

Fundamental Analysis in Macro: How the Authorities' Bad Analysis Engineered the Global Financial Crisis

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- A wrong definition of bank failure.
- Risk weightings and capital requirements for MTM resiliency.
- Reverse Engineering Basel to assess the risk on Banks' books.
- Would resilient bank still be profitable ?
- Inadequate capital requirements caused excessive compensation.
- Capital requirements insufficient to weather normal NPL cycles.
- Cognitive challenges for macro stability.

RESILIENCE UNDERMINED BY A WRONG DEFINITION OF SOLVENCY

THE NATURE OF THE BANKING CRISIS

- a) A liquidity crisis that led to latent insolvency ?
- b) A latent insolvency crisis that led to a liquidity crisis ?

CURRENT BANK FAILURE DEFINITION

- “The solvency of a bank depends on whether the value of its assets, *if held to maturity*, is sufficient to meet its obligations to depositors and holders of other bank debt” (John Vickers, “Some Economics of Banking Reform” Dec, 2012 – emphasis added).
- If banks are to rely on markets, rather than taxpayers, for their funding, they must remain solvent on a mark-to-market basis.
- The fuzzy and unworkable concept of “value if held to maturity” relies on estimates made by economic agents that are bound to be even more biased than the market.
- A butterfly effect: an apparently small mistake in the regulator’s definition of bank solvency has triggered the biggest financial hurricane in 80 years.

M-T-M INSOLVENCY RISK

WHY IS CAPITAL NEEDED?

Capital is needed to absorb losses before they affect other liabilities and cause insolvency.

HOW PROBABLE ARE LOSSES?

For normally distributed returns averaging zero (banks' ROA is rarely above 1%), there is a 50% probability of encountering losses higher than 1 annual standard deviation every 4 years, and of suffering losses larger than 2 annual standard deviations every 30 years.

RISK WEIGHTINGS AND CAPITAL REQUIREMENTS FOR MARK-TO-MARKET RESILIENCY

RISK WEIGHTING AND VOLATILITY



* Standardised Approach and “Swiss Finish”

** Stand. Dev. of time series from CGBI World Gov. Bond Index, BOA/ML Bond Indices, MSCI World

Risk Weighting is broadly consistent with the volatility of each asset class.

CAPITAL AND RISK WEIGHTED ASSETS

	Gov Bonds	AAA Bonds	A Bonds	BBB Bonds	Stocks
Annual StDev *	2.8%	3.1%	4.4%	7.3%	15.0%
Basel II - Risk Weight Coeff.	0%	25%	50%	100%	125%
Basel II Minimum Capital	-	2%	4%	8%	10%
Basel II - Allowed Leverage	∞	50	25	12.5	10
Basel III Minimum Capital (including capital buffers of 5% of RWA)	-	3.3%	6.5%	13%	16.3%
Basel III - Allowed Leverage	∞	30	15	8	6

* Stand. Dev. of time series from CGBI World Gov. Bond Index, BOA/ML Bond Indices, MSCI World

While the risk weights are broadly in line with volatility, Basel capital requirements at around one annual standard deviation of the assets they refer to is perplexing. And this is before exploiting the benefits of diversification and considering fat tails risk.

REVERSE ENGINEERING BASEL TO ASSESS THE REAL RISK ON BANKS' BOOKS

REVERSE ENGINEERING BASEL RATIOS

Banks have large and complex portfolios of assets, many of which are difficult to value. Given the vastness and complexity of banks' balance sheets, management and regulators rely on ratios but do not have a concrete perception of the risk of banks' books.

In a paper published by the Swiss Finance Institute in late 2008*, I showed how Basel ratios can be reverse-engineered into a simple, but risk-equivalent, portfolio of 2 assets.

This approach gives a practical understanding of the true level of riskiness of banks' balance sheets when viewed as an investment portfolio subject to mark-to-market volatility.

* http://www.swissfinanceinstitute.ch/op01_update.pdf

BANKS STILL RUNNING CRAZY BALANCE SHEETS!

Large US Banks, Fed CCAR 2016

Capital/RWA (Tier 1 Ratio)	12.3%
RWA/TA	72%
Leverage	11x

	Assets	Basel II Coeff.**	Risk Weighted
Stocks	525	@125%	656
AAA Bonds	<u>565</u>	@25%	<u>141</u>
Tot Assets	1,100		797
Tier 1 capital	100		

* Does not include Operational Risk and other charges but doesn't benefit from diversification

** Standardised Approach, Swiss Finish

A typical large US bank at the end of 2015 had a portfolio that has the same risk as one leveraged 5.2x in equities and 5.7x in AAA bonds. Other than in regulated banks, portfolios with so much risk do not exist because they would not survive long and hence the market would not fund them.

BANKS STILL RUNNING CRAZY BALANCE SHEETS!

EBA Stress Test Sample - End 2015

Capital/RWA (Tier 1 Ratio)	13%
RWA/TA	36%
Leverage	22.0

	Assets	Basel II Coeff.**	Risk Weighted
Stocks	440	@100%	440
AAA Bonds	<u>1,760</u>	@20%	<u>352</u>
Tot Assets	2,200		792
Tier 1 capital	100		

* Does not include Operational Risk and other charges but doesn't benefit from diversification

** Standardised Approach

A typical large European bank at the end of 2015 had a portfolio that has the same risk as one leveraged 4.4x in equities and 17.6x in AAA bonds. Other than in regulated banks, portfolios with so much risk do not exist because they would not survive long and hence the market would not fund them.

BANKS STILL RUNNING CRAZY BALANCE SHEETS!

Simplifying assumptions:

- No risk weight for other risks (operational etc.)
- BUT no benefit from diversification, which usually cuts by about 40% RWA in banks' models

Diversification benefits and dynamic risk control suffer from fallacy of composition that makes them systemic problems.

Some consider the goodwill associated with a banking licence as an important hidden asset. But this also assumes a bank is allowed to continue operations through taxpayers' funding also when considered potentially insolvent by the market. It happened in the Financial Crisis but should not happen again.

HEDGE FUNDS FAR LESS RISKY THAN BANKS!

Sample Aggressive HF Balance Sheet

	Assets	Basel II Coeff.**	Risk Weighted*
Stocks Long	120	100%	120
Stocks Short	60	100%	60
Stocks Net	60		
Gvt. Bonds , 8y	100	0%	0
Corp Bonds BBB 3y	30	100%	30
Foreign currency	50		
Interest rate risk			29.0
Currency risk			62.5
Total Assets	300		302

Capital (NAV) 100

Capital/RWA (Tier 1 Ratio) 33.2%

RWA/TA 101%

Leverage 3.0

* Does not include Operational Risk and other charges but doesn't benefit from diversification

** Standardised Approach

Minimum required capital according to Basel III (13% of RWA including add-ons) would be 39.3 only. At 100, an aggressive HF has 2.5x the minimum prudential capital prescribed to banks.

AN AGGRESSIVE HF WOULD HOLD AT LEAST TWICE AS MUCH CAPITAL AS A BANK

	US Bank	EU Bank	HF
<i>Equity/RWA (Tier 1 Ratio)</i>	12.5%	11.1%	33.2%
<i>RWA/TA</i>	72%	40%	101%
<i>Leverage (TA/Eq)</i>	11.0	22.5	3.1
<i>Capitalisation (Eq/TA)</i>	9.0%	4.4%	32%
<i>Assets' Volatility</i>	8-10%	4-6%	10-15%

- Banks, also under Basel III, will have capital equal to only roughly one annual standard deviation of their assets. This gives bank a 50% chance of becoming insolvent every 4 years.
- Aggressive HF have 2-3 annual standard deviation of capital at least.
- The public puts money into banks thinking it is safer than loaning it to anyone else. The contrary is true.

WOULD RESILIENT BANKS STILL BE PROFITABLE?

A PHASE TRANSITION

- When capital was not a constraint, any Return on Assets increased the Return on Equity. Banks' priority, hence, was increasing assets.
- Now capital is a constraint and must be raised further at a high cost. Banks must hence focus on businesses that provide a Return on Equity (on their Target Tier1 equity) higher than their cost of capital.
- Low risk, low ROA businesses were interesting because they brought banks leverageable assets. They are less interesting now under stringent capital requirements and are being abandoned. Examples are: prime brokerage, correspondent banking, clearing, guarantee provision etc. This will have deep consequences for financial markets.
- Until the market recognises the benefit of the higher capital cushion and banks' cost of capital decreases, banks will:
 - Misprice or abandon low risk business
 - Focus on high risk/high return businesses
 - Invest in Government Bonds (which carry a 0% risk weight).
- This phase transition will create discontinuities in banks business lines. Unfortunately Regulators' misguided fear of mis-named "Shadow Banking" is interfering heavily with the natural development of alternative financial piping.

AN EXAMPLE: REPRICING SPREADS

The table below shows how banks must reprice spreads as they target higher Tier 1 ratios in order cover their 10% cost of capital (detailed calculations on next page).

Rating	RWA	Spreads with Tier1=11% if cost of capital		Spreads with Tier1 = 20% if cost of capital		Market Spreads last 15yrs*		
		10%	5%	10%	5%	Min	Max	Mar-15
BBB	100%	4.8%	2.4%	8.8%	4.4%	1.2%	7.2%	2.2%
A	50%	2.4%	1.2%	4.4%	2.2%	0.6%	6.0%	1.2%
AAA	25%	1.2%	0.6%	2.2%	1.1%	0.2%	2.9%	1.1%

**Spreads based on BOA/ML Bond Indices (AAA, A, BBB and Sovereign) – All maturities.*

- The first highlighted column indicates the current situation. Only AAA spreads are coherent with banks' current cost structure.
- The second highlighted column shows the spread banks will require to earn a ROE higher than the cost of capital as they raise their Tier1 objective to 20%.
- A generalised rise in required spreads can be anticipated for the lending business to remain profitable for banks.
- The situation will normalise once the market recognises that better capitalised banks deserve a higher valuation and banks' cost of capital will decrease again. But the transition will be difficult.

PRICING SPREADS

An example: what is the required spread for owning an “A” rated loan/bond (Risk Weight = 50%)?

Hypothesis:

Target Tier1 Capital ~ 20% (TLAC)

Cost of Capital: ~ 10%

Tax Rate: ~ 33%

Cost/Income: ~ 66%

1) Pre-tax Cost of Capital = 15%

$$\text{Pre-Tax Cost of Capital} = (\text{Cost of Capital} / (1 - \text{Tax Rate})) = 10\% / (1 - 33\%) = 15\%$$

2) Required Revenue on Target Regulatory Capital = 44%

$$\text{RRTRC} = (\text{Pre-tax Cost of Capital} / (1 - \text{Cost/Income Ratio})) = 15\% / (1 - 66\%) = 44\%$$

3) Required Target Capital to Own a “A” rated bond = 10% of face

$$\text{RTC} = (\text{Bond Nominal Value} * \text{Risk Weight} * \text{Target Tier1 Ratio}) = (100\% * 50\%) * 20\% = 10\%$$

4) Required Minimum Spread Over Funding Costs on a “A” Bond = 4.4%

$$\text{RMS} = (\text{Required Target Capital} * \text{Required Rev. on Reg. Capital}) = (10 * 44\%) = 4.4\%$$

INADEQUATE CAPITAL REQUIREMENTS CAUSED EXCESSIVE COMPENSATION

BANK CAPITAL AND EXCESSIVE COMPENSATION

- The problem of excessive compensation in big banks can be read as one of insufficient capital which leads to unreasonably high pre bonus ROE (due to both fat “R” and too small “E”) which managements reduce to publishable ROE by pocketing the difference.
- The “R” is bigger than it should be also due to the “Too Big To Fail” rent position big banks enjoy as OTC market makers in securities and derivatives. There can be no differentiation between front running and market making when dealing with captive clients as in current oligopolistic OTC markets.
- The “E” is too small due to the grossly underestimated minimum capital requirement positions the banks have been regulated into. This was the devastating result of years of pondering by the sort of internationally coordinated regulatory effort, from which the solution to the current predicament is still expected.

2014 COMPENSATION LEVELS AND ROE

Top US Banks	<i>Total employees</i>	<i>Avg Actual Compensation (USD)</i>	<i>Actual ROE</i>	<i>ROE at Avg. Fin Sector Compensation</i>	<i>ROE at Avg. Fin Sector Compensation and 2x Capital</i>
Goldman Sachs	34,000	373,265	11.2%	25.6%	12.8%
Morgan Stanley	55,802	319,415	4.9%	27.0%	13.5%
Wells Fargo	264,500	113,202	13.7%	25.5%	12.8%
JPMorgan	241,359	124,959	9.8%	16.7%	8.4%
Bank of America	224,000	150,835	1.7%	15.1%	7.5%
Citigroup	241,000	99,415	3.4%	8.9%	4.5%
Average US	176,777	196,848	7.4%	19.8%	9.9%
Top European Banks	<i>Total employees</i>	<i>Avg Actual Compensation (USD)</i>	<i>Actual ROE</i>	<i>ROE at Avg. Fin Sector Compensation</i>	<i>ROE at Avg. Fin Sector Compensation and 2x Capital</i>
Barclays	132,300	137,029	-0.3%	11.6%	5.8%
Société Generale	148,322	81,047	5.0%	9.4%	4.7%
Credit Agricole	72,567	115,976	5.3%	7.2%	3.6%
DB	98,138	169,374	5.4%	19.0%	9.5%
BNP Paribas	187,903	104,644	0.2%	6.8%	3.4%
Credit Suisse	45,800	270,633	4.1%	17.2%	8.6%
UBS	60,155	277,799	7.0%	38.8%	19.4%
Average EU	106,455	165,215	3.8%	15.7%	7.9%
TOT AVERAGE	141,616	181,032	5.6%	17.8%	8.9%

Sources:

Banks' Balance Sheets (End 2014), US BEA, UK ONS, Swiss Federal Statistical Office

US Financial Sector's Average Annual Compensation = 68,000 USD

UK Financial Sector's Average Annual Compensation = 75,000 USD (45,000 GBP)

EuroArea Financial Sector's Average Annual Compensation = 75,000 USD (55,000 Euro)

Swiss Financial Sector's Average Annual Compensation = 135,000 USD (150,000 CHF)

CAPITAL AT NORMALIZED COMPENSATION

- Had banks paid in 2006 the average compensation of USD 75,000 for the financial sector (US Bureau of Labour; average US wages in all sectors were USD 39,200), a sample of the major US and European banks would have reported ROE of 31.5% versus the 19.5% ROE they actually reported given the excessive compensation they paid.
- In 2014, reported ROE fell to 5.6% on average. Of the decline from 19.5% in 2006, roughly 5% was lost due to higher capital and 9% due to worse business conditions. But had banks paid in 2014 only average financial sector compensation, the reported ROE would have been 17.8%, way too high for a business enjoying government support in a zero interest rates environment.
- If banks paid average financial sector compensation AND had twice the current capital, their ROE would be 8.9%, broadly in line with their cost of capital.

CAPITAL REQUIREMENTS INSUFFICIENT TO SURVIVE A NORMAL NPL CYCLE

AN IMPOSSIBLE BUSINESS PROPOSITION

We want banks to

- 1) make risky loans to the real economy
- 2) offer ultra safe deposits to clients

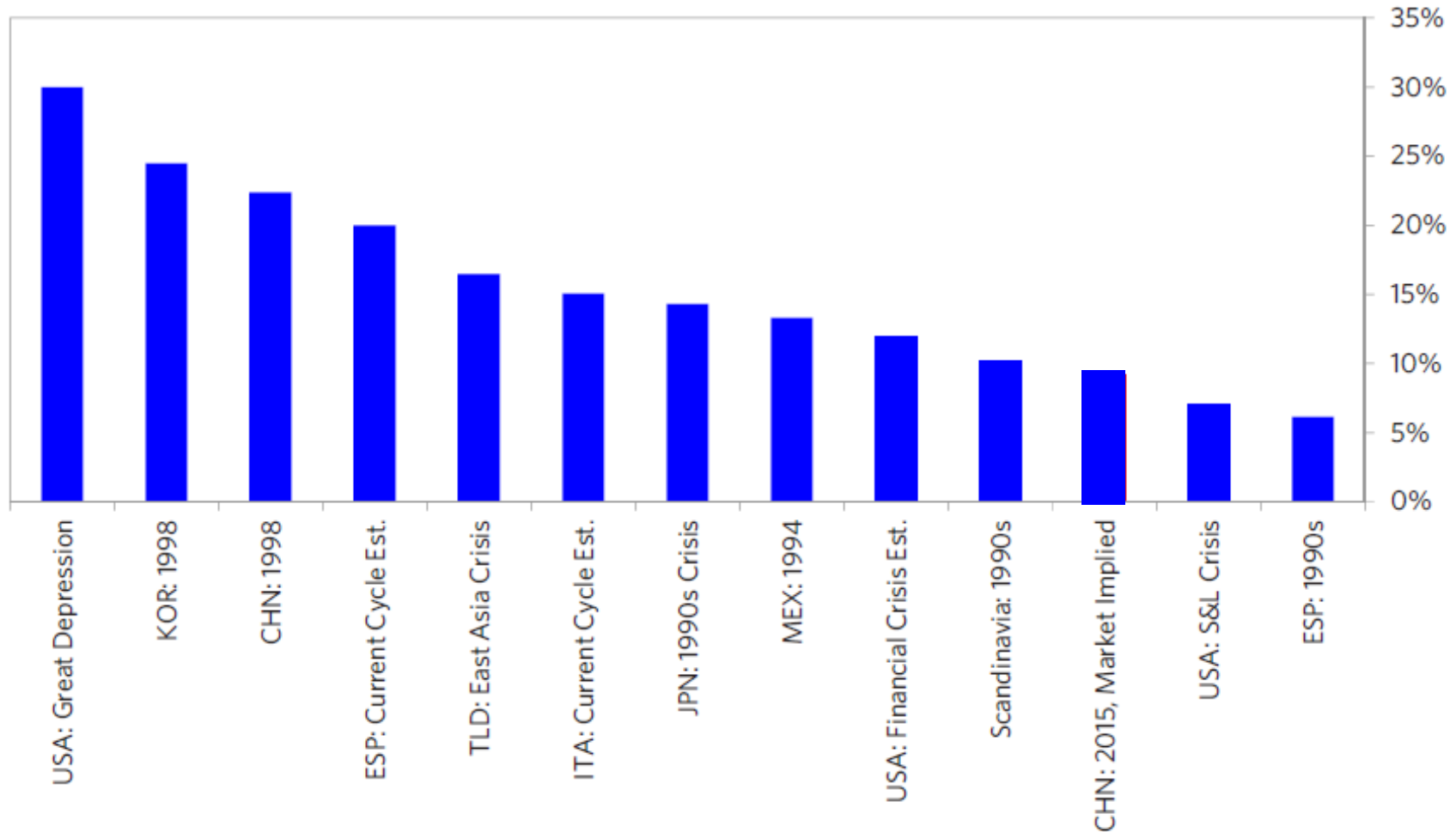
Capital is the buffer between these two incompatible objectives. It should be able to absorb losses from the risky loans and is remunerated by the levered spread between assets and liabilities.

But is the minimum "prudential" capital requirement the banks have been mandated to own enough of a buffer?

Is capital sufficient to absorb the Non Performing Loans a negative business cycle generates?

NPL CYCLES CAUSE LOSSES OF 15% OF LOANS

Historical Credit Loss Cycles (% Loans)



Source: Bridgewater

BANKS DON'T HAVE ENOUGH CAPITAL TO SURVIVE

A negative business cycle routinely creates to the affected countries losses of about 15% of the loan book.

Banks, both in Europe and in the US, currently have only about half the capital required to survive a negative business cycle.

Yet both the Fed and the ECB routinely pass almost all banks in their stress tests. A further proof the Global Financial Crisis was engineered by regulators totally lost in the complexity of their rule books and unable to see the incoherence of their grandiose designs.

Bankers just as lost in the complexity of their business and only concerned with remaining within the limits of prudential regulation.

Unfortunately if the speed limit was wrongly set at 400 km/h, driving around at 300 km/h didn't prevent all buses from crashing at the first (second? think of LTCM ...) unexpected turn.

Are Banks and their Regulators obsolete?

- All banks' business lines have seen the emergence of better intermediaries
- Pricing liabilities, rather than regulation, is the way to stop "Bank Runs"
- Why does this escape regulators? The odd regulation of US money market funds and the unjustified fear of volatility

COGNITIVE CHALLENGES FOR MACRO STABILITY

A COGNITIVE FAILURE IS PRECIPITATING THE WRONG RESPONSE

- The economy is a complex adaptive system populated by fallible agents with imperfect knowledge and understanding
- Financial regulation and large financial institutions have become themselves complex systems.
- The financial crisis was caused by massive unavoidable cognitive failures by regulators and bankers.
- We need to switch to new paradigms to understand what happened, why it will happen again, and hopefully be more resilient when it will.
- Macro Stability fora are an example of the wrong responses precipitated by the wrong diagnosis of the crisis.
- Market based finance, now misnamed “Shadow Banking” is a far sounder response.

THE WRONG RESPONSE: MORE COMPLEX RULES



- The survival of Board Members and Top Management depends on compliance with rules and regulations. Drivers distracted by way too many sign posts, are likely to miss the turn and crash.
- Boards (and other top governance bodies) overwhelmingly deal with rigid agendas dictated by the regulatory framework.
- The business risk is assessed essentially in terms of its distance from regulatory prudential speed limits. As prudential rules turned out to be grossly wrong, the banking system crashed unaware of its own risk and without breaking any rule.
- The new banking rules make the financial system more fragile by pushing it towards higher complexity, higher rigidity, higher concentration, higher interdependence and inhibit the development of new markets, product and intermediaries.
- Open and transparent markets are the only remedy to the cognitive mistakes that precipitated the Global Financial Crisis.

TAKE-AWAYS

- Solvency on a M-T-M basis has no alternatives.
- Reverse engineering Basel's ratios to comprehend risk on complex balance sheets.
- Banks still far from having adequate resiliency.
- Diversification benefits and dynamic risk management become fallacies of composition at the systemic level.
- Insufficient capital caused excessive compensation in banks.
- Cognitive errors are unavoidable in complex adaptive systems populated by fallible agents with imperfect understanding.
- Resilient markets as time tested solutions; demonising market based finance as "Shadow Banking" is counterproductive.

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The author is grateful for research assistance provided by Chiara Casale. The views expressed in this presentation are those of the author only and not of the institutions with which he is affiliated.

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