

Abstract

The paradigm that financial markets are efficient has provided the intellectual backbone for the deregulation of the banking sector since the 1980s, allowing universal banks to be fully involved in financial markets, and investment banks to become involved in traditional banking. There is now overwhelming evidence that financial markets are not efficient. Bubbles and crashes are an endemic feature of financial markets in capitalist countries. Thus, as a result of deregulation, the balance sheets of universal banks became fully exposed to these bubbles and crashes, undermining the stability of the banking system. The Basel approach to stabilise the banking system has as an implicit assumption that financial markets are efficient, allowing us to model the risks universal banks take and to compute the required capital ratios that will minimise this risk. I argue that this approach is unworkable because the risks that matter for universal banks are tail risks, associated with bubbles and crashes. These cannot be quantified. As a result, there is only one way out, and that is to return to narrow banking, a model that emerged after the previous large-scale banking crisis of the 1930s but that was discarded during the 1980s and 1990s under the influence of the efficient market paradigm.

1. The basics of banking

In order to analyse the causes of the banking crisis it is useful to start from the basics of banking. Banks are in the business of borrowing short and lending long. In doing so they provide an essential service to the rest of us, i.e. they create credit that allows the real economy to grow and expand.

This credit creation service, however, is based on an inherent fragility of the banking system. If depositors are gripped by a collective movement of distrust and decide to withdraw their deposits at the same time,

The Banking Crisis: Causes, Consequences and Remedies

Paul De Grauwe

banks are unable to satisfy these withdrawals as their assets are illiquid. A liquidity crisis erupts.

In normal times, when people have confidence in the banks, these crises do not occur. But confidence can quickly evaporate, for example, when one or more banks experience a solvency problem due to non-performing loans. Bank runs are then possible. A liquidity crisis erupts that can also bring down sound banks. The latter become innocent bystanders that are hit in the same way as the insolvent banks by the collective movement of distrust.

The problem does not end here. A devilish interaction between liquidity crisis and solvency crisis is set in motion. Sound banks that are hit by deposit withdrawals have to sell assets to confront these withdrawals. The ensuing fire sales lead to declines in asset prices, reducing the value of banks' assets. This in turn erodes the equity base of the banks and leads to a solvency problem. The cycle can start again: the solvency problem of these banks ignites a new liquidity crisis and so on.

The last great banking crisis occurred in the 1930s. Its effects were devastating for the real economy. Following that crisis the banking system was reformed fundamentally. These reforms were intended to make such a banking crisis impossible and had three essential ingredients. First, the central bank took on the responsibility of lender-of-last-resort. Second, deposit insurance mechanisms were instituted. These two reforms aimed at eliminating collective movements of panic. A third reform aimed at preventing commercial banks from taking on too

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many risks. In the US this took the form of the Glass-Steagall Act, which was introduced in 1933 and which separated commercial banking from investment banking.

Most economists thought that these reforms would be sufficient to produce a less fragile banking system and to prevent large-scale banking crises. It was not to be. Why? In order to answer this question it is useful to first discuss the concept of ‘moral hazard’.

In most general terms, moral hazard means that agents who are insured will tend to take fewer precautions to avoid the risk against which they are insured. The insurance provided by central banks and governments in the form of lender-of-last-resort and deposit insurance gives bankers strong incentives to take more risks. To counter this, authorities have to supervise and regulate, very much like any private insurer who wants to avoid moral hazard.

And that’s what the monetary authorities did for most of the post-war period. They subjected banks to tight regulations aimed at preventing them from taking on too much risk. But then something remarkable happened.

2. The efficient market paradigm

From the 1970s on, economists were all gripped by the intellectual attraction of the efficient market paradigm. This paradigm, which originated in academia, also became hugely popular outside academia. Its main ingredients are the following:

First, financial markets efficiently allocate savings towards the most promising investment projects, thereby maximising welfare. Second, asset prices reflect underlying fundamentals. As a result, bubbles cannot occur, and neither can crashes. History was reinterpreted, and those of us who thought that the tulip bubble in the 17th century was the quintessential example of a price development unrelated to underlying fundamentals were told it was all driven by fundamentals (see Garber, 2000).

The third ingredient of the efficient market paradigm is the capacity of markets for self-regulation. The proponents of this paradigm told us that financial markets can regulate themselves perfectly and that regulation by governments or central banks is unnecessary, even harmful, for as we all know bureaucrats and politicians always screw things up. All this led Greenspan to write the following poetic words in his autobiography: “authorities should not interfere with the pollinating bees of Wall Street” (Greenspan, 2007).

The efficient markets paradigm was extremely influential. It was also seized upon by bankers to lobby for deregulation. If markets work so

beautifully there was no need for regulation anymore. And bankers achieved their objective. They were progressively deregulated in the US and in Europe. The culmination was the repeal of the Glass-Steagall act in 1999 by the Clinton administration. This allowed commercial banks to take on all the activities investment banks had been managing, e.g. the underwriting and the holding of securities; the development of new and risky assets like derivatives and complex structured credit products. Thus banks were allowed to take on all the risky activities that the Great Depression had taught us could lead to problems. The lessons of history were thus forgotten.

The efficient market paradigm provided the intellectual backing for the deregulation of financial markets in general and the banking sector in particular. At about the same time financial markets experienced a burst of innovations. Financial innovations were allowed to design new financial products. These made it possible to repackage assets into different risk classes and to price these risks differently. It also allowed banks to securitise their loans, i.e. to repackage them in the form of asset-backed securities (ABSs) and to sell these in the market.

This led to the belief, very much inspired by the optimism of the efficient market paradigm, that securitisation and the development of complex financial products would lead to a better spread of risk over many more people, thereby reducing systemic risk and the need to supervise and regulate financial markets. A new era of free and unencumbered progress would be set in motion.

An important side effect of securitisation was that each time banks sold repackaged loans they obtained liquidity that could be used to extend new loans that later on would be securitised again. This led to a large increase in the credit multiplier. Thus even if the central bank kept tight control of the money base, credit expansion could go on unchecked with the same money base. The banking sector was piling up different layers of credit – one on top of the other – allowing agents to speculate in the asset markets. All this undermined the control central banks had on the expansion of credit in the economy.

3. Are financial markets efficient?

Deregulation and financial innovation promised to bring great welfare improvements: better risk spreading; lower costs of credit, benefitting firms who would invest more and benefitting millions of consumers who would have access to cheap mortgages. Who could resist the temptation of allowing these market forces to function freely without the unseemly interference of governments?

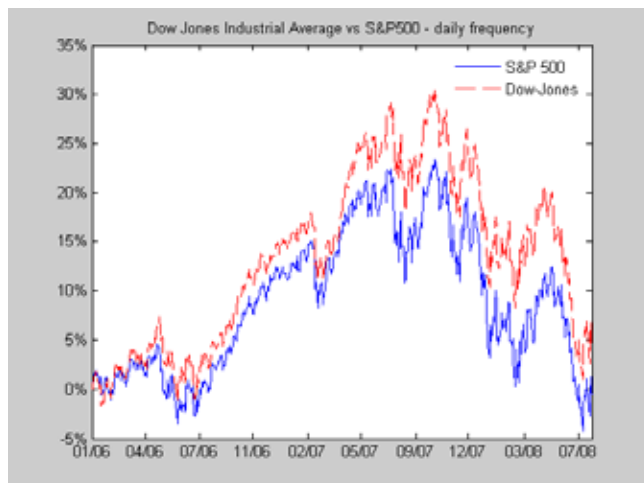
The trouble is that financial markets are not efficient. We illustrate this lack of efficiency in the two dimensions that matter for the stability of the banking sector.¹ First, bubbles and crashes are an endemic feature of financial markets. Second, financial markets are incapable of regulating themselves. Both failures would in the end bring down the new banking model that had been allowed to emerge and that was predicated upon financial markets being efficient.

3.1 Bubbles and crashes are endemic in financial markets

Nobody has written a better book on the capacity of financial markets to generate bubbles and crashes than Kindleberger in his masterful “Manias, panics and crashes”.² Kindleberger showed how the history of capitalism is littered with episodes during which asset markets are caught by a speculative fever that pushes prices to levels unrelated to fundamental economic variables. But the lessons of history have been forgotten, also because economic history has no place anymore in economic education so that economists fresh out of school can repeat the same errors, unburdened by the weight of historical knowledge, deemed to be useless.

Let us look at some of the bubbles and crashes that have littered financial markets over the last 25 years. Take the US stock market during 2006-2008. We show the Dow Jones and the Standard and Poor’s in Figure 1.

Figure 1. The Dow Jones and the S&P 500 2006-08



Source: Yahoo Finance.

¹ The empirical evidence against the efficiency of financial markets has been building up over the last decade. For useful overviews see Shleiffer (2000) and Shiller (2000).

² See Kindleberger (2005). Chancellor (1999) also provides a vivid account of the many bubbles and crashes in the history of financial markets.

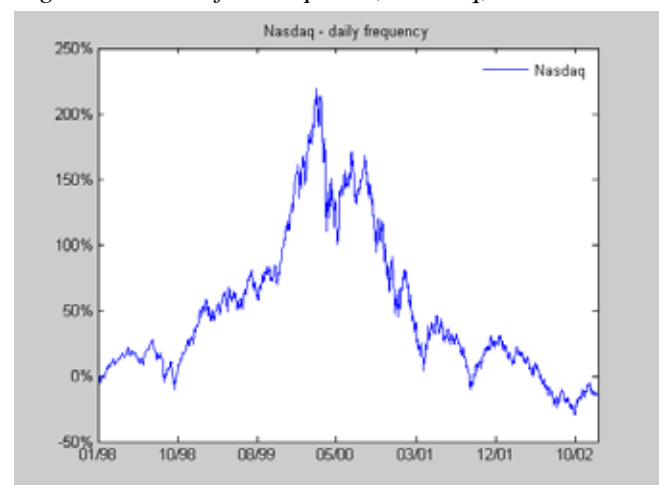
What happened in the US economy between July 2006 and July 2007 to warrant an increase of 30% in the value of stocks? Or, put differently: in July 2006 US stock market capitalisation was \$11.5 trillion. One year later it was \$15 trillion. What happened to the US economy to make it possible that \$3.5 trillion was added to the value of US corporations in just one year? During the same year GDP increased by only 5% (\$650 billion).

The answer is: almost nothing. Fundamentals like productivity growth increased at their normal rate. The only reasonable answer is that there was excessive optimism about the future of the US economy. Investors were caught by a wave of collective madness that made them believe that the US was on a new and permanent growth path for the indefinite future. Such beliefs in future wonders can be found in almost all bubbles in history, as is made vividly clear in Kindleberger’s book.

Then came the downturn with the credit crisis. In one year (July 2007 to July 2008) stock prices dropped by 30%, destroying \$3.5 trillion of value. The same as the amount created the year before. What happened? Investors finally realised that there had been excessive optimism. The wave turned into one of excessive pessimism.

There were many other episodes of bubbles and crashes in the stock markets in many different countries. The most famous was probably the IT-bubble at the end of the 1990s that had the same structure of extreme euphoria followed by depression. We show the evolution of the Nasdaq during 1999-2002 that illustrates this phenomenon. In one year the IT-shares tripled in value, and lost all of it the next year.

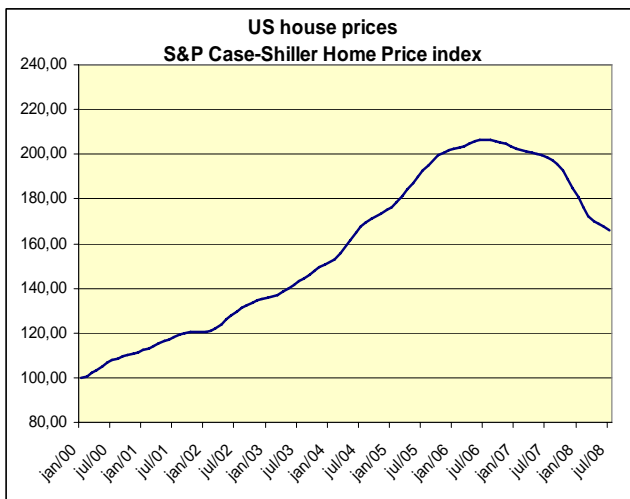
Figure 2. Index of share prices, Nasdaq, 1999-2002



Source: Yahoo Finance.

A similar story can be told about the US housing market. Figure 3 shows the Case-Shiller house price index from 2000 to 2008. During 2000-07 US house prices more than doubled. What happened to economic fundamentals in the US warranting a doubling of house prices in only seven years? Very little. Again the driving force was excessive optimism. Prices increased because they were expected to increase indefinitely into the future. This was also the expectation that convinced US consumers that building up mortgage debt would not create future problems.

Figure 3. US house prices 2000-08



Source: Standard & Poor.

Bubbles and crashes also occurred in foreign exchange markets. Figures 4 and 5 illustrate this. They show the bubbles of the dollar (against the DEM) in the 1980s and 1990s respectively. What happened in the 1980s in the US economy to warrant a doubling of the price of the dollar against the DEM (and other currencies) from 1980 to 1985? Almost nothing. Economic fundamentals between the US and the European currencies were somewhat different but these differences dwarf when compared to the movements of the dollar. What did happen is that the markets were gripped by euphoria about the US economy. It happened again in the second half of the 1990s when fairy tale wonders of the US economy were told. Then came the crash and the euphoria was instantly replaced by pessimism.

These episodes illustrate the endemic nature of bubbles and crashes in capitalist systems. They happened in the past and will continue to happen in the future.

Figure 4. DEM-USD 1980-87

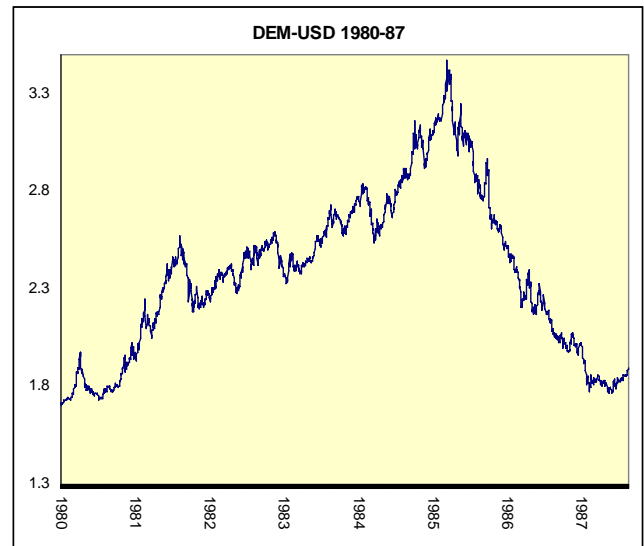
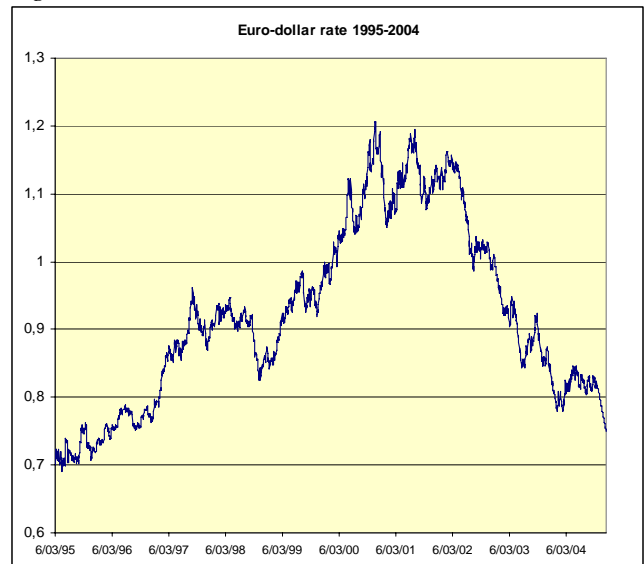


Figure 5. Euro-dollar rate 1995-2004

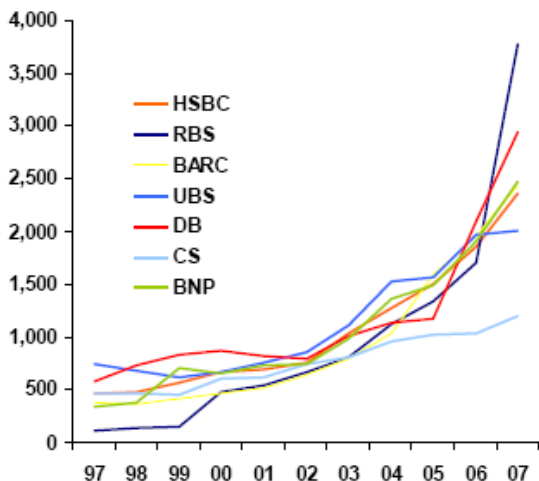


Source: De Grauwe and Grimaldi (2006).

The fact that financial markets are continuously gripped by speculative fevers leading to bubbles and crashes would not have been a major problem had banks been prevented from getting involved in financial markets. However, the deregulation of the banking sector that started in the 1980s fully exposed the banks to the endemic occurrence of bubbles and crashes in asset markets. Because banks were allowed to hold the full panoply of financial assets, their balance sheets became extremely sensitive to the bubbles and crashes that gripped these assets. Banks' balance sheets became the mirror images of the bubbles and crashes occurring in the financial markets.

This is clearly illustrated in Figure 6. It shows how since the start of the decade the balance sheets of the major banks in the world exploded, reflecting the various bubbles that occurred at that time (housing bubble, stock market bubbles, commodities bubbles).

Figure 6. European financials' balance sheets
(total assets, \$ bn)



Source: Bloomberg.

While commercial banks were increasingly getting involved in financial markets and thus taking over activities that were reserved to investment banks, the opposite occurred with investment banks. The latter increasingly behaved like banks, i.e. they borrowed short and lent long, thereby moving into the business of credit creation. To give an example: investment banks (e.g. Lehman Brothers) moved into the business of lending money to hedge funds and accepted stocks or other securities as collateral. They then went on and lent that collateral to others so as to make extra money. Thus, investment banks had become banks in that they were creating credit. In the process they created an unbalanced maturity structure of assets and liabilities. Their assets were long-term and illiquid while their liabilities had a very short maturity. Note the historical analogy between the goldsmiths who accepted gold as collateral for loans and ended up lending out the gold, thereby becoming banks. All this (the goldsmiths of the past and the investment banks of today) was done in a totally unregulated environment.

Thus, as a result of deregulation a double shift occurred: commercial banks moved into investment bank territory and investment banks moved into commercial bank territory. This led to a situation in which both the universal banks and the investment banks built up a lethal combination of credit and liquidity risks.

3.2 The illusory self-regulation of financial markets

A centrepiece of the efficient market theory was that financial markets were capable of self-regulation, making government regulation redundant. And since bureaucrats lack the expertise and the incentives to regulate, government regulation was seen as harmful.

Two mechanisms were seen as central to making self-regulation work. One was the role of rating agencies; the other was the use of mark-to-market rules.

Rating agencies, so we were told, would guarantee a fair and objective rating of banks and their financial products. This is so because it was in the interest of rating agencies to do so. These agencies were large and had to protect their reputation. Without their reputation the value of their rating would be worthless. So, contrary to government bureaucrats, the rating agents would do the best possible job to ensure that banks created safe financial products because it was in their interest to do so. The market would triumph.

It did not happen. The reason was that there was a massive conflict of interest with the rating agencies. These both advised financial institutions on how to create new financial products and later on gave a favourable rating to the same products. Their incentives, instead of leading to the creation of sound and safe financial products were skewed towards producing risky and unsafe products. So much for the superior incentives of rating agencies.

The other flaw in the belief that markets would regulate themselves was the idea of mark-to-market. If financial institutions used mark-to-market rules the discipline of the market would force them to price their products right. Since prices always reflected fundamental values mark-to-market rules would force financial institutions to reveal the truth about the value of their business, allowing investors to be fully informed when making investment decisions.

The trouble here again was the efficiency of markets. As we have made clear, financial markets are regularly gripped by bubbles and crashes. In such an environment mark-to-market rules, instead of being a disciplining force, worked pro-cyclically. Thus during the bubble this rule told accountants that the massive asset price increases corresponded to real profits that should be recorded in the books.

These profits, however, did not correspond to anything that had happened in the real economy. They were the result of a bubble that led to prices unrelated to underlying fundamentals. As a result mark-to-market rules exacerbated the sense of euphoria and intensified the bubble.

Now the reverse is happening. Mark-to-market rules force massive write-downs, correcting for the massive overvaluations introduced the years before, intensifying the sense of gloom and the economic downturn.

Thus the promise of the efficient market paradigm that financial markets would self-regulate was turned upside down. Unregulated financial markets carried the seeds of their own destruction.

4. Unintended consequences of regulation

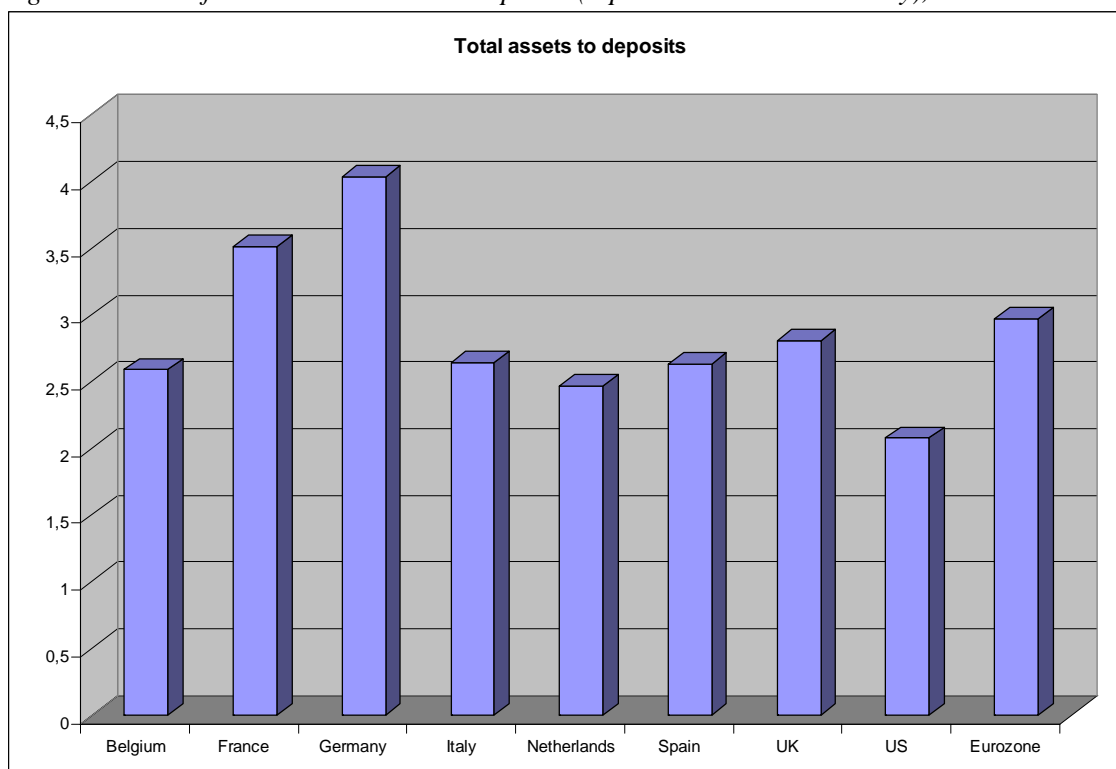
The fact that financial markets do not regulate themselves does not mean that government regulation always works wonderfully. During the 1980s and 1990s attempts were made at imposing capital ratios for banks in all developed countries. This was achieved in the Basel Accords (Basel I and II). It had disastrous consequences because of regulation arbitrage.

Basel I was based on a risk classification of assets and forced banks to set capital aside against these assets based on their risk. For example, Basel I put a low risk weight on loans by banks to other financial institutions. This gave incentives to banks to transfer risky assets (e.g. structured products) which were given a high-risk weight by the Basel I regulation, off their balance sheets. These assets were transferred in special conduits. The funding of these conduits, however was often provided by the same or

other banks. As a result bank funding of their activities increasingly occurred through the interbank market. Banks were investing in high risk assets, directly or indirectly, and obtained funding from the interbank (wholesale) market. In contrast to the deposits from the public, these interbank deposits were not guaranteed by the authorities. The building blocks of a future liquidity crisis were put into place.

Figure 7 illustrates the phenomenon. It shows the ratios of total assets to deposits (from the public) of the five largest banks in a number of countries in 2007. We observe that the total assets of banks were more than twice the size of the deposits. Put differently, in all these countries deposits from the public funded less than half of banks' assets. Funding was increasingly done in the (volatile) wholesale market. As a result, banks created large leverage effects, i.e. they increased their return on capital by massive borrowing. Unfortunately, they failed to price the large liquidity risks implicit in such leveraging.

Figure 7. Ratio of banks' total assets to deposits (top 5 banks in each country), in 2007



Source: Bankscope, Eurostat.

Another case of regulatory arbitrage would have equally dangerous consequences. This arbitrage occurred because Basel I made it possible for banks to treat assets that are insured as government securities. As a result, Basel I gave these assets a zero-risk weight. This feature was fully exploited by banks and led to the explosion of the use of CDS (credit default swaps), which insured the credit risk of banks' financial assets. In doing so, it created the

illusion in the banking system that the assets on their balance sheets carried no or a very low risk.

This turned out to be wrong. The reason again has something to do with inefficiencies in financial markets. Financial models used to price CDS are based on the assumption that returns are normally distributed. There is one general feature in all financial markets, however, and that is that returns are not normally distributed. Returns have fat tails,

i.e. large changes in the prices occur with a much greater probability than the probability obtained from a normal distribution. This fat tail feature itself is intimately linked to the occurrence of bubbles and crashes. The implication of this is that models based on normal distributions of returns dramatically underestimate the probability of large shocks.

We give an example of this phenomenon in Figure 8. This shows the daily changes (returns) of the Dow Jones Industrial since 1928 (upper pane), and we compare these observed returns with hypothetical ones that are generated by a normal distribution with the same standard deviation (lower panel). The contrast is striking.

We have added dotted horizontal lines. These represent the returns five standard deviations away from the mean. In a world of normally distributed returns, an observation that deviates from the mean by five times the standard deviation occurs only once every 7000 years (given that the observations are daily). In reality (upper panel) such large changes occurred 74 times during an 80-year period.

The models used to price credit default swaps and many other complex financial products massively underestimated this tail risk. They did not take into account that financial markets are regularly gripped by bubbles and crashes producing large changes in asset prices. Table 1 illustrates how spectacularly wrong one can be when one uses standard finance models that routinely assume normally distributed returns. We selected the six largest daily percentage

changes in the Dow Jones Industrial Average during October 2008 (which was a month of unusual turbulence in the stock markets), and asked the question of how frequently these changes occur, assuming that these events are normally distributed. The results are truly astonishing. There were two daily changes of more than 10% during the month. With a standard deviation of daily changes of 1.032% (computed over the period 1971-2008) movements of such a magnitude can occur only once every 73 to 603 trillion billion years. Yet it happened twice during the same month. A truly miraculous event, for finance theorists living in a world of normally distributed returns. The other four changes during the same month of October have a somewhat higher frequency, but we surely did not expect these to happen in our lifetime.

Our conclusion should be not that these events are miraculous but that our finance models are wrong. By assuming that changes in stock prices are normally distributed, these models underestimate risk in a spectacular way. As a result, investors have been misled in a very big way, believing that the risks they were taking were small. The risks were very big.

In addition, there were no incentives to price this tail risk because there was implicit expectation that if something very bad would happen, e.g. a liquidity crisis (a typical tail risk) central banks would provide the liquidities. This created the perception in banks that liquidity risk was not something to worry about.

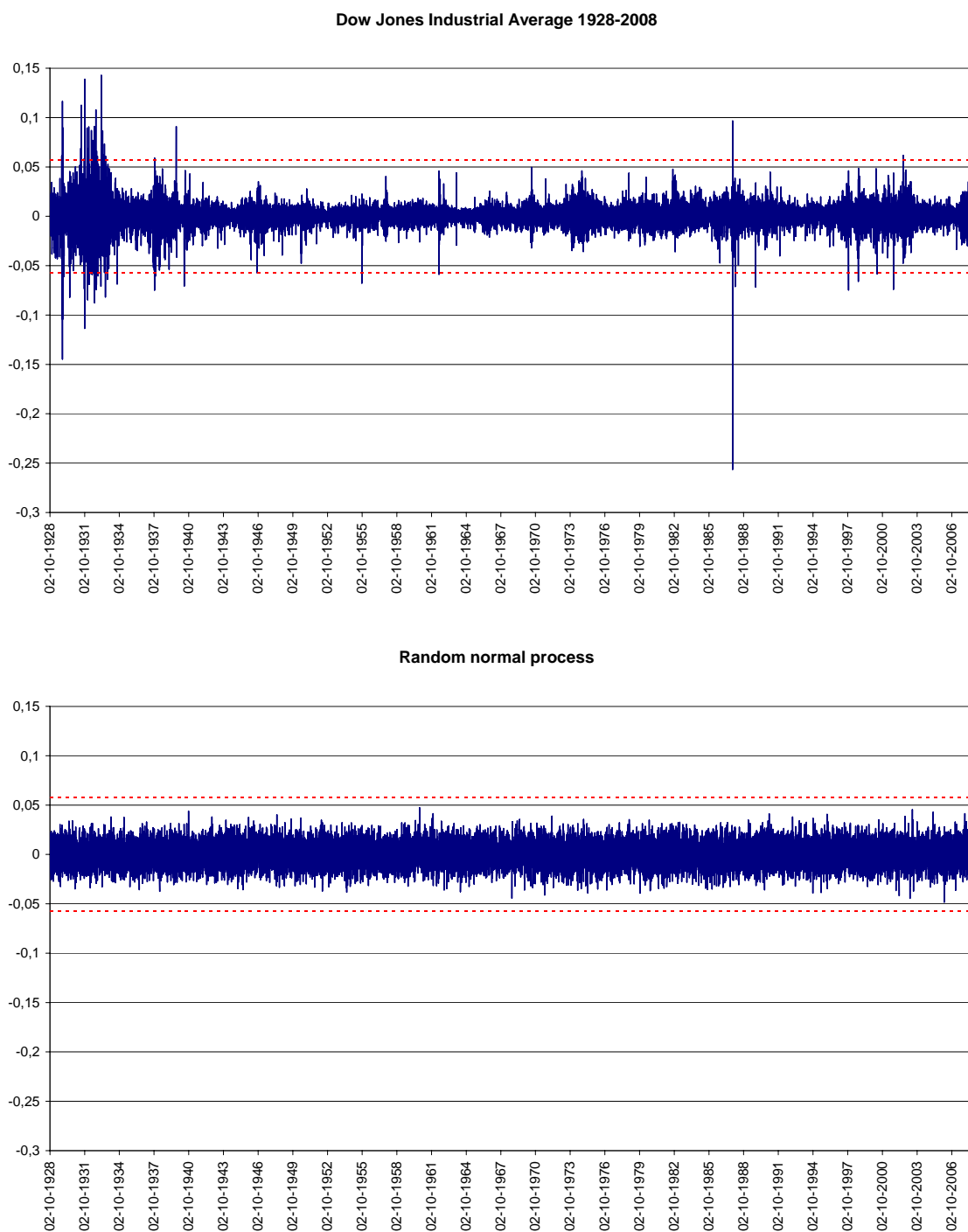
Table 1. Six largest movements of the Dow-Jones Industrial Average in October 2008

<i>A non-Normal October</i>		
Date	Percentage Change (1)	Average Frequency under Normal Law (2)
07/10/2008	-5.11%	Once in 5,345 Years
09/10/2008	-7.33%	Once in 3,373,629,757 Years
13/10/2008	11.08%	Once in 603,033,610,921,669,000,000 (3) Years
15/10/2008	-7.87%	Once in 171,265,623,633 Years
22/10/2008	-5.86%	Once in 117,103 Years
28/10/2008	10.88	Once in 73,357,946,799,753,900,000,000 (3) Years

(1) Daily returns from 01/01/1971 – to 31/10/2008 (Source Datastream)

(2) The mean of the distribution is set to zero and the standard deviation computed over the whole sample (St. Dev. = 1.032%).

Figure 8. Normally distributed returns and observed daily returns in foreign exchange markets



5. The reaction of the authorities

The authorities of the major developed countries have reacted to the crisis by using three types of instruments.

First, central banks have performed massive liquidity infusions to prevent a liquidity crisis from bringing down the banking system. Second, governments have introduced state guarantees on interbank deposits aimed at preventing a collapse of the interbank market, which would almost certainly have led to large scale liquidity crisis. Third, governments

have reacted to bank failures by massive recapitalisations of banks, and in a number of cases by outright nationalisations.

It must be said that these interventions have been successful in that they have prevented a collapse of the banking system. The issue that arises here, however, is whether these interventions will suffice to avert future crises and to bring the banking system back on track so that it can perform its function of credit creation.

The fundamental problem banks face today is that their balance sheets are massively inflated as a result of their participation in consecutive bubbles. As asset prices tumble everywhere, banks face a period during which their balance sheets will shrink substantially. This process is unlikely to be a smooth one, mainly because during the shrinking the devilish interaction of solvency and liquidity crises will occur. This is likely to create a further downward spiral. As a result, there is as yet no floor on the value of the banks' assets.

This mechanism has two negative effects. First, the capitalisations performed by governments are unlikely to be sufficient. With every eruption of the solvency-liquidity downward spiral, governments will be called upon to provide new equity infusions to counter the write-downs banks are forced to perform. The government recapitalisation programmes will throw money into a black hole. This process is already operating. As Table 2 shows, as of 13 October 2008, the amount of state capitalisations of the major banks fell short of the write-downs performed by the same banks.

Table 2.

**Largest Bank Writedowns & Capital Raising,
\$ bn, Data as of 13 October 2008**

	Writedown	Capital Raising
Wachovia	96.7	11.0
Citi	61.0	49.0
Merrill Lynch	52.2	29.9
Washington Mutual	45.6	12.1
UBS	44.2	27.1
HSBC	27.4	5.1
Bank of America	27.4	30.7
JPMorgan Chase	18.8	19.7
Morgan Stanley	15.7	14.6
IKB	14.0	11.5
Lehman	13.8	13.9
RBS	13.3	22.0
Credit Suisse	10.0	3.0
Wells Fargo	10.0	5.8
Deutsche Bank	9.8	5.9
Fortis	8.8	21.5
Credit Agricole	8.2	7.9
Other	158.4	129.0
Total	635.3	419.7

Source: Bloomberg.

A second effect of the massive deleveraging of the banking system is that it will give strong incentives to banks not to extend new loans, thereby dragging down the real economy. How far and how long this will go on, nobody knows. It is not inconceivable that this leads to a long and protracted downward movement in economic activity.

6. Short-term solutions

The solutions in the short-term will invariably involve a return of Keynesian economics. First and foremost governments will have to sustain aggregate demand by increased spending in the face of dwindling tax revenues. Large budget deficits will be inevitable and also desirable. Attempts at balancing government budgets would not work, as it would likely lead to Keynes' savings paradox. As private agents attempt to increase savings (because they reduce their consumption plans) the decline in production and national income actually prevents them from doing so. This paradox can only be solved by government dissaving.

Second, in the process of recapitalising banks, governments will substitute private debt for government debt. This also is inevitable and desirable. As agents distrust private debt they turn to government debt deemed safer. Governments will have to accommodate for this desire (see Hyman Minsky, 1986 on this).

Third, governments and central banks will also have to support asset prices, in particular stock prices. The deleveraging process of the banking system will continue to put downward pressure on asset prices. In order to stop this, governments and central banks may be forced to intervene directly in stock markets and to buy shares. As argued earlier, without a programme aiming at stopping the downward spiral involving asset prices, the recapitalisation programmes that governments have started may in fact imply throwing money into a black hole.

7. Long-term solutions: a return to narrow banking

Preventing the collapse of the banking system and making it function again are daunting tasks in the short run. Equally important is to start working on the rules for a new banking system. There are two ways to go forward. One can be called the Basel approach, the other the Glass-Steagall approach.

The Basel approach accepts as a *fait accompli* that banks will remain universal banks, i.e. do both traditional and investment bank activities. This approach then consists of defining and implementing rules governing the risks that these universal banks can take. Its philosophy is that a suitable analysis of the risk profile of the banks' asset portfolios allows for calculating the required capital to be used as a buffer against future shocks in credit risk. Once these minimum capital ratios are in place, credit risk accidents can be absorbed by the existing equity, preventing banks from going broke and thereby avoiding the devilish spillovers from solvency problems into liquidity problems.

This approach has completely failed. As was argued earlier, it was first implemented in the Basel I accord, but was massively circumvented by banks that profited from the loopholes in the system. Basel II attempted to remedy this by allowing banks to use internal risk models to compute their minimum capital ratios. The underlying assumption was that scientific advances in risk analysis would make it possible to develop a reliable method of determining minimum capital ratios.

This approach at managing bank risks does not work and will never do so because it assumes efficiency of financial markets; an assumption that must be rejected. Banks that fully participate in the financial markets subject themselves to the endemic occurrence of bubbles and crashes. These lead to large-tail risks that with our present knowledge cannot be quantified. In addition, when a liquidity crisis erupts, usually triggered by solvency problems in one or more banks, the interaction between liquidity and solvency crises is set in motion. No minimum capital ratio can stop such a spiral. Perfectly solvent banks capable of showing the best capital ratios can be caught by that spiral eliminating their capital base in a few hours. The Basel approach does not protect the banks from this spiral (a tail risk). In addition, there is no prospect of gaining substantial knowledge about tail risks in the near future. The Basel approach must be abandoned.

This leaves only one workable approach. This is a return to the Glass-Steagall Act approach, or put differently, a return to narrow banking in which the activities banks can engage in are narrowly circumscribed. In this approach banks are excluded from investing in equities, derivatives and complex structured products. Investment in such products can only be performed by financial institutions, investment banks, which are forbidden from funding these investments by deposits (either obtained from the public or from other commercial banks).

In a nutshell a return to the Glass-Steagall Act world could be implemented as follows. Financial institutions would be forced to choose between the status of a commercial bank and that of investment bank. Only the former would be allowed to attract deposits from the public and from other commercial banks and to transform these into a loan portfolio with a longer maturity (duration). Commercial banks would benefit from the lender-of-last-resort facility and deposit insurance, and would be subject to the normal bank supervision and regulation. The other financial institutions that do not opt for a commercial bank status would have to ensure that the duration of their liabilities is on average at least as long as the duration of their assets. This would imply, for example, that they would not be allowed to finance their illiquid assets by short-term credit lines from

commercial banks. Thus while commercial banks would be barred from engaging in the activities of investment banks, the reverse would also hold, i.e. investment banks would not be allowed to borrow short and to lend long, thereby taking on liquidity risks.

Thus, we would return to the Glass-Steagall world where banking activities are tightly regulated and separated from investment banking activities. This also implies that commercial banks would no longer be allowed to sell (securitise) their loan portfolio. The reason is that securitisation does not eliminate the risk for the banks, on the contrary. First, when a commercial bank repackages loans it cannot eliminate its liability associated with these loans. And as we have seen, when a credit risk materialises, these securitised loans reappear on the balance sheets of the banks, greatly increasing their risks and undermining their capital base. Second, as argued earlier, securitisation leads to a build-up of the credit pyramid. When a bank securitises a loan, it obtains new liquidities that can be used to grant new loans, which in turn can be used to securitise further. As a result, a credit expansion is made possible that occurs outside the supervision and control of the central bank (which, however, will be called upon to buy these assets when it becomes the lender-of-last-resort). Put differently, securitisation allows the credit multiplier to increase for any given level of the money base provided by the central bank. Credit gets out of control, endangering the whole banking system, including the central bank. It is worth stressing the latter point. The massive credit expansion made possible by securitisation also endangers the balance sheet of the central bank. This is so because in times of crisis, the central bank is called upon to function as a lender of last resort. As a result, it will be faced with the need to accept as collateral securitised assets that were created by banks. Allowing banks to securitise thus means that the central bank takes on a substantial part of the risk.

The preceding argument also implies that the 'originate and distribute model' that banks have increasingly used in the recent past must be abandoned. Recent proposals to save it by requiring banks to hold a fraction of the securitised assets on their balance sheets are inappropriate as they do not eliminate the risk arising from the multiplication of credit described in the previous paragraph.

To conclude: banks take extraordinary risks that are implicitly insured by the central bank in the form of lender-of-last-resort. The central banks have the right to insist that banks minimise their credit risks. These cannot be eliminated completely, but they can certainly be contained by severely restricting the nature of the loans banks can grant. The opposition

of the banks to such restrictions is likely to be fierce. Banks are likely to argue that such a restriction will reduce long-term growth. Monetary authorities should not believe one word of this self-serving rhetoric. The massive expansion of credit made possible by deregulation has not increased long-term growth, it has only made the occurrence of asset bubbles more frequent and has been at the heart of the unsustainable consumption boom in the US. All these phenomena have undermined financial stability.

A return to the Glass-Steagall world will necessitate a cooperative international approach. When only one or a few countries return to narrow banking, the banks of these countries will face a competitive disadvantage. They will lose market shares to less tightly regulated banks. As a result, they will have forceful arguments to lobby domestically against the tight restrictions they face. In the end, the governments of these countries will yield and the whole process of deregulation will start again.

8. Conclusion

The paradigm that financial markets are efficient has provided the intellectual backbone for the deregulation of the banking sector since the 1980s. Deregulation has made it possible for traditional banks to become universal banks and be fully involved in financial markets. As a result, these universal banks combine the activities of both traditional banks and investment banks. In addition, the total absence of regulation of investment banks has made it possible for these institutions to move in the direction of commercial banking, in the sense that they become institutions that, like traditional banks, fund their long-term assets by short-term liabilities. This double movement, i.e. commercial banks moving into investment bank territory and investment banks moving into commercial bank territory has led to a situation whereby both the universal banks and the investment banks build up a lethal combination of credit and liquidity risks.

There is now overwhelming evidence that financial markets are not efficient. Bubbles and crashes are an endemic feature of financial markets in capitalist countries. Thus, as a result of deregulation, the balance sheets of universal banks became fully exposed to these bubbles and crashes. As a result, banks, which by their very nature are subject to liquidity risks, added large amounts of credit risks to their balance sheets; an explosive cocktail. Investment banks that traditionally take on a lot of credit risk (exposed as they are to the vagaries of financial markets) added the liquidity risks typically reserved to traditional banks to their balance sheets.

The Basel approach to stabilise the banking system has as an implicit assumption that financial markets are efficient, allowing us to model the risks banks take and to compute the required capital ratios that will minimise this risk. We argue that this approach is unworkable because the risks that matter for banks are tail risks, associated with bubbles and crashes. These cannot be quantified. As a result, there is only one way out, and that is to return to narrow banking, a model that emerged after the previous large-scale banking crisis of the 1930s but that was discarded during the 1980s and 1990s under the influence of the efficient market paradigm. Application of this model will lead to a situation whereby the activities of commercial and investment banks are strictly separated.

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