S. rules, institutions should exclude from the survey any assets to which they no longer have any credit risk. For example, if an institution sold a pool of assets and retained no credit risk on the transferred assets, it would not include those assets in QIS-4. However, if an institution retains some exposure to the transferred assets, that exposure should be included.
159. For QIS-4 purposes, clean-up calls should meet the requirements in current U.S. rules for the transferred exposures to be removed from the originator's risk-weighted assets (i.e., an eligible clean-up call). For a traditional securitization, if a clean-up call does not meet these eligibility criteria, the underlying exposures should be treated as though they were not securitized, and an institution should reverse out the effects of any gain-on-sale income (see Sub-Section E below) related to that securitization. For synthetic securitizations with ineligible clean-up calls, the institution purchasing credit protection should hold capital against the entire amount of the underlying exposures as if they did not benefit from any credit protection. Transactions with ineligible clean-up calls should be included in the other worksheets as if the underlying assets had not been securitized. For example, an institution providing an ineligible clean-up call on a securitized pool of auto loans should report those loans in the "**Other Retail**" worksheet.
160. Servicer cash advances and seller representations and warranties should be included (or excluded) as they are under current U.S. rules. Institutions do not have to hold any risk-based capital against the obligation to make servicer advances or for representations and warranties as long as such obligations do not meet the definition of credit-enhancing representations or warranties contained in current U.S. capital regulations.
161. For the purposes of the calculation that compares the measured EL with reserves, securitization exposures do not contribute to the EL amount. Similarly, any specific reserves against securitization exposures should be excluded from the measure of reserves.
162. As under current U.S. capital treatment, where an institution holds only a proportional interest in a securitization tranche, that position's capital charge should be recorded as the prorated share of the capital charge for the entire tranche.
163. Institutions should report the "notional" amount, that is, the entire amount of any liquidity facility and/or credit enhancement extended to an ABCP program.

Institutions should discuss such exposures with their primary supervisor if there are questions of how (or where) they should be included in the worksheet.

C. Hierarchy of Approaches

164. To incorporate a securitization exposure into QIS-4, an institution should use one of the approaches described in the following sub-sections. These include the ratings-based approach (RBA), the internal assessment approach (IAA), and the supervisory formula approach (SFA). QIS-4 also applies a unique treatment to certain securitizations that contain an early amortization provision.

165. As described in section E below, any gain on sale or credit-enhancing interest-only strips should be deducted from Tier 1 capital or Total Capital, respectively.

166. The RBA should be used in cases where a securitization exposure is rated, or where a rating can be inferred based on an externally rated subordinated tranche. Only when an external rating or an inferred rating is not available, should the SFA or the IAA be used. The IAA is only available for exposures to ABCP programs, while the SFA is only available if there is an AIRB approach for the exposures underlying the securitization. Generally, if none of these approaches are applicable to a securitization exposure, that exposure should be deducted equally from Tier 1 and Tier 2 capital. An exception to deduction (in cases where none of the above approaches apply) is available in cases where no AIRB approach exists for the underlying exposures that comprise the securitization (e.g., the securitization of music concert receivables). In such cases, the current U.S. rules should be used to determine the securitization exposure's risk weight.

167. For QIS-4, institutions may choose to use either the SFA or IAA.

D. Limitation on Maximum Capital Requirement

168. The maximum capital requirement (i.e., a "cap" on the minimum total risk-based capital requirement) for a securitization exposure is set equal to the AIRB capital requirement that would have been applied to the underlying exposures were they held directly by the institution, including the EL component for the underlying securitized exposures. The maximum capital requirement is not inclusive of the capital requirements for gain-on-sale income, credit-enhancing interest-only strips, or accrued interest receivables (AIR) that meet the definition of a residual interest under current U.S. rules (see Sub-Section E below). Accordingly, capital is to be held for these exposures in addition to the cap amount. Institutions should report the amount of exposures excluded from risk weighting or deduction due to the application of the cap in cell E17.

E. Gain on Sale and Credit-Enhancing Interest-Only Strips

169. Institutions should deduct from Tier 1 capital any increase in equity capital resulting from a securitization transaction that is associated with the recognition of expected future margin income (FMI) resulting in a gain on sale that is recognized in regulatory capital. For example, a gain on sale associated with the recording of a CEIO should be deducted from Tier 1. Over time, from an accounting perspective, as an institution realizes the increase in equity that was booked at origination of a securitization transaction through actual receipt of cash flows, the amount of required deduction from Tier 1 capital should be reduced accordingly. Deductions related to gain-on-sale income should be reported in cell E23.
170. Institutions should deduct from total capital (half from Tier 1 and half from Tier 2) all exposures meeting the current U.S. regulatory definition of a CEIO net of the amount that results in a gain on sale, which must be deducted from Tier 1 capital. CEIOs include items such as excess spread that represents subordinated cash flows of future margin income.¹³ Institutions should also treat AIR as CEIOs for QIS-4 purposes. Deductions from capital may be calculated net of any provisions or reserves taken against the relevant securitization exposures. As under current U.S. rules, the amount deducted may be net of any associated deferred tax liability. CEIOs should be reported in cell F24.
171. Rather than deducting the gain on sale from Tier 1 capital and the remaining portion of the CEIO, if any, from total capital, respondents may take a more conservative approach and deduct the entire amount of the CEIO (net of any associated deferred tax liability) from Tier 1 capital and ignore the gain-on-sale amount. If an institution chooses this option, it should report this amount in cell E23.

F. Ratings-Based Approach (RBA)

172. Similar to current U.S. rules, the RBA assigns risk-weighted assets by multiplying the amount (i.e., the amortized cost) of the exposure by the appropriate risk weights shown in Tables 11 and 12 below. Institutions should apply this approach to both retained and purchased securitization exposures. For QIS-4 purposes, as with current U.S. rules, interest-only and principal-only strips, even if rated, should be assigned a risk weight of 100 percent. Such exposures should be reported in cell E131 of the “**Securitization**” worksheet.
173. Securitization exposures using the RBA should generally be reported in cells E33 to E61. If a rated exposure also benefits from CRM in the form of financial collateral that is separate and apart from the securitization structure, it should be

¹³ Unlike under current U.S. rules, there is no Tier 1 capital limitation of 25 percent for CEIOs in QIS-4.

reported in cells I33 to J61. If a rated exposure benefits from CRM in the form of a guarantee that is separate and apart from the securitization structure, it should be reported in cells O33 to P61. Since the vast majority of rated securitization exposures do not also utilize credit risk mitigation, we would expect the bulk of institutions' rated exposures to be placed in cells E33 to E61. Where CRM is integrated into a securitization transaction and is reflected in the external credit rating assigned to a securitization exposure or exposures, the risk weight associated with that credit rating should be used, and no additional benefits for CRM should be recognized.

174. To use the RBA, the rating should meet all of the requirements for recognition of ratings under current U.S. rules.
175. Institutions may also infer a rating for a securitization exposure, with the same limitations that exist under current U.S. rules; therefore, the exposure for which a rating is being inferred must be senior in all respects, including maturity, to the externally rated exposure in the same securitization structure. Inferred ratings should be reported in the same area of the worksheet as explicitly rated positions as described above.
176. The risk weight applied to a rated exposure depends on (i) the external/inferred rating, (ii) whether the rating represents a long-term or a short-term rating, (iii) the granularity of the underlying pool, and (iv) the seniority of the exposure.
177. Under the RBA, a securitization exposure is treated as a senior tranche if it is effectively backed or secured by a first claim on the entire amount of the assets in the underlying securitized pool. While this generally includes only the most senior position within a securitization transaction, in some instances there may be some other claim that, in a technical sense, may be more senior in the waterfall (e.g., a swap claim, a servicer advance, a servicing fee, or a trustee fee) but may be disregarded for the purpose of determining which positions are subject to the "senior tranches" column. Examples of a senior exposure might include a "super-senior" tranche in a synthetic securitization, the most senior (e.g., AAA) tranche in a traditional securitization, or a liquidity facility in an ABCP program.
178. Institutions may apply the risk weights for senior positions if the effective number of underlying exposures (N, as defined in Appendix D) is 6 or more and the position is senior as described above. When N is less than 6, the risk weights in the right-most column apply. In all other cases, the "Base risk weights" in the third column below apply.

Table 11: RBA Risk Weights – Long-Term Rating

External Rating ¹⁴	Risk weights for senior positions	Base risk weights	Risk weights for tranches backed by non-granular pools
AAA	7%	12%	20%
AA	8%	15%	25%
A+	10%	18%	35%
A	12%	20%	
A-	20%	35%	
BBB+	35%	50%	
BBB	60%	75%	
BBB-	100%		
BB+	250%		
BB	425%		
BB-	650%		
Below BB- and non-rated	Deduction		

Table 12: RBA Risk Weights – Short-Term Rating

External Rating	Risk weights for senior positions	Base risk weights	Risk weights for tranches backed by non-granular pools
A-1/P-1	7%	12%	20%
A-2/P-2	12%	20%	35%
A-3/P-3	60%	75%	75%
All other ratings/non-rated	Deduction	Deduction	Deduction

179. For QIS-4 purposes, respondents should treat GSE guaranteed pass-through, collateralized mortgage obligations, and real estate mortgage investment conduit securities (e.g., Fannie and Freddie MBS) as senior, AAA-rated asset-backed securities.¹⁵

180. Institutions may also use the RBA to risk weight servicer cash advances. While these advances are not directly rated, a rating can generally be inferred since the advance is usually more senior than the senior-most security issued.

¹⁴ The external ratings are illustrative and do not represent an endorsement of any particular rating agency.

¹⁵ While Fannie and Freddie MBS do not carry an explicit rating, for QIS-4 purposes, these positions will be considered to be as senior and to carry the same ratings as these agencies' senior, unsecured debt, which is rated AAA.

G. Internal Assessment Approach (IAA)

181. Institutions should use the IAA only for non-rated exposures to ABCP programs (e.g., liquidity facilities and credit enhancements). As under the FIN 46 final rule, an ABCP program is defined as a structure that predominately issues externally rated commercial paper with an original maturity of one year or less that is backed by assets or other exposures held in a bankruptcy-remote, special purpose entity. Securitization exposures for which the IAA has been used should be reported in cells F33 to F61.
182. Internal assessments of exposures to ABCP programs should be mapped to equivalent external ratings of an NRSRO. Those rating equivalents should then be used to determine the appropriate risk weights under the RBA, which are assigned to the notional amounts of the exposures. For example, if an institution uses the IAA to rate a liquidity facility as the equivalent of single-A, it would then use the appropriate risk weight from the RBA for a single-A rating – typically the risk weight for a senior, single-A rated exposure. This single-A risk weight would be applied to the maximum possible exposure amount of the liquidity commitment (i.e., contractual notional amount) to arrive at a risk-weighted assets number.
183. To use the IAA, the following conditions must be met:
- The ABCP issued must be externally rated.
 - The internal assessment must be based on NRSRO criteria for the underlying asset type. In particular the stress factors for determining credit enhancement requirements must be at least as conservative as the publicly available rating criteria of the major NRSROs that are externally rating the ABCP program's commercial paper for the asset type being purchased by the program.
 - The internal assessment must be the equivalent of at least investment grade when initially assigned to an exposure.
 - Internal assessments must correspond to the external ratings of NRSROs.
 - Additional criteria for the use of the IAA can be found in ¶ 619-622 of the June Framework.
184. For QIS-4 purposes, respondents should consider whether an exposure would likely be able to meet the criteria for using this approach when the framework is implemented, even if the criteria are not precisely fulfilled at the time of the survey. If institutions do not expect to meet these criteria for a significant portion of the exposures for which this approach is meant to apply, they should consult with supervisors to determine how to report these exposures.
185. As under the FIN 46 final rule, if an institution has multiple overlapping exposures (such as a program-wide credit enhancement and a liquidity facility) to an

ABCP program, the higher of the two capital charges should be reported, while the other can be excluded from risk-based capital.

H. Supervisory Formula Approach (SFA)

186. Institutions may use the SFA for non-rated securitization exposures, including non-rated exposures to ABCP conduits if preferred by the reporting institution. As in the general AIRB framework, risk-weighted assets generated through the use of the SFA are calculated by multiplying the capital charge generated by the SFA by 12.5.
187. Securitization exposures and resulting risk-weighted assets using the SFA should be reported in their respective columns of cells E72 to F80 for nonresidential mortgage exposures and mortgage exposures without pool-level mortgage insurance, and E86 to F94 for residential mortgage exposures with pool-level mortgage insurance. If a non-rated exposure benefits from CRM in the form of financial collateral, the exposure and risk-weighted asset amount's adjusted EAD exposure should be reported in cells I72 to K80 or I86 to K94. If a non-rated exposure benefits from CRM in the form of a guarantee, the risk weight amount should be reported in cells O72 to P80 or O86 to P94.
188. As noted in the retail instructions, individual loan-level PMI should be reflected in an adjustment to LGD. Therefore, only the benefits of pool-level mortgage insurance may be reported in cells O86 to P94 to avoid double-counting the benefits of loan-level PMI.
189. Under the SFA, the capital charge for a securitization exposure depends on six institution-supplied inputs: (1) the AIRB capital charge had the underlying exposures not been securitized (K_{IRB}); (2) the tranche's credit enhancement level (L); (3) the tranche thickness (T); (4) the pool's effective number of exposures (N); (5) the pool's exposure-weighted average loss-given-default (LGD); and (6) the notional amount of underlying exposures that have been securitized (E). For a complete discussion of how to apply the SFA, see Appendix D.¹⁶

I. Non-AIRB Exposures

190. Where there is no specific AIRB approach for the exposures underlying a securitization exposure, institutions should apply the RBA for rated securitization exposures as described above and should report such exposures in the RBA area of the “**Securitization**” worksheet. If a position is not rated, institutions should use current U.S. securitization rules to determine the risk-based capital requirement and

¹⁶ A separate Excel calculator worksheet entitled “SFA.XLS” can be used to determine capital requirements under the SFA.

report the exposure in cells E102 to G103. Exposures that utilize the alternate capital calculation for small business obligations should also be reported in these cells.¹⁷

191. If such exposures benefit from CRM in the form of collateral, they should be reported in cells I102 to L103. If a guarantee provides CRM, the exposures should be reported in cells O102 to P103.

J. Non-RBA, -IAA, and -SFA Exposures

192. Respondents should report in cell E108 any exposures where the RBA, IAA, and SFA could not be applied, but for which an AIRB treatment exists for the underlying securitization exposures.

K. Early Amortization

193. Early amortization provisions are defined as mechanisms that, once triggered, allow investors to be paid out prior to the originally stated maturity of the securities issued. Depending on the credit performance of the securitized pool, an originating institution might be required to hold capital against all (or a portion) of the investors' interest (i.e., against both the drawn and undrawn balances related to the securitized exposures) when: (1) it sells exposures into a structure that contains an early amortization feature; and (2) the exposures sold are of a revolving nature. Revolving exposures are ones where the borrower is permitted to vary the drawn amount and repayments within an agreed limit under a line of credit (e.g., credit card receivables and corporate loan commitments).

194. However, institutions are not required to hold risk-based capital for early amortization risk in the following situations:

- Replenishment structures where the underlying exposures do not revolve and the early amortization ends the ability of the institution to add new exposures;
- Transactions of revolving assets containing early amortization features that mimic term structures (i.e., where the risk on the underlying facilities does not return to the originating institution);
- Structures where an institution securitizes one or more credit line(s) and where investors remain fully exposed to future draws by borrowers even after an early amortization event has occurred;

¹⁷ See, 12 CFR part 3, Appendix A § 4(i) (OCC); 12 CFR part 325, appendix A § II.B.5(i) (FDIC); 12 CFR Chapter V, part 567.6(b)(5) (OTS).

- The early amortization clause is solely triggered by events not related to the performance of the securitized assets or the selling institution, such as material changes in tax laws or regulations.

195. For risk-based capital purposes, an early amortization provision will be considered either controlled or non-controlled. A controlled early amortization provision must meet all of the following conditions.

- The institution must have appropriate capital and liquidity plans in place to ensure that it has sufficient capital and liquidity available in the event of an early amortization.
- Throughout the duration of the transaction, including the amortization period, there is the same pro rata sharing of interest, principal, expenses, losses and recoveries based on the selling institution's and investors' relative shares of the receivables outstanding at the beginning of each month.
- The selling institution must set a period for amortization that would be sufficient for at least 90% of the total debt outstanding at the beginning of the early amortization period to have been repaid or recognized as in default; and
- The pace of repayment should not be any more rapid than would be allowed by straight-line amortization over the period set out in the aforementioned bullet.

196. An early amortization provision that does not satisfy the above conditions is considered a non-controlled early amortization provision.

197. The originator's capital charge for the investors' interest is determined as the product of (a) the EAD of the investors' interest, (b) K_{IRB} , and (c) the appropriate CCF shown below.

198. The EAD associated with the investors' interest is defined as the sum of (a) the investors' share of drawn balances in the securitized accounts and (b) the EAD associated with the undrawn portions of the securitized accounts attributable to the investor. This attribution is calculated as the ratio of the investors' share of the drawn balances to the total amount of drawn balances.

199. The CCFs depend upon whether the early amortization repays investors through a controlled or non-controlled mechanism. The CCFs also differ according to whether the securitized exposures are uncommitted retail credit lines (e.g., credit card receivables) or other credit lines (e.g., revolving corporate facilities). A line is considered uncommitted if it may be unconditionally cancelled without prior notice.

Table 13
Controlled early amortization features

	Uncommitted	Committed
Retail credit lines	3-month average excess spread CCF 133% of trapping point or more: 0% CCF Less than 133% to 100% of trapping point: 1% CCF Less than 100% to 75% of trapping point: 2% CCF Less than 75% to 50% of trapping point: 10% CCF Less than 50% to 25% of trapping point: 20% CCF Less than 25% of trapping point: 40% CCF	90% CCF
Non-retail credit lines	90% CCF	90% CCF

Table 14
Non-controlled early amortization features

	Uncommitted	Committed
Retail credit lines	3-month average excess spread CCF 133% or more of trapping point: 0% CCF Less than 133% to 100% of trapping point: 5% CCF Less than 100% to 75% of trapping point: 15% CCF Less than 75% to 50% of trapping point: 50% CCF Less than 50% of trapping point: 100% CCF	100% CCF
Non-retail credit lines	100% CCF	100% CCF

200. For uncommitted retail credit lines (e.g., credit card receivables) in securitizations containing controlled or non-controlled early amortization features, institutions must compare the three-month average excess spread¹⁸ to the point at which the institution is required to trap excess spread as required by the structure (i.e., excess spread trapping point). In cases where a transaction does not require

¹⁸ Excess spread is generally defined as gross finance charge collections and other income received by the trust or SPE minus certificate interest, servicing fees, charge-offs, and other senior trust or SPE expenses.

excess spread to be trapped, a trapping point equal to 4.5 percentage points should be used. The institution must divide the excess spread level by the transaction's excess spread trapping point to determine the appropriate segment and then apply the corresponding conversion factors, as outlined in the tables above.

201. All other securitized revolving exposures (i.e., those that are committed retail and all non-retail exposures) with controlled early amortization features will be subject to a CCF of 90% against the off-balance sheet exposures. All other securitized revolving exposures (i.e., those that are committed retail and all non-retail exposures) with non-controlled early amortization features will be subject to a CCF of 100% against the off-balance sheet exposures.
202. Securitization transactions subject to the early amortization capital charge are still subject to the maximum capital requirement (i.e., cap) as described earlier.
203. Securitization exposures subject to the early amortization charge should be reported in cells E119 to M123. The worksheet contains separate areas within these cells for controlled and non-controlled structures and for retail and non-retail exposures. While the investor's interest requiring capital under these early amortization rules is reported within the "**Securitization**" worksheet, the capital requirements under AIRB for the on-balance sheet seller's interest should be reported in the appropriate retail or wholesale worksheet (e.g., the "**QRE**" worksheet for the seller's interest of credit card receivables).

L. CRM for Securitization Exposures

204. The treatment below applies when an institution has obtained a credit risk mitigant on a securitization exposure. Credit risk mitigants include guarantees, credit derivatives or eligible financial collateral for the purposes of the securitization framework. Collateral in the context of this sub-section generally refers to that used to hedge the credit risk of a securitization exposure rather than the underlying exposures of the securitization transaction.
205. Rated tranches that benefit from CRM built into the securitization structure should use the RBA and should not apply any additional benefit for CRM. For example, a AAA-rated tranche that benefits from an insurance wrap that is part of the securitization structure should utilize the RBA; no additional credit should be given for the presence of the insurance wrap.
206. If multiple credit risk mitigants cover a single exposure (e.g., both collateral and a guarantee partially cover an exposure), the institution should disaggregate the exposure into portions covered by each credit risk mitigant (e.g., the portion covered by collateral and the portion covered by the guarantee) and the risk-weighted assets of each portion should be calculated separately. When credit protection provided by

a single protection provider has differing maturities, they should be subdivided into separate layers of protection.

207. As noted earlier, positions benefiting from CRM should be reported in cells I33 to P61 (rated exposures), I72 to P94 (SFA), I102 to P103 (no AIRB treatment), or I108 to P108 (non-RBA, -IAA, and -SFA exposure) depending on the type of exposure and the type of CRM.

Collateralized Transactions

208. Institutions should calculate an adjusted exposure amount to take account of the effects of collateral. Using haircuts, the value of any collateral received should be adjusted to take account of possible future fluctuations in the value of that collateral vis-à-vis the covered exposure. In general, the amount of the securitization exposure does not need to be adjusted for movements in its market value (i.e., H_c is generally zero).

209. The following instruments may be recognized as eligible collateral for securitization exposures:

- Cash (as well as certificates of deposit or comparable instruments) on deposit with the institution that is incurring the counterparty exposure.
- Gold.
- Debt securities rated by an NRSRO where these are either: (1) at least BB- when issued by sovereigns or GSEs; (2) at least BBB- when issued by other entities (including banks and securities firms); or, (3) at least A-3/P-3 for short-term debt instruments.
- Debt securities not rated by an NRSRO where these are: (1) issued by a bank; (2) listed on a recognized exchange; (3) classified as senior debt; (4) all rated issues of the same seniority by the issuing bank are rated at least BBB- or A-3/P-3 by an NRSRO; (5) the institution holding the securities as collateral has no information to suggest that a rating below BBB- or A-3/P-3 is justified; and (6) the security is sufficiently liquid.
- Mutual funds where: (1) a price for the fund is publicly quoted daily; and (2) the mutual fund is limited to investing in instruments that are considered eligible collateral.
- Equities (including convertible bonds) that are included in a main index or are not included in a main index but are listed on a recognized exchange.
- Mutual funds that include the equities described above.

210. Where the volatility-adjusted exposure amount is greater than the volatility-adjusted collateral amount (including any adjustment for foreign exchange risk), institutions should calculate their risk-weighted assets as the difference between the

two multiplied by the risk weight applicable to the underlying exposure as if it did not benefit from any credit protection as determined under the securitization framework.

211. The exposure amount after risk mitigation is calculated as follows:

$$E^* = \max \{0, [E \times (1 + H_e) - C \times (1 - H_c - H_{fx})]\}$$

where:

E* = the exposure value after risk mitigation

E = current value of the exposure

H_e = haircut appropriate to the securitization exposure

C = the current value of the collateral received

H_c = haircut appropriate to the collateral (as defined in Appendix C)

H_{fx} = haircut appropriate for currency mismatch between the collateral and exposure (as defined in Appendix C)

212. The risk-weighted assets after CRM are equal to (a) the exposure amount after CRM (E*) multiplied by (b) the risk weight of the securitization exposure prior to consideration of any CRM.

213. Where the collateral is a basket of assets, the haircut on the basket will be

$$H = \sum_i a_i H_i$$

where a_i is the dollar weight of the asset in the basket and H_i the

haircut applicable to that asset.

214. An institution may choose to use either standard or own-estimate haircuts. However, if an institution seeks to use own-estimate haircuts, it must do so for the full range of instrument types for which it would be eligible to use own-estimates, with the exception of immaterial portfolios where it may use the standard supervisory haircuts. Standard supervisory haircuts are listed in Table C-1 of Appendix C. The conditions for calculating own-estimate haircuts are also provided in Appendix C.

215. The minimum holding period for securitization transactions is 20 business days with daily revaluation. When the frequency of revaluation is longer than the minimum, the minimum haircut numbers should be scaled up depending on the actual number of business days between revaluation using the following formula:

$$H = H_M \sqrt{\frac{N_R + (T_M - 1)}{T_M}}$$

where:

H = haircut

H_M	=	haircut under the minimum holding period
T_M	=	minimum holding period for the type of transaction
N_R	=	actual number of business days between revaluation

216. When an institution calculates the volatility on a T_N day holding period, which is different from the minimum 20-day holding period T_M , H_M should be calculated using the square root of time formula found in Appendix C.

217. Where the credit protection is denominated in a currency different from that in which the exposure is denominated – i.e., there is a currency mismatch – the amount of the exposure considered protected is reduced by the application of a haircut H_{FX} :

$$G_A = G \times (1 - H_{FX})$$

where,

G = nominal amount of the credit protection

H_{FX} = haircut appropriate for currency mismatch between the credit protection and underlying obligation.

Guarantees

218. For QIS-4, the treatment of guarantees for securitization exposures is the same as that described in Section XI. However, such exposures should be reported within the “**Securitization**” worksheet.

Maturity Mismatches

219. A maturity mismatch occurs when the residual maturity of a hedge is less than that of the underlying securitization exposure. When the underlying exposures of the securitization exposure have different maturities, the longest maturity must be taken as the maturity of the securitization exposure. Maturity mismatches may arise in the context of synthetic securitizations when, for example, an institution uses credit derivatives to transfer part or all of the credit risk of a specific pool of assets to third parties. When the credit derivatives unwind, the transaction will terminate. This implies that the effective maturity of the tranches of the synthetic securitization may differ from that of the underlying exposures. Originating institutions of synthetic securitizations must deduct non-rated, retained positions requiring deduction. In other words, when deduction is required, maturity mismatches are not taken into account. For all other securitization exposures, institutions must apply the maturity mismatch treatment described in Section XI.

XIII. EQUITY EXPOSURES

220. Institutions should use only the Market-Based Approach (MBA), as described below, to calculate RWA of non-traded equity exposures. Institutions should not use the PD/LGD approach to equities contained in the June Framework. The MBA requires that institutions first identify any equity exposures that are excluded from the calculations and then determine whether the remaining equity portfolio is “material” (as defined below). The RWA of equity portfolios that are not considered material will be calculated by assigning risk weights of 0, 20, or 100 percent to the balance sheet value of the equity position. For material portfolios, institutions should use the MBA. Under the MBA, institutions should use either an internal models approach or the simple risk weight method for determining capital for banking book equity exposures.

221. Sections A and B identify the types of instruments that give rise to equity exposures and the entries related to calculations of materiality. For institutions subject to the Market Risk Amendment, trading account equities will remain subject to the existing market risk capital rules and do not fall under this framework. Section C describes the entries necessary for the MBA.

A. Definition of an Equity Exposure

222. Equity exposures include both direct and indirect ownership interests, whether voting or non-voting, in the assets and income of a commercial enterprise or of a financial institution that is not consolidated or deducted from capital. The following characteristics should be used in classifying an exposure as an equity that should be included in the “**Equity**” worksheet:¹⁹

- An equity is not redeemable, in the sense that the return of invested funds requires the sale of the investment or the sale of the rights to the investment (or by the liquidation of the issuer);
- An equity does not embody an obligation on the part of the issuer; and,
- An equity instrument represents a residual claim on the assets or income of the issuer.

223. Also, any instrument with the same structure as those that are recognized as Tier 1 capital for banking organizations should be included as an equity exposure. In addition, equity exposures include any instrument that embodies an obligation on the part of the issuer, if it meets any of the following conditions:

- The issuer may defer indefinitely the settlement of the obligation;

¹⁹ Exposures held in a BOLI separate account product that meet this definition of equity should also be reported within the “**Equity**” worksheet.

- The obligation requires settlement by issuance of a fixed number of the issuer's equity shares;
- The obligation requires settlement by issuance of a variable number of the issuer's equity shares and (ceteris paribus) any change in the value of the obligation is attributable to, comparable to, and in the same direction as, the change in the value of a fixed number of the issuer's equity shares; or

224. Mandatory convertible debt (or preferred shares) that, on a specified date, converts to an equity instrument should be treated as equity. All other forms of preferred stock (both perpetual and limited life), as well as mezzanine debt, should be treated as debt. Warrants to convert securities into common shares should be treated as equity.

B. EAD for Equity Exposures

225. The EAD for an equity exposure is the carrying value used in financial statements.

C. Exclusions and Materiality

226. In calculating the materiality of a portfolio, institutions should exclude investments with low market risk or that were made pursuant to legislated programs designed to encourage investment in specified sectors of the economy.²⁰

Exclusions

227. *Data Entry:* Enter in cell F28 the carrying value of all equity exposures to entities whose debt obligations qualify for a zero risk weight under the standardized approach for credit risk, as described in the June Framework. Entities whose debt obligations qualify for a zero risk weight generally include (i) sovereigns rated AAA to AA-; (ii) the Bank for International Settlements; (iii) the IMF; (iv) the Federal Reserve System and the European Central Bank; (v) the European Community; and (vi) high-quality multilateral development banks (MDBs) with strong shareholder support (e.g. the World Bank group).

228. Enter in cell F29 the carrying value of all investments in non-central government public-sector entities (PSEs) that are not traded publicly and that are generally held as a condition of membership, for example, stock of a Federal Home Loan Bank

²⁰ This includes equity investment made pursuant to the following authorities: 1) for national banks and state nonmember banks, 12 CFR Part 24, 2) for state member banks, 12 CFR 208.22, 3) for thrifts, 12 CFR Part 560.30 and 4) for bank holding companies, 12 CFR 225.28.

229. Enter in cell F30 community development investments, such as equity exposures of community development corporations (CDCs) or community and economic development entities (CEDEs) that promote the public welfare and that are made pursuant to existing regulations. Equity investments that are held through a small business investment company (SBIC) under section 302(b) of the Small Business Investment Act of 1958 and that are less than 10 percent of the institution's Tier 1 plus Tier 2 capital should also be entered on this line.

Materiality

230. If total equity exposures (not including the excluded equities noted above) are, on average during the prior year, less than 10 percent of the institution's Tier 1 and Tier 2 capital, then the equity exposures are weighted at 100 percent and are not included in the calculation of risk-weighted assets under the MBA. This materiality threshold is 5 percent of the banking organization's Tier 1 and Tier 2 capital if the equity portfolio consists of less than ten individual holdings.

231. *If the portfolio is not material, no further entries are required on this worksheet.*

D. Market-Based Approach

232. If equity investments (excluding exempted securities) exceed the materiality thresholds described above, then the risk-weighted assets should be measured using the MBA. Either the simple approach, or the internal models approach may be used. Institutions should specify which approach should be used in the AIRB calculations in cell AA39 using the drop-down box provided.

Simple Risk Weight Method

233. Under the simple risk weight method, a risk weight of 300 percent is applied to publicly traded equities, and a 400 percent risk weight is applied to other equities that are not publicly traded.

234. *Data entry:* Respondents should record the carrying value of publicly and non-publicly traded exposures in cells F40 and F41, respectively.

Internal Models Approach

235. Under the internal models approach to equities, respondents should calculate an estimate that represents a 99.0 percent (one-tailed) confidence level of estimated maximum loss over a quarterly time horizon and should be recorded in cell F56.

236. The worksheet multiplies the result generated by the internal model by 12.5 to form risk-weighted assets. However, that RWA number will be subject to a

constraint, which is implemented within the worksheet. The value of risk-weighted assets under the internal models approach will be overwritten if it is less than the level of risk-weighted assets resulting from a 200 percent risk weight for publicly traded equities, plus a 300 percent risk weight for all other equities.

XIV. OPERATIONAL RISK

237. Under the Advanced Measurement Approaches (AMA), the regulatory capital requirement for operational risk is based on an estimate of operational risk derived from an institution's internal risk measurement system. A current draft of qualitative and quantitative criteria for use of the AMA is set forth in *Supervisory Guidance on Operational Risk Advanced Measurement Approaches for Regulatory Capital (August 4, 2003) (AMA Supervisory Guidance)*.
238. **Operational risk** is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events. This includes legal risk, which is the risk of loss resulting from failure to comply with laws as well as prudent ethical standards and contractual obligations. It also includes the exposure to litigation from all aspects of an institution's activities. For QIS-4, operational risk should also include any retail fraud losses. Strategic and reputation risks and not included.²¹
239. **Operational risk losses** are characterized by seven event factors associated with:
- a. *Internal fraud*: an act of a type intended to defraud, misappropriate property or circumvent regulations, the law or company policy, excluding diversity/discrimination events, which involve at least one internal party.
 - b. *External fraud*: an act of a type intended to defraud, misappropriate property or circumvent the law, by a third party.
 - c. *Employment practices and workplace safety*: an act inconsistent with employment, health or safety laws or agreements, from payment of personal injury claims, or from diversity/discrimination events.
 - d. *Clients, products, and business practices*: an unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements), or from the nature or design of a product.
 - e. *Damage to physical assets*: the loss or damage to physical assets from natural disaster or other events.
 - f. *Business disruption and system failures*: disruption of business or system failures.

²¹ An institution's definition of operational risk may encompass other risk elements as long as the supervisory definition is met.

- g. *Execution, delivery, and process management*: failed transaction processing or process management, from relations with trade counterparties and vendors.
240. Operational risk loss is measured as the financial impact associated with an operational event that is recorded in the institution's financial statements consistent with Generally Accepted Accounting Principles (GAAP). Operational risk losses should include all out-of-pocket expenses associated with an operational event but should not include opportunity costs, foregone revenue, or costs related to investment programs implemented to prevent subsequent operational risk losses.
241. ***Operational risk exposure*** is measured as the estimate of the potential operational losses that the banking institution faces at a soundness standard consistent with a 99.9 percent confidence level over a one-year period.
242. The operational risk exposures generated should reflect the sum of expected losses and unexpected losses unless the banking organization can demonstrate that it has measured and accounted for expected losses. Institutions may take into account the effect of diversification between operational loss event types both across and within business lines. Under the AMA methodology, institutions may incorporate an adjustment to the quantification of operational risk exposure through the recognition of the risk mitigating impact of insurance and other approved risk mitigation instruments and programs. The adjustment is limited to 20% of the overall operational risk exposure result determined by the institution using its loss data, qualitative factors, and quantitative framework.
243. *Data Entry*: Total Operational Risk Exposure: Respondents should report in cell G104 the dollar amount of the consolidated firm-wide operational risk exposure (i.e., the capital charge associated with operational risk).
244. Adjustments to Total Operational Risk Exposure: To provide a transparent means of determining the relative importance of various inputs and assumptions, report the institution's total operational risk exposure without the effects of the three AMA components listed below. The amounts reported should not be cumulative.
245. In cell G111 report the total operational risk exposure without benefit of diversification. In cell G112 report the total operational risk exposure without benefit of an insurance offset. In cell G113 report the operational risk exposure calculated based purely on quantitative methods, where feasible. In cell G114 report the operational risk exposure calculated for credit card fraud. In cell G115 report the operational risk exposure calculated for other retail fraud.

* * *

Appendix A: The AIRB Risk-Weight Formulas and Capital Calculation

246. The first section of this appendix describes how the Excel program uses the data to form the measure of risk-weighted assets. The second section describes how the UL-only measure of risk-weighted assets is combined with a revised calculation of the numerator to form the measured RBC ratio.

Calculation of UL-only risk-weighted assets

247. In the first step of the calculation, the PD drives the asset value correlation (AVC) for the exposure to a value between the upper and lower bounds, which differ by portfolio as shown in Table A-1.²² For example, the upper bound for corporate, bank and sovereign lending was set equal to 0.24, and the lower bound to 0.12. The equation to establish r as a decreasing function of PD (for the corporate, bank and sovereign portfolio) is:

$$r = \left(\left[e^{-z \times PD} \right] \times u \right) + \left(\left[1 - e^{-z \times PD} \right] \times l \right)$$

Where,

e = the base of natural logarithms (i.e., 2.71828),

u = the upper bound on the AVC for low PDs,

l = the lower bound on the AVC for high PDs, and

z = a parameter that determines the shape of the AVC function.

Table A-1

Exposure Type / Table	Worksheet								
	Sov-Bank-Corp	SME Corp	HVCRE	IPRE	HELOCs	Other Mort.	QREs	RBEs	Other Retail
z	50	50	50	50	N/A	N/A	N/A	35	35
u	0.24	0.24	0.30	0.24	0.15	0.15	0.04	0.16	0.16
l	0.12	0.12	0.12	0.12	0.15	0.15	0.04	0.03	0.03

²² Note that some of the risk-weight functions do not have a PD-varying AVC parameter. Specifically, the mortgage risk-weight functions and the credit card function have a constant AVC value. The AVC for the retail mortgage risk-weight equation is currently a flat 15 percent across the entire range of PDs. The AVC parameter is a flat 4 percent for the QRE portfolio.

248. A further adjustment is made to the asset value correlation parameter for SME exposures. The firm size adjustment uses the following specification.

$$r_{SME} = r - .04 \left(1 - \frac{S - 5}{45} \right)$$

where,

r_{SME} = size-adjusted asset value correlation,
 r = the initial AVC, which is itself a function of the PD, and
 S = the measure of borrower size, either sales revenue or assets, measured in millions, where S is capped at \$50 million and has a floor of \$5 million.

249. The maximum reduction in the asset correlation parameter based on this formula is 4 percent, and is reached when the measure of borrower size is \$5 million or less. For all borrower sizes below \$5 million, borrower size should be set equal to \$5 million. The adjustment shrinks to zero as borrower size approaches \$50 million.

250. In the second step, the PD, and the PD-driven value of asset correlation, are combined with the bank-supplied values of LGD, and Maturity (M) to form the required capital per dollar of exposure (labeled K) for an exposure that is not in default.²³ Specifically,

$$K = \left[LGD \times N \left(\frac{N^{-1}(PD) + N^{-1}(q)\sqrt{r}}{\sqrt{1-r}} \right) - (LGD \times PD) \right] \times \left[\frac{1 + [(M - 2.5) \times b]}{1 - [1.5 \times b]} \right]$$

where,

$$b = [.11852 - (.05478 \times \log_e(PD))]^2$$

251. In the third step, this per dollar capital requirement (in percent) is converted into a dollar capital requirement by multiplying by the exposure at default (EAD), which is measured in dollars. That dollar capital requirement is then converted into UL-only risk-weighted assets (RWA), to be used in the denominator of the ratio, by multiplying by 12.5.

$$RWA = K \times EAD \times 12.50$$

²³ Note that M for retail exposures is set at one.

252. This 12.5 multiplicative factor is used to convert the dollar capital requirement (K times EAD) into a measure that is equivalent to the risk-weighted assets concept inherent in the current Accord.

Calculation of the RBC Ratio Under the Current and the AIRB Approaches

a) The Current Accord

253. Since 1988, the RBC ratio has been expressed as the ratio of capital (in the numerator) to the measure of risk-weighted assets (in the denominator). That is:

$$\text{Total RBC ratio}_{1988} = \frac{\text{Tier 1} + \text{Tier 2} + \text{GR}_{<1.25}}{\text{RWA}}$$

where,

Tier 1 = components of Tier 1 capital (reflecting deductions for certain purchased credit card relationships, mortgage servicing assets, and deferred tax assets, when those assets exceed specified thresholds).

Tier 2 = components of Tier 2 capital (excluding general provisions for QIS-4 purposes)

GR_{<1.25} = general reserves that are less than 1.25 percent of risk-weighted assets

RWA = risk-weighted assets

b) The RBC ratio using AIRB

254. The UL-only measure of risk-weighted assets described above does not include any portion of expected losses (EL). EL is measured as:

$$EL = PD \times LGD \times EAD ,$$

which is incorporated into the RBC ratio as an adjustment to the numerator. That is, the program nets EL against a component of capital. Specifically, under the AIRB approach, reserves, such as the ALLL, are removed from the definition of capital and the EL measure is netted against those reserves to form an “excess” or a “shortfall” in the level of reserves.

255. Then, if there were a “shortfall” (i.e., EL exceeds the ALLL) the program deducts that shortfall from the measured amount of the remaining Tier 1 and Tier 2 capital components. Conversely, if there is an “excess”, the program adds that excess to the institution’s Tier 2 capital. Importantly, the calculation limits the size of the addition of a surplus to Tier 2 capital to be no larger than 60 basis points of RWA.

256. Therefore, an institution's measured ratio (assuming it is in a position of "excess reserves") is given by:

$$RBC\ ratio = \frac{T1 + \left(T2 + \min[(R - EL)^+ , .006 \times RWA_{UL}] \right)}{RWA_{UL}}$$

where,

- T1 = Tier 1 capital (as defined above)
- T2 = Tier 2 capital elements (excluding reserves)
- R = Reserves
- EL = Expected losses (calculated as $PD \times LGD \times EAD$), and
- RWA_{UL} = Risk-weighted assets (calculated for UL-only)

257. This equation says that the addition of surplus reserves to the Tier 2 elements of capital in the numerator is constrained to be the smaller of (R-EL), when that number is positive, and 60 basis points of RWA_{UL} .

258. Conversely, if EL exceeds reserves, then the RBC ratio would be calculated as:

$$RBC\ ratio = \frac{[T1 + .5 \times (R - EL)^-] + [T2 + .5 \times (R - EL)^-]}{RWA_{UL}}$$

259. Half of any reserve shortfall is deducted from Tier 1 capital and half is deducted from Tier 2 capital.

Appendix B: Instructions for the “Input” Worksheet

260. This appendix provides instructions for completing the “**Input**” worksheet. Many of these entries will align generally with amounts reported in the institution’s Consolidated Financial Statements for Bank Holding Companies (FR Y-9) report filed with the Federal Reserve. Accordingly, in cases where comparable regulatory figures are available, they are provided (only) for reference purposes.
261. Note: Amounts provided in this worksheet should align, by portfolio, with amounts reported on other worksheets under AIRB and, therefore, should reflect any guarantees and other credit risk mitigants that cause exposures to be reallocated among portfolios under AIRB.
262. QIS-4 participants are expected to allocate all exposures that are subject to credit risk among AIRB portfolios and to apply their best estimates of the risk parameters to any exposures for which specific information is not available. If such exposures are material, discuss the matter with your supervisor.

General Information

263. On line 4, enter the date consistent with the regulatory reports used as the basis for the QIS-4 data. For most institutions, this date should be either June 30, 2004 or September 30, 2004.
264. On line 13, show the volume of total risk weighted assets, as they are measured using the current U.S. risk-based capital standards. This number, which is the denominator of the current risk-based capital ratio, should equal line 62 of schedule HC-R of FR Y-9.

Capital and ALLL Information

265. On line 19, enter the amount of Tier 1 capital reported by the institution. This number should reflect any deductions made for PCCRs, MSAs, etc. that exceed specified thresholds expressed as a percentage of Tier 1 capital. Those limitations are described in the Agencies’ current risk-based capital regulations. Therefore, for commercial banks with holding companies, the measure of Tier 1 included on line 19 of the “**Input**” worksheet should closely approximate line 11 of schedule HC-R of the Y-9.
266. On line 20, enter the amount of Tier 2 capital reported by the institution in its regulatory reports, prior to applying the limitation that Tier 2 capital be no greater than Tier 1 capital. For holding companies, the measure of Tier 2 included on line 20 should closely approximate line 17 of schedule HC-R of the Y-9.

267. On line 21, show the amount of “other additions to (deductions from) Tier 1 capital” that is reported at line 10 of schedule HC-R of the Y-9. A large portion of this item is the Tier 1 deductions associated with equity investments. Under the AIRB approach, the capital requirement on equities is calculated differently, such that this deduction from capital under the current RBC approach will be added back to form the Tier 1 measure used in the AIRB approach.
268. On line 24, respondents should report the amount of deductions from total capital under current U.S. rules. For holding companies, this amount should equal the amount reported on line 20 of schedule HC-R of the Y-9.
269. On line 31, enter the amount of the allowance for loan and lease losses includible in Tier 2 under current rules. This should equal line 14 of HC-R of the Y-9.
270. On line 34, enter the total Allowance for Loan and Lease Losses reported in line 4.c. of schedule HC for the holding company.

Current Accord RWA

271. This portion of the worksheet requests information about the *risk-weighted assets* associated with the institution’s trading and banking activities according to current capital requirements.
272. In line 47, institutions should enter the RWA related to trading book positions whether these positions are treated under the market risk amendment or receive banking book treatment. The amount reported here should exclude counterparty credit risk capital requirements associated with OTC derivatives that are booked in the trading account. These counterparty credit risk charges should be reported in the appropriate AIRB wholesale portfolio worksheet and the corresponding area in “**Current**” worksheet and should also be entered in lines 199 to 217 of this “**Input**” worksheet.

On-Balance Sheet Exposures

273. This portion of the worksheet requests the carrying value of (1) drawn credit exposures in the banking book, (2) trading assets, and (3) “other assets” that are not subject to AIRB calculations
274. On lines 65 to 115, enter asset amounts that are gross of specific provisions and partial charge-offs. On line 99, report accrued interest receivables and “work-in-progress” that have not been included in any of the AIRB wholesale portfolio worksheets. Under the AIRB approach, these assets will be risk weighted at 100 percent.

275. On line 113, report retail margin loans used by customers to purchase readily marketable securities. Do not report these exposures in any of the AIRB worksheets, nor in the “**Current**” worksheet.

276. All corporate lease residuals should be reported in lines 104 to 106. The residual value of leased corporate assets are assigned to the 100 percent risk weight category, which is the treatment of “other assets” for which the PD/LGD framework is not applicable (e.g., fixed assets, mortgage servicing assets, and other intangibles). Note that residuals associated with retail leases should be reported on line 114.

Off-Balance Sheet Exposures

277. This section requests information about the notional amount of off-balance sheet exposures, including those related to undrawn lines of credit and to various forms of financial guarantees and other commitments in which the institution has substituted its own credit standing.

278. Lines 149 to 181 request exposure data for off-balance sheet exposures, by AIRB portfolio.

Counterparty Exposures

279. Lines 199 to 217 request exposure data for repo-style transactions and OTC derivatives. On line 199, enter the institution’s EAD related to repo/securities lending/borrowing for which AIRB data are available for measuring risk. This amount corresponds to exposures reported in section 1.C of the “**Sov-Bank-Corp**” worksheet.

280. On lines 208 to 217, enter the credit equivalent amount of OTC derivatives transactions to sovereign, bank, and corporate, HVCRE, IPRE, and SME counterparties for which AIRB data are available.

Provisioning Data by Portfolio

281. In lines 268 to 279 in columns E through J, institutions should allocate both the Allowance for Loan and Lease Losses (ALLL) and partial charge-offs (including any specific reserves) by selected AIRB portfolios (equity and securitizations require different treatment and are not requested). Changes in the book value of lease residual values should not be included.

Appendix C: Repo-Style Transactions

282. To qualify for this EAD treatment as repo-style or prime brokerage transactions the exposure should be marked-to-market daily and subject to a daily margin maintenance requirement. Further, the repo-style or prime brokerage transaction should be documented under a qualifying master netting agreement that fulfills specific requirements (see the Agencies' August 2003 ANPR).
283. In order to fulfill these standards, transactions executed under U.S. law must meet the definition of a "repurchase agreement" (11 USC §101 (47)) or a "securities contract" (11 USC §741 (7)). Where transactions are executed under non-U.S. law, they must meet similarly robust standards. In either case, an institution must have conducted sufficient legal review to verify all netting criteria are met, have a well-founded legal basis to reach this conclusion, and undertake such further review as necessary to ensure continuing enforceability of the agreements.
284. The calculated EAD, in effect, is an adjusted EAD amount that measures the unsecured loan equivalent exposure amount to the counterparty. Thus, no collateral effects for these transactions would be incorporated through the LGD; rather, the applicable LGD would be the LGD assigned to an unsecured exposure to the counterparty. The PD assigned to the EAD is the PD appropriate to the counterparty. In these transactions, the risk-reducing effect of posted financial collateral will operate through the measured EAD, rather than through the method typical for other corporate exposures of incorporating the risk-reducing effects of collateral into the LGD measure.
285. Where the repo is not subject to a qualifying master netting agreement, no netting effects may be recognized and the EAD is determined as the notional amount of an individual transaction, which would be assigned a PD appropriate to the counterparty. Collateral effects would be reflected through LGD. Firms that do not have the capability of reflecting collateral effects of repo-style transactions subject to qualifying master netting agreements through EAD may reflect collateral effects through LGD. In that case, the LGD must be applied to the notional amount of each individual transaction without taking into account netting effects. Repo-style exposures not subject to a qualifying master netting agreement should be entered in cells AA121 to AF140. Those repo-style exposures that are subject to master netting agreements should be entered in cells AG121 to AO140.

EAD Treatment

286. The estimate of EAD equals the sum of the current exposures to the counterparty under the master netting arrangement and a measure for the PFE to the counterparty. The current exposure should equal the sum of the market values of all securities and cash lent, sold subject to repurchase, or pledged as collateral to the counterparty

under the master netting agreement, less the sum of the market values of all securities and cash lent, sold subject to repurchase, or pledged as collateral by the counterparty. The PFE calculation would be based on the market price volatilities of the securities delivered to, and the securities received from, the counterparty, as well as any foreign exchange rate volatilities associated with any cash or securities delivered or received.

287. Thus, for each counterparty, the following general framework takes into account the impact of master netting agreements:

$$EAD = \max \{0, [(\sum E - \sum C) + PFE]\}$$

Where,

E = the current market value of the exposure

C = the current market value of the collateral received

288. The calculated EAD amount will be assigned a PD and an *unsecured* LGD appropriate to the counterparty to obtain the risk weighted asset amount for the exposure. The calculated EAD amounts would fill the PD/LGD matrix for the PD rows 121 to 140 and the LGD columns AA118 to AO118.

289. Banks may estimate the PFE using one of three methods, listed in order of sophistication: (1) VaR, (2) own estimate haircuts or (3) supervisory haircuts.

290. In all three approaches, the institution must assume a minimum 5-business day holding period for repo-style transactions and a minimum 10-business day holding period for prime brokerage transactions.

VAR Approach

291. Banks may estimate the PFE using a VaR measure. This measure of PFE should estimate the 99th percentile, one-tailed confidence interval for a five-day holding period for repo-style transactions or 10-day holding period for prime brokerage transactions using a minimum one-year historical observation period of price data on the instruments comprising the loan and the collateral. Holding periods should be adjusted upward where appropriate to take into account the illiquidity of an instrument.

292. Under this approach, EAD is determined as:

$$EAD = \max \{0, [(\sum E - \sum C) + (\text{VaR output from internal market risk model})]\}$$

293. No particular model is required for the VaR-based measure, but the model should capture all material risks for these repo-style transactions. In light of the complexity involved in this modeling exercise, for purposes of QIS-4, a “reasonable estimate” will suffice.

Haircut Approaches

294. PFE using haircuts is calculated as follows:²⁴

$$\text{PFE} = \sum \{ (E \times H_e) + (C \times H_c) + (C \times H_{fx}) \}$$

where:

E = current value of exposure

H_e = haircut appropriate for the exposure type, adjusted for minimum holding period

C = current value of collateral

H_c = haircut appropriate for the collateral type, adjusted for minimum holding period

H_{fx} = haircut for currency mismatch, adjusted for minimum holding period

295. *Own estimates for haircuts.* Banks may use their own estimates of market price volatility and foreign exchange volatility to estimate the appropriate haircuts for exposures, collateral and currency mismatch. The haircuts must not take into account the correlations between unsecured exposures, collateral, and foreign exchange. In calculating the haircuts, a 99th percentile one-tailed confidence interval is to be used. Banks should adjust the haircuts upward where appropriate to take into account the illiquidity of an instrument. The haircut estimate must be calculated using a minimum of one-year historical observation period for price data. No particular type of model is prescribed, but the model should capture all the material risks run by the banks.

296. Where an institution calculates its own estimates of volatilities on a T_N day holding period which is different from the specified minimum holding period T_M , the H_M will be calculated using the square root of time formula:

$$H_M = H_N \sqrt{\frac{T_M}{T_N}}$$

297. *Supervisory Haircuts.* The supervisory haircuts in the table below assume daily mark-to-market, daily re-margining and a 10-business day holding period. To

²⁴ In the event that a bank has offsetting positions in identical securities, the bank may net the PFEs.

calculate the PFE under the supervisory haircut approach, banks would apply the appropriate haircut, adjusted for holding period if necessary, to both the original exposure amount and the collateral posted according to the table below. If there is a currency mismatch between the exposure and collateral, the collateral is also adjusted for the mismatch.

Issue rating for debt securities	Residual Maturity	Sovereigns ²⁵	Other issuers
AAA to AA-/A-1	≤ 1 year	0.5	1
	>1 year, ≤ 5 years	2	4
	> 5 years	4	8
A+ to BBB-/A-2/A-3 and unrated bank securities per para 116(d)	≤ 1 year	1	2
	>1 year, ≤ 5 years	3	6
	> 5 years	6	12
BB+ to BB-	All	15	25
Main index equities and gold		15	
Other equities (including convertible bonds) listed on a recognised exchange		25	
UCITS/Mutual funds		Highest haircut applicable to any security in which the fund can invest	
Cash in the same currency ²⁶		0	
FX haircut applicable to cash or security positions denominated in a currency other than the settlement currency		8	

298. The haircuts in the table above can be scaled down to reflect the 5-day minimum holding period set forth for repo-style transactions by using the same square root of time formula set forth above, which in this context would be determined as:

²⁵ The following multilateral development banks may be treated as sovereigns: the World Bank Group, comprised of the International Bank for Reconstruction and Development (IBRD) and the International Finance Corporation (IFC), the Asian Development Bank (ADB), the African Development Bank (AIDB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IADB), the European Investment Bank (EIB), the European Investment Fund (EIF), the Nordic Investment Bank (NIB), the Caribbean Development Bank (CDB), the Islamic Development Bank (IDB), and the Council of Europe Development Bank (CEDB).

²⁶ Eligible cash collateral.

$$H_5 = H_{10} \sqrt{\frac{5}{10}}$$

299. To summarize: All the exposure amounts to the counterparty are added. Then all the collateral amounts posted by the counterparty are added. The difference between those amounts is the current net bilateral exposure to that counterparty. An additional buffer is then added to the current bilateral exposure to account for the possible changes in the values of the exposure and the collateral. That additional buffer can be calculated in one of three ways: (1) VaR measure of the 99th percentile net change in the net bilateral exposure amount over a 5-day holding period (10-day for prime brokerage transactions), (2) own estimates haircuts applied to both original exposure amount and collateral amount, or (3) supervisory haircuts applied to both original exposure amount and collateral amount. To calculate EAD, this buffer measure is added to the currently measured (positive or negative) net bilateral exposure amount (i.e., it is added to $(\Sigma E - \Sigma C)$).

Appendix D: Applying the Supervisory Formula to Securitization Exposures

300. A securitization exposure's capital charge under the SFA equals the amount of the securitization exposure (E) times the greater of (a) $0.0056 \cdot T$ or (b) $(S[L+T] - S[L])$, where the function $S[Y]$, the Supervisory Formula, is given by the following expression:

$$S[Y] = \left\{ \begin{array}{ll} Y & \text{when } Y \leq K_{IRB} \\ K_{IRB} + K[Y] - K[K_{IRB}] + (d \cdot K_{IRB} / \omega)(1 - e^{\omega(K_{IRB} - Y) / K_{IRB}}) & \text{when } K_{IRB} < Y \end{array} \right\}$$

where Y is either L or L+T, and where,

$$\begin{aligned} h &= (1 - K_{IRB} / LGD)^N \\ c &= K_{IRB} / (1 - h) \\ v &= \frac{(LGD - K_{IRB}) K_{IRB} + 0.25 (1 - LGD) K_{IRB}}{N} \\ f &= \left(\frac{v + K_{IRB}^2}{1 - h} - c^2 \right) + \frac{(1 - K_{IRB}) K_{IRB} - v}{(1 - h) \tau} \\ g &= \frac{(1 - c)c}{f} - 1 \\ a &= g \cdot c \\ b &= g \cdot (1 - c) \\ d &= 1 - (1 - h) \cdot (1 - \text{Beta}[K_{IRB}; a, b]) \\ K[Y] &= (1 - h) \cdot ((1 - \text{Beta}[Y; a, b])Y + \text{Beta}[Y; a + 1, b]c). \end{aligned}$$

301. In these expressions, $\text{Beta}[Y; a, b]$ refers to the cumulative beta distribution with parameters a and b evaluated at L and L+T. The supervisory-determined parameters in the above expressions are as follows: $\tau = 1000$, and $\omega = 20$. A separate Excel calculator worksheet entitled "SFA.XLS" can be used to determine capital requirements under the SFA.

302. For securitizations involving retail exposures, the SFA may be implemented by setting the parameters h and v equal to zero.

303. A liquidity facility that meets the definition of “eligible” under current U.S. rules (see the FIN 46 final rule) and that can only be drawn in the event of a general market disruption²⁷ is assigned a 20% CCF under the SFA.²⁸ That is, an institution recognizes 20% of the capital charge generated under the SFA for the facility. It is probable that such an exposure will overlap with other liquidity facilities that will likely result in a higher amount of regulatory capital. In such situations, capital need not be assessed against the general market disruption liquidity facility.
304. If the risk weight resulting from the SFA is 1250%, survey respondents should deduct the securitization exposure subject to that risk weight from Total capital. Deductions associated with non-residential mortgage securitizations and residential mortgage securitizations should be reported in row 90 and 106, respectively.
305. K_{IRB} is the ratio of (a) the AIRB capital requirement including the EL portion for the underlying exposures in the pool to (b) the exposure amount of the pool (e.g., the sum of the drawn amounts related to securitized exposures plus the EAD associated with the undrawn commitments related to the exposures). Quantity (a) above must be calculated in accordance with the applicable minimum AIRB standards as if the exposures in the pool were held directly. This calculation should reflect the effects of any CRM that is applied on the underlying exposures (either individually or to the entire pool, except in the case of loan-level PMI), and hence benefits all of the securitization exposures. K_{IRB} is expressed in decimal form (e.g., a capital charge equal to 15% of the pool would be expressed as 0.15). For structures involving an SPE, all the assets of the SPE that are related to the securitizations should be treated as exposures in the pool, including assets in which the SPE may have invested a reserve account, such as a cash collateral account; however, for QIS-4 purposes, if these additional amounts are immaterial, they can be ignored in the determination of K_{IRB} . These amounts should be taken into account when determining L.
306. In cases where an institution has set aside a specific provision or has a non-refundable purchase price discount on an exposure in the pool, quantities (a) and (b) defined above must be calculated using the gross amount of the exposure without the specific provision and/or non-refundable purchase price discount. In this case, the amount of the non-refundable purchase price discount on a defaulted asset or the specific provision can be used to reduce the amount of any deduction from capital associated with the securitization exposure. Non-refundable purchase price discounts for receivables do not affect either the comparison of EL with the level of reserves or the calculation of risk-weighted assets.

²⁷ A general market disruption is defined as where more than one SPE across different transactions is unable to roll over maturing commercial paper, and that inability is not the result of an impairment in the SPEs’ credit quality or in the credit quality of the underlying exposures.

²⁸ Generally, only Canadian ABCP liquidity facilities include the limitation that they can only be drawn in the event of a general market disruption. However, we have included this provision to be complete and in case such facilities exist in the U.S. market.

307. In many cases, the purchase price of receivables will reflect a discount that provides first loss protection for default losses, dilution losses or both. To the extent a portion of such a purchase price discount will be refunded to the seller, this refundable amount may be treated as first loss protection under the AIRB securitization framework

308. L is measured (in decimal form) as the ratio of (a) the amount of all securitization exposures that are subordinate to the tranche in question to (b) the total amount of exposures in the pool. Institutions must determine L before considering the effects of any tranche-specific credit enhancements, such as third-party guarantees, that benefit only a single tranche. Any gain-on-sale, CEIOs, and/or AIR associated with the securitization are not included in the measurement of L. If there is any reserve account funded by accumulated cash flows from the underlying exposures that is more junior than the tranche in question, this can be included in the calculation of L. Unfunded reserve accounts may not be included if they are to be funded from future receipts from the underlying exposures.

309. T is measured as the ratio of (a) the nominal size of the tranche of interest to (b) the notional amount of exposures in the pool.

310. The effective number of exposures (N) is calculated as follows:

$$N = \frac{(\sum_i EAD_i)^2}{\sum_i EAD_i^2}$$

where EAD_i represents the exposure at default associated with the i^{th} exposure in the pool. Multiple exposures to the same obligor should be consolidated (i.e. treated as a single exposure). In the case of re-securitization (i.e., the securitization of securitization exposures), the formula applies to the number of securitization exposures in the pool and not the number of underlying exposures in the original pools.

311. The exposure-weighted average loss given default (LGD) is calculated as follows:

$$LGD = \frac{\sum_i LGD_i \cdot EAD_i}{\sum_i EAD_i}$$

where LGD_i represents the average LGD associated with all exposures to the i^{th} obligor. In the case of re-securitization, an LGD of 100% should be assumed for the underlying securitized exposures. When default and dilution risks for purchased receivables are treated in an aggregate manner (e.g., a single reserve or over-collateralization is available to cover losses from either source) within a securitization, the LGD input must be constructed as a weighted-average of the LGD for default risk and the 100% LGD for dilution risk. The weights are the stand-alone AIRB capital charges for default risk and dilution risk, respectively.

312. Under the conditions provided below, institutions may use a simplified method for calculating N and LGD. In the simplified calculation, C_m denotes the share of the pool corresponding to the sum of the largest ‘m’ exposures (e.g., a 15% share corresponds to a value of 0.15). The institution should set the level of m for each of its exposures. If the portfolio share associated with the largest exposure, C_1 , is no more than 0.03 (i.e., 3% of the underlying pool), then for purposes of the SFA, the institution may set LGD equal to 0.50 and N equal to the following amount

$$N = \left(C_1 C_m + \left(\frac{C_m - C_1}{m - 1} \right) \max\{1 - m C_1, 0\} \right)^{-1}$$

313. Alternatively, if only C_1 is available and this amount is no more than 0.03, then the institution may set LGD equal to 0.50 and N equal to $1 / C_1$.

* * *