



Financial Crisis: The Perfect Storm

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The current financial crisis has been caused by an exponential expansion of:

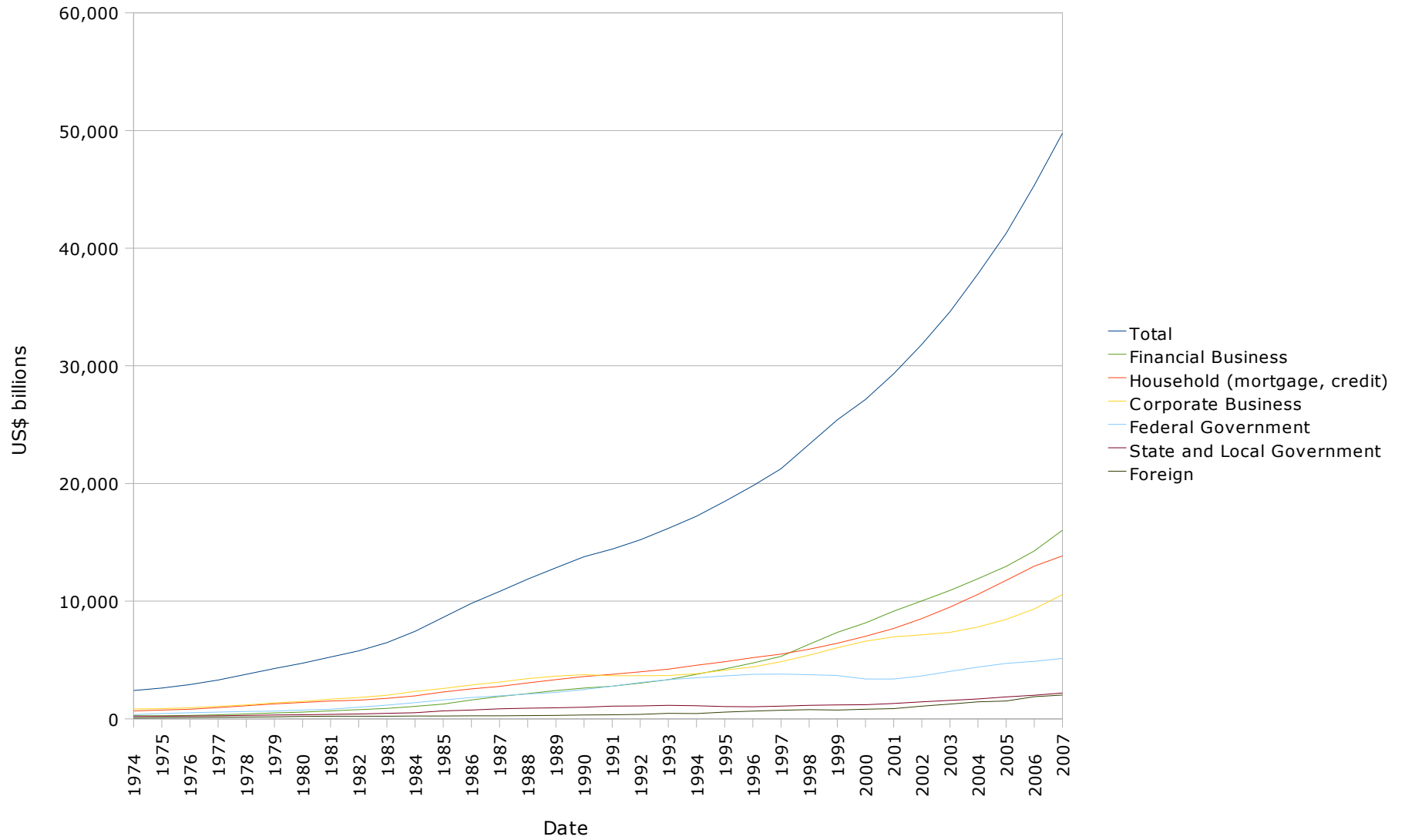
DEBT AND LEVERAGE

that financed an asset bubble and increased default risks to proportions not previously understood.

The expansion of debt was facilitated by a number of interrelated events, that have been fuelling each other over the last decade to generate the perfect storm.

1. Incremental use of securitisation vehicles.
2. Change in regulation.
3. Incremental use of derivatives.
4. Expansion of the hedge fund industry.

US Debt Outstanding - Total and by Sector



Source: US Federal Reserve - Flow of Funds Accounts of the United States - Sep 18th, 2008.
www.federalreserve.gov/releases/Z1/

US Securitisation Notional Outstandings by Collateral, Q3 2008

Collateral	€ billion
ABS	1,984.0
Agency MBS	3,534.9
Non-agency RMBS	1,039.1
Non-agency CMBS	401.4
Total	6,959.5

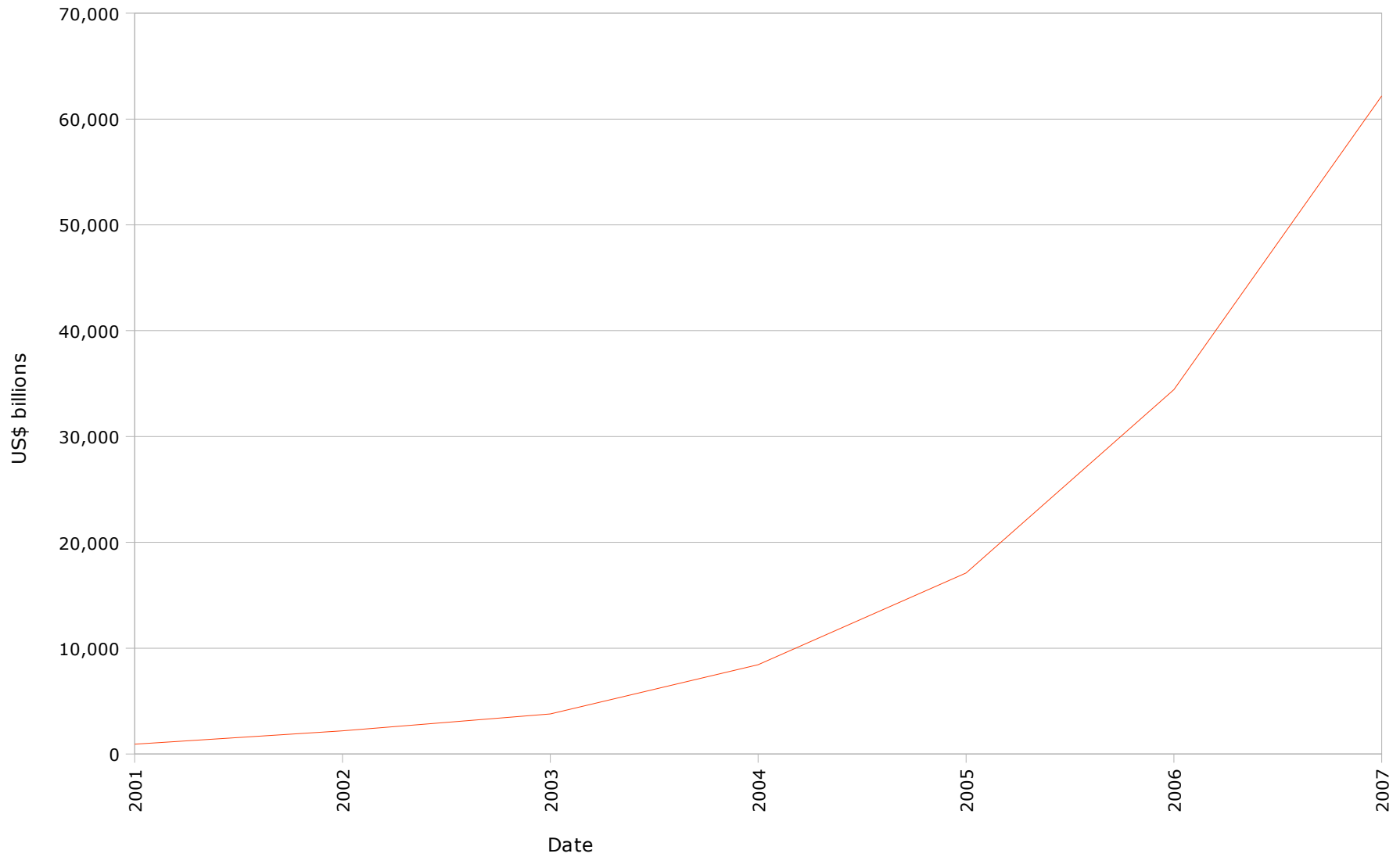
European Securitisation Notional Outstandings by Collateral, Q3 2008

Collateral	€ billion
ABS	176.1
CDO	284.0
CMBS	139.2
RMBS	848.4
WBS	39.7
Total	1,487.5

Total US and European 8,447.0

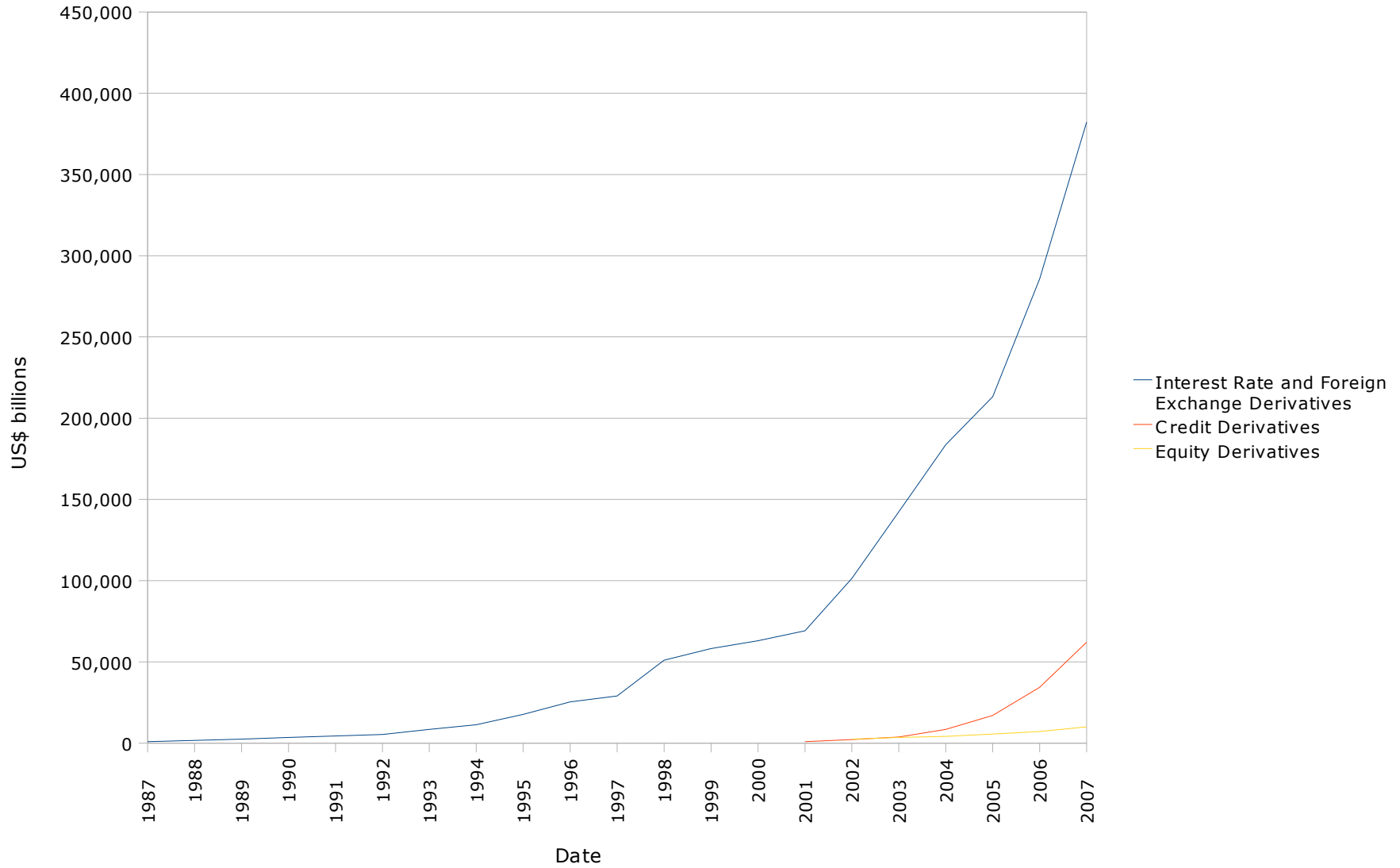
Source: Securities Industry and Financial Markets Association (SIFMA) ESF Securitisation Data Report - Q3 2008
www.europansecuritisation.com/Market_Standard/2008-08_ESF_Q3.pdf

Notional Amounts of Credit Derivative Contracts Outstanding



Source: ISDA Market Survey - Notional Amounts Derivative Contracts Outstanding - 2008.
www.isda.org/statistics/

Notional Amounts of Derivative Contracts Outstanding

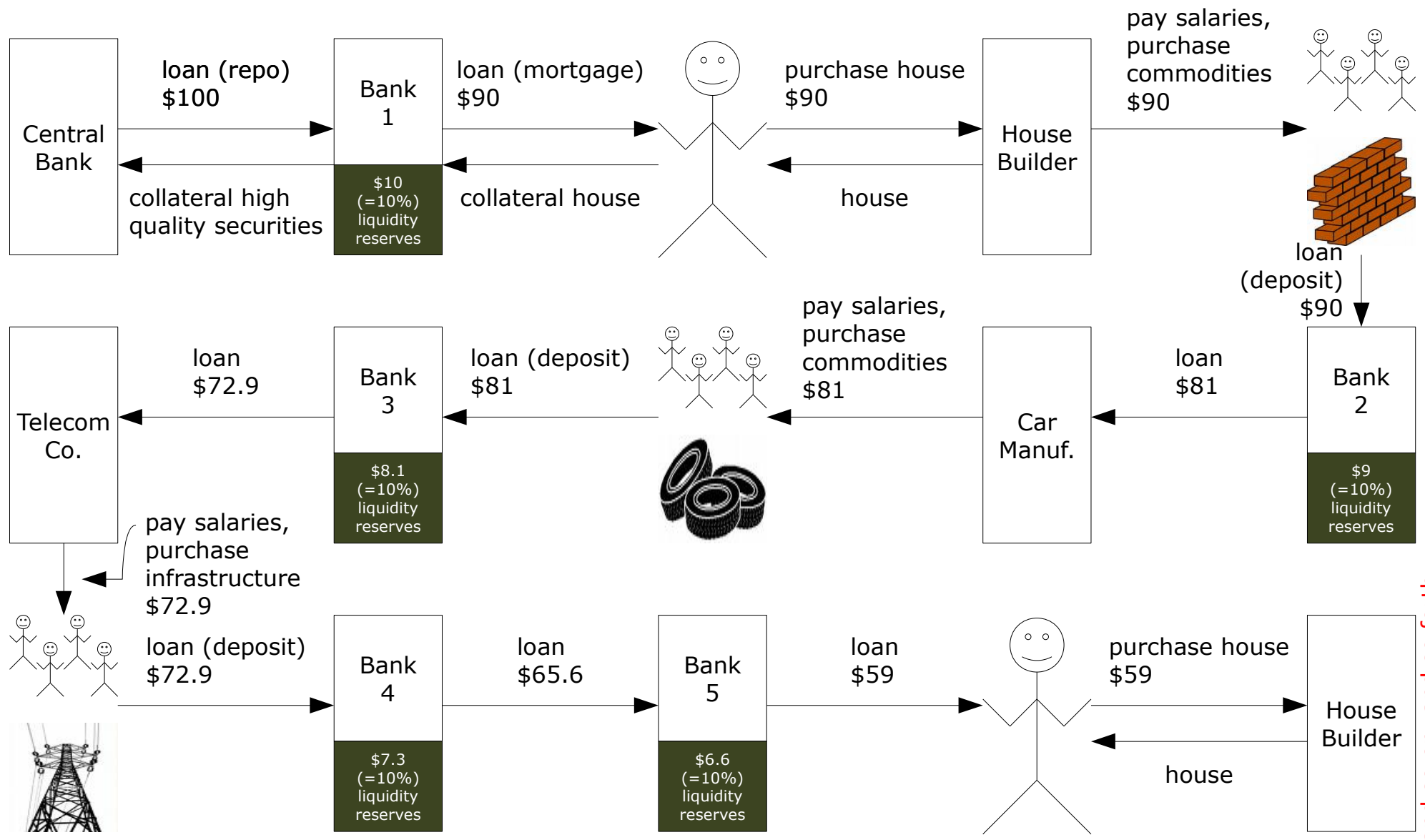


Source: ISDA Market Survey - Notional Amounts Derivative Contracts Outstanding - 2008
www.isda.org/statistics/

The role of central banks

- > Broadly speaking, central banks have two sets of responsibilities:
 - To promote a healthy economy through maximum sustainable employment, stable prices, and moderate long-term interest rates.
 - To ensure the stability of the financial system.
- > The tools used by central banks to achieve their goal:
 - Monetary policy (money supply)
 - Regulation
 - Lender of last resort

Monetary policy



...and so on, and so forth...

Money supply

- > Money is injected into the economy through a process of lending by the government, central bank, or monetary authority (expansion or easing).
- > Money is withdrawn from the economy when it is repaid back to the government, central bank, or monetary authority (contraction or tightening).
- > Money in the economy continually exchanges hands through the exchange of goods and/or services or through lending to individuals, corporations or banks.
- > Injection of money in the economy encourages an expansion of debt. Conversely, withdrawal of money from the economy encourages a contraction of debt.
- > The money circulating in an economy at any point should be enough to support the level of economic activity (i.e., frequency of transactions). This creates stability, which is translated in low and stable inflation.

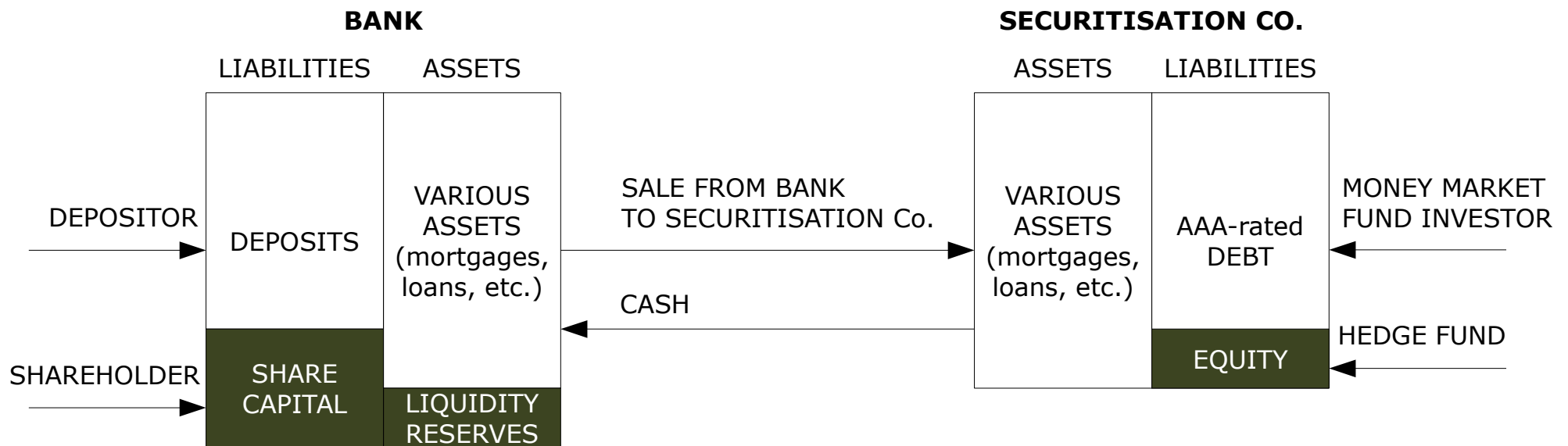
Regulation: Liquidity reserves

- > Liquidity reserves are imposed by most central banks for asset/liability risk management purposes.
 - Banks tend to accept deposits (borrow money) that can be withdrawn by depositors (lenders) "on demand" but lend the deposited money for mortgages purposes or to corporates, etc., on a long term basis. Through liquidity reserves, banks try to ensure that, in the worst case of a "bank run" they can meet the "on demand" withdrawal requests.
- > Liquidity reserves on "on demand" deposits have the indirect benefit of controlling the amount of debt that can be created from the money supply, since through their cycle in the economy, money would be reserved whenever the underlying transaction is an on-demand deposit.
 - In the previous example, with a liquidity reserve of 10% on every deposit, total debt that could be created for \$100 injection in the economy is \$1,000.
- > In the past years, when traditional banking was prevalent and the main form of saving money was through deposits, liquidity reserves had the added indirect benefit of controlling the expansion of debt.

Planting the first seed of trouble

- > The most recent years saw the introduction and increase use of alternative, non-traditional, "borrowing" and "lending" instruments and sources, that require no liquidity reserve requirements, and quite often are not even regulated.
 - Time deposits, Money Market Funds and Corporate Paper (CP), to start with.
 - Conduits and Securitisation vehicles, to follow.
- > Funding through such instruments and sources that have not been subject to liquidity reserve requirements, together with the expansion of the new aggressive yield hungry industry of hedge funds, gradually facilitated an expansion of debt that eventually became exponential and got out of control.

A vicious circle



1. Bank sells its assets (loans) to securitisation vehicle.
 2. Bank uses cash received to replenish assets (loans).
 3. Bank sells its assets (loans) to securitisation vehicle.
 4. Bank uses cash received to replenish assets (loans).
- ...and the cycle starts again...

A Porsche is a beautiful car

- > Banks:
 - earn structuring/sale fees through setting up the securitisation vehicle and selling their liabilities to hedge funds, money market funds, etc.
 - generate further profits through increased volume turnover - converting assets (loans) to cash that can be re-invested in further assets (loans).
- > Hedge funds and money market funds find a new asset to invest in, that in turn helps them grow their Assets Under Management and earn more fees.
- > Lawyers and rating agencies earn fees by advising and rating the liabilities of the securitisation vehicle.
- > Mortgage brokers' fees multiply through increased mortgage volumes.
- > Corporate/mortgage borrowers see the yield/value of their investments/properties sky rocket due to strong economies/house prices, and driven by irrational exuberance ultimately fuel the frenzy.

What about risk control?

- > Banks: Their incentive to exercise prudent risk analysis of borrowers diminishes since ultimate bearer of the risk will no longer be the bank itself, but the hedge fund and money market fund.
- > Hedge fund and money market funds: They do not have the appropriate tools, as lending is traditionally a banking product, and their benchmark risk analysis relies on the bank's excellent historical lending records.
- > Borrowers: As in any asset bubble, investors convince themselves of an ongoing appreciation or strong yield of the assets they invest in and have no hesitation to finance them through debt.

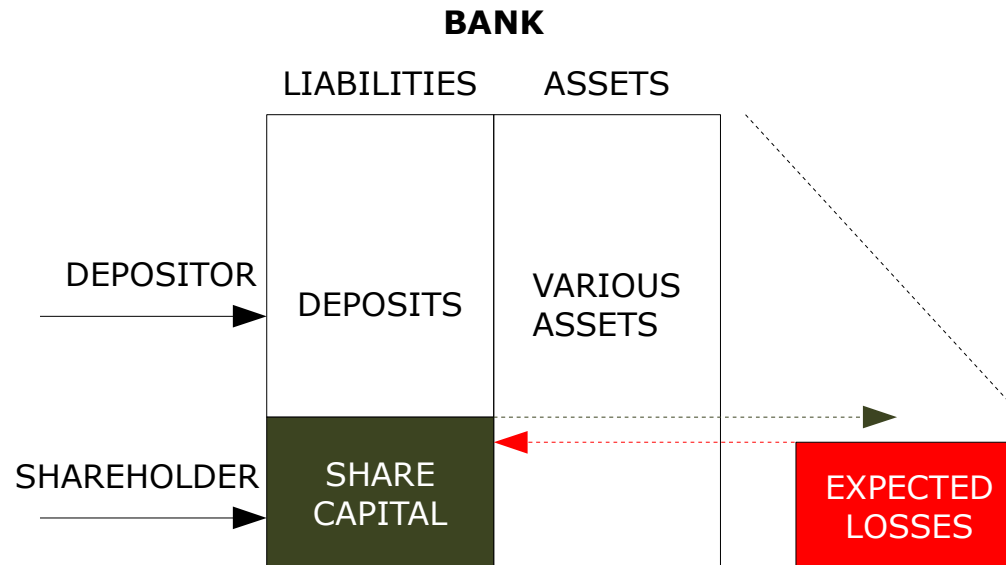
The beast is out of control

- > As the new loans are financed through selling of existing loans and not through increased deposits, liquidity reserves do not change, therefore there is no limit to expansion of debt that can occur away from regulatory oversight.
- > Different investment instruments ("on demand" deposits, time deposits, money market funds, etc.), some of which have liquidity reserve requirements and some of which do not, compete for investors' money.
 - Each time an investor chooses a non-reserve bearing instrument over a reserve-bearing one (e.g, over a deposit), the debt expansion "dampening effect" is absent.
 - Each time a depositor withdraws from a reserve-bearing instrument (e.g., from a deposit) to invest in a non-reserve bearing instrument, the effect is a release of liquidity reserves which therefore results in an expansion of the money supply as that money that was reserved can also be lent out by the bank.

The monster that feeds itself

- > Not only has an asset bubble been created and fuelled through exponential debt expansion and reduced risk control, the bubble has also created its own monetary base to support it using securitisation to expand the money supply!

Regulation: Capital



- > To safeguard depositors, regulators seek to ensure that a bank's "expected losses" from its assets will not exceed the bank's share capital. In this way, any losses that materialise will not impair the bank's ability to repay its depositors, since the value of the assets is "expected" to always be greater than the value of the deposit liability.
- > A Bank's assets therefore can not grow beyond a level where their expected loss will exceed the bank's share capital.

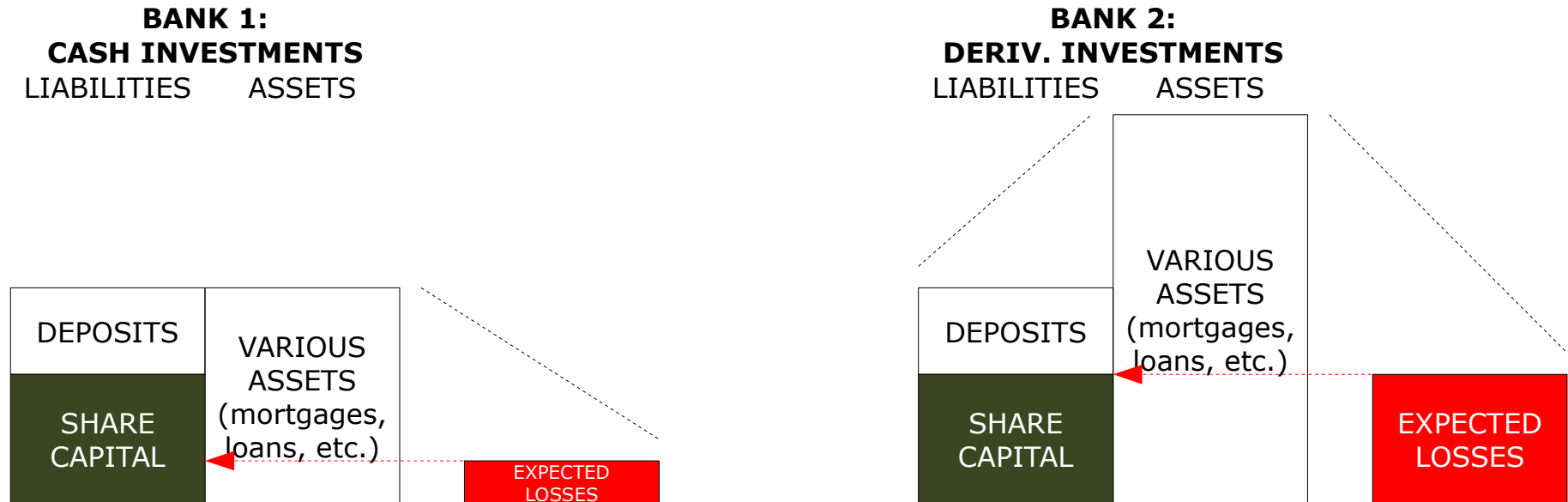
Planting the second seed of trouble

- > A series of events over the last 5 years helped banks significantly reduce their calculation of expected losses for the same unchanged risk.
 - Change in regulation.
 - Incremental use of derivatives.
- > The implication of this was that banks could expand their asset base by making bigger and/or riskier investments, which in turn meant more revenues for the banks.

Change in regulation

- > The calculation of expected losses used to be governed by a simplistic and conservative methodology introduced by the regulators called Capital Adequacy Directive I (CAD I).
- > Recent years saw the introduction of CAD II, under which regulators allowed banks to self regulate by calculating themselves the expected losses of their asset portfolio.
- > As CAD I was a conservative methodology, banks that migrated on the CAD II approach calculated expected losses on their asset portfolio that were significantly less than those implied by CAD I.
- > Implication for such banks was that they could expand their asset base.

Derivatives

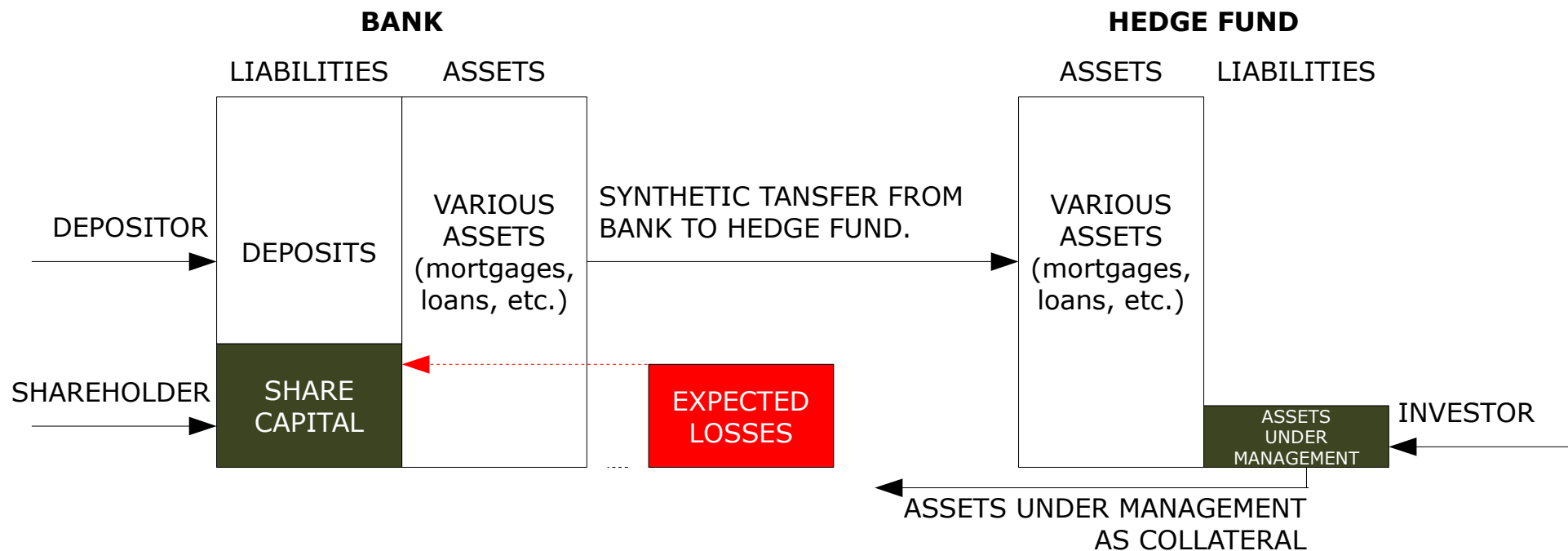


- > Derivative trading allows a bank to increase its assets/exposures, without increasing its liabilities, to a level where expected losses equal the share capital.
- > In this example:
 - \$1 loss above the "expected losses" of Bank 1 hits the shareholder.
 - \$1 loss above the "expected losses" of Bank 2 hits the depositor.
- > Credit Derivatives (for example, Credit Default Swaps (CDS)) are the main tool used by banks for such increase in exposure.

Hedge funds

- > If an individual borrows from a bank to speculate on financial assets, against which the individual deposits a margin requirement to the bank, together with the assets purchased as collateral, the bank will ask for further margin in the case where the assets depreciate in value. If the individual is unable to meet the margin requirements, the bank will sell the assets. If the losses that materialise are not met by the margin requirement the bank will have further recourse to the individual's assets (for example, home, car, etc.).
- > Hedge funds use derivative trading with banks to take exposures far greater than the Assets Under Management of the fund. Essentially, the Assets Under Management are used, in totality, as a margin/collateral requirement against the risks they underwrite. For example, a hedge fund with \$2 of Assets Under management could use derivatives to take risks which exposes them to maximum losses of \$100 (i.e., 50x leverage).
- > If a hedge fund's exposures loose more than the Assets Under Management (in the example above, if the hedge fund looses more than \$2 in the \$100 portfolio), the bank will be unable to recover any losses above that, as the only recourse it can have is to the Assets Under Management of the fund.
- > The bank does not even have the safeguard of being able to force a sale of the assets when the losses reach a certain trigger loss level before they reach the total Assets Under Management. The bank can only sell the assets once margin/collateral calls are not met, which would be very late, as the hedge fund has already lost all its Assets Under Management. Any losses above that level, have to be taken by the bank.

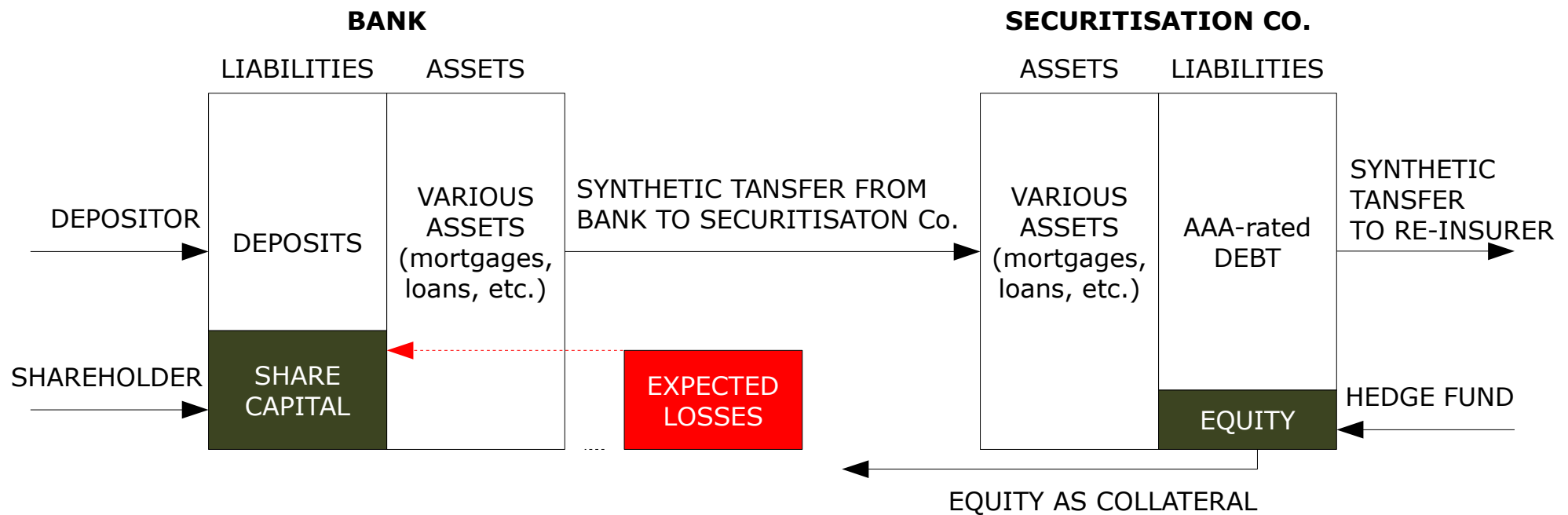
Simple hide and seek



1. Bank uses credit derivatives to synthetically transfer a portfolio of credit risk assets to hedge fund.
2. Bank receives as margin/collateral the Assets Under Management of the hedge fund.
3. Bank calculates a virtually no risk position and its expected losses close to zero (as the risk has been transferred to the hedge fund and there is margin/collateral in place).
4. Bank "releases" share capital which allows it to take on further credit risk assets (through cash or credit derivative trading).

...and the cycle starts again...

Hide and seek. The great chameleon.



1. Bank uses credit derivatives to synthetically transfer a portfolio of credit risk assets to securitisation vehicle.
2. Securitisation vehicle sells its junior/equity liabilities to hedge fund and uses credit derivatives to synthetically transfer its senior liabilities to re-insurer (e.g. AIG).
3. Bank receives as margin/collateral the junior/equity investment of the hedge fund.
4. Bank calculates a virtually no risk position and its expected losses close to zero (as the risk has been transferred to securitisation vehicle and there is margin/collateral in place and any losses above the margin/collateral have been underwritten by the re-insurer, who has underwritten so many \$billions of similar transactions, that it is virtually guaranteed that the re-insurer will be bankrupt if ever claims are made).
5. Bank "releases" share capital which allows it to take on further credit risk assets (through cash or credit derivative trading).
6. ...and the cycle starts again...

I want an Aston Martin too

- > Banks:
 - generate more returns by using derivatives to leverage their share capital.
 - earn structuring/sale fees through setting up the securitisation vehicle and selling their liabilities to hedge funds, re-insurers, etc.
 - generate further profits through increased volume turnover - constantly buying and selling risk through derivative trading.
- > Hedge funds find a new asset to invest in, that in turn helps them grow their Assets Under Management and earn more fees.
- > Re-insurers earn more premium and diversify their underwriting ventures into credit risk.
- > Lawyers and rating agencies earn fees by advising and rating the liabilities of the securitisation vehicle.

An exothermic reaction

- > In reality, the bank still has the full risk of the assets, and only the margin/collateral received to use as an offset against any losses.
- > Even in the latter example, where a re-insurer underwrites any losses above the margin/collateral, the likelihood is that the re-insurer will be bankrupt if ever claims are made against it, as it has underwritten \$billions of similar transactions. (The re-insurers could expand so aggressively because their models were calculating a virtually zero probability of a claim against them, as the claim would only happen if losses exceeded the margin/collateral calls which were assumed to already be generous enough and above expected losses).
- > For all effective purposes, the bank uses the hedge fund's Assets Under Management to expand its own assets, thereby leveraging the bank's deposit base (please refer to next four slides for more detailed explanation)!
- > This process can be repeated again and again and again - virtually facilitating an uncontrolled expansion of risk.

An example

- > All banks in the example have \$10 of share capital and \$90 of deposit base.
- > Assume that expected losses on assets were 5% and actual losses eventually incurred are 8%.
- > Bank A:
 - Uses \$100 to purchase \$100 of assets.
 - Expected losses are \$5 ($=5\%*100$), which is well within share capital, therefore within regulatory limits.
 - Actual losses are \$8 ($=8\%*100$).
 - Therefore shareholders lose 80% ($=8/10$) of their share capital, whilst depositors remain intact.

An example

> Bank B:

- Uses \$100 to purchase \$100 of assets and buys another \$100 of assets through credit derivatives. Total assets are \$200 ($=100+100$).
- Expected losses are \$10 ($=5\%*200$), which is equal to share capital, therefore within regulatory limits.
- Actual losses are \$16 ($=8\%*200$)
- Therefore shareholders lose 100% ($=10/10$) of their share capital, whilst each depositor loses 6.7% ($=6/90$) of their deposit.

An example

- > Bank C:
 - Uses \$100 to purchase \$100 of assets and buys another \$100 of assets through credit derivatives. Total assets are \$200 ($=100+100$).
 - Expected losses are \$10 ($=5\%*200$), which is equal to share capital, therefore within regulatory limits.
 - Bank uses credit derivatives to buy another \$2,000 of assets and sell the same amount of \$2,000 risk to hedge funds, for which the bank receives a margin/collateral of \$100. Even if hedge fund defaults, and all \$2,000 of assets comes on balance sheet, expected losses of \$100 ($=5\%*2,000$) should be covered by margin/collateral, therefore still OK.
 - If losses are above 5% (in this example 8%), hedge fund will default, as hedge funds put all their Assets Under Managements under margin/collateral in this way. Therefore no extra margin/collateral is available for the bank. As hedge fund no longer around, bank loses the "synthetic transfer"/"sale" of assets and remains with the extra \$800 of assets on balance sheet, but has the margin/collateral to offset against losses.
 - Actual losses are \$66 ($=8\%*200+8\%*2,000-10-100$), therefore shareholders loose 100% ($=10/10$) of their share capital, whilst each depositor loses 62.2% ($=56/90$) of their deposit.

An oxymoron

- > It is well known that creditors like low leveraged balance sheets (debt/share capital ratio) since the higher the share capital relative to debt, the higher the chance it will buffer the creditors from losses.
- > Against all intuition, for a given share capital and a bank that uses derivatives to expand its asset base, it would be in a depositor's best interest for the bank to have as much deposit (debt) as is possible for a given amount of share capital, i.e., as leveraged a balance sheet as possible, since every \$1 loss above the share capital will hit a wider deposit base and the loss will be diluted!!!
 - In the earlier example, if bank C had \$590 deposits instead of \$90, with all other things being equal, each deposit would have lost 9.5% ($=56/590$) of their deposit instead of the 62.2% ($=56/90$) losses incurred.

Was regulation absent?

- > Contrary to popular belief, derivatives, in particular credit derivatives, were very heavily regulated at the level of each regulated financial institution.
- > What is not regulated, is the total volume of credit derivatives traded globally, which ended up being comparable to the volume of underlying assets they were referencing!
- > Regulation proved to be ineffective - this is down to the inability of the whole financial industry (not just the regulators') to understand all the moving parts that together contributed to the downfall of the system.

Brave new world

- > French President Nicolas Sarkozy declared recently that "the idea that markets are always right was a mad idea...".
- > Nobody can disagree with that. Markets are certainly not always right, but is there anybody that can ever be more right than the markets?
- > That the markets corrected themselves is a proof of their resilience. Long live the markets!
- > Going forward, what is needed is more effective regulation to ensure that the markets operate in a controlled environment where the creation of debt and the formation of asset bubbles, and the subsequent burst will not be prevented, but the swings will be moderated.

Frequently Asked Questions (FAQ)

1. What economic environment should we expect going forward?
2. Can the government help?
3. Should we expect inflation or deflation?
4. Where has all the money gone?
5. What is the relationship between money supply and valuations of assets in the economy?
6. Is debt useful?
7. Should asset bubbles be controlled?
8. Is this crisis a proof that conspiracy theorists are right?

FAQ#1: Future economic environment

- > In my opinion, we are now entering a period of significant recession (which also means reduced economic activity/transaction volumes).
- > Lenders are no longer willing to lend.
- > Consumers are not willing to borrow or to spend.
- > This will hurt the economy, especially those industries (housing, car, etc.) that relied on consumers borrowing to purchase the assets.
- > Corporate bankruptcies will rise.
- > Corporates will cut costs, which will cause a rise in unemployment.
- > Individual bankruptcies will rise.
- > Depending on level of bankruptcies, some banks may be forced into bankruptcies too.
- > The asset bubble has already unravelled, but it will take time for the debt that created it to be reduced through repayments or bankruptcies, before we can observe growth and confidence again.

FAQ#2: Can the government help?

- > In my opinion, monetary policy will be ineffective to help the situation.
 - Increasing the money supply in the economy will make more money available for corporates and individuals that wish to borrow, but it is unlikely that borrowers will be motivated to do so.
 - Increasing the money supply and reducing interest rate may have a very small positive impact of reducing the interest rate servicing cost of borrowers, even though this is unlikely as it is driven more by counterparty risk than by the level of risk-free interest rates.
- > Fiscal policy is currently a more useful tool to manage the crisis - but this should come with a health warning.
 - Reducing taxation in this period of budget deficits, will have the effect of shifting debt away from the wider economy to the government (what I call, "the great big moderator") as the government makes available cash to the economy to repay debt whilst taking the debt on itself through borrowing back from those in the economy that are willing to lend. The government, already overburden with debt, should ensure that they can sustain tax cuts and meet their future debt obligations.

FAQ#3: Inflation or deflation?

- > In my opinion:
 - we are now entering a period of deflation, similar to the period that Japan endured the last decade,
unless
 - governments find it impossible to meet their debt obligations (which will be further overburdened with social services and pensions) and are forced to restructure their debt or print money, in which case we will experience hyperinflation.
- > The former outcome is more likely, but I would not totally discount the latter, which will also depend on the period of the recession.
- > A word of caution: As seen in slide "Notional amount of derivative contracts outstanding", the outstanding notional amount of interest rate and foreign exchange derivatives is more than 6x the outstanding notional amount of credit derivatives (\$382 trillion versus \$62 trillion). With continued volatility in foreign exchange rates, and should interest rates spiral out of control due to inflationary pressures, these type of derivatives can cause a crisis not dissimilar to the one we have already experienced.

FAQ#4: Where has all the money gone?

- > The amount of money in the economy has remained unchanged, as there has not been a significant change in monetary policy.
- > What we have observed is a reduction in asset valuations. This, as described above, has no relation to the amount of money in the economy.
- > There is no money that is waiting to be re-invested, as the wider economy is overburdened with debt and in any case does not believe there is "value" in the assets that created the bubble.

FAQ#5: Money Supply and Asset Value

- > Over a period of time, money generates economic activity whose transactional value is far greater than the money that had originally been injected (slide "Monetary Policy").
- > To dispel a misconception, common particularly amongst non-economists, there is no reason why the gross, or the net, value of assets in an economy at any point in time has to be equal, or in any way related, to the amount of money in circulation at the same time.
 - Say \$100 circulating through the economy are responsible for the purchase and sale of 5 houses, with each house having a value \$100. Total asset value is \$500. Moreover, if the houses appreciate in value to \$130 each, total asset value is now \$650, whilst there is still only \$100 circulating in the economy.

FAQ#6: Debt

- > Debt can be good. Debt can be bad. Debt is an inevitable part of human behaviour.
- > The ability to borrow is crucial for an economy to flourish, but can also result in disaster if the debt is allowed to grow uncontrollably and/or is borrowed for non-productive means.
- > It really depends on a borrower's intentions and also on its ability to repay. Depending on the situation, any of the below could be welcomed and positive for the borrower and for the economy, or the opposite.
 - Borrow to invest
 - Borrow to put a roof over my head
 - Borrow to consume
 - Borrow to speculate

FAQ#7: Asset bubbles

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- > An asset bubble can be formed with or without speculation funded through debt.
- > However, asset bubbles are encouraged through easy access to debt. The asset becomes accessible to a wider range of buyers than otherwise, who can participate in the frenzy through borrowing.
- > A financial system that can support infinite expansion of debt, positively influences the speed and magnitude of the formation of the asset bubble.
- > Extracts from US Federal Reserve Chairman, Ben S. Bernanke talk on Asset-Price Bubbles to the New York Chapter of the National Association for Business Economics in Oct. 2002:
 1. "...for the Fed to be an "arbiter of security speculation or values" is neither desirable nor feasible."
 2. "It keeps monetary policy focused on the appropriate goal variables, economic activity and inflation."

FAQ#7: Asset bubbles

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- > In my opinion, Chairman Bernake is focusing on the wrong issue.
 - He is right, that central banks should not control from the top by becoming arbiters of price. This would be equivalent to a referee deciding whether the final result in a football game was fair or whether to unilaterally change it.
 - However, that does not mean that central banks should not set the rules and create an appropriate control environment in which the markets can freely operate and in which asset bubbles will be, not entirely prevented, but moderated.
- > As Chairman Bernake mentions, the Fed's "goal variables" are "economic activity and inflation". Since, as evidently observed in this crisis, asset bubbles harm economic activity, central banks should try to moderate their rise and fall, not from the top and arbitrating prices, but from the bottom, with appropriate regulation.
- > I believe most central banks were too focused on controlling inflation, and using money supply as their tool, were complicit to the crisis that we are observing now, by creating incentives for the economy to expand the debt in an uncontrolled manner.

FAQ#8: Conspiracy theories

- > Contrary to conspiratorial theorists, the type of monetary policy described in this presentation, does not mean that "we, the people" are indebted to the central banks.
- > Every individual has the choice of whether or not to borrow, what to borrow and how much to borrow. Statistically, some borrowing will always exist.
- > It would be our choice to borrow some apples from our neighbour, as would also be our choice to borrow some money from our high street bank. To blame the central bank for creating and lending the money in the first instance, is no different to blaming the farmer who produced and sold (or perhaps lent - who knows?) the apples in the first place.
- > "We, the people" would be as likely to borrow in a barter economy ("lend me your time and I will give you back mine") or in an economy where the currency is real commodities ("lend me your gold to buy a house").
- > In fact, the most equitable way of creating and injecting money in the economy is through lending.
- > The crisis was not created by the "elitists", but by human greed and advanced financial engineering that created side-effects that most people, including most regulators, did not foresee.

Thank you

I am grateful for your attention!

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