Financial Regulation and Basel III

Dr. Alonso Peña, CQF
(alonso.pena@fitchlearning.com)

CQF

Contents

Preface: The Balance Sheet

Before Basel

The (wrong) Big Picture

What is Capital and the Capital Ratios?

Basel III

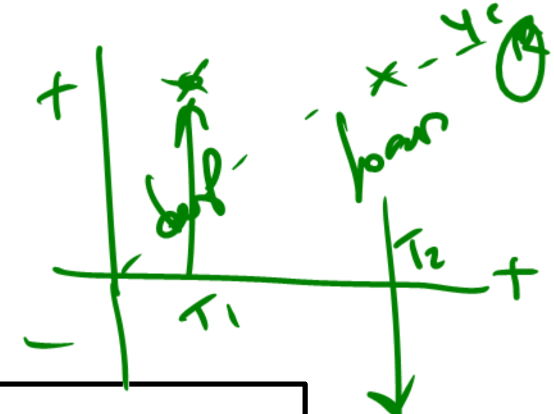
Case Study 1: Capital Ratios

Case Study 2: NSFR

Preface: The Balance Sheet

Citi 2014

What is the balance sheet of a typical commercial bank?



A — Assets	%	L — Liabilities	%
Liquid Assets		**Deposits**	50% D
Cash	7%		
Central Banks		**Wholesale Funding**	
Inter Bank		Inter-Bank	16% W
		Money market	
Loans to Customers	34%	Capital market	
Trading Assets/Investments		**Trading Liabilities**	
Securities	48%	Short Positions	18% X_L
Reverse Repos		Repo Borrowings	
Derivatives (ITM)		Derivatives (OTM)	
Non-Financial Assets		**Hybrid Capital**	6% HC
Goodwill	11%		
Fixed Assets		**Shareholders Equity**	10% E
Total Assets	100%	**Total Liabilities**	100%

A = L + E

Before Basel

Before Basel

- In 1974, G10 central bank governors created a forum to discuss and coordinate best practice in the **risk management and supervision of banks**.

- The Bank for International Settlements (BIS) in Basel offered premises and facilities, hence the **Basel Committee on Banking Supervision (BCBS)** was set up.

- **Before 1988, there were no minimal capital standards** for banks which meant that capital losses arising from activities put deposit holders at risk.

BIS

BCBS

The (Wrong) Big Picture

E + earnings

8%

Risk-weighted Assets (RWA)

CR MR OP

$$\text{TOTAL CAPITAL} = 0.08\left(CR \times RWA + MR \times RWA + OP \times RWA\right)$$

Minimum requirement!

Basel II → III

e.g.

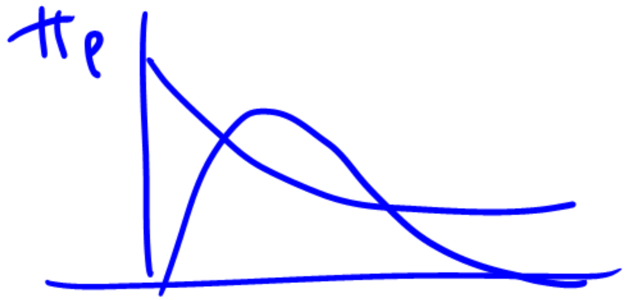
$$\max\left(VAR_t, m \times VAR_{AVG}\right)$$

today

10-day @ 99%

3

last 25 days



$\boxed{CR}$

Basel II

Vasicek

VAR: one factor Gaussian copula model

$$\mathrm{WCDR}_i = N\left[\frac{N^{-1}(PD_i)+\sqrt{\rho}\,N^{-1}(0.999)}{\sqrt{1-\rho}}\right]$$

Worst case default rate

"the bank is 99.9% certain it will not be exceeded next year for the i-th CP"

CR:F_IRB **CREDIT RISK: FOUNDATION INTERNAL RATINGS BASED**

Risk Measurement Approaches

Market risk	Standardized Approach (SA)	MR:SA
	Internal Models Approach (IMA)	MR:IMA
Credit risk	Standardized Approach (SA)	CR:SA
	Foundation Internal Ratings-Based Approach (F_IRB)	CR:F_IRB
	Advanced Internal Ratings-Based Approach (A_IRB)	CR:A_IRB
Operational risk	Basic Indicator Approach (BIA)	OP:BIA
	Standardized Approach (SA)	OP:SA
	Advanced Measurement Approach (AMA)	OP:AMA

What is Capital and the Capital Ratios?

What is Capital?

- Capital is a permanent source of funding for the bank which it can use to fund it's activities.

- It also serves as primary **loss of absorbing capacity** in order to protect more senior liabilities which are **not classified as capital**, such as:
  - Deposits
  - Senior debt
  - OTC derivative losses

T1 → equity + retained earnings.

T2 →

- **Capital is ranked into Tier 1 and Tier 2** where the highest quality of capital – Core Tier 1 – has the following features:
  - Perpetual
  - Lowest ranked/First loss
  - Non-contractual distributions (interest/dividends)

Basel I

- The original Basel accord (Basel I) was developed in 1988
  - Focusing on **credit risk** and implemented in 1992
  - Later amended in 1996 to consider **market risk**, implemented Jan 1998
- This introduced the **total capital ratio of 8% (Cooke ratio)** where banks had to hold at least this amount of capital against their **Risk Weighted Assets (RWA)**.
- The **BCBS** itself has **no legal power** but makes recommendations which are implemented by **local regulators** (e.g. implemented in Europe by the **Capital Requirements Directive – CRD)**.

Basel II

2007

- Basel II, **which improved the measurement of credit risk and included capture of operational risk**, was released in 2004 and was due to be implemented from year-end 2006. The implementation of Basel II was re-affirmed by the G20 Leaders, who committed to complete, where necessary, the adoption of Basel II by 2011.
- **Three pillars**
  - Pillar 1: Minimum capital requirements
    - Against credit risk, market risk and operational risk
  - Pillar 2: Supervisory review
  - Pillar 3: Market discipline

transparency

Σm, 8%

ICAAP

RZB

- Flexibility towards risk measurement through a **choice of approaches**:
  - Standard approaches – Easier to implement, but higher capital charge
  - Advanced approaches – Harder to implement but lower capital charge
- Emphasis on **internal processes** for managing and controlling risk
- Maintains the 8% total capital ratio (Cooke ratio) from Basel I: Total capital/total risk weight assets for credit, market, operational risk

Basel II Example

- A bank has a balance sheet as represented below and wants to **calculate its ratios with respect to credit risk only under the standardized approach**:

Assets	\$m	RW%	\$RWA	Financing	\$m
Cash	5	0	0	Deposits	94
T-bonds	5	0	0	Sub-ord. debt	5
Corp bond (BB-)	60	100	60	Common Stock	1
Corp loans (unrated)	30	100	30		
	100		90		100

TC

CET

$$\text{Total capital ratio} = \frac{6}{90} = 6.67\% \qquad \text{Tier 1 and core Tier 1 ratios} = \frac{1}{90} = 1.11\%$$

- The BIS capital ratio may be expressed as:

$$\text{Capital ratio} = \frac{\text{Total capital}}{\text{Risk weighted assets}} => 8\%$$

- In other words, at least 8% of the bank's capital (Tier 1 + Tier 2) must be kept in secure, safe, non-risky assets:
  - Minimum **core Tier 1 capital (CT1)** ratio = 2% EQ
  - Minimum **Tier 1 capital** ratio = 4% EQ + earnings
  - Minimum **Total capital** ratio = 8%

This means that the ratios we just calculated in our example would put the bank in serious trouble. They would need to reduce RWA or raise Capital.

Banking Book vs. Trading Book

Fundamental Review trading Book (FRTB)

- **Trading book**
- An accounting book which contains assets with are authorized for active trading, e.g. equity inventory used by the flow desk.
- Trading book positions should be frequently and accurately valued by marking the positions to market (**MTM**), i.e. accounted for at fair value.

- **Banking book**
- An accounting book which includes all other assets which are not actively traded by the bank, rather they are **held until maturity**, e.g. customer loans.
- Usually accounted for on an **accruals basis** with provisions.

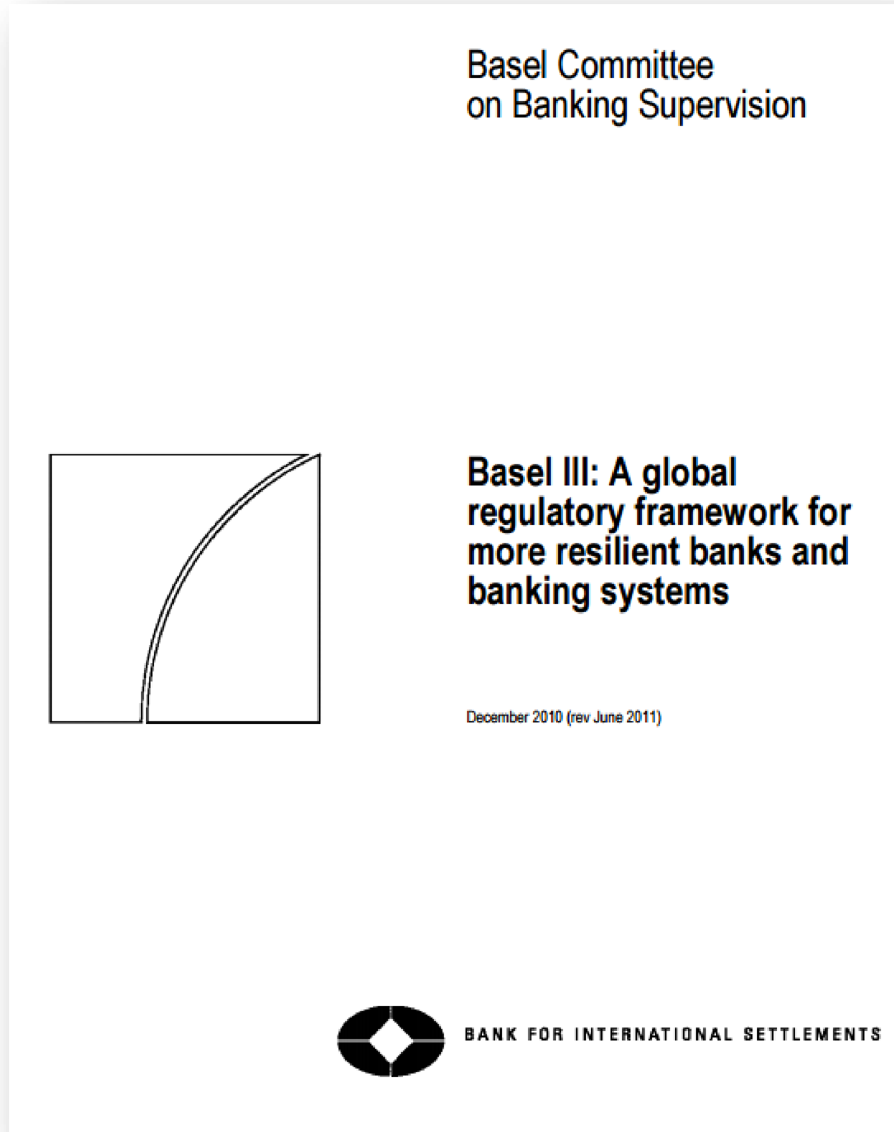
ES

Basel 2.5

- Basel 2.5 was developed by BCBS in 2009 in response to the financial crisis. It was to be implemented no later than Dec 2011.
- **Switzerland**
  - FINMA (regulator) implemented early, in Jan 2011, for **Systematically Important Financial Institutions (SIFIs)**
- **European Union (NB includes UK)**
  - Implemented Dec 2011 via CRD3 (Basel III will be CRD4)
- Though Basel 2.5 did not increase the capital ratio limits themselves, it roughly **tripled Market Risk RWAs for large banks** with trading divisions.
- Main elements:
  - Stressed VaR (SVaR)
  - Counterpart Credit Risk and CVA
  - Incremental Risk Charge (IRC)
  - Comprehensive Risk Measure (CRM)

arbitrage Banking Book vs Trading Book

Basel III



Basel Committee
on Banking Supervision

Basel III: A global regulatory framework for more resilient banks and banking systems

December 2010 (rev June 2011)

BANK FOR INTERNATIONAL SETTLEMENTS

http://www.bis.org/publ/bcbs189.pdf

Basel III: Capital

- Basel III builds upon the regulatory framework adopted by Basel II and Basel 2.5, which now form integral parts of the Basel III framework.
  - Quality and level of required capital increased
    - Tier 3 (softer forms of capital) eliminated, non-qualifying, non-core Tier 1 and 2 capital phased out over ten years
    - Greater focus on ordinary (common) equity, minimum to be raised to 4.5% of risk-weighted assets, after deductions
  - Capital loss absorption at point of non-viability
    - Issuance of capital instruments that will be written off or converted to equity, contingent upon stressed scenarios, e.g. co-co bonds
  - Capital conservation buffer
    - Additional 2.5% capital rule, bringing total to 7%
    - Allows supervisors to restrict bonus/dividend payments
  - Countercyclical buffer
    - Range of 0-2.5%
    - Discretion by supervisors, to be imposed in case of excessive credit expansion

Changes in Capital Classification

Basel II

Tier 3

Tier 2
Supplementary capital

Lower Tier 2 (LT2)

Upper Tier 2 (UT2)

Tier 1
Core capital

Hybrid Tier 1

Innovative Tier 1 (IT1)

Non-Innovative Tier 1 (NIT1)

Core Tier 1 (CT1)

Basel III

Tier 2 (T2)

Tier 2
Gone concern capital

Additional Tier 1 (AT1)

Common Equity Tier 1 (CET1)

Tier 1
Going concern capital

Basel III: Leverage

- Accounting non-risk-based **Leverage Ratio (LR)**:

$$LR = \frac{\text{Tier 1 capital}}{\text{Total exposure (on + off balance sheet)}} \geq 3\%$$

  - **Objective:** Constrain the build up of excessive leverage in the banking system
  - **Reported quarterly** as the simple average of each month in the quarter
  - Tier 1 min 3% of un-weighted assets (therefore, max leverage = 33x)
  - Off balance sheet items include future counterparty risk on OTC derivatives and credit commitments
  - Being tested Jan 2013-Jan 2017, banks disclose figures from Jan 2015, **implementation Jan 2018**

Basel III: Liquidity

1 month

- **Liquidity Coverage Ratio (LCR):**

$$\mathrm{LCR} = \frac{\text{Stock of high quality unencumbered liquid assets}}{\text{Total net cash flows due out over next 30 days}} \geq 100\%$$

  - **Objective**: Ensure solvency during stressed environment
  - **Reported monthly** (with the operational capacity to increase the frequency to weekly or even daily in stressed situations)
  - High quality liquid assets include **cash and transferable assets of high liquidity and credit quality** which are not issued by the institution and which are listed on a recognized exchange
  - Total net cash flows out are calculated under a **stress scenario**
  - Minimum ratio of 60% **introduced Jan 2015,** rising by 10% per year to 100% by Jan 2019

Basel III: Liquidity

1 year

- **Net Stable Funding Ratio (NSFR):**

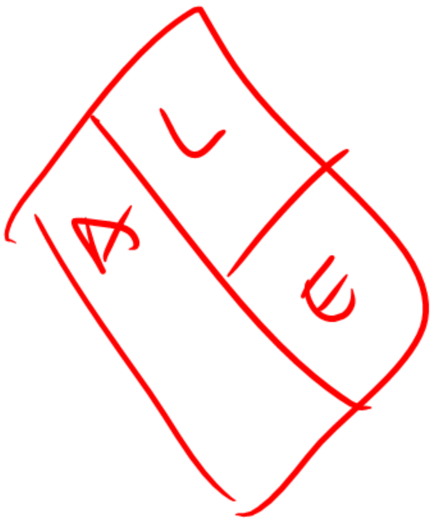
$$\text{NSFR} = \frac{\text{Available stable funding}}{\text{Required stable funding}} \geq 100\%$$

  - **Objective** : Encourage longer term rather than shorter term funding
  - **Reported quarterly** (at least)
  - Available Stable Funding (ASF) = financing multiplied by an ASF factor. For example:
    - Equity and all borrowings > =1y = 100%
    - 'Stable' demand deposits <1y = 90%, where 'less stable' = 80%
    - Wholesale funding <1y = 50%
  - Required Stable Funding (RSF) = assets multiplied by an RSF factor.

  For example:
    - Cash, interbank loans <1y, unencumbered securities <1y = 0%
    - Unencumbered corporate bonds rated AA- of higher >=1y = 20%
    - Gold, large cap equities = 50%
    - Unencumbered retail/SME loans <1y = 85%, >=1y = 100%
  - Minimum standard expected to apply from **Jan 2018**

Case Study 1: Capital Ratios Deutsche Bank

Consolidated Balance Sheet



in € m.	Notes	Dec 31, 2015	Dec 31, 2014
Assets:			
Cash and central bank balances[1]		96,940	74,482
Interbank balances (w/o central banks)[1]		12,842	9,090
Central bank funds sold and securities purchased under resale agreements	21, 22	22,456	17,796
Securities borrowed	21, 22	33,557	25,834
Financial assets at fair value through profit or loss			
Trading assets		196,035	195,681
Positive market values from derivative financial instruments		515,594	629,958
Financial assets designated at fair value through profit or loss		109,253	117,285
Total financial assets at fair value through profit or loss	12, 16, 21, 22, 37	820,883	942,924
Financial assets available for sale	16, 21, 22	73,583	64,297
Equity method investments	17	1,013	4,143
Loans	19, 20, 21, 22	427,749	405,612
Property and equipment	23	2,846	2,909
Goodwill and other intangible assets	25	10,078	14,951
Other assets	26, 27	118,137	137,980
Assets for current tax	36	1,285	1,819
Deferred tax assets	36	7,762	6,865
Total assets		**1,629,130**	**1,708,703**
Liabilities and equity:			
Deposits	28	566,974	532,931
Central bank funds purchased and securities sold under repurchase agreements	21, 22	9,803	10,887
Securities loaned	21, 22	3,270	2,339
Financial liabilities at fair value through profit or loss	12, 16, 37		
Trading liabilities		52,304	41,843
Negative market values from derivative financial instruments		494,076	610,202
Financial liabilities designated at fair value through profit or loss		44,852	37,131
Investment contract liabilities		8,522	8,523
Total financial liabilities at fair value through profit or loss		599,754	697,699
Other short-term borrowings	31	28,010	42,931
Other liabilities	26, 27	175,005	183,823
Provisions	20, 29	9,207	6,677
Liabilities for current tax	36	1,699	1,608
Deferred tax liabilities	36	746	1,175
Long-term debt	32	160,016	144,837
Trust preferred securities	32	7,020	10,573
Obligation to purchase common shares		0	0
Total liabilities		**1,561,506**	**1,635,481**
Common shares, no par value, nominal value of € 2.56	34	3,531	3,531
Additional paid-in capital		33,572	33,626
Retained earnings		21,182	29,279
Common shares in treasury, at cost	34	(10)	(8)
Equity classified as obligation to purchase common shares		0	0
Accumulated other comprehensive income (loss), net of tax		4,404	1,923
Total shareholders' equity		**62,678**	**68,351**
Additional equity components		4,675	4,619
Noncontrolling interests		270	253
Total equity		**67,624**	**73,223**
Total liabilities and equity		**1,629,130**	**1,708,703**

Source: Deutsche Bank Annual Report 2015
https://www.db.com/ir/en/download/Deutsche_Bank_Annual_Report_2015.pdf

Financial Position

in € m.	Dec 31, 2015	Dec 31, 2014	2015 increase (decrease) from 2014 in € m.	in %
Cash and central bank balances[1]	96,940	74,482	22,458	30
Interbank balances (w/o central banks)[1]	12,842	9,090	3,752	41
Central bank funds sold, securities purchased under resale agreements and securities borrowed	56,013	43,630	12,383	28
Trading assets	196,035	195,681	354	0
Positive market values from derivative financial instruments	515,594	629,958	(114,364)	(18)
Financial assets designated at fair value through profit or loss	109,253	117,285	(8,033)	(7)
thereof:				
Securities purchased under resale agreements	51,073	60,473	(9,400)	(16)
Securities borrowed	21,489	20,404	1,085	5
Loans	427,749	405,612	22,137	5
Brokerage and securities related receivables	94,939	115,054	(20,115)	(17)
Remaining assets	119,765	117,911	1,854	2
Total assets	**1,629,130**	**1,708,703**	**(79,573)**	**(5)**
Deposits	566,974	532,931	34,043	6
Central bank funds purchased, securities sold under repurchase agreements and securities loaned	13,073	13,226	(153)	(1)
Trading liabilities	52,304	41,843	10,461	25
Negative market values from derivative financial instruments	494,076	610,202	(116,126)	(19)
Financial liabilities designated at fair value through profit or loss	44,852	37,131	7,721	21
thereof:				
Securities sold under repurchase agreements	31,637	21,053	10,585	50
Securities loaned	554	1,189	(635)	(53)
Other short-term borrowings	28,010	42,931	(14,921)	(35)
Long-term debt	160,016	144,837	15,179	10
Brokerage and securities related payables	134,637	143,210	(8,574)	(6)
Remaining liabilities	67,564	69,170	(1,605)	(2)
Total liabilities	**1,561,506**	**1,635,481**	**(73,975)**	**(5)**
Total equity	**67,624**	**73,223**	**(5,599)**	**(8)**

[1] In 2015, comparatives have been restated. See Note 1 "Significant Accounting Policies and Critical Accounting Estimates – Significant Changes in Estimates and Changes in Presentation" for detailed information.

Source: Deutsche Bank Annual Report 2015
https://www.db.com/ir/en/download/Deutsche_Bank_Annual_Report_2015.pdf

Transitional template for regulatory capital, RWA and capital ratios

in € m.	Dec 31, 2015 CRR/CRD 4 fully-loaded	Dec 31, 2015 CRR/CRD 4	Dec 31, 2014 CRR/CRD 4 fully loaded	Dec 31, 2014 CRR/CRD 4
Common Equity Tier 1 (CET 1) capital: instruments and reserves				
Capital instruments and the related share premium accounts	37,088	37,088	37,144	37,144
Retained earnings	27,607	27,607	26,509	26,509
Accumulated other comprehensive income (loss), net of tax	4,096	4,281	1,617	1,923
Independently reviewed interim profits net of any foreseeable charge or dividend	(7,025)	(7,025)	481	481
Other	0	92	0	118
Common Equity Tier 1 (CET 1) capital before regulatory adjustments	**61,766**	**62,042**	**65,750**	**66,175**
Common Equity Tier 1 (CET 1) capital: regulatory adjustments				
Additional value adjustments (negative amount)	(1,877)	(1,877)	0	0
Other prudential filters (other than additional value adjustments)	(622)	(330)	(725)	(391)
Goodwill and other intangible assets (net of related tax liabilities) (negative amount)	(8,439)	(3,376)	(12,979)	(2,596)
Deferred tax assets that rely on future profitability excluding those arising from temporary differences (net of related tax liabilities where the conditions in Art. 38 (3) CRR are met) (negative amount)	(3,310)	(1,324)	(2,620)	(524)
Negative amounts resulting from the calculation of expected loss amounts	(106)	(58)	(712)	(147)
Defined benefit pension fund assets (negative amount)	(1,173)	(469)	(961)	(192)
Direct, indirect and synthetic holdings by an institution of own CET 1 instruments (negative amount)	(76)	(39)	(54)	(11)
Direct, indirect and synthetic holdings by the institution of the CET 1 instruments of financial sector entities where the institution has a significant investment in those entities (amount above the 15 % threshold and net of eligible short positions) (negative amount)	(818)	(278)	(499)	(84)
Deferred tax assets arising from temporary differences (net of related tax liabilities where the conditions in Art. 38 (3) CRR are met) (amount above the 15 % threshold) (negative amount)	(953)	(324)	(778)	(133)
Other regulatory adjustments	(291)	(1,537)	(345)	(1,994)
Total regulatory adjustments to Common Equity Tier 1 (CET 1) capital	[illegible]	(9,613)	(19,674)	(6,072)
Common Equity Tier 1 (CET 1) capital	**44,101**	**52,429**	**46,076**	**60,103**
Additional Tier 1 (AT1) capital: instruments				
Capital instruments and the related share premium accounts	4,676	4,676	4,676	4,676
Amount of qualifying items referred to in Art. 484 (4) CRR and the related share premium accounts subject to phase out from AT1	N/M	6,482	N/M	10,021
Additional Tier 1 (AT1) capital before regulatory adjustments	**4,676**	**11,157**	**4,676**	**14,696**
Additional Tier 1 (AT1) capital: regulatory adjustments				
Direct, indirect and synthetic holdings by an institution of own AT1 instruments (negative amount)	(125)	(48)	(57)	(57)
Residual amounts deducted from AT1 capital with regard to deduction from CET 1 capital during the transitional period pursuant to Art. 472 CRR	N/M	(5,316)	N/M	(10,845)
Other regulatory adjustments	0	0	0	0
Total regulatory adjustments to Additional Tier 1 (AT1) capital	**(125)**	**(5,365)**	**(57)**	**(10,902)**
Additional Tier 1 (AT1) capital	**4,551**	**5,793**	**4,619**	**3,794**
Tier 1 capital (T1 = CET 1 + AT1)	**48,651**	**58,222**	**50,695**	**63,898**
Tier 2 (T2) capital	**12,325**	**6,299**	**12,376**	**4,395**
Total capital (TC = T1 + T2)	**60,976**	**64,522**	**63,072**	**68,293**
Total risk-weighted assets	**396,714**	**397,382**	**393,969**	**396,648**
Capital ratios				
Common Equity Tier 1 capital ratio (as a percentage of risk-weighted assets)	11.1	13.2	11.7	15.2
Tier 1 capital ratio (as a percentage of risk-weighted assets)	12.3	14.7	12.9	16.1
Total capital ratio (as a percentage of risk-weighted assets)	15.4	16.2	16.0	17.2

CET $= \frac{44,101}{396,714} = 11\%$

TC ≈ 15%: $= \frac{60,976 \text{ CAP}}{396,714 \text{ RWA}}$

Task: Reconstruct these capital ratios

Source: Deutsche Bank Annual Report 2015
https://www.db.com/ir/en/download/Deutsche_Bank_Annual_Report_2015.pdf

Risk-weighted assets by model approach and business division according to transitional rules

in € m.	Corporate Banking & Securities	Private & Business Clients	Global Transaction Banking	Deutsche Asset & Wealth Management	Non-Core Operations Unit	Consolidation & Adjustments and Other	Dec 31, 2015 Total
Credit Risk	89,811	72,171	42,435	12,942	13,028	11,633	242,019
Segment reallocation	(3,515)	536	4,854	376	76	(2,328)	0
Advanced IRBA	85,249	61,655	32,253	10,346	7,858	12,862	210,223
Central Governments and Central Banks	3,990	45	1,077	1	6	9,500	14,619
Institutions	8,497	1,303	3,472	140	382	355	14,149
Corporates	59,482	11,369	26,837	3,945	2,944	882	105,459
Retail	192	38,910	23	130	725	0	39,980
Other	13,088	10,028	844	6,131	3,801	2,125	36,016
Foundation IRBA	2,083	3,076	174	0	0	0	5,333
Central Governments and Central Banks	0	0	0	0	0	0	0
Institutions	0	5	0	0	0	0	5
Corporates	2,083	3,072	174	0	0	0	5,329
Standardized Approach	5,172	6,792	5,154	2,219	5,093	1,099	25,530
Central Governments or Central Banks	24	146	30	2	0	0	202
Institutions	539	86	33	11	2	0	671
Corporates	2,473	1,441	3,511	1,147	739	573	9,884
Retail	6	4,172	239	34	567	0	5,018
Other	2,129	948	1,342	1,027	3,785	525	9,755
Risk exposure amount for default funds contributions	821	111	0	0	0	0	933
Settlement Risk	9	0	0	0	0	0	9
Credit Valuation Adjustment (CVA)	12,012	434	2	347	3,083	0	15,877
Internal Model Approach	11,957	396	2	343	3,082	0	15,780
Standardized Approach	55	38	0	4	1	0	97
Market Risk	33,795	32	173	1,268	14,286	0	49,553
Internal Model Approach	28,776	0	173	373	8,741	0	38,063
Standardized Approach	5,019	32	0	895	5,545	0	11,491
Operational Risk[1]	59,503	7,644	9,456	9,252	4,069	0	89,923
Advanced measurement approach	59,503	7,644	9,456	9,252	4,069	0	89,923
Total	**195,130**	**80,280**	**52,066**	**23,808**	**34,465**	**11,633**	**397,382**

[1] The movements for the business divisions are due to a change in the allocation methodology performed in the first quarter 2015.

CR CVA MR OP

Source: Deutsche Bank Annual Report 2015
https://www.db.com/ir/en/download/Deutsche_Bank_Annual_Report_2015.pdf

otc ET
10:4

Notional amounts of OTC derivatives on basis of clearing channel and type of derivative

Dec 31, 2015

in € m.	Notional amount maturity distribution: Within 1 year	> 1 and ≤ 5 years	After 5 years	Total	Positive market value	Negative market value	Net market value
Interest rate related:							
OTC	10,955,593	9,682,810	6,375,377	27,013,781	345,998	325,179	20,819
Bilateral (Amt)	3,906,875	4,952,043	3,205,837	12,064,755	316,736	298,220	18,516
CCP (Amt)	7,048,718	4,730,767	3,169,540	14,949,025	29,261	26,959	2,302
Exchange-traded	4,452,134	1,400,495	3,742	5,856,371	272	237	35
Total Interest rate related	**15,407,727**	**11,083,305**	**6,379,119**	**32,870,152**	**346,270**	**325,416**	**20,854**
Currency related:							
OTC	4,672,846	1,134,801	531,085	6,338,731	116,007	115,379	628
Bilateral (Amt)	4,644,414	1,134,686	531,085	6,310,184	115,900	115,270	630
CCP (Amt)	28,432	115	0	28,547	107	109	(2)
Exchange-traded	33,064	15	0	33,079	109	174	(65)
Total Currency related	**4,705,910**	**1,134,815**	**531,085**	**6,371,810**	**116,116**	**115,553**	**563**
Equity/index related:							
OTC	394,193	197,092	23,521	614,806	25,063	28,818	(3,756)
Bilateral (Amt)	394,193	197,092	23,521	614,806	25,063	28,818	(3,756)
CCP (Amt)	0	0	0	0	0	0	0
Exchange-traded	501,706	66,571	8,993	577,270	5,533	6,164	(631)
Total Equity/index related	**895,899**	**263,663**	**32,514**	**1,192,076**	**30,596**	**34,983**	**(4,387)**
Credit derivatives related							
OTC	270,524	949,312	129,622	1,349,458	23,548	20,992	2,556
Bilateral (Amt)	176,492	445,572	72,423	694,486	14,784	12,386	2,399
CCP (Amt)	94,032	503,741	57,199	654,972	8,763	8,606	157
Exchange-traded	0	0	0	0	0	0	0
Total Credit derivatives related	**270,524**	**949,312**	**129,622**	**1,349,458**	**23,548**	**20,992**	**2,556**
Commodity related:							
OTC	5,998	1,260	9,516	16,775	776	891	(115)
Bilateral (Amt)	5,998	1,260	9,516	16,775	776	891	(115)
CCP (Amt)	0	0	0	0	0	0	0
Exchange-traded	78,204	27,066	10	105,279	497	604	(107)
Total Commodity related	**84,202**	**28,326**	**9,526**	**122,054**	**1,273**	**1,496**	**(223)**
Other:							
OTC	20,621	5,378	43	26,043	906	1,953	(1,048)
Bilateral (Amt)	20,618	5,378	43	26,039	902	1,953	(1,051)
CCP (Amt)	3	0	0	3	3	0	3
Exchange-traded	8,430	11	0	8,441	22	49	(27)
Total Other	**29,051**	**5,389**	**43**	**34,484**	**928**	**2,002**	**(1,074)**
Total OTC business	**16,319,775**	**11,970,654**	**7,069,164**	**35,359,593**	**512,297**	**493,213**	**19,084**
Total bilateral business	9,148,589	6,736,032	3,842,425	19,727,045	474,162	457,538	16,623
Total CCP business	7,171,186	5,234,622	3,226,739	15,632,548	38,135	35,674	2,461
Total exchange-traded business	**5,073,538**	**1,494,157**	**12,746**	**6,580,441**	**6,433**	**7,229**	**(795)**
Total	**21,393,313**	**13,464,811**	**7,081,910**	**41,940,034**	**518,730**	**500,441**	**18,289**
Positive market values after netting and cash collateral received	**0**	**0**	**0**	**0**	**53,202**	**0**	**0**

IR

CR

EQ

Com

Source: Deutsche Bank Annual Report 2015
https://www.db.com/ir/en/download/Deutsche_Bank_Annual_Report_2015.pdf

Case Study 2: NSFR

Exercise: The Net Stable Funding Ratio (NSFR)

Basel III

Background

The NSFR focuses on liquidity management over a period of one year defined as

$$\text{NSFR} = \frac{\text{Amount of Stable Funding}}{\text{Required Amount of Stable Funding}} \qquad \text{NSFR} = \frac{\sum_i L_i \times W_i^{ASF}}{\sum_i A_i \times W_i^{RSF}}$$

Which can also be written as the weighted sum of various balance sheet items depending on a factor established by regulators.

The numerator is calculated by multiplying each category of funding (capital, wholesale deposits, retail deposits, etc.) by an available stable funding (W_ASF) factor, reflecting their stability. As shown in Table 1 the ASF for wholesale deposits is less than that for retail deposits, which in turn is than that for Tier 1 or Tier 2 capital.

The denominator is calculated from the items requiring funding. Each category of these is multiplied by a required stable funding (W_RSF) factor to reflect the permanence of the funding required. Some of the applicable factors are indicated in Table 2. Basel III requires the NSFR to be greater than 100% so that the calculated amount of stable funding is greater than the calculated required amount of stable funding.

Table 1: ASF Factors for Net Stable Funding Ratio

ASF Factor	Category
100%	Tier 1 and Tier 2 capital, Preferred stock and borrowing with a remaining maturity greater than one year
90%	"Stable" demand deposits and term deposits with remaining maturity less than one year provided by retail or small business customers
80%	"Less Stable" demand deposits and term deposits with remaining maturity less than one year provided by retail or small business customers
50%	Wholesale demand deposits and term deposits with remaining maturity less than one year provided by non-financial corporates, sovereigns, central banks, multilateral development banks, and public sector entities
0%	All other liability and equity categories

Table 2: RSF Factors for Net Stable Funding Ratio

RSF Factor	Category
0%	Cash. Short-term instruments, securities, loans to financial entities if they have a residual maturity of less than one year
5%	Marketable securities with a residual maturity greater than one year if they are claims on sovereign governments or similar bodies with a 0% risk weight
20%	Corporate bonds with a rating of AA- or higher and a residual maturity greater than one year. Claims on sovereign governments or similar bodies with a risk weight of 20%
50%	Gold, equity securities, bonds rated A+ to A-
65%	Residential mortgages
85%	Loans to retail and small business customers with a remaining maturity less than one year
100%	All other assets

$NSFR > 100\%.$

ASF

RSF

Assignment

Task: Calculate the NSFR of the following bank with a simplified balance sheet (amounts in Millions GBP):

ASSETS			LIABILITIES	
Cash	5		Retail Deposits (stable)	40
Treasury Bonds (>1yr)	5		Wholesale Deposits	48
Mortgages	20		Tier 2 Capital	4
Small Business Loans	60		Tier 1 Capital	8
Fixed Assets	10			
	100			100

$ASF = 40 \cdot 90\% + 48 \cdot 50\% + 4 \cdot 100\% + 8 \cdot 100\% = 72\ \$$

$RSF = 5 \cdot 0\% + 5 \cdot 5\% + 20 \cdot 65\% + 60 \cdot 85\% + 10 \times 100\% = 74.25$

Reference:

John C Hull, Risk Management and Financial Institutions, 4th Edition, 2015.

$NSFR = \frac{72}{74.25} = \underline{\underline{97\%}}$ X