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Derivatives and business models

Mihail Turlakov

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Derivatives and business models

I never think of the future. It comes soon enough.
-Albert Einstein-

The markets and XVA adjustments – several stories

- ✓ The reality of CVA/XVA management
- ✓ Negative swap spreads
- ✓ CCPs - CDS clearing, CCP counterparty charge, etc.
- ✓ Wrong-way risk in margin dynamics – WWR in MVA and FVA

Markets transformation and business models

- ✓ XVAs, central clearing, and derivatives
- ✓ OTC markets transformation
- ✓ Business models in the financial markets

CVA management reality (1) - Why not to hedge perfectly?

Reality is quite different than it actually is
-Antoine de Saint-Exupery-

- Single-name protection is not available for large part of the portfolio
  - ✓ CDS market has limited coverage and liquidity. CDS market became less liquid (a side effect of regulations), three times less volume from 2008 to 2015
  - ✓ Many names (i.e. project finance, etc.) never had publicly traded credit instruments
  - ✓ Shorting bonds is also a precarious effort

- Systemic hedges by indices (ITRX, etc.) or sovereign CDSs is a proxy/model hedge
  - ✓ Jump-to-Default and recovery are not hedged
  - ✓ MtM model volatility is hedged, but basis risk (between index and single-name) is increased

- Although CVA was intended by regulators to be hedged fully, and the banks obeyed as best as they can. But **the direct hedging of the credit risk of CVA cannot be done** in practice - **the major tension at the heart of CVA reality.**

CVA management reality (2) - CVA/XVAs are a measure of Tail-Risks

Tail risk is a very rare but strong-impact event

- XVAs (CVA, FVA, MVA and KVA) are **systemic risks** of corporate and sovereign hedging which explode in the market crises
  - ✓ Systemic concentration risks transform into counterparty and funding crises, although rarely yet quite abruptly

- XVAs (CVA, FVA, MVA and KVA) are **illiquidity risks**
  - ✓ Not easily tradable/novated OTC, not repo-able and only CCP-convertible at full cost

- Coupled shocks in credit, FX, and IR/funding markets cause even more non-linear changes of CVA and FVA
  - ✓ "Good, bad, and ugly" feedback loops and liquidity
  - ✓ Wrong-way risk is important

- Defaults (jump-to-default in CVA) and liquidity squeezes (jump to insolvency in FVA) are

CVA management reality (3) – key points

- CVA/FVA/KVA models can vary somewhat, but **CVA/XVA management is very different in different banks** due to multiple (organisational, top-management, different markets, and business models) reasons

  - ✓ **CVA/XVAs are tail-risks with non-hedgeable jump-to-default and recovery risks**
  - ✓ Significant model risks – “basis risks by design”, wrong-way risk, forward-rating risk, ... appreciated only over economic cycle (2-5 years)

- **CVA/XVA management is better to have some pro-active elements**

  - ✓ Tier-1s and some Tier-2s banks have to hedge CVA PL volatility to manageable levels
  - ✓ Tier-2s and Tier-3s can, very sensibly, keep the credit risk and not hedge, yet **“management-sensitivity threshold” is likely to be breached under some stressed conditions**

Negative swap spreads (1) – recent story

- Fixed-rate debt used to be swapped at positive spread into floating Libor+
- The supply of receive-fixed by corporates is questioned and interrupted
  - ✓ cheapening fixed-rate issuance
- The supply of pay-fixed by asset managers and hedge funds is broken
  - ✓ hedging credit and interest rates risks
  - ✓ swap spread wideners – used to be systemic risk hedge
- Reasons
  - ✓ swaps shifting to the clearing and not carrying counterparty risk spread which made swap spreads positive before that?
  - ✓ Leverage ratio made costly to warehouse US Treasuries for banks (wider UST rate), China raising cash by selling USTs. Term repo spiked above Libor
  - ✓ Record corporate issuance and supply of receivers (lower swap rates)
- Dislocations between the swap rate and pension fund discount rates
  - ✓ “swaps are no longer an effective hedge of the liabilities
- “When we start clearing repo, spreads will correct significantly…” K. Griffin, Citadel

CDS clearing & CCP counterparty charge – recent stories

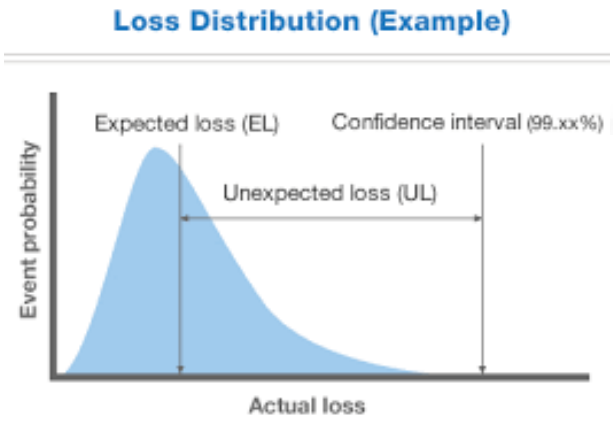
- "Banks obstruct single-name CDS clearing"
  - ✓ The biggest concern on clearing financials
  - ✓ Inheriting contracts written on itself?
  - ✓ Gap risk and transfer costs

- ICE is "working through" wrong-way issues
  - ✓ may be necessary to revamp auctions
  - ✓ A group of 25 US buy-side firms voluntarily committed to begin clearing single-names CDSs
  - ✓ SEC – "no plans" to introduce single-name CDS clearing

- Dealers disagree over charge for CCP counterparty risk
  - ✓ Fed stress tests push US banks towards charging CVA for cleared derivatives
  - ✓ "CCP is a counterparty like any other counterparty"?
  - ✓ Liquid CDSs for CCPs and traded where?
  - ✓ Interest rates bid/ask spreads on CCPs?

Wrong-way risk (WWR) (1) - concentration and model risks

- Business models imply concentration risks
- **Wrong-way risk in funding – the big issue in margin/cleared trading**
- CVA/XVA has large model risks, especially appreciated over economic cycle (2-5 years)
  - ✓ wrong-way risk



WWR (2b) - a stress-scenario model

- Predictable WWR enforced by capital flows and crisis outflows in EM
  - ✓ Unstable correlations
  - ✓ Dependent on economic and market cycles
  - ✓ Pricing consistent with stress-based trading limits
  - ✓ Crisis state is more quantifiable than intermediate states and correlations?

- **Important and useful to think in terms of scenarios &stress tests**

M. Turlakov, "Wrong-way risk, credit and funding", Risk (2013)

The main assumption – WWR is determined by a particular scenario

A particular example - sovereign default

Exposure given the counterparty default

$$EPE_{WWR} = P(sov|Cpty) * EPE^{stressed} + \left(1 - P(sov|Cpty)\right) * EPE$$

- One possible parametrisation and coupling to the systemic risk

$$P(sov|Cpty) = \lambda P(sov)$$

Derivatives and business models

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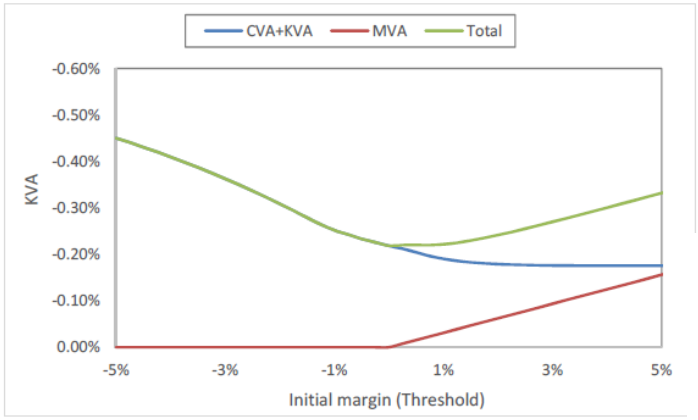
Markets transformation and business models – part 2

- ✓ XVAs, central clearing, and derivatives
- ✓ OTC markets transformations
- ✓ Business models in the financial markets

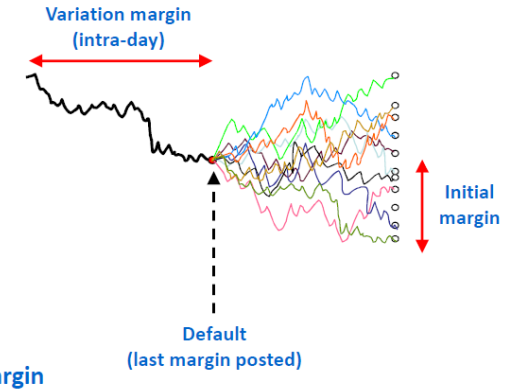
XVAs and central clearing – the burden of initial margin and gap risk

- **Current exposure method**
  - Initial margin is not favoured due to no reduction in KVA as a result of IM



CCPs and Initial Margin

SOLUM FINANCIAL PARTNERS



- **Initial margin**
  - Cover the cost of a member defaulting (to a confidence level over a pre-defined period)
  - Also significantly drives the cost of central clearing
  - To a large extent independent of the credit quality of the member
  - Not great in the case of wrong-way risk (likely jump in exposure when member defaults)

XVAs and derivatives – general observations

CVA/XVA is the illiquidity charge (for the counterparty credit and other risks)

- Enforced by regulators and auditors
- Is the systemic risk reduced by the introduction of CVA? Aren't banks coupled even more by hedging of CVA on the interbank lines?

FVA is the business-strategy cost, hedging-strategy and business dependent

- Not yet enforced by regulators and auditors
- Lack of term-funding market in EM

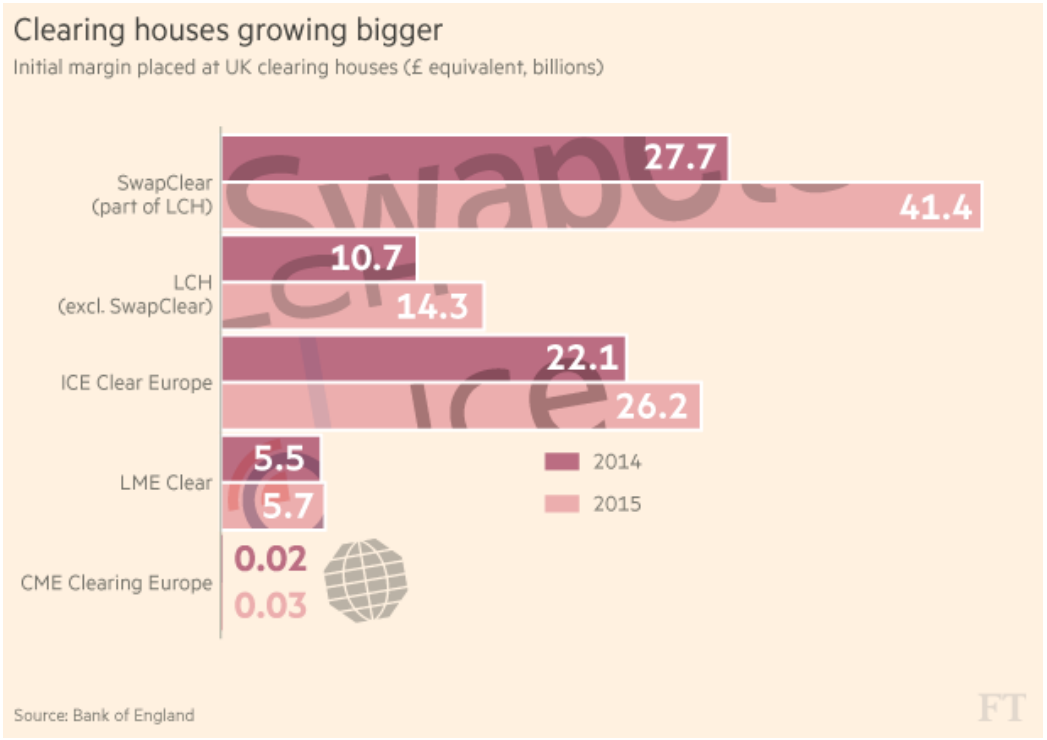
KVA is the capital charge/cost and/or cost of the capital/VaR buffer

- Predictability of banks RoEs?

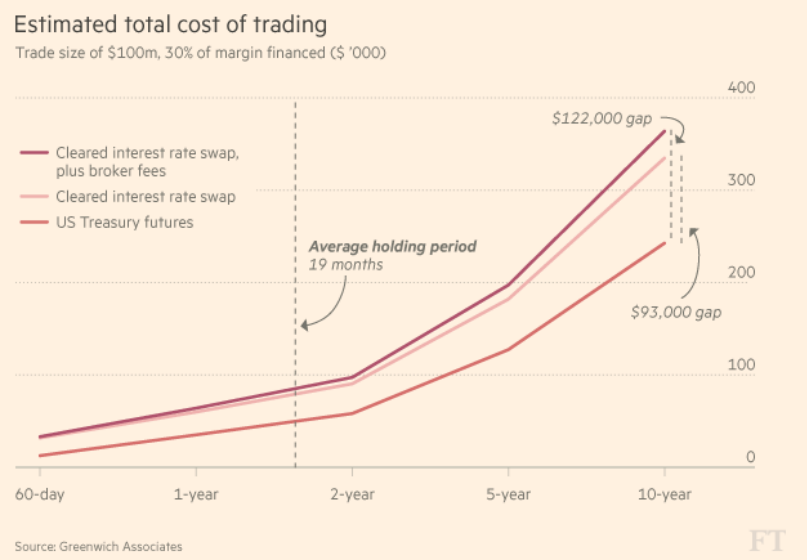
The ever changing nature of funding conditions

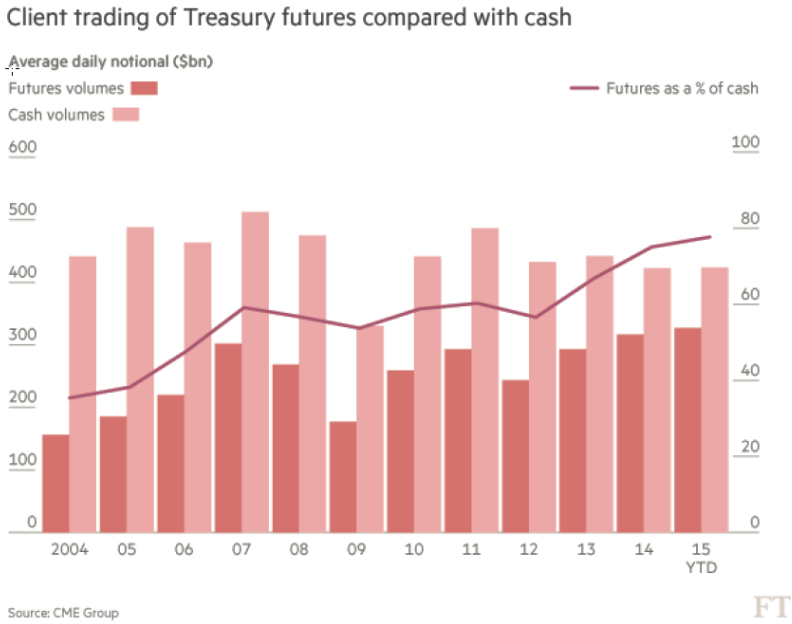
- The world of rotating QE's and the global carry trade
- Negative rates and flat curve in many major G10 economies

OTC markets transformation (1)



OTC markets transformation (2) - futurisation





OTC markets transformation (3) – banks struggle

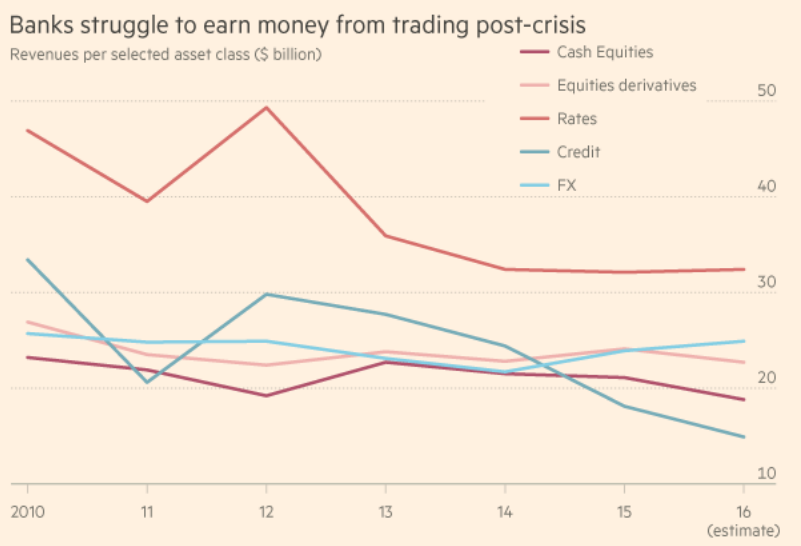


Exhibit 1

We expect banks to shrink balance sheet further

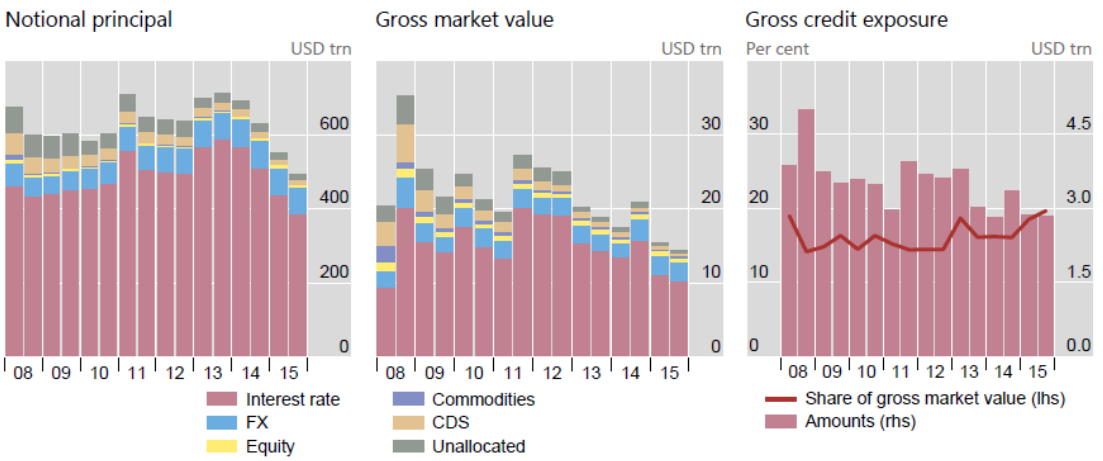
Share of 2014 balance sheet and expected reduction

	Changes in balance sheet 2010-14	Further potential reduction
Rates & repo	~ -30%	-15% to -25%
FX, EM, & Commodities	~ -25%	-5% to 0%
Credit & Securitised	~ -30%	-5% to -15%
Equities	~ 0%	-5% to 0%
Total	**~ -20%**	**-10% to -15%**

Source: Oliver Wyman proprietary data and analysis

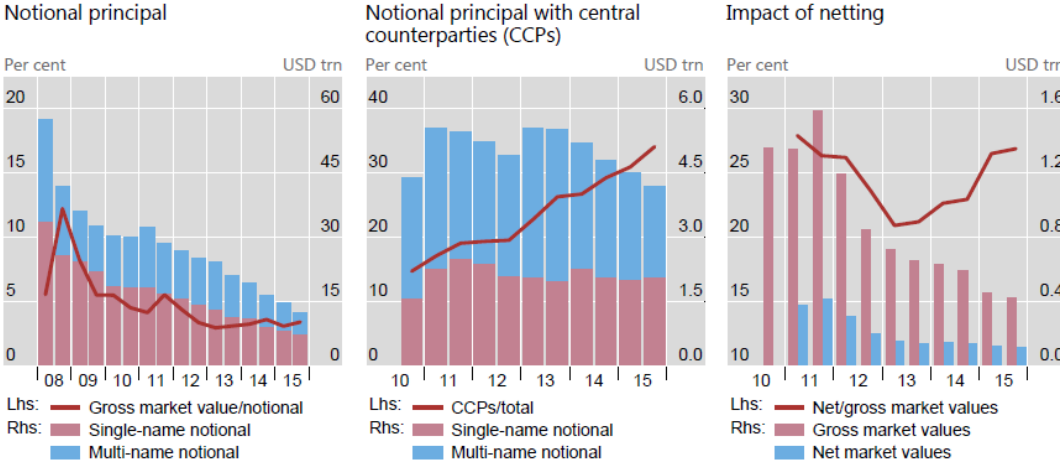
OTC markets transformation (4) – global OTC derivatives

Global OTC derivatives markets[1] Graph 6



Further information on the BIS derivatives statistics is available at www.bis.org/statistics/derstats.htm.

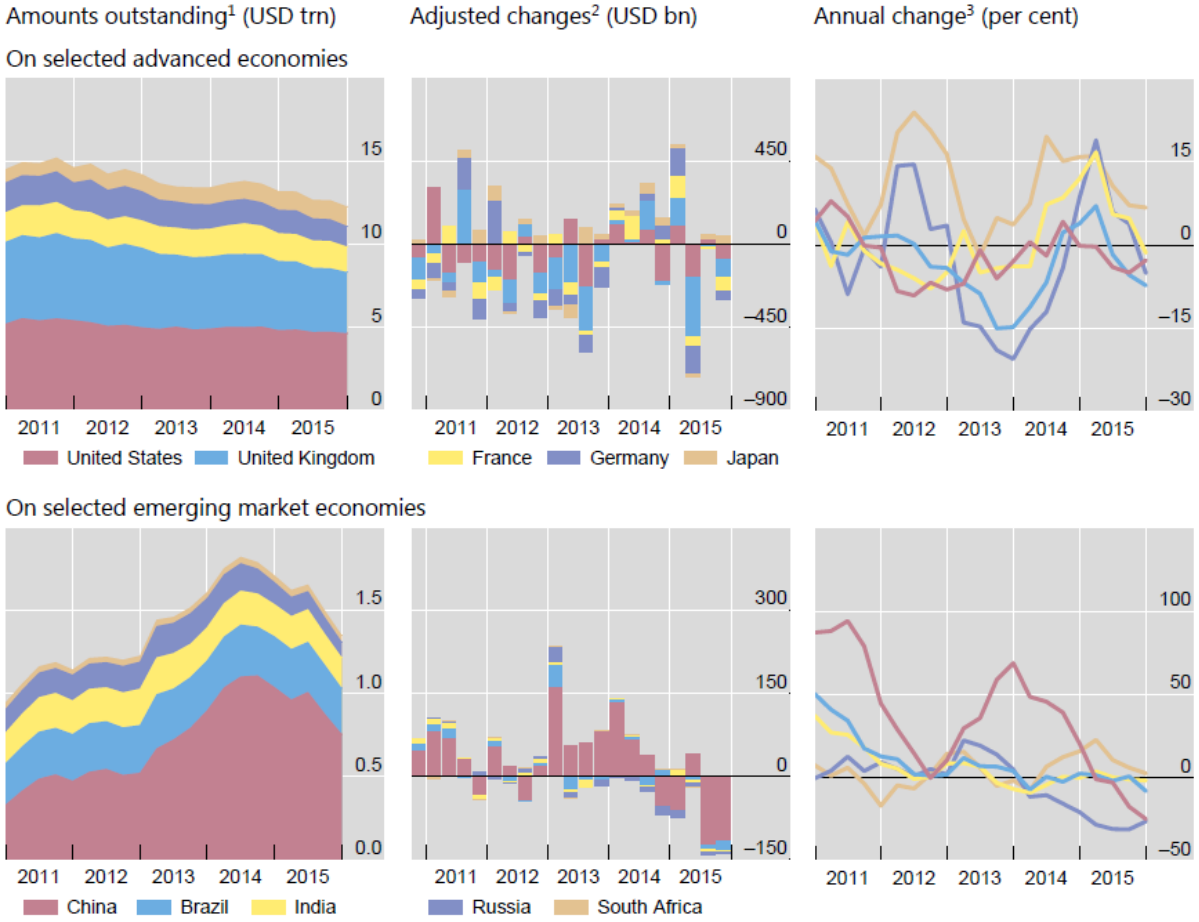
Credit default swaps[1] Graph



Further information on the BIS derivatives statistics is available at www.bis.org/statistics/derstats.htm.

OTC markets transformation (5) – cross-border claims

Cross-border claims, by borrowing country — Graph 3



Further information on the BIS locational banking statistics is available at www.bis.org/statistics/bankstats.htm.

OTC markets transformation (6) - liquidity rewiring between banks and asset managers

Exhibit 11

Recent shifts in risk across the value chain

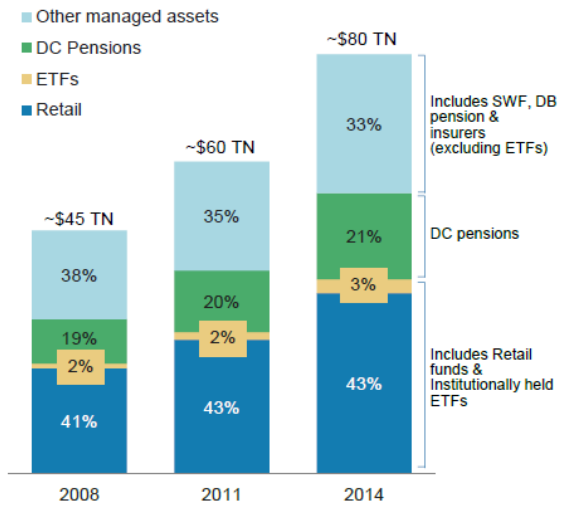
	Operational risk	Counterparty credit risk	Liquidity risk	Market risk
Asset owners		Central clearing and initial margin	Collateralisation, decreased market liquidity	Increased holding of riskier assets
Buy-side	↑			
Sell-side		← Balance sheet reductions and de-risking →		
Market infrastructure	Growth of electronic trading, central clearing and collateralisation			
Aggregate impact	Operational risk increasing	Banks de-risking, but asset owners and MI may be absorbing much of the risk		

Changes in risk over past 2-3 years:
Increased Risk Decreased Risk

Exhibit 12

Redeemable funds account for ~46% of AuM

Global AuM evolution, $TN

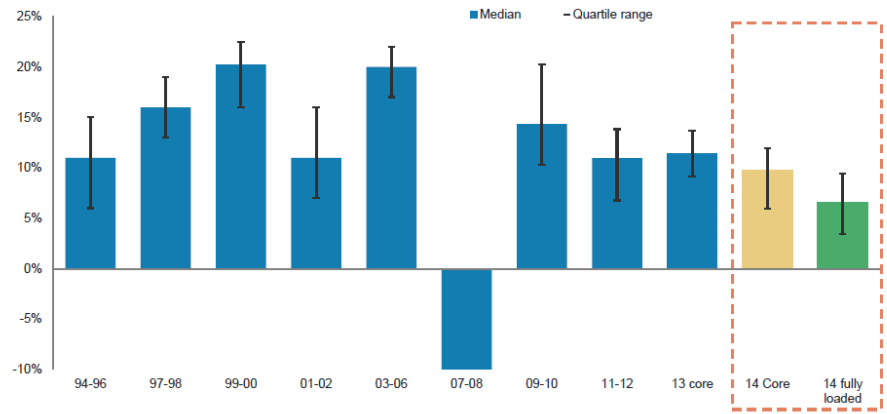


Source: The CityUK, Oliver Wyman Wealth & Asset Management model

Exhibit 38

Spread of wholesale banks returns around the average has increased 2013-14

RoE (%)



1.Includes impact of legacy books and fines attributable to wholesale banking activities. Excludes FHFA and Department of Justice settlements / fines for BAML and BNPP
Source: Oliver Wyman analysis

Business models – who and how?

Current view of securities ecosystem revenue pools

VALUE CHAIN	Sell-side	Buy-side[1]	Market infrastructure: Execution venues (exchanges, IDBs, CCPs)	Market infrastructure: (I) CSDs	Market infrastructure: Custodians	Market infrastructure: Data & tech providers & other 3rd parties	TOTAL
Primary	$60 BN		$1 BN				~$60 BN
Execution	$165 BN		$15 BN		$4 BN	$3 BN	~$190 BN
Investment management		~$430 BN					~$430 BN
Clearing			$5 BN		$1 BN		$5-10 BN
Securities services			$1-2 BN		$40 BN		$40-45 BN
Post trade data & analytics			$5 BN	$3 BN		$21 BN	$25-30 BN
Revenue	~$225 BN	~$430 BN	$25-30 BN	~$3 BN	~$45 BN	~$24 BN	$750 BN

2010-2014 CAGR: < -3% | -3-0% | 0-3% | 3-5% | > 5%

1.Includes Asset Managers and Hedge Funds. Excludes Private Equity and Real Estate. Includes Distribution and Manufacturing

Source: Company annual reports, Oliver Wyman proprietary data and analysis

Summary

- Financial markets are changing and reconstructing remarkably due to regulations and central banks actions

- Business models of sell-side, buy-side and infrastructure and service firms are challenged and to be rebuilt

- XVA adjustments and other “spreads” (swap spreads, WWR, etc.) are only early indicators of current and future deeper structural changes

Supplementary material

Brief history (1)
Counterparty risk before and after 2007

"I'm not so much concerned about the return on my money, but the return of my money." Will Rogers

before 2007

- sovereign and bank credit risk was not on the agenda (not priced in)
- (for example, in 2006 Greece 5y CDS @ 12bps)

$$CDS_{sovereign} \ll CDS_{bank} \ll CDS_{corporate}$$

- classic banking system allowing the flow of credit from banks to corporates, mainly corporate credit risk for loans and bonds is priced in

after 2007

- counterparty risk in OTC bank-to-bank and bank-to-corporate is a big concern

$$CDS_{sovereign} \sim CDS_{bank} \sim CDS_{corporate}$$

- regulatory measures (i.e. CVA VAR, capital ratios, etc) and funding pressures (via collateralisation or CCPs) assure no return to "classic banking system" in the near future
- Disintermediation of banks from loans
- more strongly coupled financial system, more correlation/snap risks

Brief history (2)
Future and present of XVAs

Stage 1 (before GFC-2007)

Recognition of "hidden" credit/counterparty/funding/WWR risks

- Even back-to-back trades do have risk

Stage 2 (2007-2012)

Global Banks – CVA model

- CVA desks fully established
- Market-based spreads?
- Still plenty of differences and variations?

Stage 3 (2012-future)

Regional and EM Banks – CVA and FVA model?

- Historical/credit analysis spreads make more sense
  No liquid CDS market, no meaningful differential corporate vs bank spreads
- CVA desks being set up
- Multi-tier market

Global Banks – FVA and KVA?

- The future of FICC businesses in Global and EM banks?
- Optimisation of capital and profitability?

XVA and the DM and EM differences (1)
The markets

The dominance of Rates markets in DM

- funding, loans and bonds issuance mainly in the same own currency
- Rates markets are less correlated with FX

The dominance of FX markets in EM

- Eurobonds and local currency bonds are comparable in the market size
- posting currency under CSA is USD, not own currency. Immediate coupling to FX
- CDS for EM nominated in USD (quanto adjustments)
- the dominance of USD as a dual/parallel currency for commerce and retail

More prevalent and explicit WWR in EM

- EM - less liquid, less developed and therefore more inter-coupled markets
- Concentration risks in EM more explicit than in DM?
- Rates and FX markets are strongly coupled in EM

Basel 3 - even bigger strain for EM derivatives?

- Ring-fencing liquidity for subsidiaries
- Deglobalisation of corporate funding, pressure on Xccy swaps one-way

XVA and the DM and EM differences (3)
The flows

Interest rates differential between EM and DM is the big driver of global flows

- FX carry trade between DM and EM
- FX forward points, and therefore EPE >> ENE
- The dominance of WW Xccy flows (for banks) – a corporate issuing a bond in local currency and swapping in low-rate USD (in DM, there is large flow of IRS payers)

Credit and funding derivatives flows in EM

- Local bonds hedged by Xccy swap versus HC (hard-currency) Eurobond
- LC (local currency) funding versus HC (hard-currency) funding, the consequences of supply and demand as well as liquidity of the markets
- Local rates and bonds hedged by IRS swap
- Eurobonds hedged by unsecured CDS versus USD swaps

Triple WW for CVA in EM on CDS widening (due to bond outflows)

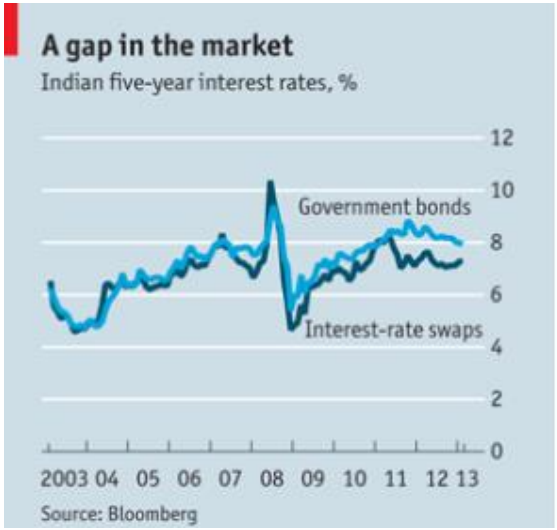
- USD-EM FX higher - carry trade outflows/loop
- Local rates higher, and therefore EPE/exposure higher – local bonds outflows/loop
- Implied vol is higher, and the exposure/EPE higher – skew/smile risk-aversion/loop

XVA and the DM and EM differences (4)
The liquidity

Gaps and lack of liquidity (supply/demand) in EM

- Example: Indian swaps and bonds

("Derivatiff", Economist, feb16, 2013)



Own funding spread and the funding sources in EM?

- Unsecured (ON funding and only short-term in EM)
- Secured (FX swaps, Xccy swaps, repos)
- Own bond-CDS basis

Liquid IR DM can be justified/rationalised via the quantitative Libor-OIS framework

- Discounting/OIS (funding implied) and projection/IRS/Libor curves in a single currency
- Discounting/funding curves implied from FX and Xccy swaps (under CSA)

XVA and the DM and EM differences (4)
The questions

Multiple questions about CVA and FVA, especially in EM

- The applicability of MtM CVA for illiquid names, mixed historical and market risks?
- The applicability of CVA in EM without developed credit (CDS, bonds) markets?
- The accounting/base currency for CVA in local Ccy or USD?
- The lack of developed term-funding markets for FVA in EM?
- **CVA and FVA should include strong WWR effects in EM and their (hardly possible) hedging?**
- The separation of systemic (country or index) and single-name credit risks?

CVA and FVA concepts have been developed in DM and raise even more questions and strain in the EM context

WWR (2a) - example of WWR for FX

- Emerging Markets – in financial crises and/or recessions, corporate and sovereign defaults as well as downgrades are accompanied by severe declines in local currency values
  - ✓ numerous historical examples (South-East Asia, Russia in 1998, 2007, 2014)
  - ✓ one-sided quite certain effect due to capital outflows reaction in the global financial system

  - ✓ … definitely important risk but not necessarily quantified via correlations

WWR models (3) - the review

… many models already but not yet practical enough?!

- "Exposure given default" Models
  - ✓ for sovereign or corporate, FX example (A. Levy, 1999, JP Morgan)
  - ✓ pricing in the Ccy devaluation scenario given the default
  - ✓ calibration of Ccy devaluation amount is possible, although quanto CDS is illiquid market
- Stochastic/Dynamic Credit Models
  - ✓ assume stochastic dynamics and jumps (Mercurio, Li (Risk magazine), Cappriotti, Lee (Risk), the talks by T. Hulme, A. Green)
  - ✓ many parameters not well-defined (credit-FX/rate correlations, credit vol too high, etc)
- Joint distribution models
  - ✓ Gaussian copula (Redon, Finger, Iacono, Buckley et al, Rosen, etc)
  - ✓ not always easy to apply to a portfolio
  - ✓ historical correlation? Correlation between time-to-default and exposure?
  - ✓ Hazard rate as a function of exposure (Hull-White, 2011)

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