APPENDIX E TO PART 208—CAPITAL ADEQUACY GUIDELINES FOR STATE MEMBER BANKS; MARKET RISK MEASUREMENT

Section 1. Purpose, Applicability, Scope, and Effective Date

(a) Purpose. The purpose of this appendix is to ensure that banks with significant exposure to market risk maintain adequate capital to support that exposure. This appendix supplements and adjusts the risk-based capital ratio calculations under appendix A of this part with respect to those banks.

(b) Applicability. (1) This appendix applies to any insured state member bank whose trading activity on a worldwide consolidated basis equals:
   (i) 10 percent or more of total assets, or
   (ii) $1 billion or more.

(2) The Federal Reserve may additionally apply this appendix to any insured state member bank if the Federal Reserve deems it necessary or appropriate for safe and sound banking practices.

(c) Scope. The capital requirements of this appendix support market risk associated with a bank’s covered positions.

(d) Effective date. This appendix is effective as of January 1, 1997.

This appendix is based on a framework developed jointly by supervisory authorities from the countries represented on the Basle Committee on Banking Supervision and endorsed by the Group of Ten Central Bank Governors. The framework is described in a Basle Committee paper entitled “Amendment to the Capital Accord to Incorporate Market Risks,” January 1996. Also see modifications issued in September 1997.

For purposes of this appendix, the following definitions apply:

(a) Covered positions mean all positions in a bank’s trading account, and all foreign exchange and commodity positions, whether or not in the trading account. Positions include on-balance-sheet assets and liabilities and off-balance-sheet items. Securities subject to repurchase and lending agreements are included as if they are still owned by the lender. Covered positions exclude all positions in a bank’s trading account that, in form or in substance, act as liquidity facilities that provide liquidity support to asset-backed commercial paper. Such excluded positions are subject to the risk-based capital requirements set forth in appendix A of this part.

(b) Market risk means the risk of loss resulting from movements in market prices. Market risk consists of general market risk and specific risk components.

(1) General market risk means changes in the market value of covered positions resulting from broad market movements, such as changes in the general level of interest rates, equity prices, foreign exchange rates, or commodity prices.

(2) Specific risk means changes in the market value of specific positions due to factors other than broad market movements and includes event and default risk as well as idiosyncratic variations.

(c) Tier 1 and Tier 2 capital are defined in appendix A of this part.

(d) Tier 3 capital is subordinated debt that is unsecured; is fully paid up; has an original maturity of at least two years; is not redeemable before maturity without prior approval by the Federal Reserve; includes a lock-in clause precluding payment of either interest or principal (even at maturity) if the payment would cause the issuing bank’s risk-based capital ratio to fall or remain below the minimum required under appendix A of this part; and does not contain and is not covered by any covenants, terms, or restrictions that are inconsistent with safe and sound banking practices.

(e) Value-at-risk (VAR) means the estimate of the maximum amount that the value of covered positions could decline during a fixed holding period within a stated confidence level, measured in accordance with section 4 of this appendix.

2 Trading activity means the gross sum of trading assets and liabilities as reported in the bank’s most recent quarterly Consolidated Report of Condition and Income (Call Report).

3 Tier 1 capital excludes structural positions in foreign currencies from its covered positions.

4 A bank that voluntarily complies with the final rule prior to January 1, 1998, must comply with all of its provisions.

5 Subject to supervisory review, a bank may exclude structural positions in foreign currencies from its covered positions.
Section 3. Adjustments to the Risk-Based Capital Ratio Calculations

(a) Risk-based capital ratio denominator. A bank subject to this appendix shall calculate its risk-based capital ratio denominator as follows:

(i) Adjusted risk-weighted assets. Calculate adjusted risk-weighted assets, which equals risk-weighted assets (as determined in accordance with appendix A of this part) excluding the risk-weighted amounts of all covered positions (except foreign-exchange positions outside the trading account and over-the-counter derivative positions)\(^7\) and receivables arising from the posting of cash collateral that is associated with securities borrowing transactions to the extent the receivables are collateralized by the market value of the borrowed securities, provided that the following conditions are met:

- (i) The transaction is based on securities includable in the trading book that are liquid and readily marketable,
- (ii) The transaction is marked to market daily,
- (iii) The transaction is subject to daily margin maintenance requirements, and
- (iv)(A) The transaction is a securities contract for the purposes of section 555 of the Bankruptcy Code (11 U.S.C. 555), a qualified financial contract for the purposes of section 11(e)(8) of the Federal Deposit Insurance Act (12 U.S.C. 1821(e)(8)), or a netting contract between or among financial institutions for the purposes of sections 401–407 of the Federal Deposit Insurance Corporation Improvement Act of 1991 (12 U.S.C. 4401–4407), or the Board's Regulation EE (12 CFR Part 231); or
- (B) If the transaction does not meet the criteria set forth in paragraph (iv)(A) of this section, then either:
  - (i) The bank has conducted sufficient legal review to reach a well-founded conclusion that:
    - (i) The securities borrowing agreement executed in connection with the transaction provides the bank the right to accelerate, terminate, and close-out on a net basis all transactions under the agreement and to liquidate or set off collateral promptly upon an event of counterparty default; and
    - (ii) Under applicable law of the relevant jurisdiction, its rights under the agreement are legal, valid, binding, and enforceable and any exercise of rights under the agreement will not be stayed or avoided; or

\(^7\) Foreign-exchange positions outside the trading account and all over-the-counter derivative positions, whether or not in the trading account, must be included in adjusted risk-weighted assets as determined in appendix A of this part.

(ii) Risk-based capital ratio numerator. A bank subject to this appendix shall calculate its risk-based capital ratio numerator by allocating capital as follows:

(i) VAR-based capital charge. The VAR-based capital charge equals the higher of:

- (A) The previous day’s VAR measure; or
- (B) The average of the daily VAR measures for each of the preceding 60 business days multiplied by three, except as provided in section 4(e) of this appendix;

(ii) Specific risk add-on. The specific risk add-on is calculated in accordance with section 5 of this appendix; and

(iii) Capital charge for de minimis exposure. The capital charge for de minimis exposure is calculated in accordance with section 4(a) of this appendix.

(b) Market risk equivalent assets. Calculate market risk equivalent assets by multiplying the measure for market risk (as calculated in paragraph (a)(2) of this section) by 12.5.

(c) Denominator calculation. Add market risk equivalent assets (as calculated in paragraph (a)(3) of this section) to adjusted risk-weighted assets (as calculated in paragraph (a)(1) of this section). The resulting sum is the bank’s risk-based capital ratio denominator.

(d) Risk-based capital ratio numerator. A bank subject to this appendix shall calculate its risk-based capital ratio numerator by allocating capital as follows:

(1) Credit risk allocation. Allocate Tier 1 and Tier 2 capital equal to 8.0 percent of adjusted risk-weighted assets (as calculated in paragraph (a)(1) of this section).\(^8\)

(2) Market risk allocation. Allocate Tier 1, Tier 2, and Tier 3 capital equal to the measure for market risk as calculated in paragraph (a)(2) of this section. The sum of Tier 2 and Tier 3 capital allocated for market risk must not exceed 250 percent of Tier 1 capital allocated for market risk. (This requirement means that Tier 1 capital allocated in this

\(^8\) A bank may not allocate Tier 3 capital to support credit risk (as calculated under appendix A of this part).
Federal Reserve System

paragraph (b)(2) must equal at least 28.6 percent of the measure for market risk.)

(3) Restrictions. (i) The sum of Tier 2 capital (both allocated and excess) and Tier 3 capital (allocated in paragraph (b)(2) of this section) may not exceed 100 percent of Tier 1 capital (both allocated and excess). 9

(ii) Term subordinated debt (and intermediate-term preferred stock and related surplus) included in Tier 2 capital (both allocated and excess) may not exceed 50 percent of Tier 1 capital (both allocated and excess).

(4) Numerator calculation. Add Tier 1 capital (both allocated and excess), Tier 2 capital (both allocated and excess), and Tier 3 capital (allocated under paragraph (b)(2) of this section). The resulting sum is the bank’s risk-based capital ratio numerator.

Section 4. Internal Models.

(a) General. For risk-based capital purposes, a bank subject to this appendix must use its internal model to measure its daily VAR, in accordance with the requirements of this section. 10 The Federal Reserve may permit a bank to use alternative techniques to measure the market risk of de minimis exposures so long as the techniques adequately measure associated market risk.

(b) Qualitative requirements. A bank subject to this appendix must have a risk management system that meets the following minimum qualitative requirements:

(1) The bank must have a risk control unit that reports directly to senior management and is independent from business trading units.

(2) The bank’s internal risk measurement model must be integrated into the daily management process.

(3) The bank’s policies and procedures must identify, and the bank must conduct, appropriate stress tests and backtests. 11 The bank’s policies and procedures must identify the procedures to follow in response to the results of such tests.

(4) The bank must conduct independent reviews of its risk measurement and risk management systems at least annually.

(c) Market risk factors. The bank’s internal model must use risk factors sufficient to measure the market risk inherent in all covered positions. The risk factors must address interest rate risk, equity price risk, foreign exchange rate risk, and commodity price risk.

(d) Quantitative requirements. For regulatory capital purposes, VAR measures must meet the following quantitative requirements:

(1) The VAR measures must be calculated on a daily basis using a 99 percent, one-tailed confidence level with a price shock equivalent to a ten-business day movement in rates and prices. In order to calculate VAR measures based on a ten-day price shock, the bank may either calculate ten-day figures directly or convert VAR figures based on holding periods other than ten days to the equivalent of a ten-day holding period (for instance, by multiplying a one-day VAR measure by the square root of ten).

(2) The VAR measures must be based on an historical observation period (or effective observation period for a bank using a weighting scheme or other similar method) of at least one year. The bank must update data sets at least once every three months or more frequently as market conditions warrant.

(3) The VAR measures must include the risks arising from the non-linear price characteristics of options positions and the sensitivity of the market value of the positions to changes in the volatility of the underlying rates or prices. A bank with a large or complex options portfolio must measure the volatility of options positions by different maturities.

(4) The VAR measures may incorporate empirical correlations within and across risk categories, provided that the bank’s process for measuring correlations is sound. In the

9 Excess Tier 1 capital means Tier 1 capital that has not been allocated in paragraphs (b)(1) and (b)(2) of this section. Excess Tier 2 capital means Tier 2 capital that has not been allocated in paragraph (b)(1) and (b)(2) of this section, subject to the restrictions in paragraph (b)(3) of this section.

10 A bank’s internal model may use any generally accepted measurement techniques, such as variance-covariance models, historical simulations, or Monte Carlo simulations. However, the level of sophistication and accuracy of a bank’s internal model must be commensurate with the nature and size of its covered positions. A bank that modifies its existing modeling procedures to comply with the requirements of this appendix for risk-based capital purposes should, nonetheless, continue to use the internal model it considers most appropriate in evaluating risks for other purposes.

11 Stress tests provide information about the impact of adverse market events on a bank’s covered positions. Backtests provide information about the accuracy of an internal model by comparing a bank’s daily VAR measures to its corresponding daily trading profits and losses.

12 For material exposures in the major currencies and markets, modeling techniques must capture spread risk and must incorporate enough segments of the yield curve—at least six—to capture differences in volatility and less than perfect correlation of rates along the yield curve.
event that the VAR measures do not incor-
porate empirical correlations across risk
categories, then the bank must add the sepa-
rate VAR measures for the four major risk
categories to determine its aggregate VAR
measure.

(e) Backtesting. (1) Beginning one year after
a bank starts to comply with this appendix,
a bank must conduct backtesting by com-
paring each of its most recent 250 business
days' actual net trading profit or loss13 with
the corresponding daily VAR measures gen-
erated for internal risk measurement pur-
poses and calibrated to a one-day holding pe-
riod and a 99 percent, one-tailed confidence
level.

(2) Once each quarter, the bank must iden-
tify the number of exceptions, that is, the
number of business days for which the mag-
nitude of the actual daily net trading loss, if
any, exceeds the corresponding daily VAR
measure.

(3) A bank must use the multiplication fac-
tor indicated in Table 1 of this appendix in
determining its capital charge for market
risk under section 3(a)(2)(I)(B) of this appen-
dix until it obtains the next quarter’s backtesting results, unless the Federal Re-
serve determines that a different adjustment
or other action is appropriate.

### Table 1—Multiplication Factor Based on
Results of Backtesting

<table>
<thead>
<tr>
<th>Number of exceptions</th>
<th>Multiplication factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or fewer</td>
<td>3.00</td>
</tr>
<tr>
<td>5</td>
<td>3.40</td>
</tr>
<tr>
<td>6</td>
<td>3.50</td>
</tr>
<tr>
<td>7</td>
<td>3.65</td>
</tr>
<tr>
<td>8</td>
<td>3.75</td>
</tr>
<tr>
<td>9</td>
<td>3.85</td>
</tr>
<tr>
<td>10 or more</td>
<td>4.00</td>
</tr>
</tbody>
</table>

Section 5. Specific Risk

(a) Modeled specific risk. A bank may use its
internal model to measure specific risk. If
the bank has demonstrated to the Federal
Reserve that its internal model measures the
specific risk, including event and default
risk as well as idiosyncratic variation, of
covered debt and equity positions and in-
cludes the specific risk measures in the
VAR-based capital charge in section 3(a)(2)(I)
of this appendix, then the bank has no spe-
cific risk add-on for purposes of section
3(a)(2)(II) of this appendix. The model should
explain the historical price variation in the
trading portfolio and capture concentration,
both magnitude and changes in composition.

The model should also be robust to an ad-
verse environment and have been validated
through backtesting which assesses whether
specific risk is being accurately captured.

(b) Partially modeled specific risk. (1) A bank
that incorporates specific risk in its internal
model but fails to demonstrate to the Fed-
eral Reserve that its internal model ade-
quately measures all aspects of specific risk
for covered debt and equity positions, includ-
ing event and default risk, as provided by
section 5(a), of this appendix must calculate
its specific risk add-on in accordance with
one of the following methods:

(i) If the model is susceptible to valid sepa-
bation of the VAR measure into a specific
risk portion and a general market risk por-
tion, then the specific risk add-on is equal to
the previous day’s specific risk portion.

(ii) If the model does not separate the VAR
measure into a specific risk portion and a
general market risk portion, then the spe-
cific risk add-on is the sum of the previous
day’s VAR measures for subportfolios of cov-
ered debt and equity positions that contain
specific risk.

(2) If a bank models the specific risk of
covered debt positions but not covered eq-
ity positions (or vice versa), then the bank
may determine its specific risk charge for
the included positions under section 5(a) or
5(b)(I) of this appendix, as appropriate. The
specific risk charge for the positions not in-
cluded equals the standard specific risk cap-
tal charge under paragraph (c) of this sec-
tion.

(c) Specific risk not modeled. If a bank does
not model specific risk in accordance with
section 5(a) or 5(b) of this appendix, then the
bank’s specific risk capital charge shall
equal the standard specific risk capital
charge, calculated as follows:

(1) Covered debt positions. (i) For purposes
of this section 5, covered debt positions means
fixed-rate or floating-rate debt instruments
located in the trading account and instru-
ments located in the trading account with
values that react primarily to changes in in-
terest rates, including certain non-convert-
ible preferred stock, convertible bonds, and
instruments subject to repurchase and lend-
ing agreements. Also included are deriv-
atives (including written and purchased op-
tions) for which the underlying instrument
is a covered debt instrument that is subject
to a non-zero specific risk capital charge.

(A) For covered debt positions that are de-
rivatives, a bank must risk-weight (as de-
scribed in paragraph (c)(i)(ii) of this sec-
tion) the market value of the effective no-
tional amount of the underlying debt instru-
ment or index portfolio. Swaps must be in-
cluded as the notional position in the under-
lying debt instrument or index portfolio,
with a receiving side treated as a long posi-
tion and a paying side treated as a short po-

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13Actual net trading profits and losses typically include such things as realized and
unrealized gains and losses on portfolio posi-
tions as well as fee income and commissions
associated with trading activities.
(B) For covered debt positions that are options, whether long or short, a bank must risk-weight (as described in paragraph (c)(1)(i) of this section) the market value of the underlying debt instrument or index multiplied by the option’s delta.

(ii) A bank may net long and short covered debt positions (including derivatives) in identical debt issues or indices.

(iii) A bank must multiply the absolute value of the current market value of each net long or short covered debt position by the appropriate specific risk weighting factor indicated in Table 2 of this appendix. The specific risk capital charge component for covered debt positions is the sum of the weighted values.

**TABLE 2—SPECIFIC RISK WEIGHTING FACTORS FOR COVERED DEBT POSITIONS**

<table>
<thead>
<tr>
<th>Category</th>
<th>Remaining maturity (contractual)</th>
<th>Weighing factor (in percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>N/A</td>
<td>0.00</td>
</tr>
<tr>
<td>Qualifying</td>
<td>6 months or less</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>Over 6 months to 24 months</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Over 24 months</td>
<td>1.60</td>
</tr>
<tr>
<td>Other</td>
<td>N/A</td>
<td>8.00</td>
</tr>
</tbody>
</table>

(A) The government category includes all debt instruments of central governments of OECD-based countries, including bonds, Treasury bills, and other short-term instruments, as well as local currency instruments of non-OECD central governments to the extent that the bank has liabilities booked in that currency.

(B) The qualifying category includes debt instruments of U.S. government-sponsored agencies, general obligation debt instruments issued by states and other political subdivisions of OECD-based countries, multi-lateral development banks, and debt instruments issued by U.S. depository institutions or OECD-banks that do not qualify as capital of the issuing institution. This category also includes other debt instruments, including corporate debt and revenue instruments issued by states and other political subdivisions of OECD countries, that are:

(i) Rated investment-grade by one nationally recognized credit rating agency; or

(ii) A bank may net long and short covered debt positions (including derivatives) in identical debt issues or indices.

(iii)(A) A bank must multiply the absolute value of the current market value of each net long or short covered debt position by the appropriate specific risk weighting factor indicated in Table 2 of this appendix. The specific risk capital charge component for covered debt positions is the sum of the weighted values.

(B) For covered equity positions that are options, whether long or short, a bank must risk-weight (as described in paragraph (c)(2)(i) of this section) the market value of the effective notional amount of the underlying equity instrument or equity portfolio multiplied by the option’s delta.

(ii) A bank may net long and short covered equity positions (including derivatives) in identical equity issues or equity indices in the same market.

(iii)(A) A bank must multiply the absolute value of the current market value of each net long or short covered equity position by the risk weighting factor of 8.0 percent, or by 4.0 percent if the equity is held in a portfolio that is both liquid and well-diversified.

14 Organization for Economic Cooperation and Development (OECD)-based countries is defined in appendix A of this part.

15 U.S. government-sponsored agencies, multi-lateral development banks, and OECD banks are defined in appendix A of this part.

16 A bank may also net positions in depository receipts against an opposite position in the underlying equity or identical equity in different markets, provided that the bank includes the costs of conversion.

17 A portfolio is liquid and well-diversified if: (1) It is characterized by a limited sensitivity to price changes of any single equity issue or closely related group of equity issues held in the portfolio; (2) the volatility of the portfolio’s value is not dominated by the volatility of any individual equity issue or by equity issues from any single industry or economic sector; (3) it contains a large number of individual equity positions, with no single position representing a substantial
covered equity positions that are index contracts comprising a well-diversified portfolio of equity instruments, the net long or short position is multiplied by a risk weighting factor of 2.0 percent.

(B) For covered equity positions from the following futures-related arbitrage strategies, a bank may apply a 2.0 percent risk weighting factor to one side (long or short) of each position with the opposite side exempt from charge, subject to review by the Federal Reserve:

(i) Long and short positions in exactly the same index at different dates or in different market centers; or

(ii) Long and short positions in index contracts at the same date in different but similar indices.

(C) For futures contracts on broadly-based indices that are matched by offsetting positions in a basket of stocks comprising the index, a bank may apply a 2.0 percent risk weighting factor to the futures and stock basket positions (long and short), provided that such trades are deliberately entered into and separately controlled, and that the basket of stocks comprises at least 90 percent of the capitalization of the index.

(iv) The specific risk capital charge component for covered equity positions is the sum of the weighted values.


APPENDIX F TO PART 208—CAPITAL ADEQUACY GUIDELINES FOR BANKS: INTERNAL-RATINGS-BASED AND ADVANCED MEASUREMENT APPROACHES

Part I General Provisions

Section 1 Purpose, Applicability, Reservation of Authority, and Principle of Conservatism

Section 2 Definitions

Section 3 Minimum Risk-Based Capital Requirements

Part II Qualifying Capital

Section 11 Additional Deductions Not Required

Section 12 Deductions and Limitations

Part III Qualification

Section 21 Qualification Process

Section 22 Qualification Requirements

Section 23 Ongoing Qualification

Section 24 Merger and Acquisition Transitional Arrangements

A portion of the portfolio’s total market value; and (4) It consists mainly of issues traded on organized exchanges or in well-established over-the-counter markets.