APPENDIX 13C: Primary Regulators of Depository Institutions

Legend

FDIC	Federal Deposit Insurance Corporation	NCUA	National Credit Union Administration
FTC	Federal Trade Commission	OCC	Office of the Comptroller of the Currency
Federal Reserve	Board of Governors of the Federal Reserve System/Federal Reserve Banks		

A.	National banks	Federal Reserve, FDIC, OCC
B.	State member banks	State authority, Federal Reserve, FDIC
C.	State nonmember banks insured	State authority, Federal Reserve, FDIC
D.	Noninsured state banks	State authority, Federal Reserve, FTC
E.	Insured savings institutions, federal*	Federal Reserve, FDIC, OCC
	Insured savings institutions, state†	State authority, Federal Reserve, FDIC
F.	Uninsured savings institutions, state	State authority, Federal Reserve, FTC
G.	Credit unions, federal	NCUA, Federal Reserve, state authority
	Credit unions, state	State authority, NCUA, Federal Reserve, FTC
H.	Bank holding companies	Federal Reserve, state authority, FTC
I.	Savings institution holding companies	State authority, Federal Reserve, FTC, OCC
J.	Foreign branches of U.S. banks, national and state members	Federal Reserve, state authority, OCC
	Foreign branches of U.S. banks, insured state nonmembers	State authority, FDIC
K.	Edge Act corporations	Federal Reserve
	Agreement corporations	State authority, Federal Reserve
L.	U.S. branches and agencies of foreign banks, federal	OCC, Federal Reserve, FDIC, FTC, state authority
	U.S. branches and agencies of foreign banks, state	State authority, Federal Reserve, FDIC, OCC, FTC

The appendix provides an overview of primary regulators of depository institutions as of December 2013. It is not intended to cover each area of regulatory responsibility in detail. Further, the appendix and accompanying footnotes should not be considered either a substitute for or an interpretation of the regulations. Regulatory agencies should be consulted for answers to specific questions.

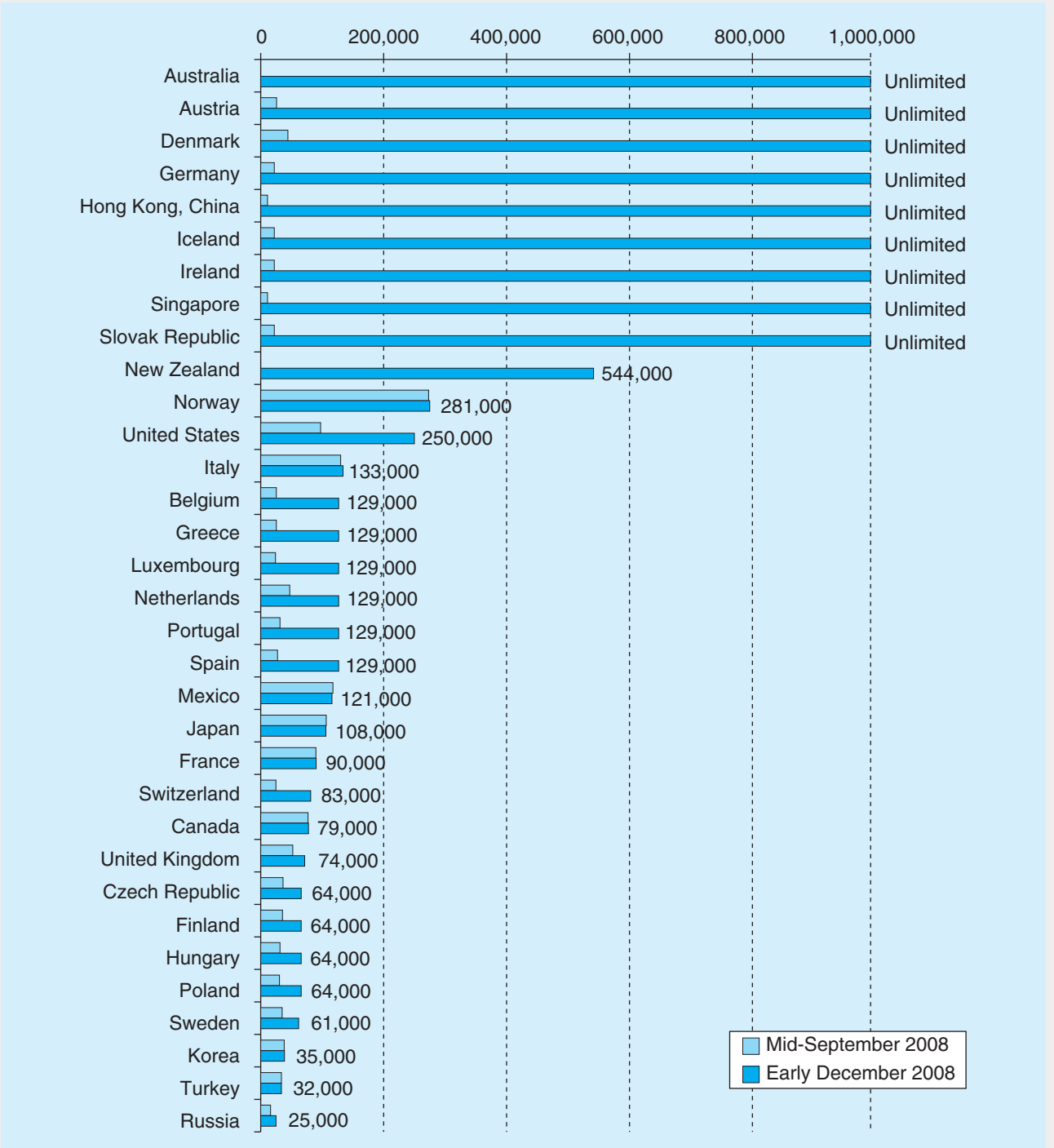
*Federal savings institutions include any thrift institution, such as federal savings banks, federally chartered under Section 5 of the Home Owners' Act.

†State savings institutions include any state-chartered savings bank, savings association, building and loan association, homestead association, or cooperative bank.

Source: Public Information Department, Federal Reserve Bank of New York, 33 Liberty Street, New York, NY 10045. **www.federalairserve.gov**

APPENDIX 13D: Deposit Insurance Coverage for Commercial Banks in Various Countries

Figure 13–6 U. S. Dollar Equivalents, at Current Exchange Rates, as of mid-September and Early December 2008



Source: "Financial Crisis: Deposit Insurance and Financial Safety Net Aspects." Organization for Economic Cooperation and Development, working paper, December 2008. www.oecd.org

APPENDIX 13E: Calculating Risk-Based Capital Ratios

Since the passage of the Federal Deposit Insurance Corporation Improvement Act (FDICIA) in 1991, a DI's capital adequacy is assessed according to where its capital ratios place in one of the five target zones listed in Table 13–4. Under Basel III, the capital ratios used include:

(i) Common equity Tier I risk-based capital ratio = Common equity Tier I capital/Credit risk–adjusted assets,
(ii) Tier I risk-based capital ratio = Tier I capital (Common equity Tier I capital + Additional Tier I capital)/Credit risk–adjusted assets,
(iii) Total risk-based capital ratio = Total capital (Tier I + Tier II)/Credit risk–adjusted assets, and
(iv) Tier I leverage ratio = Tier I capital/total Exposure

Capital

In the measurement of a depository institution's capital adequacy, its capital is the standard by which each of these risks is measured. Under Basel III, a DI's capital is divided into common equity Tier I (CET1), additional Tier I, and Tier II. CET1 is the primary or core capital of the DI; Tier I capital is the primary capital of the DI plus additional capital elements; and Tier II capital is supplementary capital. The total capital that the DI holds is defined as the sum of Tier I and Tier II capital. The definitions of CET1, additional Tier I capital, and Tier II supplementary capital are listed in Table 13–16.

Common Equity Tier I Capital. Common equity Tier I capital is closely linked to a DI's book value of equity, reflecting the concept of the core capital contribution of a DI's

TABLE 13–16 Summary Definitions of Qualifying Capital for Depository Institutions

Common Equity Tier I Capital (CET1)

- Common shares issued by the bank and stock surplus that meet the criteria for classification as common shares for regulatory purposes;
- Retained earnings;
- Accumulated other comprehensive income and other disclosed reserves;*
- Common shares issued by consolidated subsidiaries of the bank and held by third parties (i.e., minority interest) that meet the criteria for inclusion in common equity Tier I capital;
- Less goodwill;
- Regulatory adjustments applied in the calculation of common equity Tier I.

Additional Tier I Capital

- Instruments with no maturity dates or incentives to redeem (callable by the issuer after 5 years only if replaced with "better" capital);
- Noncumulative perpetual preferred stock and related surplus;
- Tier I minority interest, not included in the banking organization's common equity Tier I capital;
- Instruments that currently qualify as Tier I capital under the agencies' general risk-based capital rules and that were issued under the Small Business Job's Act of 2010, or, prior to October 4, 2010, under the Emergency Economic Stabilization Act of 2008;
- Regulatory adjustments applied in the calculation of additional Tier I capital.

Tier II Capital

- Instruments subordinated to depositors and general creditors of the bank;
- Subordinated debt and preferred stock;
- Total capital minority interest, not included in the banking organization's Tier I capital;
- Allowance for loan and lease losses not exceeding 1.25 percent of the banking organization's total risk-weighted assets;
- Instruments that currently qualify as Tier II capital under the agencies' general risk-based capital rules and that were issued under the Small Business Job's Act of 2010, or, prior to October 4, 2010, under the Emergency Economic Stabilization Act of 2008;
- Regulatory adjustments applied in the calculation of Tier II capital.

* For example, unrealized gains on available-for-sale (AFS) equity securities, losses related to defined benefit pension obligations.

owners.[16] CET1 capital consists of the equity funds available to absorb losses. Basically, it includes the book value of common equity plus minority equity interests held by the DI in subsidiaries minus goodwill. Goodwill is an accounting item that reflects the amount a DI pays above market value when it purchases or acquires other DIs or subsidiaries.

Tier I Capital. Tier I capital is the sum of CET1 capital and additional Tier I capital. Included in additional Tier I capital are other options available to absorb losses of the bank beyond common equity. These consist of instruments with no maturity dates or incentives to redeem, for example, noncumulative perpetual preferred stock. These instruments may be callable by the issuer after 5 years only if they are replaced with "better" capital.

Tier II Capital. Tier II capital is a broad array of secondary "equity-like" capital resources. It includes a DI's loan loss reserves plus various convertible and subordinated debt instruments with maximum caps.

We first look at how this capital is used as a cushion against credit risk using the Bank for International Settlements (BIS) Standardized Approach described in Basel III.

Credit Risk–Adjusted Assets

Under Basel III capital adequacy rules, risk-adjusted assets represent the denominator of the risk-based capital ratios. Two components make up credit risk–adjusted assets: (1) credit risk–adjusted on-balance-sheet assets, and (2) credit risk–adjusted off-balance-sheet assets.

Calculating Risk-Based Capital Ratios

Credit Risk–Adjusted On-Balance-Sheet Assets under Basel III. A major criticism of the original Basel Agreement was that individual risk weights depended on the broad categories of borrowers (i.e., sovereigns, banks, or corporates). For example, under Basel I, all sovereign loans had a risk weight of 100 percent regardless of the borrowing country's credit risk. The Basel II and III Standardized Approach aligns regulatory capital requirements more closely with the key elements of DIs' risk by introducing a wider differentiation of credit risk weights. The Standardized Approach of Basel III includes a greater number of exposure categories for purposes of calculating total risk-weighted assets than Basel II, provides for greater recognition of financial collateral, and permits a wider range of eligible guarantors. Accordingly, compared with Basel I and II, the Standardized Approach of Basel III should produce capital ratios more in line with the actual economic risks that DIs are facing.

Under the Basel III risk-based capital plan, each DI assigns its assets to one of several categories of credit risk exposure. Table 13–17 lists the key categories and assets in these categories. The main features are that cash assets; cash, U.S. T-bills, notes, and bonds of all maturities; and GNMA (Ginnie Mae) mortgage-backed securities (mortgage securitization packages backed by a government agency) are all zero risk based. In the 20 percent class are U.S. agency–backed securities, municipal issued general obligation bonds, FHLMC and FNMA mortgage-backed securities, and interbank deposits.[17] In the 50 percent class are multifamily mortgage loans and other municipal (revenue) bonds. Most other on-balance-sheet assets, such as commercial loans, consumer loans, premises, and other assets, are in the 100 percent risk category.

Residential 1- to 4-family mortgages are separated into two risk categories (category 1 residential mortgage exposures and category 2 residential mortgage exposures). Category 1 residential mortgages include traditional, first-lien, prudently underwritten mortgage

16. However, loan loss reserves are assigned to Tier II capital because they often reflect losses that have already occurred rather than losses or insolvency risks that may occur in the future.

17. The Federal Home Loan Mortgage Corporation (FHLMC) and the Federal National Mortgage Association (FNMA) are government-managed mortgage securitization agencies. (See Chapter 7 for more details on these agencies.)

TABLE 13–17 Summary of the Risk-Based Capital Standards for On-Balance-Sheet Items under Basel III

Category 1 (0% weight)
Cash; Gold bullion; Federal Reserve Bank balances; Direct and unconditional claims on the U.S. government, its central bank, or a U.S. government agency; Exposures unconditionally guaranteed by the U.S. government, its central bank, or a U.S. government agency; Claims on certain supranational entities (such as the International Monetary Fund) and certain multilateral development banking organizations; Claims on and exposures unconditionally guaranteed by sovereign entities that meet certain criteria (as discussed below).

Category 2 (20% weight)
Cash items in the process of collection; Exposures conditionally guaranteed by the U.S. government, its central bank, or a U.S. government agency; Claims on government sponsored entities (GSEs); Claims on U.S. depository institutions and NCUA-insured credit unions; General obligation claims on and claims guaranteed by the full faith and credit of state and local governments (and any other public sector entity, as defined in the proposal) in the United States; Claims on and exposures guaranteed by foreign banks and public sector entities if the sovereign of incorporation of the foreign bank or public sector entity meets certain criteria (as described below).

Category 3 (35% weight)
1- to 4-family residential mortgages (as described below).

Category 4 (50% weight)
"Statutory" multifamily mortgage loans meeting certain criteria; Presold residential construction loans meeting certain criteria; Revenue bonds issued by state and local governments in the United States; Claims on and exposures guaranteed by sovereign entities, foreign banks, and foreign public sector entities that meet certain criteria (as described below); 1- to 4-family residential mortgages (as described below).

Category 5 (75% weight)
1- to 4-family residential mortgages (as described below).

Category 6 (100% weight)
Commercial loans; consumer loans; Claims on and exposures guaranteed by sovereign entities, foreign banks, and foreign public sector entities that meet certain criteria (as described below); All other on-balance-sheet assets not listed above, including real assets, premises, fixed assets, and other real estate owned; 1- to 4-family residential mortgages (as described below).

Category 7 (150% weight)
Loans and other exposures that are 90 days or more past due; High volatility commercial real estate loans; 1- to 4-family residential mortgages (as described below).

Category 8 (200% weight)
1- to 4-family residential mortgages (as described below).

Category 9 (1250% weight)
Securitization exposures.

Risk Weights for Equities

Most publicly traded equity exposures: 300%
Equity exposures that are not publicly traded: 400%
Equity exposures in investment funds: 600%

Risk Weights for 1- to 4-Family Residential Mortgages

Loan-to-Value Ratio	Risk Weight for Category 1 Mortgages	Risk Weight for Category 2 Mortgages
≤ 60%	35%	100%
> 60% and ≤ 80%	50%	100%
> 80% and ≤ 90%	75%	150%
> 90%	100%	200%

continued

TABLE 13–17 Summary of the Risk-Based Capital Standards for On-Balance-Sheet Items under Basel III *continued*

Risk Weights for Sovereign Exposures		
		Risk Weight
Sovereign CRC	0–1	0%
	2	20%
	3	50%
	4–6	100%
	7	150%
No CRC		100%
Sovereign default		150%

Risk Weights for Foreign Banks		
		Risk Weight
Sovereign CRC	0–1	0%
	2	20%
	3	50%
	4–7	150%
No CRC		100%
Sovereign default		150%

Source: "Regulatory Capital Rules: Standardized Approach for Risk-Weighted Assets; Market Discipline and Disclosure Requirements," Office of the Comptroller of the Currency, Treasury; Board of Governors of the Federal Reserve System; and the Federal Deposit Insurance Corporation, June 2012. www.occ.gov; www.federalreserve.gov; www.fdic.gov

loans. Category 2 residential mortgages include junior liens and nontraditional mortgage products. The risk weight assigned to the residential mortgage exposure then depends on the mortgage's loan-to-value ratio (as listed in Table 13–17). For example, category 1 mortgages with a loan-to-value ratio of less than 60 percent have a risk weight of 35 percent; category 2 mortgages with a loan-to-value ratio of greater than 90 percent have a risk weight of 200 percent. Mortgages more than 90 days past due are assigned a risk weight of 150 percent. Risk weights for sovereign exposures are determined using OECD (Organization for Economic Cooperation and Development) country risk classifications (CRCs).[18] A sovereign is a central government (including the U.S. government) or an agency, department, ministry, or central bank of a central government. The OECD's CRCs assess a country's credit risk using two basic components: the country risk assessment model (CRAM)—an econometric model that produces a quantitative assessment of country credit risk—and the qualitative assessment of the CRAM results—which integrates political risk and other risk factors not fully captured by the CRAM. The two components are combined and classified into one of eight risk categories (0–7). Countries assigned to categories 0–1 have the lowest possible risk assessment and are assigned a risk weight of 0 percent, while countries assigned to category 7 have the highest possible risk assessment and are assigned a risk weight of 150 percent (see Table 13–17).[19] The OECD provides CRCs for more than 150 countries. Assessments are publicly available on the OECD website.[20] Countries with no CRC assessments are assigned a credit risk weight of 100 percent. A 150 percent risk weight is assigned to sovereign exposures immediately upon determining that an event of sovereign default has occurred or if a sovereign default has occurred during the previous five years.

Risk weights on exposures to foreign banks are also based on the CRC assessment for the bank's home country (see Table 13–17). Banks located in countries assigned to the 0–1 category have the lowest possible risk assessment and are assigned a risk weight of 0 percent, while countries assigned to the 4–7 category have the highest possible risk assessment and are assigned a risk weight of 150 percent. Banks located in countries with no CRC assessments are assigned a credit risk weight of 100 percent; a 150 percent risk

18. See OECD, "Country Risk Classification," www.oecd.org/document/49/0,3746,en_2649_34169_1901105_1_1_1_1,00.html

19. Basel II used credit rating agencies' (e.g., S&P) credit ratings to assess the credit risk of sovereign exposure as well as commercial loans. However, during the financial crisis, the U.S. Congress characterized credit rating agencies as organizations whose activities are fundamentally commercial in character. Credit rating agencies played a critical "gatekeeper" role in the debt markets and performed evaluative and analytical services on behalf of clients. There were conflicts of interest of credit rating agencies in providing credit ratings to their clients. Further, by having these credit ratings incorporated into federal regulations, there was a perceived government "sanctioning" of the credit rating agencies' credit ratings. Thus, Basel III no longer uses credit rating agencies' credit ratings. The OECD is a noncommercial entity that does not produce credit assessments for fee-paying clients, nor does it provide the sort of evaluative and analytical services as credit rating agencies.

20. www.oecd.org/document/49/0,2340,en_2649_34171_1901105_1_1_1_1,00.html

weight is assigned to sovereign exposures immediately upon determining that an event of sovereign default has occurred or if a sovereign default has occurred during the previous five years.

To figure the credit risk–adjusted assets, the DI multiplies the dollar amount of assets it has in each category by the appropriate risk weight.

EXAMPLE 13–3 Calculation of On-Balance-Sheet Credit Risk–Adjusted Assets under Basel III

Consider the bank's balance sheet in Table 13–18, categorized according to the risk weights of Basel III. Under Basel III, the credit risk-adjusted value of the bank's on-balance-sheet assets would be:

$$\begin{aligned}\text{Credit risk–adjusted on-balance-sheet assets} &= 0(8\text{m} + 13\text{m} + 60\text{m} + 50\text{m} + 42\text{m}) \\ &\quad + 0.2(10\text{m} + 10\text{m} + 20\text{m} + 55\text{m} + 10\text{m}) + 0.5(34\text{m} + 308\text{m} + 75\text{m}) \\ &\quad + 1(390\text{m} + 108\text{m} + 22\text{m}) + 1.5\ (10\text{m}) = \$764.5 \text{ million}\end{aligned}$$

The simple book value of on-balance-sheet assets is $1,215 million. The bank's credit risk–adjusted value under Basel III is $764.5 million.

TABLE 13–18 Bank's Balance Sheet under Basel III *(in millions of dollars)*

Weight	Assets		Liabilities/Equity		Capital Class
0%	Cash	$ 8	Demand deposits	$ 150	
	Balances due from Fed	13	MMDAS deposits	500	
	Treasury bills	60	CDs	380	
	Long-term Treasury securities	50	Fed funds purchased	80	
	Long-term government agencies (GNMAS)	42			
20	Items in process of collection	10	Convertible bonds	10	Tier II
	Long-term government agencies (FNMAS)	10	Subordinated bonds	10	Tier II
	Munis (general obligation)	20			
	Loans to countries with OECD CRC rating of 2	55			
	Loans to foreign banks in country with OECD CRC rating of 2	10	Perpetual preferred stock (nonqualifying)	5	Tier II
50	University dorm bonds (revenue)	34			
	Residential 1- to 4-family mortgages, Category 1, loan-to-value ratio between 60% and 80%	308	Retained earnings	40	CET 1
	Loans to foreign banks in country with OECD CRC rating of 3	75	Common stock	30	CET 1
100	Commercial loans	390	Noncumulative perpetual preferred stock (qualifying)	10	Additional Tier I
	Consumer loans	108			
	Premises, equipment	22			
150	Loans to countries with OECD CRC rating of 7	10		$1,215	
N/A	Reserve for loan losses	(10)			Tier II
	Total assets	$1,215			
Off-Balance-Sheet Items:					
	$80m in two-year loan commitments to a U.S. corporation				
	$10m direct credit substitute standby letters of credit issued to a U.S. corporation				
	$50m in commercial letters of credit issued to a U.S. corporation				
	One fixed-floating interest rate swap for four years with notional dollar value of $100m and replacement cost of $3m				
	One 2-year Euro$ contract for $40m with a replacement cost of −$1m				

credit equivalent amount

The on-balance-sheet equivalent credit risk exposure of an off-balance-sheet item.

Credit Risk–Adjusted Off-Balance-Sheet Activities. The credit risk–adjusted value of on-balance-sheet assets is only one component of the capital ratio denominator. The other is the credit risk–adjusted value of the DI's off-balance-sheet (OBS) activities. These OBS activities represent contingent rather than actual claims against depository institutions (see Chapter 11). Thus, regulations require that capital be held not against the full face value of these items, but against an amount equivalent to any eventual on-balance-sheet credit risk these securities might create for a depository institution. Therefore, in calculating the credit risk–adjusted asset values of these OBS items we must first convert them into **credit equivalent amounts**—amounts equivalent to an on-balance-sheet item. Further, the calculation of the credit risk–adjusted values of the off-balance-sheet activities involves some initial segregation of these activities. In particular, the calculation of the credit risk exposure or the credit risk–adjusted asset amounts of contingent or guaranty contracts such as letters of credit differs from the calculation of the credit risk–adjusted asset amounts for foreign exchange and interest rate forward, option, and swap contracts. We first consider the credit risk–adjusted asset value of OBS guaranty-type contracts and contingent contracts and then examine derivative or market contracts.

The Credit Risk–Adjusted Asset Value of Off-Balance-Sheet Contingent Guaranty Contracts. Consider the appropriate conversion factors in Table 13–19. Note that under Basel III, direct credit substitute standby letter of credit guarantees issued by DIs have a 100 percent conversion factor rating, or credit equivalent amount. Similarly, sale and repurchase agreements and assets sold with recourse are also given a 100 percent conversion factor rating. Future performance-related SLCs and unused loan commitments of more than one year have a 50 percent conversion factor. Other loan commitments, those with one year or less to maturity, have a 20 percent credit conversion factor. Standard trade-related commercial letters of credit and banker's acceptances sold have a 20 percent conversion factor. Under Basel III, risk weights assigned to OBS contingent guaranty contracts are the same as if the DI had entered into the transactions as a principal. Thus, the credit ratings used to assign a credit risk weight for on-balance-sheet assets (listed in Table 13–17) are also used to assign credit risk weights on these OBS activities (e.g., issuing a two-year loan commitment to a foreign bank located in a country with an OECD CRC assessment of 4 would result in a risk weight of 150 percent).

EXAMPLE 13–4 Calculating Off-Balance-Sheet Contingent or Guaranty Contracts' Credit Risk—Adjusted Assets

To see how OBS activities are incorporated into the risk-based ratio, we can extend Example 13–3 for the bank in Table 13–18. Notice that in addition to having $764.5 million in credit risk-adjusted assets on its balance sheet, the bank also has the following off-balance-sheet contingencies or guarantees:

1. $80 million two-year loan commitments to a U.S. corporations.
2. $10 million direct credit substitute standby letters of credit issued to a U.S. corporation.
3. $50 million commercial letters of credit issued to a U.S. corporation.

To find the risk-adjusted asset value for these OBS items, we follow a two-step process.

Step 1. Convert OBS Values into On-Balance-Sheet Credit Equivalent Amounts
In the first step we multiply the dollar amount outstanding of these items to derive the credit equivalent amounts using the conversion factors (CFs) listed in Table 13–19.

OBS Item	Face Value		Conversion Factor		Credit Equivalent Amount
Two-year loan commitment	$80m	×	0.5	=	$40m
Standby letter of credit	10m	×	1.0	=	10m
Commercial letter of credit	50m	×	0.2	=	10m

Thus, the credit equivalent amounts of loan commitments, standby letters of credit, and commercial letters of credit are, respectively. $40, $10, and $10 million. These conversion factors convert an OBS item into an equivalent credit or on-balance-sheet item.

Step 2. Assign the OBS Credit Equivalent Amount to a Risk Category
In the second step we multiply these credit equivalent amounts by their appropriate risk weights. In our example, because each of the contingent guaranty contracts involves a U.S. corporation, each is assigned a risk weight of 100 percent.

OBS Item	Credit Equivalent Amount		Risk Weight (W_t)		Risk-Adjusted Asset Amount
Two-year loan commitment	$40m	×	1.0	=	$40m
Stand by letter of credit	10m	×	1.0	=	10m
Commercial letter of credit	10m	×	1.0	=	10m
					$60m

Thus, the bank's credit risk-adjusted asset value of its OBS contingencies and guarantees is $60 million.

The Credit Risk–Adjusted Asset Value of Off-Balance-Sheet Market Contracts or Derivative Instruments. In addition to having OBS contingencies and guarantees, FIs engage heavily in buying and selling OBS futures, options, forwards, swaps, caps, and other derivative securities contracts for interest rate risk, credit risk, and foreign exchange risk management and hedging reasons, as well as buying and selling such products on behalf of their customers (see Chapter 11). Each of these positions potentially exposes DIs to **counterparty credit risk,** that is, the risk that the counterparty (or other side of a contract) will default when suffering large actual or potential losses on its position. Such defaults mean that a DI would have to go back to the market to replace such contracts at (potentially) less favorable terms.

counterparty credit risk
The risk that the other side of a contract will default on payment obligations.

Under the risk-based capital ratio rules, a major distinction is made between exchange-traded derivative security contracts (e.g., Chicago Board of Trade's exchange-traded options) and over-the-counter–traded instruments (e.g., forwards, swaps, caps, and floors). The credit or default risk of exchange-traded derivatives is approximately zero because when a counterparty defaults on its obligations, the exchange itself adopts the counterparty's obligations in full. However, no such guarantees exist for bilaterally agreed, over-the-counter contracts originated and traded outside organized exchanges. Under Basel III, banks must hold capital equal to 2 percent times the margin requirement on exchange-traded derivatives. The nominal 2 percent risk weighting is intended to reflect the fact that the risk of default on an exchange-traded derivative security is assumed to be very low.

TABLE 13–19 Conversion Factors for Off-Balance-Sheet Contingent or Guaranty Contracts

Sale and repurchase agreements and assets sold with recourse that are not included on the balance sheet (100%)
Direct-credit substitute standby letters of credit (100%)
Performance-related standby letters of credit (50%)
Unused portion of loan commitments with an original maturity of one year or less (20%)
Unused portion of loan commitments with an original maturity of more than one year (50%)
Commercial letters of credit (20%)
Banker's acceptances conveyed (20%)
Other loan commitments (10%)

Sources: "Regulatory Capital Rules: Standardized Approach for Risk-Weighted Assets; Market Discipline and Disclosure Requirements," Office of the Comptroller of the Currency, Treasury, June 2012, Board of Governors of the Federal Reserve System, June 2012, and the Federal Deposit Insurance Corporation, June 2012. www.occ.gov; www.federalreserve.gov; www.fdic.gov

Hence, most OBS futures and options positions have virtually no capital requirements for a DI, while most forwards, swaps, caps, and floors do.[21]

As with contingent or guaranty contracts, the calculation of the risk-adjusted asset values of OBS market contracts requires a two-step approach. First, we calculate a conversion factor to create credit equivalent amounts. Second, we multiply the credit equivalent amounts by the appropriate risk weights.

Step 1. Convert OBS Values into On-Balance-Sheet Credit Equivalent Amounts. We first convert the notional or face values of all non-exchange-traded swap, forward, and other derivative contracts into credit equivalent amounts. The credit equivalent amount itself is divided into a *potential exposure* element and a *current exposure* element. That is:

$$\text{Credit equivalent amount of OBS derivative security item (\$)} = \text{Potential exposure (\$)} + \text{Current exposure (\$)}$$

potential exposure

The risk that a counterparty to a derivative securities contract will default in the future.

The **potential exposure** component reflects the risk that the counterparty to the contract may default in the *future*. The probability of such an occurrence depends on the future volatility of interest rates for an interest rate contract, credit risk for a credit contract, or exchange rates for an exchange rate contract. Thus, the potential exposure conversion factors in Table 13–20 are larger for credit contracts than for interest rate contracts. Also, note the larger potential exposure risk for longer-term contracts of both types.

current exposure

The cost of replacing a derivative securities contract at today's prices.

In addition to calculating the potential exposure of an OBS market instrument, a DI must calculate its **current exposure** with the instrument. This reflects the cost of replacing a contract if a counterparty defaults *today*. The DI calculates this *replacement cost* or *current exposure* by replacing the rate or price initially in the contract with the current rate or price for a similar contract and recalculating all the current and future cash flows that would have been generated under current rate or price terms.[22] The DI discounts any future cash flows to give a current present value measure of the contract's replacement cost. If the contract's replacement cost is negative (i.e., the DI profits on the replacement of the contract if the counterparty defaults), regulations require the replacement cost (current exposure) to be set to zero. If the replacement cost is positive (i.e., the DI loses on the replacement of the contract if the counterparty defaults), this value is used as the measure

TABLE 13–20 Credit Conversion Factors for OBS Derivative Contracts Used in Calculating Potential Exposure

Remaining Maturity	(1) Interest Rate Contracts	(2) Exchange Rate Contracts	(3) Credit Contracts (Investment Grade)	(4) Credit Contracts (Non-Investment Grade)	5) Equity Contracts	(6) Precious Metals Contracts	(7) Other
1. Less than one year	0%	1.0%	5.0%	10.0%	6.0%	7.0%	10.0%
2. One to five years	0.5	5.0	5.0	10.0	8.0	7.0	12.0
3. Over five years	1.5	7.5	5.0	10.0	10.0	8.0	15.0

Source: "Regulatory Capital Rules: Standardized Approach for Risk-Weighted Assets; Market Discipline and Disclosure Requirements," Office of the Comptroller of the Currency, Treasury, June 2012, Board of Governors of the Federal Reserve System, June 2012, and the Federal Deposit Insurance Corporation, June 2012. www.occ.gov; www.federalreserve.gov; www.fdic.gov

21. This may create some degree of preference among DIs for using exchange-traded hedging instruments rather than over-the-counter instruments, because using the former may save a DI costly capital resources.

22. For example, suppose a £1 million two-year forward foreign exchange contract was entered into in January 2015 at $1.55/£. In January 2016, the bank has to evaluate the credit risk of the contract, which now has one year remaining. To do this, it replaces the agreed-upon forward rate $1.55/£ with the forward rate on current one-year forward contracts, e.g., $1.65/£. It then recalculates its net gain or loss on the contract if it had to be replaced at this price. If the spot rate in January 2016 is $1.64/£, then the replacement cost on this contract is ($1.65 − $1.55) × £1m × $1.64 = $164,000.

of current exposure. Since each swap or forward is in some sense unique, calculating current exposure involves a considerable computer processing task for the DI's management information systems. Indeed, specialized service firms are likely to perform this task for smaller DIs.

Step 2. Assign the OBS Credit Equivalent Amount to a Risk Category. Once the current and potential exposure amounts are summed to produce the credit equivalent amount for each contract, we multiply this dollar number by a risk weight to produce the final credit risk–adjusted asset amount for OBS market contracts.

Under Basel III, the appropriate risk weight is generally 1.0, or 100 percent. That is:

$$\text{Credit risk–adjusted value of OBS market contracts} = \text{Total credit equivalent amount} \times 1.0 \text{ (risk weight)}$$

EXAMPLE 13–5 Calculating Off-Balance-Sheet Market Contract Credit Risk-Adjusted Assets

The bank in Examples 13–3 and 13–4 has taken one interest rate hedging position in the fixed-floating interest rate swap market for four years with a notional dollar amount of $100 million and one 2-year forward foreign exchange contract for $40 million (see Table 13–18).

Step 1

We calculate the credit equivalent amount for each item or contract as:

					Potential Exposure + Current Exposure			
Type of Contract (remaining maturity)	Notional Principal	×	Potential Exposure Conversion Factor	=	Potential Exposure	Replacement Cost	Current Exposure	Credit Equivalent Amount
Four-year fixed-floating interest rate swap	$100m	×	0.005	=	$0.5m	$3m	$3m	$3.5m
Two-year forward foreign exchange contract	$40m	×	0.050	=	$2m	−$1m	$0	$2m

For the four-year, fixed-floating interest rate swap, the notional value (contract face value) of the swap is $100 million. Since this is a long-term (one to five years to maturity) interest rate market contract, its face value is multiplied by 0.005 to get a potential exposure or credit risk equivalent value of $0.5 million (see row 2 of Table 13–20. We add this potential exposure to the replacement cost (current exposure) of this contract to the bank. The replacement cost reflects the cost of having to enter into a new four-year, fixed-floating swap agreement at today's interest rates for the remaining life of the swap should the counterparty default. Assuming that interest rates today are less favorable, on a present value basis, the cost of replacing the existing contract for its remaining life would be $3 million. Thus, the total credit equivalent amount—current plus potential exposures—for the interest rate swap is $3.5 million.

Next, look at the foreign exchange two-year forward contract of $40 million face value. Since this is a foreign exchange contract with a maturity of one to five years, the

potential (future) credit risk is \$40 million × 0.05, or \$2 million (see row 2 In Table 13–20). However, its replacement cost is *minus* \$1 million. That is, in this example our bank actually stands to gain if the counterparty defaults. Exactly why the counterparty would do this when it is in the money is unclear. However, regulators cannot permit a DI to gain from a default by a counterparty since this might produce all types of perverse risk-taking incentives. Consequently, as in our example, current exposure has to be set equal to zero (as shown). Thus, the sum of potential exposure (\$2 million) and current exposure (\$0) produces a total credit equivalent amount of \$2 million for this contract. Since the bank has just two OBS derivative contracts, summing the two credit equivalent amounts produces a total credit equivalent amount of \$3.5m + \$2m = \$5.5 million for the banks OBS market contracts.

Step 2

The next step is to multiply this credit equivalent amount by the appropriate risk weight, Specifically, to calculate the risk-adjusted asset value for the bank's OBS derivative or market contracts, we multiply the credit equivalent amount by the appropriate risk weight, which is generally 1.0, or 100 percent:

$$\begin{array}{ccccccc} \text{Credit risk–adjusted asset value of OBS derivatives} & = & \text{\$5.5 million (credit equivalent amount)} & \times & \text{1.0 (risk weight)} & = & \text{\$5.5 million} \end{array}$$

Total Credit Risk–Adjusted Assets under Basel III. Under Basel III, the total credit risk–adjusted assets are \$830 million (\$764.5 million from on-balance-sheet activities, plus \$60 million for the risk-adjusted value of OBS contingencies and guarantees, plus \$5.5 million for the risk-adjusted value of OBS derivatives).

Calculating the Overall Risk-Based Capital Position. After calculating the risk-weighted assets for a depository institution, the final step is to calculate the CET1, Tier I, and total risk-based capital ratios.

EXAMPLE 13–6 Calculating the Overall Risk-Based Capital Position of a Bank

From Table 13–18, the bank's CET1 capital (common stock and retained earnings) totals \$70 million; additional Tier I capital (qualifying perpetual preferred stock) totals \$10 million; and Tier II capital (convertible bonds,subordinate bonds, nonqualifying perpetual preferred stock, and reserve for loan losses) totals \$35 million.

We can now calculate our bank's capital adequacy under the Basel III risk-based capital requirements as:

$$\text{CET1 risk-based ratio} = \frac{\text{\$70m}}{\text{\$830.0m}} = 8.43\%$$

$$\text{Tier I risk-based capital ratio} = \frac{\text{\$70m} + \text{\$10m}}{\text{\$830.0m}} = 9.64\%$$

and

$$\text{Total risk-based capital ratio} = \frac{\text{\$70m} + \text{\$10m} + \text{\$35m}}{\text{\$830.0m}} = 13.86\%$$

To be adequately capitalized, the minimum CET1 risk-based capital ratio is 4.5 percent (see Table 13–4), the minimum Tier I capital ratio is 6 percent, and the minimum total risk-based capital ratio required is 8 percent. Thus, the bank in our example has more than adequate capital under all three capital requirement formulas.

TABLE 13–21 Capital Conservation Buffer, Capital Ratio Levels, and Maximum Payout Ratios

Capital Conservation Buffer (%)	Common Equity Tier I Capital Ratio (%)	Tier I Capital Ratio (%)	Total Capital Ratio (%)	Maximum Payout Ratios (expressed as a percentage of earnings)
0–0.625	4.5–5.125	6.0–6.625	8.0–8.625	0%
>0.625–1.25	>5.125–5.75	>6.625–7.25	>8.625–9.25	20
>1.25–1.875	>5.75–6.375	>7.25–7.875	>9.25–9.875	40
>1.875–2.5	>6.375–7.0	>7.875–8.5	>9.875–10.5	60
>2.5	>7.0	>8.5	>10.5	No payout ratio limitation

Capital Conservation Buffer. In addition to revising the minimum capital ratio requirements for credit risk, Basel III introduced a capital conservation buffer designed to ensure that DIs build up a capital surplus, or buffer, outside periods of financial stress that can be drawn down as losses are incurred during periods of financial stress. Under Basel III, a DI would need to hold a capital conservation buffer of greater than 2.5 percent of total risk-weighted assets to avoid being subject to limitations on capital distributions and discretionary bonus payments to executive officers. If a DI's capital buffer falls below 2.5 percent, constraints on earnings payouts (e.g., *dividends, share buybacks,* and *"bonus" payments*) will be imposed. Table 13–21 lists the maximum dividend payout ratio allowed as the conservation buffer falls below 2.5 percent. As can be seen, the smaller the conservation buffer, the greater the constraint on a DI's discretionary payout of earnings. For example, a DI with a capital conservation buffer between 1.875 and 2.5 percent (e.g., a CET1 capital ratio of 6.75 percent, a Tier I capital ratio of 8.2 percent, or a total capital ratio of 10.2 percent) at the end of the previous calendar quarter would be allowed to distribute no more than 60 percent of its eligible retained income in the form of capital distributions or discretionary bonus payments during the current calendar quarter. Rather, the DI would need to conserve at least 40 percent of its eligible retained income during the current calendar quarter, using these earnings to build up its capital conservation buffer.

Countercyclical Capital Buffer. Basel III also introduced a countercyclical capital buffer that may be declared by any country experiencing excess aggregate credit growth. The countercyclical capital buffer can vary between 0 percent and 2.5 percent of risk-weighted assets. This buffer must be met with CET1 capital, and DIs are given 12 months to adjust to the buffer level. Like the capital conservation buffer, if a DI's capital levels fall below the set countercyclical capital buffer, restrictions on earnings payouts are applied. Table 13–22 lists these restrictions. International banks will pay a weighted average buffer charge based on their credit exposures to each country. Thus, if a bank has 60 percent of its assets in country A with an imposed countercyclical buffer of 2 percent and 40 percent of its assets in country B with a countercyclical buffer requirement of 1 percent, the countercyclical buffer for the bank is 1.6 percent $[(0.60 \times 2\%) + (0.40 \times 1\%)]$.

TABLE 13–22 Countercyclical Buffer, Capital Ratio Levels, and Maximum Payout Ratios

Capital Conservation Plus Countercyclical Buffer (%)	Common Equity Tier I Capital Ratio (%)	Tier I Capital Ratio (%)	Total Capital Ratio (%)	Maximum Payout Ratios (expressed as a percentage of earnings)
0–1.25	4.5–5.75	6.0–7.25	8.0–9.25	0%
>1.25–2.5	>5.75–7.0	>7.25–8.5	>9.25–10.5	20
>2.5–3.75	>7.0–8.25	>8.5–9.75	>10.5–11.75	40
>3.75–5.0	>8.25–9.5	>9.75–11.0	>11.75–13.0	60
>5.0	>9.5	>11.0	>13.0	No payout ratio limitation

Leverage Ratio. One of the features of the financial crisis of 2008–2009 was the accumulation of extreme on- and off-balance-sheet leverage throughout the banking system. During the worst of the crisis, DIs were forced by the market to reduce leverage to an extent that intensified falling asset prices and DI losses, in addition to declines in DI capital and reduced credit availability. To prevent this cycle from recurring, Basel III introduced a leverage ratio requirement that is intended to discourage the use of excess leverage and to act as a backstop to the risk-based capital requirements described earlier.

Under the Standardized Approach, the Basel III leverage ratio is defined as the ratio of Tier I capital to on-balance-sheet assets. Once Basel III is fully phased in (in 2019, see Table 13–3), to be well capitalized, a DI must hold a minimum leverage ratio of 5 percent; to be adequately capitalized, a DI must hold a minimum leverage ratio of 4 percent. Under the Advanced Approach, the Basel III leverage ratio is defined as the ratio of Tier I capital to a combination of on- and off-balance-sheet assets:

$$\text{Leverage ratio} = \frac{\text{Tier I capital}}{\text{Total exposure (on and off balance sheet)}}$$

Total exposure is equal to the DI's total assets plus off-balance-sheet exposure. For derivative securities, off-balance-sheet exposure is current exposure plus potential exposure as described earlier. For off-balance-sheet credit (loan) commitments, a conversion factor of 100 percent is applied unless the commitments are immediately cancelable. In this case, a conversion factor of 10 percent is used.

Interest Rate Risk, Market Risk, and Risk-Based Capital

From a regulatory perspective, a credit risk–based capital ratio is adequate only as long as a depository institution is not exposed to undue interest rate or market risk. The reason is that the risk-based capital ratio takes into account only the adequacy of a bank's capital to meet both its on- and off-balance-sheet credit risks. Not explicitly accounted for is the insolvency risk emanating from interest rate risk (duration mismatches) and market (trading) risk.

www.federalreserve.gov

www.bis.org

To meet these criticisms, in 1993 the Federal Reserve (along with the Bank for International Settlements) developed additional capital requirement proposals for interest rate risk and market risk. Since 1998 DIs have had to calculate an "add-on" to the 8 percent risk-based capital ratio to reflect their exposure to market risk. There are two approaches available to DIs to calculate the size of this add-on: (1) the standardized model proposed by regulators and (2) the DI's own internal market risk model. To date, no formal add-on has been required for interest-rate risk, although Basel II suggested a framework for a future capital ratio for interest rate risk similar to the original 1993 proposal. Specifically, Basel II stated that banks should have interest rate risk measurement systems that assess the effects of interest rate changes on both earnings and economic value. These systems should provide meaningful measures of a bank's current levels of interest rate risk exposure and should be capable of identifying any excessive exposures that might arise.

Operational Risk and Risk-Based Capital

Basel II implemented an additional add-on to capital for operational risk. Prior to this proposal, the BIS had argued that the operational risk exposures of banks were adequately taken care of by the "8 percent" credit risk–adjusted ratio. But increased visibility of operational risks in recent years has induced regulators to propose a separate capital requirement for credit and operational risks. As noted above, the BIS now believes that operational risks are sufficiently important for DIs to devote resources to quantify such risks and to incorporate them separately into their assessment of their overall capital adequacy. In the 2001 and 2003 Consultative Document, the Basel Committee proposed three specific methods by which depository institutions would calculate capital to protect against operational risk: the basic indicator approach, the standardized approach, and the advanced measurement approach. These were implemented in 2006.