History Repeating for Economists

An Anticipated Financial Crisis

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Summary

Finance can contribute to growth through various mechanisms: the transfer of savings from lenders to borrowers, the smoothing of investment and consumption profiles over time or again the transfer of risk. Financial innovations have their own characteristics: the result of private profit-seeking strategies, new financial products can spread very fast, because their production process is immaterial. This rapid diffusion can have a significant impact on macroeconomic stability. Financial history shows that the effects of financial innovation, ultimately favourable to growth, materialize through a succession of crises and efforts at regulation to avoid their repetition. Historical analysis, unlike the theories that postulate the stability and efficiency of financial markets, also allows us to detect the emergence of financial crises. The crisis triggered by the subprime mortgage meltdown is no exception. The sequence: "private financial innovation, diffusion, entry into a zone of financial fragility, open crisis" does not stem from the irrationality of agents' behaviour. Is it then possible to avoid a financial crisis? Why not apply the same sort of certification procedures to financial innovations as we impose on food products, drugs, cars, public transport, banking and insurance? Up until now, the omnipotence of finance has prohibited any such public intervention.

A historic reversal of the process of financialization

Most analysts were astonished and bewildered by the crisis that emerged in the summer of 2007. Yet this crisis is coherent with theories that study growth and its disruptions from a historical perspective. Financial innovations are the "great forgotten" of traditional economic analyses. And yet there is no reason why they should be treated any differently from technical, organizational, institutional or medical innovations. On paper, finance can contribute to growth through several mechanisms: by the transfer of savings from lenders to borrowers, by the smoothing over time of investment and consumption profiles or by the transfer of risks. What is particular about financial innovations is that they result from private profit-seeking strategies, and the new financial products are diffused all the more quickly because their process of production is immaterial. This diffusion can have major repercussions on macroeconomic stability because of the externalities[2] that characterize it.

The same specialists who had warned against the risks of irrational exuberance in relation to the new economy also championed the idea that sophisticated financial products would be capable of surmounting most of the obstacles to growth, by funding education, providing a guarantee against the risks of change, solving the problem of underdevelopment and helping to eradicate poverty. The dream of all-powerful finance was, in particular, given fresh expression in the United States in the financing of home loans for households that did not have the necessary financial resources. The securitization of these mortgages led to the beginning of the crisis that emerged in the summer of 2007 and gradually became systemic. The consequences of this phenomenon were exacerbated in 2008, amplified by the introduction of fair-value accounting (Bignon, Biondi, Ragot, 2004).

Modern financial theory is grounded on the hypotheses of market efficiency, in the sense that all the available information is incorporated into the market price, and that there exists complete arbitrage between the different financial instruments. This latter hypothesis is used in the models of portfolio management and price evaluation of the new financial instruments. Under these conditions, the public authorities cannot supervise the financial market. Responsibility for its good

[2] The inventors of new financial products act solely with a view to the profits they can capture, without taking into account the unfavourable consequences for macroeconomic stability, in this case the outbreak of a financial crisis directly linked to the success of these new instruments.

functioning is therefore delegated to the financiers, bounded by a few elementary rules concerning information disclosure, accounting transparency and insider trading.

In the 1990s, banks started to face a mounting barrage of criticism: their transaction costs were too high, they could not overcome the asymmetry of information between lenders and borrowers, and they were subject to irreversibility in writing loans that made them fragile and susceptible to crises, especially in the emerging countries. The supposed qualities of the financial markets, on the contrary, were lauded. They were said to circulate information better than the financial intermediaries traditionally embodied by the banks. They constantly transmit the relevant information through the formation of stock market prices and interest rates. The have the advantage of reversibility, unlike the operation of lending. They spread the risk over a vast group of differentiated financial and non-financial actors. Lastly, they provide a lower cost of access to financing than bank loans.

This confidence in market finance was itself the result of what was presented at the time as a theoretical and practical advance: economists and financial theorists constructed a science of the price formation of assets, options, derivatives and swaps. This conceptual breakthrough was converted into practices, routines and computer programmes of portfolio management. Risk was controlled thanks to the rational management of investments, using sophisticated statistical methods that are beyond the grasp of laymen, and even of financiers of the old school. So goodbye to the empirical methods, banking and financial panics and irrationalities that had hitherto marked financial history! The discourse that had been written for the "new economy" reappeared: it is not possible to evaluate the risk of crisis using the tools of the past, because a new period has dawned with the widespread use of derivatives.

The conception of value creation has been affected. In the past, historical cost accounting accurately defined the nature of profit in the activities of manufacturing transformations and services. In the modern economy, the source of profit lies in the skilful management of a set of assets and liabilities. Consequently, the financial community has obtained the adoption of "mark-to-market" and "mark-to-model" accounting, part of the dominant strategy of investment banks. First, thanks to the constant evaluation of the firm's financial position provided by the market price, investors possess transparent information, and financial organizations are expected to correct rapidly any deterioration in profitability or to enter a zone of financial vulnerability. Second, in the case of those assets for which there is no equivalent market, the new accounting system delegates to the actors the task of evaluating the price of assets and liabilities by means of models specific to each firm.

This proposal has been accepted by the public authorities on the grounds of the scientificness of the corresponding models, at the price of exclusively entrusting the production and control of financial information to the community of financiers.

The central novelty of the 1990s and 2000s touches the heart of financial activity. In the past, the purpose of almost every financial innovation was to facilitate an activity in the real economy: company investment and cash, purchase of durable goods, access to housing, public debt and, more recently, the financing of start-ups. The rapid development of financial theory has produced an impressive series of pure financial innovations, pure in the sense that their sole aim is to facilitate financial activity itself. The main transformation lies in the disconnection between financing and risk-taking, thanks to the invention of ever more sophisticated derivatives. Thus, what some authors have referred to as the "financial division of labour" has developed to an unprecedented degree over the last 20 years: the rise to power of credit rating agencies, pension funds and money managers, the creation of ever more complex financial instruments defining as many specializations of financial agents. This evolution was interpreted as a sign that the financial system had arrived at maturity and as a decisive contribution to its resilience, because the risk is spread to those who have the will and wherewithal to assume it. By very principle, the public authorities are not stakeholders. The innovation is appropriated by a financial entity that refuses to communicate its net position on the different markets, because that has become strategic information on which its profitability and survival depend.

These transformations were presented by the financial community as the foundations of a coherent new system. This system covered not only the question of the financing and risk associated with investment and innovation, but also and above all the model of control of non-financial firms, the nature of public interventions, the choice between system of distribution or pension funds for retirement pensions and lastly, the free circulation of capital and financial instruments on an international level. It is therefore no exaggeration to say that US growth, and to some extent British growth, have been driven by the constant renewal of financial innovations, especially those stimulating household consumption. In the institutional configuration of these two economies, one could therefore consider that the financial regime now occupied the central position, taking the place that wage relations had in the Fordist growth regime. Many theorists, from a wide range of ideological orientations, presented this model as the necessary reference and successor to the regime of mass production and consumption. One important consequence concerned monetary policy:

this was no longer simply a matter of arbitrating between inflation and unemployment, but also and above all the key reference of the financial community.

In the 1970s, theorists of liberalism insisted on the restoration of high competition as a condition for growth and improvement in standards of living. From the mid-1980s on, it was the boom in finance that was supposed to guarantee efficiency in the allocation of capital and presented as the mainspring of growth and innovation. In this conception, all the other institutions, particularly labour law and government, are no more than rigidities, prejudicial to the efficiency that can only be achieved by markets, and first and foremost the financial market. From then on, the institutional configuration of the US economy became the reference in international comparisons, and it became standard thinking to attribute the very poor growth of Europe and Japan to their backwardness in adopting the modern methods of financial management. The advice of international organizations was therefore to import them as fast as possible. Market finance thus became the emblematic figure of *the modernity of capitalism*, of its efficiency and resilience.

The sequence "private financial innovation, diffusion, entry into a zone of financial fragility, open crisis" has thus been set into motion. It is the very expression of the radical uncertainty that presides over the evaluation of any financial asset. Should we, for all that, infer that financial crises are inevitable and that regulation only serves to displace the origin of the crises? This text presents a historical perspective of successive crises, highlighting the role that financial innovations have played in triggering them. It concludes with the possibility of *ex ante* social control of these innovations: the public authorities can ensure that the introduction of a new technique in the domain of private finance is accompanied by clauses to render impossible the propagation of major macroeconomic imbalances due to negative externalities that can be detected in advance. Why not apply the same procedures of certification to financial innovations as those required for food products, drugs, cars, public transport, banking and insurance? Hitherto, the omnipotence of finance has prevented such government intervention, but the loss of credibility of the financial system in the United States and the *a priori* beneficial effects of all financial innovation have now placed this question at the top of the agenda.

Each of the pillars of the finance-led model of growth has suddenly collapsed, creating a radically different configuration to that of the last two decades. It is no longer possible to support the hypothesis of the informational efficiency of markets, even if some fundamentalists continue to blame the subprime crisis on excessive regulation and on the moral hazard encouraged by the way previous crises

have been dealt with. The financial press, instead of extolling the exceptional returns of certain investment funds, try to keep up to date with the volume of losses, expressed in billions of dollars. Employees of retirement age who had counted on drawing from their 401k accounts are forced to keep on working. Finally, everyone recognizes that it was unreasonable to mass-produce housing for populations who were known to be unable to pay for them. By unduly relaxing the intertemporal financial constraint, the financial community is directly responsible for the crisis that has caused its downfall.

The uncertain consequences of financial innovations

Growth is classically a question of technical and organizational changes, as Joseph Schumpeter (1949) observed. It is therefore in the realm of finance theory that we should seek the mechanisms linking growth with the diffusion of new financial products.

Studies of the contributions of finance to economic activity go back a long way. In particular, they examine the role of finance in the adjustment of savings and investment (Gurley and Shaw, 1956). The process of transferring savings from households to companies or of reallocating profits between mature industries and strong-growth industries is essential. In theory, the quality of the financial system therefore plays a decisive role in the process of growth.

- In the Soviet regime, capital was allocated according to political criteria: inefficiency in the use of capital led to the gradual exhaustion of the sources of growth (Sapir, 1989).
- In the Fordist growth regime, the regulatory supervision of banks and financial markets did not prevent the reallocation of profits towards sectors and firms creating productivity gains and new standards of production and consumption. During this period, the mixed economy showed itself to be superior to a typical market economy (Shonfield, 1965).
- In the finance-led growth regime, the allocation of capital was governed by the financial community's anticipation of promising sectors. At the end of the 1990s, this led to the diversion of capital from companies in mature, highly profitable sectors towards start-ups, most of which destroyed the capital through their failure to find a market for their potential innovations (Perkins and Perkins, 1999). The mimicry associated with what we have called the "Internet

convention" led to an ultimately inefficient allocation, as demonstrated by the destruction of capital when the bubble burst (Boyer, 2004).

Box 1
Status and evolution of financial innovations

The present analysis attributes a decisive role to innovations, considered simultaneously as a possible engine not only of growth, but also of crisis.

1. We owe this general interpretation to Joseph Schumpeter's work on the theory of development, published in 1911. According to his extended conception of innovation, it denotes the emergence of a new product, a new process or a new organization in a given economic entity. The process of development was therefore characterized by long waves marked first by a phase of growth linked to the diffusion of this innovation by the competition and then by a depressive period of adjustment of the whole economy through the disappearance of oligopolistic rents linked to the innovation.
2. It was Charles Kindleberger (1978) who proposed a history of financial crises based on an analogous hypothesis applied to finance: a financier invents a new instrument of financing and/or risk coverage whose high initial profitability provokes a process of diffusion and imitation, leading to a speculative phase which, in every case, leads to a crisis that may be more or less serious depending on whether it remains local (tulip mania) or transforms the very conditions of economic dynamics (securitization).
3. The analysis that follows does not deal with one sole innovation, but with the succession and subsequent combined effect of different innovations that have been made possible and favoured by financial liberalization: models of risk management, models of share valuation, securitization of a huge set of financial assets, subprime mortgage market, organizational models of the big Wall Street investment banks.
4. A perverse and unprecedented complementarity appeared between these diverse innovations, causing a massive transfer of risk onto almost every agent in the financial market. The set of mechanisms that was intended to cover risk actually intensified excessive risk-taking because of the rupture of the links of responsibility in loan contracts. The collapse of this pyramid, the freezing of interbank lending and the drastic tightening of credit conditions for non-financial agents are the direct consequences of this new configuration of the financial system in the United States. In this sense, it is perfectly legitimate to characterize the situation that emerged in September 2008 as a systemic financial crisis.

These observations are consistent with the main conclusion of a review of the literature published in 2003: financial innovations can favour improvements in technologies and organizations, and therefore in growth, but they can equally well result in speculative movements that are unfavourable to the stability of long-term growth (see Table 1).

Table 1 – Financial innovations: sources of growth or of crisis

Function	Impact on	
	Growth	Crises
1. Transfer of wealth over time	Favours investment by eliminating the irreversibility of choice	Makes possible the creation of rights in excess of future wealth
2. Risk management	Allows investment through the separation of financing and risk	Accentuates risk, because of poor evaluation resulting from the division of labour among financial actors
3. Pooling wealth	Better allocation of capital	Favours the emergence of bubbles and poor allocation of capital because of liquidity
4. Creation and dissemination of information	Socializes views of the future	Nurtures mimicry, however irrational it may be
5. Organization of payments	An efficient banking system favours growth	Constitutes a resonance chamber, amplifying the financial disorders at the heart of systemic crises

Source: after Rajan and Zingales (2003).

We can cite various examples of this ambivalence:

- The *socialization of information* about agents' expectations is organized by the financial markets, for want of complete futures markets for all transactions. Any new futures market therefore enriches the information available and, *a priori*, facilitates investment choices. On the other hand, the convention that emerges from the functioning of this market may provoke widespread *mimetic behaviour*, because the actors are dissuaded from carrying out their own analysis of the value of financial assets. Because of this, when there is a high level of uncertainty, the market is divided between two equilibriums, one pessimistic, the other optimistic, compared to what an estimation of the fundamental value would give (Orléan, 1990). Good dissemination of information does not necessarily, therefore, entail the efficient allocation of capital.
- The separation between financing and risk, which has made possible derivatives and notably certain credit derivatives such as credit default swaps, should enable agents to *cover themselves against a risk* by transferring it to a third party more capable of assuming it. This opening up of bilateral credit relations to third

parties encourages the two actors concerned to take greater risks, because they can transfer those risks and because they possess better information about their scale. There is therefore a strong probability that once established, this mechanism will incite *excessive risk-taking* that increases the probability of entering a zone of financial fragility. The development of derivatives in the mortgage market of the United States provides a good example of such a process.

- The *liquidity of the economy* increases when deep, liquid markets develop, independently of money creation, giving financial actors the illusion that they can in fact do without banks and money creation. Many actors have used very high leverage to obtain exceptional levels of profitability. If they lose the corresponding gamble, they resort to bank credit. If the commercial banks are themselves the victims of mistaken expectations, the liquidity of the financial markets suddenly dries up. This is the mechanism that triggered the collapse of the subprime mortgage market and precipitated a systemic crisis. Financial agents cannot rely on either the market or their models to evaluate their assets and liabilities.

Private innovations, crises, followed by regulations in finance

On the financial markets, some agents seek to evaluate future returns by analysing the information provided by the most recent data on company results, the movement of short-term interest rates, exchange rate trends, prospects of technical change, tax policy, and so on. The mechanism is organized according to expectations and analysis that projects into the future. Other agents on the financial markets content themselves with retrospective analysis, as the chartists do with stock market prices. A number of models have shown that the behaviour of chartists and "followers" amplifies the upward movement initiated by those agents who are best-informed and equipped to analyse the impact of an innovation capable of raising the rate of return on capital in a company, in a sector or even in the economy as a whole (Tadjeddine, 2006).

The problems of uncertainty that weigh on the use of all financial instruments are heightened by the launch of a new financial product. The actors must form an opinion based on beliefs, for want of past observations. Just to take one example, the financial community believed in the new economy, although there were few elements to justify the almost doubling of rates of return on capital. The very

novelty of the financial technique, product or instrument may suggest the dawn of an unprecedented period in which past regularities will fade away. Financial history, on the contrary, provides hypotheses for the trajectory of technical and financial innovations that have been supposed to herald a new era.

The horizon of the actors involved does not exceed a few years, while the effort of information search and analysis focuses on the most recent developments. Thus, through the formation of the market price, a belief emerges in the dawning of a new epoch marked by returns without precedent in terms of their magnitude and/or stability. Financial history has the great merit of detecting the repetition of the same sequence of speculative fervour. Such works are numerous: isolated to begin with (Kindleberger, 1978), they have increased with the growing frequency of crises since the mid-1980s (Garber, 2000; Eichengreen, 2003; Roubini, 2008). The novelty is that macroeconomic and financial theorists themselves refer to the series of phases of runaway speculation when constructing models to explain the inefficiency of markets, by means of more or less substantial modifications to either the hypothesis of rationality (Shiller, 2000), or the organization of markets (Shleifer, 2002).

Adopting this perspective helps to shed light on the current situation: it is not the first time that a technical innovation has been considered radical and capable of permanently raising profit levels. So, for instance, the restructuring of firms and changes in the frontiers between sectors under the impact of information and communication technologies in the 1990s were compared to advances in the scientific organization of labour in the United States in the 1920s. The fast rise in liquidity on the stock market itself provoked a rash of mergers and acquisitions that corresponded in its own way to the increase in liquidity observed during the 1960s in the United States (see Table 2).

Table 2 – The most notorious bubbles: revealing the functioning of finance and credit

	Response of informed agents	propagation Mechanisms	Recognition by the authorities	Collapse	Political reaction/reform
Tulip mania in the Netherlands (1630-1636).					
A virus is discovered that produces attractive tulips; national prosperity	Research into methods of selecting bulbs and purchases on the market	Boom in bulb contracts signed before notaries, growth in transactions	?	1637	?
South sea bubble (1710-1720)					
Profits derived from conversion of the public debt; expectation of a monopoly on trade with the Spanish	Purchase of the debt before conversion and profits from presenting the securities for conversion	Development of speculation through a network of coffee houses	Government approval, royal involvement	1720	Punishment of directors, restrictions on the use of the legal form of company
Mississippi bubble (1717-1720)					
Rapid growth of trade with the New World; Law's success as financier	Law's plan to become rich and powerful by converting French public debt	Government support, strong expansion in credit through Law's bank to sustain the wave of purchases	Official support from the Duke of Orleans, criticism of Law punished	1720	Fall of Law; abandonment (until 1787) of efforts to reform French public finances
Railway boom in Great Britain (1845-1848)					
End of the depression; enthusiasm for this new mode of transport	Growing number of railway projects	Development of Ponzi-type schemes (using capital to pay dividends)	Laws for each network, suggesting government approval	No sudden collapse, gradual adjustment	Reform of accounting standards; rules imposing the payment of dividends out of revenue and not out of capital
Railway boom in the United States (1868-1873)					
End of the Civil War; colonization of the West of the United States	Construction of networks subsidized by the government	Increasing numbers of railway contracts; expectation that subsidies would continue	Henry Varnum Poor and Charles Frances Adams	1873, bankruptcy of Jay Cooke & Company	?
Loans to Argentina (1880)					
Strong world demand for Argentine agricultural products; substantial profits for the first investors	Flow of investments from Great Britain to Argentina; extension of the rail network	New debt issues on the London market; creation of companies speculating in land prices	Remarks of Argentine President; optimism of Barings as to improvement of the situation and the possibility of reimbursement	Bankruptcy of Barings (November 1890)	Coup d'etat in Argentina; laws unfavourable to foreign investment
Real estate boom in Florida (1920-1925)					
Pleasant winter climate; proximity of large US centres of population; economic prosperity	Construction of railways; development of Miami; real estate projects	Creation of a network of real estate agents selling plots of land in Florida	William Jennings Bryan extols Florida; close relations between mayors and developers	1926	Prosecutions for fraud
Stock market bubble in the United States (1920-1929)					
Rapid expansion of mass production; fast growth; end of the fear of deflation	Growth in the supply of securities; creation of new investment funds	Growth in the profit margins of financial intermediaries; boom in credit	Receives the blessing of Coolidge, Hoover, Mellon and Irving Fisher	October 1929 and following years	Fragmentation of large companies; financial and banking regulation; many and varied state interventions
Wave of mergers in the United States (1960-1969)					
Twenty years of rising stock market prices making shares highly profitable	Emergence of professionally managed conglomerates: ITT, Textron, Teledyne, etc.	Exchange of securities to give the appearance of growth in profits	Harvard investment fund takes positions on the market, McGeorge Bundy encourages financial institutions to invest aggressively	1970–1971	Reform of accounting practices, Williams Act.
Internet bubble and wave of mergers (1999-2000)					
Opening up to financial markets of high-growth economies; new prospects opened up by ICT	Creation of new financial instruments; reorganization of portfolios on an international scale; exploitation of market imperfections for takeover operations	Abundant savings linked to the growth in pension funds and boom in portfolio investments; entry of new agents onto the market	Alan Greenspan, after warning against irrational exuberance, goes along with the opinion of the market	March 2000–June 2003	Sarbanes–Oxley law regulating accounting, the responsibility of CEOs, the communication of financial results; growth of movements against financial globalization

Source: after A. Shleifer (2002), pp. 170–171

A chain of events leading to the return of public control

At the origin of such a chain of events lies an impetus given by a new technique (new methods of producing tulips… mass production methods), by finance (creation of shares in a navigation company), a political discontinuity (railway boom after the American Civil War), consumption (emergence of customers for new services [holidays in Florida thanks to the renting or buying of an apartment]) or by an unprecedented new financial situation (rush of liquidities onto the stock market allowing a rise in the number of takeover bids). The adoption of a selective strategy by informed economic agents guarantees them the reality of expected returns. They carry out purchases justified by their technical expertise (how to grow the new tulips? what real estate to build in Florida?) or by the privileged information they possess (which is generally the case for financial innovations). Their behaviour is rational in the economic sense of the term, and does not in itself lead to a speculative boom.

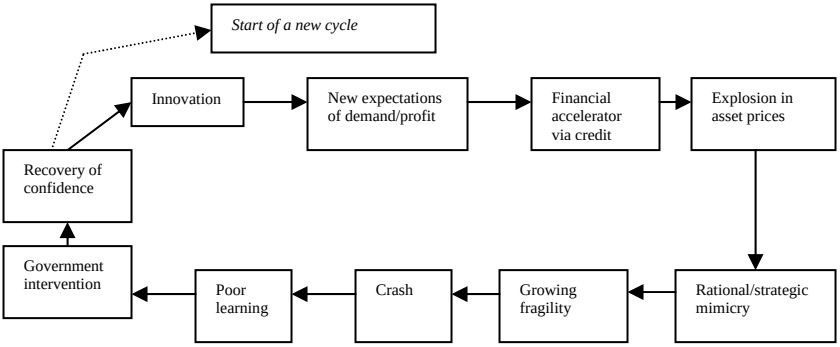
The rise in the price of products and consequently in the financial assets of companies that produce them endorses the strategy of these informed agents. In reaction to these price signals, other agents enter the market, unaware of the nature of the innovation and trusting simply to an extrapolation of the rising prices. A new shareholder unacquainted with the functioning of the stock market transfers a large part of his portfolio into this financial instrument. In this third step, "followers" and credit play a decisive role in the speculative surge.

The endorsement of expectations by an indisputable authority accentuates the boom. In the Mississippi Bubble, the French government gave John Law its official support. In the United States in the 1920s, Irving Fisher declared that share prices had reached a "permanently high plateau", a diagnosis that he maintained up until the eve of the stock market crash. In the modern period, the position of Alan Greenspan, who had originally warned against irrational exuberance, marked a watershed in the Internet bubble when he came over to the opinion of the markets ("private agents know better than the central banker what share prices ought to be").

The appearance of a gap between returns obtained and returns expected marks the climax of the sequence and the imminence of the forthcoming downturn. This occurs either as a result of the endogenous erosion of returns because of over-accumulation or in response to a piece of bad news, apparently minor, that triggers a change in opinions about future prospects. In other cases, the best-informed agents judge that, given the height attained by asset prices, now would be the best time to get out by selling them.

Lastly, intervention by the government, faced with the gravity of the social and political consequences of the crash, signals the search for blame and the reintroduction of rules and reforms both to avoid repetition of such episodes and to re-establish confidence, without which the markets cannot operate. In most cases, these measures are successful in having the crisis forgotten. A new cycle can then begin (see Figure 1).

Figure 1 – The cycle from major innovation to crash



This diagram sheds fresh light on the history of the last decade in terms of financial innovations.

The subprime crisis in perspective

The movement of financial liberalization, both internal and external, made it much easier to experiment with new financial products. As they have grown in number, we now possess a sufficiently large sample of innovations and crises to be able to make an overall judgement: in the absence of adequate public regulation and control, there is a great risk that financial innovations will lead to a local, sectorial, financial and, in certain cases, macroeconomic crisis. The last decade can be likened to the race between the tortoise and the hare: financial agents, in the role of the hare, launch the process, and it is up to the public authorities, in the role of the tortoise, to absorb the costs of the resulting financial crises and to try to prevent their repetition by adopting a new strategy and, perhaps, new regulations. The financial

markets that were supposed to be self-regulating are in fact the source of crises that often have dramatic consequences for the economy and society as a whole.

The stock market crash of 19 October 1987: the ghost of 24 October 1929 soon forgotten

The sequence of events started with the collapse of the Dow Jones in the New York stock market, on a scale equivalent to that which marked the beginning of the 1929 crisis. Analysts asked themselves the question that provided the title of Hyman Minsky's book: *Can it happen again?*. According to a view of the economy affirming the concept of the long-term equilibrium and invariance of the fundamental economic mechanisms, this heralded a depression comparable to that of the 1930s. This forecast turned out to be mistaken, for two main reasons (see Table 2).

- The two crises had different origins. In one case, stock market speculation simply amplified an imbalance in the regime of accumulation, which explains the scale of the economic and social costs of the 1930s in the United States. In the crisis of 1987, there was sustained growth, although it took place in an international context troubled by the uncertainty of exchange rates and their evolution. The imbalance was essentially within the financial sphere.
- The chairman of the Federal Reserve Board (the Fed, hereafter) learnt from the errors his predecessors had committed in the 1930s. Instead of allowing a chain reaction of bankruptcies to develop among the financial actors, Alan Greenspan supplied abundant liquidities to the endangered financial operators. After the event, continued growth and slight inflation were observed, instead of depression and deflation.

Thus, stock market crises follow, but do not resemble each other. It was the conjunction of financial products that emerged at the beginning of the 1980s that lay at the origin of the crisis. At that time, a new method of portfolio management started to develop, in which each transaction was associated with the writing of options with the aim of guarding against errors of anticipation. Simultaneously, all the actors in the market equipped themselves with software allowing them to place directly the orders entailed by this programme of optimization. A sharp downturn in stock market prices sparked off a depressionary spiral: nearly everyone wanted to sell and no one wanted to buy.

- The widespread adoption of the strategy of *risk coverage* precipitated the event against which the agents had sought to protect themselves on a microeconomic level: the conjunction of rational microeconomic strategies blocked the market. This feature can be found in most other crises, including that of subprime mortgages (see Figure 10, below).
- The central role of the Fed was confirmed by this episode: faced with a liquidity crisis, and whatever the responsibilities of the other actors or the risks of moral hazard, the central bank is the lender of last resort with the task of restoring continuity in the system of payments. This characteristic is present in most of the crises mentioned in this text.
- The institution of circuit breakers, by request of the government, (but not by the professionals, who think that the mechanisms of the market should be allowed to operate freely) suspends trading in the event of prices moving too far, too fast. Thus, the financial markets record the sedimentation of rules instituted to prevent the repetition of past crises. When the political authorities go back on some of these rules, such as the separation between commercial banks and investment banks, a return to old forms of crisis becomes possible, as certain of the developments in the 2008 crisis have shown.

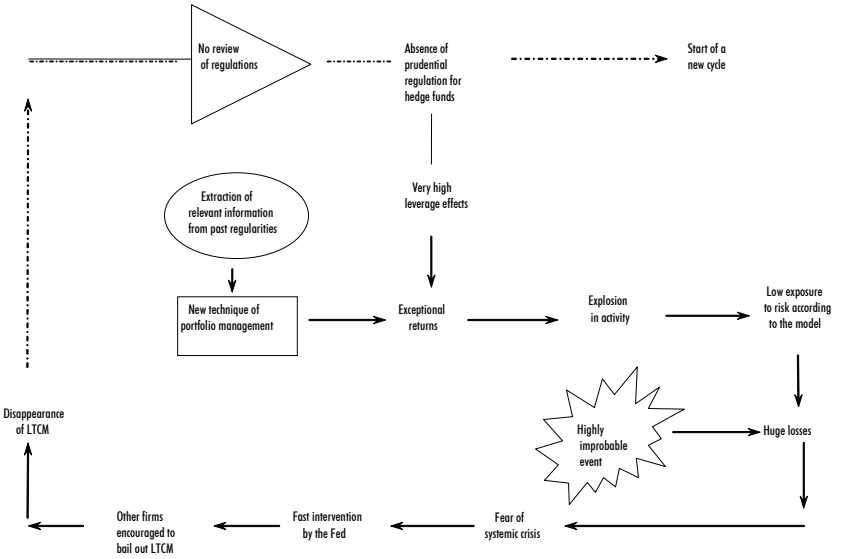
The first of these lessons, though not the other two, was demonstrated in the United States in the following crisis.

A first crisis forewarning of the danger of derivatives: the collapse of LTCM in 1998

The theories of market finance have seen many developments since the beginning of liberalization. Statistical and mathematical techniques have become more sophisticated and theorists have proposed new methods for evaluating risk and setting a price on derivatives. The contributions of Black and Scholes (1973) and Merton (1973) opened up a wide domain for the invention of new derivatives. Far from observing the regularities resulting from the functioning of the markets, they invented a method of evaluation. They proposed this to the financial community, which adopted it to the point of making the regularities postulated by the theoretical model appear in the market prices. The performative nature of the financial theory is a novelty for standard theories, both micro- and macroeconomic (MacKenzie and Millo, 2003).

This mastery of the measurement of risk led many to believe that all possibility of a major financial crisis had been eliminated. The collapse of Long Term Capital Management (LTCM) is interesting precisely because it shows that financial crises do not necessarily derive from irrationality on the part of ill-informed agents or from the mimetic behaviour of crowds (Kindleberger, 1978, 1994; Shefrin, 2000). They may stem from the implementation of a new rationale of optimization of financial return, so vigorous that it destabilizes the macroeconomic regularities, and all the more so when an event occurs that is only supposed to happen once a century, in the light of retrospective analysis (see Figure 2).

Figure 2 – The collapse of Long Term Capital Management: an *ad hoc* solution brokered by the Fed, with no review of public control



The substantial losses incurred by one financial institution initially of modest size raised two questions for the public authorities responsible for financial stability.

- *Derivatives*, supposed to cover the risk of certain agents, expose others to a risk that is all the greater as they become the regular, if not exclusive, suppliers of this type of product. This result, drawn from observation of the

LTCM crisis, is also confirmed by modelling that takes into account the specificities of the current organization of the financial market. The creation of a futures market and a derivative can push the economy into a zone of financial fragility, under conditions characteristic of existing markets (Artus, 1990; Li and Barkley, 2001; Brock *et al.*, 2006).

- This contradicts the intuition that can be drawn from the last chapter of *La Théorie de la valeur* ("Theory of Value") by Gérard Debreu (1959): if all the futures markets are open, an equilibrium can exist under the usual conditions. As we draw closer to this ideal, we should therefore move towards financial stabilization. The recent financial literature belies this fairly essential conjecture, as it forms the basis for strategies of creation and multiplication of derivatives.
- The sudden appearance of losses of the order of billions of dollars is the direct consequence of the use of extremely high leverage, with factors of 30 to 50. Then it only takes a fall of 3.3 per cent or even 2 per cent for the losses to exceed the equity capital. This is the whole problem with hedge funds or even the management of an experienced firm like Lehman Brothers: it only had 1 billion dollars in equity to cover derivative positions of more than 30 billion.

The various regulatory authorities were not worried by these risks and imposed no rules on the most dynamic managers of Wall Street. *Self-organization* by the market players was the solution favoured by the Fed chairman, who organized the taking over of LTCM by other, healthier investment banks. This elegant and economical solution – from the point of view of public finance – helped to conceal the dangers of derivatives and of hedge fund strategies.

Table 3 – A comparison of four crises in the United States and the crisis in Japan: the decisive role of banks

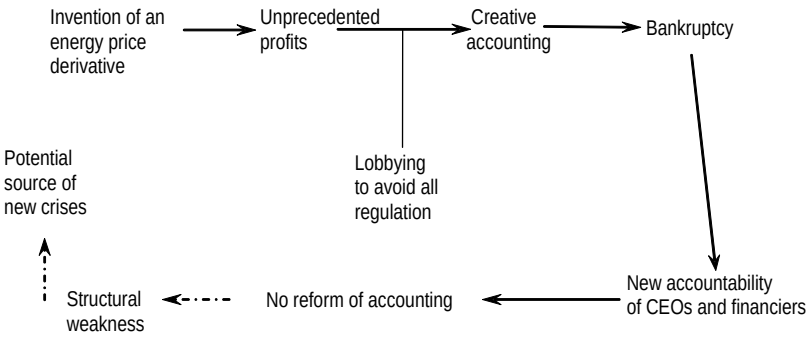
	United States 1929-1939	United States 1987	Japan 1991-2003	United States 2000-2003	United States 2007 - ….
"REAL" ORIGIN OF THE BUBBLE	Method of mass production	Recovery of growth No financial bubble	An original production model	Boom in ICT and the new economy	Speculative boom in the housing market and easy access to credit
PRE-CRISIS ECONOMIC SITUATION	Strong growth	Period of structural adjustments	Regime of growth tending to decelerate	Strong, non-inflationary growth	Sustained growth with a few inflationary tensions
TYPE OF CRISIS					
▪ Stock market crisis	*	*	*	*	Not initially, then contamination by subprimes
▪ Banking crisis	*	No	*	No, remarkable resilience due to securitization	Yes, for investment banks
▪ Real estate crisis	No	No	*	Weak and localized	Yes, significant
MANIFESTATION OF THE CRISIS					
▪ Depression and deflation followed by late recovery	*				
▪ Growth and inflation		*			
▪ Quasi-stagnation then deflation			*		
▪ Recession without deflation				*	*
POLICY	*Follow the orthodox line* ▪ Initially laissez-faire ▪ Then an attempt at institutional reconfiguration (New Deal)	*Not to repeat 1929* ▪ Rapid reaction of the Fed ▪ Supply of liquidities to the financial market	*Go with the flow* ▪ Tardy action by the Bank of Japan and the Ministry of Finance ▪ No restructuring of banks	*Guard against deflation* ▪ Quick cut in interest rates ▪ Budget stimulus, including the consequences of the 9/11 attacks	*Pull out of a systemic crisis* ▪ Quick cut in interest rates and lender of last resort, even for investment banks ▪ Budget stimulus ▪ Take over control or nationalize numerous financial institutions ▪ Creation of an institution of defeasance and plans for new regulations
LINK					
▪ Gravity of the crisis/fragility of banks	*	No	*	No	Resilience of commercial banks, collapse of investment banks
▪ Absence of crisis/resilience of banks	No	*	No	*	Systemic and structural financial crisis

The Enron episode (December 2001)

Setting aside the exact characteristics of the derivative, the same sequence can be observed, *mutatis mutandis*, for the energy derivatives proposed by Enron. This was the epoch of the "new economy" and the hopes of a dematerialization of economic activity: why invest irreversibly in facilities to produce and transport energy when one can organize the futures market of the corresponding contracts to make substantial profits, from a modest capital investment, guaranteeing greater flexibility in its allocation. Just as with LTCM, Enron was so successful that it became the flagship to which many others aspired, the returns it posted were so exceptional.

In 2000, it turned out that these results were obtained essentially through legal accounting practices, consisting in discounting to present value its existing contracts. The corresponding costs were hidden away in satellite accounts that were not consolidated with those of the parent company (Mistral *et al.*, 2003). Essentially, this was therefore a problem of the information available to the financial market. It was followed by calls for greater transparency and for the accountability, including penal, of CEOs and financial directors, which gave rise to the Sarbanes–Oxley Act (see Figure 3).

Figure 3 – The fall of Enron: increase in the accountability of senior managers, without reform of accounting practices or supervision of new derivatives



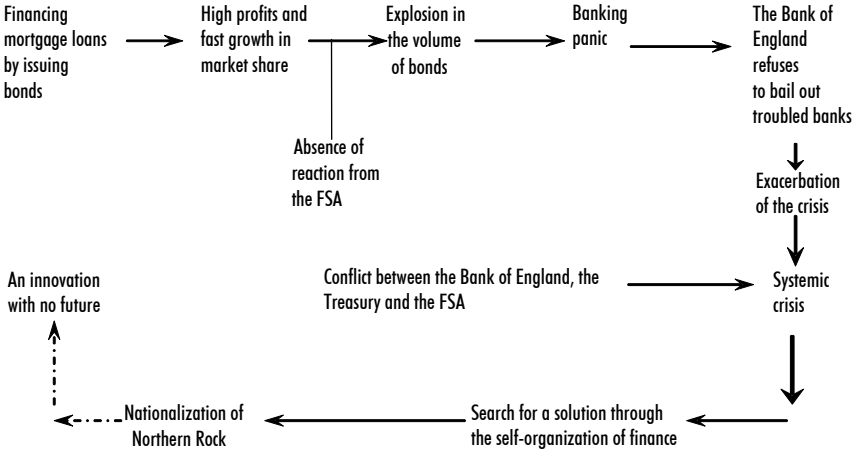
Other problems remain, despite the new legislation:

- Enron used its political connections to dissuade the financial supervisory authorities from establishing any control or regulation of derivatives, under the two pretexts of a complexity that only they could master and the principle of freedom of enterprise. An equivalent mechanism can be observed in the case of subprimes in the second half of the 2000s.
- Accounting practices oriented towards the financial community, implementing the principle of fair value, imposed serious risks on the stability of finance. It introduced strong procyclicity in the results posted, which remained virtual (Boyer, 2007). As much as the actors were satisfied during periods of speculative boom, so they suffered a *sudden risk of bankruptcy* during periods of adjustment. We need look no further for the reason behind the bankruptcy of Lehman Brothers, or the absorption of Merrill Lynch by Bank of America. As the products became ever more sophisticated and the volumes concerned continued to grow, the sums involved became enormous during the second half of the 2000s, to the point of *threatening the financial stability* of the whole United States and world financial system.
- Finally, as a last paradox, securitization also led to the specialization of certain investment banks or insurance companies in certain segments of the market, whereas securitization is meant to *spread the risk*, which was only partly the case. The resulting *concentration of risks* increased the probability and violence of financial crises when private firms were forced to reveal to the market the extent of their losses, information that was kept private as long as possible. The disarray of the public authorities became apparent when they were obliged to ask other private financial bodies to verify the accounting situation of those firms that they were thinking of taking over, as was the case for Bear Stearns.

The division of responsibilities in financial supervision: the case of Northern Rock (February 2008)

The banking panic that broke out in England illustrates another key point: because of the division of labour between the different bodies responsible for financial supervision and their sedimentation over time, the public authorities were initially dumbfounded by the abruptness of the Northern Rock crisis (see Figure 4).

Figure 4 – The financial innovation that sparked off the first banking crisis since 1856



The origins of this crisis lay in an innovation that met, initially, with great success: Northern Rock, specialized in mortgages, decided to use massive bond issues as a means to develop its activity and win a larger share of the market. In the space of a few years, the bank became one of the star players in the sector, as long as the British real estate bubble continued to swell. The supervisory authorities (the Bank of England, the Financial Services Authority [FSA], the Treasury, and the City) remained silent, although this strategy presented new risks for the bank and by extension for the British financial system. When the downturn in the housing market came, it triggered a spiral of asset depreciation because of bad debt and the fall in the bank's share price. Customers, alarmed by a declaration from an external authority, rushed to withdraw their deposits from the bank.

To begin with, the Bank of England, directed by an economist aware of the problems of moral hazard that the rescue of Northern Rock would raise, refused to bail out the bank. Ambiguity also floated over the division of responsibilities between the various authorities of control or supervision. In keeping with a British tradition, the government hoped that the City itself would find a solution without the need for state intervention. The panic then spread to the whole of the British banking system, to such an extent that the government was forced to nationalize the bank. Certainly not the sort of measure one would expect to see in the programme of New Labour!

This new episode confirms the lessons to be drawn from previous crises and provides a few new elements.

- First, given the plasticity of finance, an innovation implemented by a minor bank is capable of triggering a movement powerful enough to endanger the bank itself and even the whole financial system. It is therefore important that regulations and supervisory authorities cover the whole of the financial system.
- Second, *ambiguity* about supervisory authority is prejudicial to an ordered resolution of the crisis when the innovations connect diverse financial instruments (loans, derivatives, bonds, swaps, insurance, options). The various authorities may uphold different views about the treatment of financial crises. Some prefer to avert the next crisis, even at the expense of aggravating the present one by refusing a public bail-out for incompetent or reckless speculators. Others consider that stability of the financial and monetary order is the most important thing in a market economy, even if it means indemnifying the actors at the origin of the crisis.
- Finally, the speed of the downturn, the growing interconnectivity between different markets and the fact that it takes so little to trigger a vicious circle of generalized asset depreciation generally settles the argument in favour of public bail-out, whatever the political programme of the governments involved, the warnings of economists or the protests of opposition parties. The trajectory of the US economy since March 2007 provides a good example of improvisation in the management of systemic financial crises.

The mortgage derivatives crisis: silence from the regulatory authorities followed by massive intervention

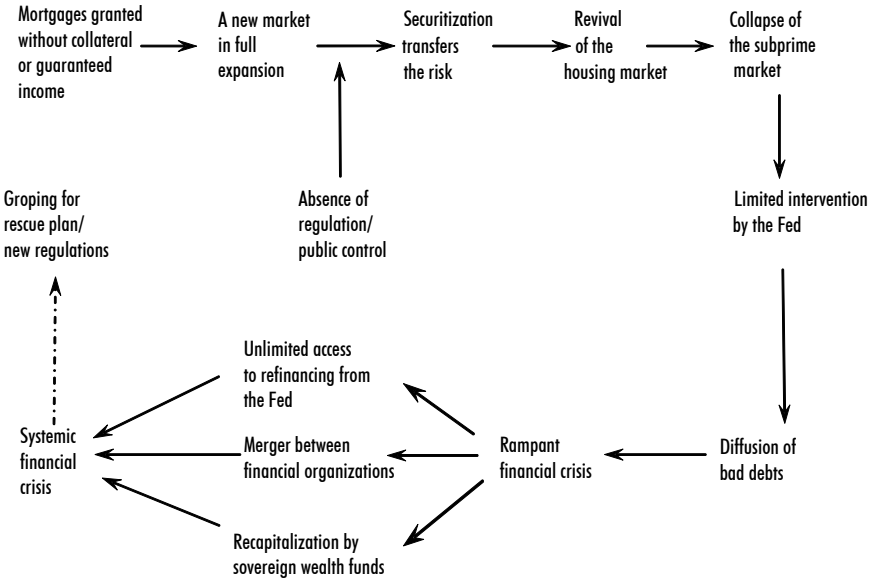
The role played by the central bank in fixing low interest rates is another factor in the genesis of bubbles associated with financial innovations. One illustration can be found in the United States after the bursting of the internet bubble, when the Fed kept interest rates down to relieve financial institutions and indebted households and accompany a programme of fiscal stimulus. The Republican administration also announced a programme of access to home ownership for minorities and disadvantaged groups. Mortgage establishments leapt at the new opportunities for profit that this opened up: they offered loans without bothering to make any request for collateral or for information about income, in the hope that the continuing surge in real estate prices would be the best guarantee. Thanks to particularly active lobbying of public authorities by the financial companies, the corresponding financial products and their securitization were not covered by any regulation. Thus, all the

ingredients were brought together for the typical development of a high-risk financial innovation (see Figure 5).

There was a sharp downturn in the market. The classification of tranches of credit proved to be hopelessly over-optimistic when the rate of defaults started to rise and the price of real estate started to fall in 2007. The subprime market disappeared. As it figured prominently in the books of a number of banks, this triggered a liquidity crisis, to which the Fed responded initially by providing easier access to liquidities, of a modest amount. Given the scale of the assets involved, of the order of 3 thousand billion dollars, it soon became apparent that defaults were still rising and that the banks were incapable of evaluating a growing number of assets. The subprime market was closed, and the *ad hoc* models drawn up by each bank, assuming constant access to liquidity and a low risk correlation, no longer provided any relevant information. The systemic crisis had started, as it was the very principle of the valuation of assets that was the root of discord. Interbank credit, in particular, dried up completely.

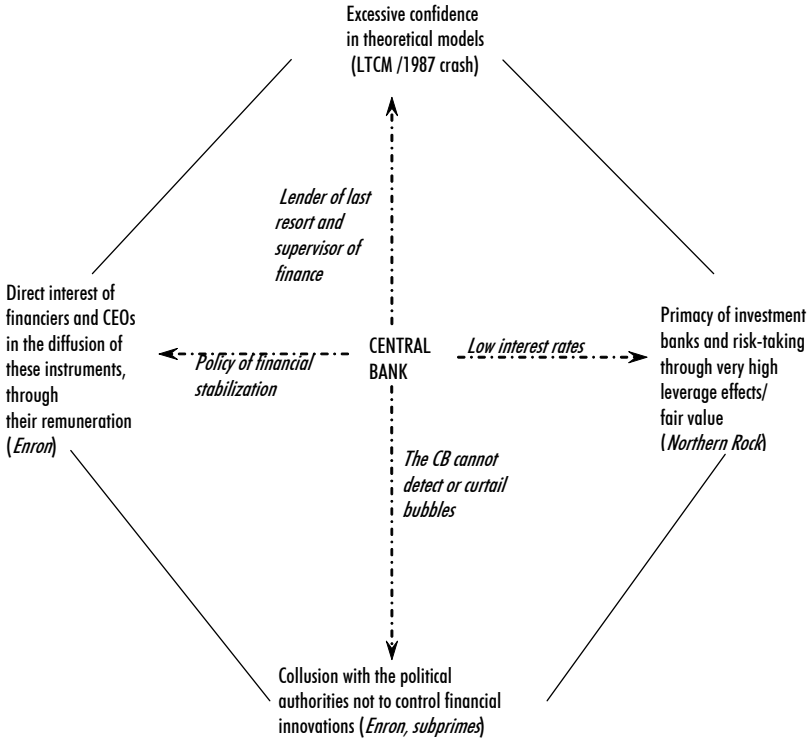
A new stage in the crisis was reached in 2008 when the Fed guaranteed unlimited access to liquidity and encouraged mergers between financial establishments, while recapitalization by sovereign funds was accepted, which, not long before, had been denounced for their lack of transparency and the threat they posed to the stability of the world financial system! The most remarkable phenomenon was surely the fumbling nature of US policy. The Treasury Secretary minimized the scale of the crisis, the Fed granted facilities of access to credit and both called for responsible action from Wall Street… without taking full measure of the origins and depth of the crisis: the whole system of valuation of assets and liabilities had frozen up. Under such conditions, monetary policy is an indirect and crude tool for resolving this crisis of a largely new nature.

Figure 5 – An innovation that was *a priori* dangerous, but in line with a policy of widening access to home ownership



In fact, the process triggered by the subprime crisis combined the consequences of most of the innovations that had accumulated during financial liberalization: the massive transfer of uncontrollable risks to third parties, confidence in models estimated over a relatively short time, certainty of permanent access to liquidity, the race for leverage to obtain higher returns on equity, lobbying to prevent the intrusion of supervisory authorities into particularly profitable markets. The crisis is of an unprecedented scale, because it condenses all the problems and imbalances that have been denied or postponed throughout the last decade (see Figure 6).

Figure 6 – The subprime crisis results from the conjunction of financial innovations since the 1980s: widespread underestimation and transfer of risk



The end of consumer-debt-driven growth

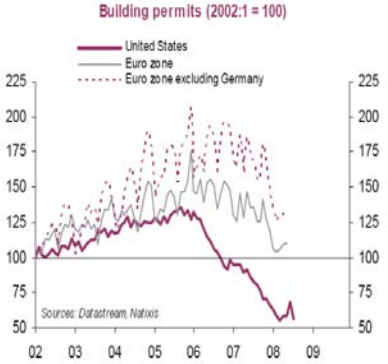
The subprime crisis probably marks the end of an era for the financialization of the economy and for the more specific mainsprings of growth in the United States. The process set under way when this crisis started in 2007 combines three movements:

- A classical crisis surfaced in the United States, where the corollary of the overproduction of housing has been the production of bad debt. In this respect,

building permit applications have collapsed since 2006, while the stock of unsold housing is growing by inertia. Overproduction has triggered a movement of deceleration followed by a moderate then rapid fall in prices (see Graphs 1 and 2), while financiers had convinced the general public that prices could only keep on rising, as at the end of the internet bubble (in this case the price of housing rather than firms in the "new economy"). This phenomenon is consistent with the competitive regulation of a very fragmented sector. In this respect, the price surge was less pronounced in the eurozone, and real estate prices started to fall later. The suddenness of the downturn in prices struck derivatives particularly hard, because it confounded all the forecasts that had been based solely on observation of the most recent period of growth. We must therefore reject the interpretation offered by the financial community, that they were the victims of a "once-in-a-century" event.

Graphs 1 and 2 – A traditional crisis of overproduction of housing

Graph 1 – Collapse in building permits



Graph 2 – Brutal downturn in prices

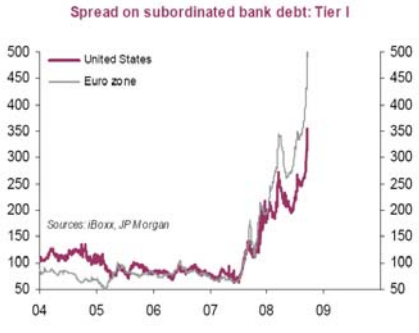
Source: Artus, P. (2008c, pp. 5–6).

- A real estate crisis that had two groups of victims: borrowers, evicted from their homes *en masse*, contributing to the reappearance of ghost towns, and financiers. Uncertainty about the solvency of actors in the system led to all credit being cut, with the exception of day loans, at rates reminiscent of the mistrust shown towards the financial establishments of emerging countries in crisis during the 1990s (see Graph 3). As the semi-public regulatory organizations on the mortgage market had been encouraged to take greater risks, Fannie Mae and

Freddie Mac only escaped bankruptcy through a total public takeover, in the hope that this would prevent the onset of a domino effect in the mortgage market (see Graph 4).

Graphs 3 and 4 – A systemic crisis: collapse and bankruptcy of financial intermediaries

Graph 3 –
Market mistrust of banks



Graph 4 –
Crisis and transformation of the two mortgage market regulating bodies

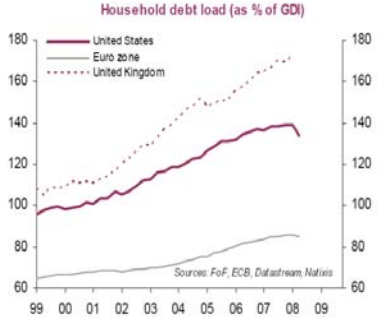
Source: Artus P. (From left to right : 2008b, p. 6; 2008c, p. 3).

- In the autumn of 2008, the recessionary effects on the real economy started to appear. This was no simple "business cycle" like the others. As Figures 1 to 4 showed, and as had been anticipated by using a simple model of finance-led growth, the subprime crisis marked the moment when growth in the United States reached its limits. Not only had easy access to credit and the hopes of getting rich on the stock market reduced household savings almost to zero (Graph 5), but this process had only been possible through a continuous rise in the household debt-to-income ratio (Graph 6). In this respect, the United States has only been surpassed by Great Britain, also the victim of a major crisis, and earlier than the rest of Europe.

Graphs 5 and 6 – An end to growth driven by growing levels of household debt

Graph 5 –
A very low rate of savings

Graph 6 –
Accumulating debt

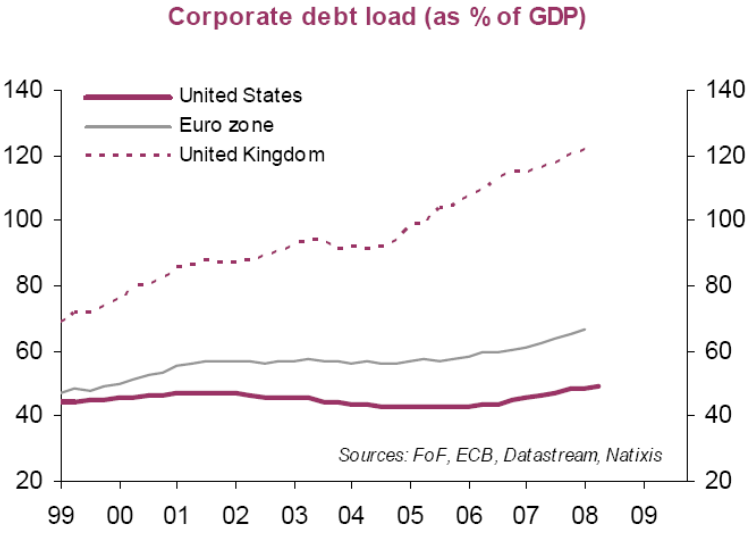


Source: Artus (From left to right: 2008c, p. 8; 2008a, p.2)

The instability comes from the excessive indebtedness of companies at the end of the boom, constituting another novelty compared to the analyses drawn from H. Minsky's model or from the financial accelerator model, which are both founded on the same hypothesis. This was not the case for non-financial companies in the United States in 2008, because they have learnt the dangers of overindebtedness from previous crises (Graph 7). Financial companies, on the contrary, have misused leverage, and that is why they are going bankrupt one after another. As credit is becoming ever harder to obtain, they are in turn suffering from the subprime crisis and feeding a second depressionary wave. This is therefore a systemic crisis, because even the firms that have not made management errors may find themselves on the brink of ruin.

In the conventional theories, finance is supposed to help stabilize economic flows, contribute to efficiency in the allocation of capital and meet the financing needs of the real economy. The present analysis shows, on the contrary, that the real sector is the next victim of the excesses of liberalization and uncontrolled financial innovation. Thus public opinion in the United States, although inclined to denounce the negative role of federal powers and regulations, is calling for financial organization to be taken in hand by the government. The slogan "let us get rich quickly even if we don't know why" has been replaced by an urgent plea to "deliver us from predatory finance and protect our assets" (see Table 8).

Graph 7 – Low levels of debt in US companies



Source: Artus, 2008a, p. 2.

Up until September 2008, the countries that had been "backward" in adopting financial modernity resisted better than Wall Street and the City. In October, however, with the continued inability of the government to resuscitate the US financial system, the crisis started to spread, with various British, German, Belgian, French and Icelandic firms going bankrupt. It occurred to such an extent that the G8 leaders envisaged taking over control of finance on an international level. One era is ending, another, uncertain one is beginning.

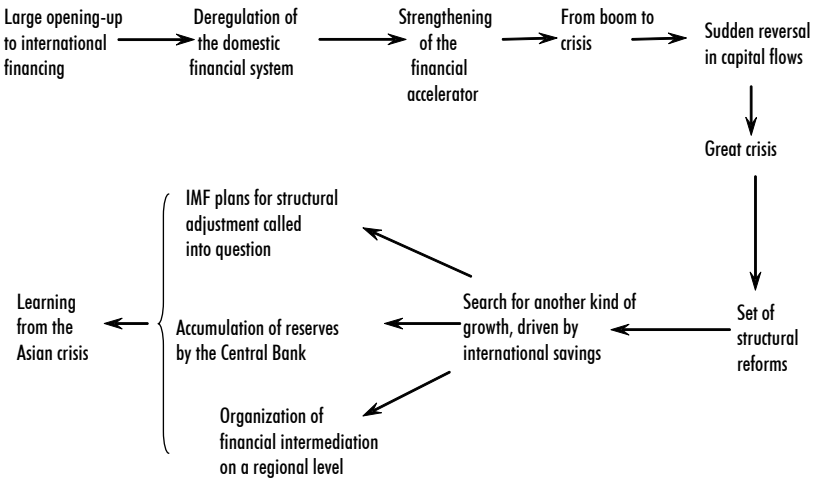
Lessons from the 1997 Asian crisis

Is our progress towards systemic crisis inevitable? Should we accept it as the price to pay for financial innovations that are favourable to growth and well-being over the long term? After the Asian crisis of 1997, the governments of the Asian countries, and notably Korea, Japan and China, had clearly perceived the dangers of wholesale opening to international capital movements and hasty liberalization of their national financial systems. As much as the inflow of foreign capital appeared to be beneficial *a priori*, so its medium-term consequences were negative: excess of national liquidity, speculative movements in real estate and stock exchanges, poor

allocation of capital between exposed and sheltered sectors…, and the devastating effects of a reversal in these capital flows.

Bearing in mind the scale of the economic, social and political costs of the 1997 crisis, the public authorities and governments started looking for alternatives to the strategy of growth driven by financialization and foreign savings. As a result, the Asian countries have succeeded in defining a pragmatic policy. First, they abandoned the Washington Consensus and refused to implement the International Monetary Fund's (IMF) programmes of structural adjustment. The adoption of an *ad hoc* exchange regime has led to the accumulation of reserves by the central banks to avoid any currency crisis. Lastly, the densification of financial intermediation in Asia constitutes another long-term solution to dollar debts owed to North American banks and institutions (Figure 7).

Figure 7 – Seeking new methods to manage the entry into international finance: the Asian countries



This new direction for economic policy in Asian countries brought new tensions to macroeconomic management at the national level, because of excess liquidity heightening the dangers of inflation and speculation, and at the international level, because it leads to a strong increase in international liquidity, raising problems of the balance of savings and investment on a world-wide level.

Nevertheless, the Asian experience is valuable because it suggests that *we can learn from the gravity of crises* to attempt to avoid their repetition.

In this respect, it is remarkable that the heart of the crisis that started in 2007 should be the United States and Great Britain, and not the emerging countries. This contrasts with the 1980s and 1990s. In a way, their slowness in adopting sophisticated financial instruments protected the emerging countries from the outbreak of a crisis equivalent to that of the United States. Gerschenkron's theory (1962) can be ironically extended to finance: it is advantageous to be backward in the adoption of a financial instrument, because one avoids falling into the crisis suffered by countries at the forefront of innovation.

The United States and the United Kingdom, on the contrary, have to restore the coherence and viability of their financial systems: is it reasonable to continue entrusting financial actors with the full initiative for the creation of new instruments when they have proved to be incapable of either foreseeing or stemming a crisis that many observers, such as Warren Buffet (2003), for example, had already predicted?

For public control of financial innovation

The debacle of the theory of market efficiency and the failure of the organizational model of investment banks

The disarray of Wall Street financiers and then of politicians who thought they had found *ad hoc* solutions with each new bankruptcy of an investment bank or insurance company is commensurate with the firmness of their earlier belief in market efficiency without any public control. It is therefore important to seek the origins of the subprime crisis not only in the practices of Wall Street and other financial actors, but in the theories and models representing the formation of prices of ever more complex financial products.

In the end, most financial theorists have been the victims of an illusion: as each market gives the impression of instant adjustment of a set of supply and demand, they adopted a conception of markets analogous to that developed for products and services. The issue is not simply that of the contrast between material production and immaterial service, but also, and above all, that of the significance of the exchanges of promises that are exclusive to financial markets. The value of a financial instrument suffers from two major uncertainties. The first derives from the impossibility of predicting every state of nature: will it be possible to build power

stations on the principle of nuclear fusion? Will a generic treatment be found to delay old age?… A vaccine against AIDS? The second stems from the fact that the return on individual decisions is highly dependent on the strategy of other actors, and the difficulty in anticipating their strategies increases with the time horizon.

The financial theory underlying the minimization of portfolio risk and the valuation of financial products does not incorporate this characteristic: this is the origin of what we can describe without exaggeration as the debacle of the financial economics research programme (Table 4).

Table 4 – The complete failure of standard-theory explanations

	MARKET EFFICIENCY	CHOICE OF PORTFOLIO/ OPTION VALUE	BEHAVIOURAL FINANCE
ORIGIN	Disruption by regulation	An exceptional event (LTCM)	Psychological traits, mimicry, blindness to disaster
EXAMPLE	Public bail-out	LTCM	Tulip mania
MECHANISM	Excessive risk-taking due to regulation	Confidence in a scientific model leads to unsustainable leverage	Herd behaviour becomes generalized
SOLUTION	Abandonment of all public intervention	Ceiling for leverage Submission of hedge funds to prudential ratios	Return to personal, realistic evaluation, financial education
RELEVANCE	No regulation of subprimes and yet a crisis broke out Reason for permanence of regulation	For hedge funds, less for mortgage market	Underestimates the rationality of actors' behaviour: were the traders of Lehman Brothers rational?

First, the hypothesis of the informational efficiency of markets, already problematical during periods of stable growth, becomes an obstacle to understanding when a speculative bubble like subprimes bursts. On a theoretical level, it assumes that all participants in the market have complete, or at least sufficient, information without cost. Yet the breakthrough of new microeconomic theory is constructed entirely on the asymmetry and imperfection of information, and this hypothesis applies particularly well to financial markets. How could investors, who are mostly outsiders with regard to management of the company, have better information than

the managers? The latter are subject to the ban on insider trading and possess relevant information for investors. Furthermore, when uncertainty increases, each agent tends to doubt his own evaluation and refer to that of the market when deciding what individual strategy to adopt. When there is high uncertainty, this mechanism is sufficient to shift the stock market price durably far from its fundamental value, even when this latter is known to everyone (Orléan, 1990). Lastly, the greater the liquidity, the more rational is the strategy of speculation consisting in buying a security in the hope of selling it at a higher price in the next period, without taking any account of its fundamental value…, which therefore disappears from the market.

Thus, financial markets are far from achieving satisfactory efficiency in the allocation of capital. Even if all the actors transmit the information they possess to the market, there is no reason why the resulting financial convention should anticipate the reality of future returns, because they are all facing incredible uncertainty, specific to the financial market. Moreover, if there are successive periods of speculation, then the poor allocation of capital is an intrinsic characteristic of the financial market. This is confirmed by the evaluations of costs associated with the bursting of the internet bubble and then the subprime bubble.

Lastly, the current crisis has dissipated the illusion that direct finance was less costly and less susceptible to crisis than intermediation by the banks. We need look no further than the magnitude of the profits made by investment banks, hedge funds and private equity funds during the years leading up to the crisis to see that the financial sector was in no way competitive and that it captured more value than it created.

The idea that the most modern statistical tools can provide us with thorough control of the financial risk has been utterly refuted. The evaluation of options and derivatives was based on a large number of hypotheses, some of which were explicit, but many of which remained implicit. First, the distribution of shocks was considered to follow the law of large numbers and therefore to converge towards a Gaussian law: by definition, this excludes infrequent events of great magnitude. Yet specialists from the field of physics have long remarked on the existence of "fat tails" and shown that they result from an endogenous mechanism of interactions between agents on financial markets (Sornette, 2003; Bouchaud, 2008). The existence of such a mechanism was revealed with the violence that we all observed when the subprime crisis broke out. Another hypothesis was that asset markets are liquid, and that as a consequence, agents can arbitrate between different assets. But with the downturn in

the market, the sudden return of risk aversion has paralysed most of the markets between financial intermediaries. Derivatives held a lot of attractions, but they provided absolutely no guarantee of access to liquidity.

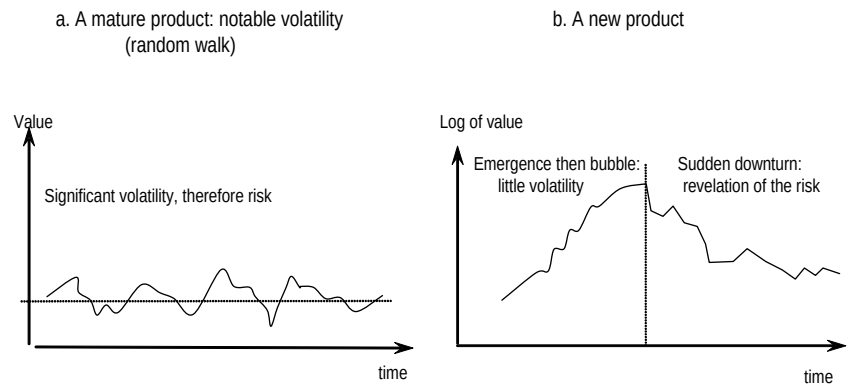
To illustrate this point – which deserves to be developed in more detail – in more concrete terms, we could compare the designers of modern financial products to engineers, given the task of launching a satellite to orbit the Earth. For the convenience of calculations and to conform to the orthodox view, they assume that the world is flat. Strangely, and to their great surprise, the satellite falls back down on their heads. This is the equivalent to the total breakdown of paradigms and cognitive references that occurred in the autumn of 2008.

Another striking feature is the strong overlapping between research in financial economics and the management models of US financial intermediaries. Disregarding the crucial lessons to be drawn from the collapse of LTCM, they continued to put their faith in models that had already shown their limitations, without giving themselves any margin of security. The scale of leverage that was justified in this way contributed to the abruptness of the serial collapse of large establishments that had made the fortune and reputation of Wall Street. An organizational model that was believed to triumph through the virtues of science collapsed, because the theory did not tally with the observation data.

The error in evaluating the risks associated with a new financial product is more subtle, as the only data taken into account are for the first few years after its launch. If the product is successful and the chartists detect a cumulative movement with little in the way of short-period oscillations, it follows that this new asset presents a better return and moderate risk, assessed in terms of volatility. It is only when the corresponding bubble bursts that it reveals the major risk that short-term analysis could not detect (Figure 8). The historical sequence of different speculative bubbles, on the other hand, presents this sort of downturn as a predictable event, with a margin of error concerning the exact date of the reversal (Davis, 1992).

Autumn 2008 thus saw the simultaneous collapse of a financial theory, an organizational model of finance dominated by investment banks, and a belief, deeply shared between experts and politicians, in the efficiency of financial markets. It is in this sense, at the risk of repeating ourselves, that this crisis is systemic and unprecedented.

Figure 8 – Why the models get it wrong when evaluating the risk of new financial instruments



Epoch-making innovations are framed by rules enacted after major crises

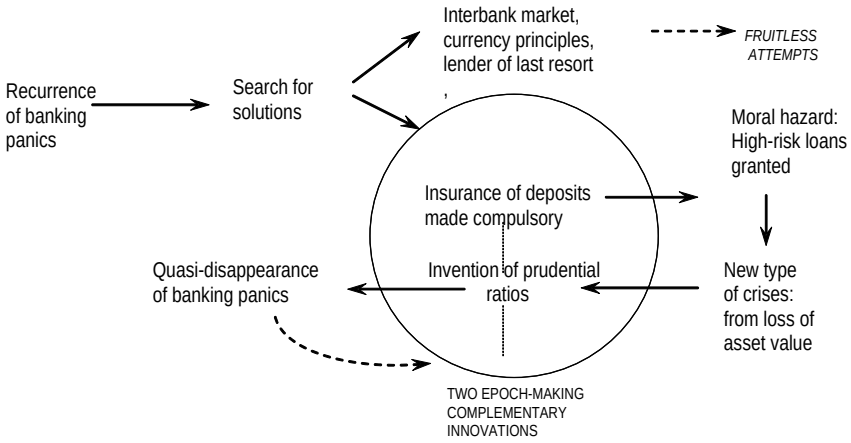
Taking a historical perspective, one key lesson can be drawn for the present period. The origin of most financial systems and instruments lies in a private innovation that has come up against a destabilization of the financial and monetary order. The return of public control over the conditions governing the implementation of the innovation was needed to make it compatible with the stability of a market order, in other words the stability of currency and finance. The gravity of the subprime crisis raises precisely that question of the regulations and controls needed to ensure sustainable and efficient use of the financial innovations accumulated over the last 20 years.

The liberalization of financial markets has not signalled the irreversible decline of commercial banks. The quasi-bankruptcy of all the investment and business banks of Wall Street shows that in its present state, their system is not blessed with long-term viability. The complete development of private innovations drives the financial system towards systemic crisis and reveals their incompatibility with the imperative of financial stability. The banks with a predominantly commercial activity, on the other hand, had come through the internet crisis relatively unharmed, and again in 2008, those that have not gambled on the new financial products show more resilience, despite the systemic nature of this crisis.

It is therefore well worth retracing the history of the construction and diffusion of this coherent model, combining private initiative and public control. The first steps of the commercial bank were marked by a succession of banking panics, during which depositors demanded the immediate liquidity of their assets. During at least a century, the community of bankers, experts and public authorities have searched for the means to prevent this phenomenon. The organization of an interbank market to respond to financial crises was one of the solutions thought up that turned out to be dead ends. In this particular case, when all the banks are experiencing illiquidity, they are incapable of coming to each other's aid. It was only very late on, after the crisis of 1929, that the principle of deposit insurance was instituted and then diffused.

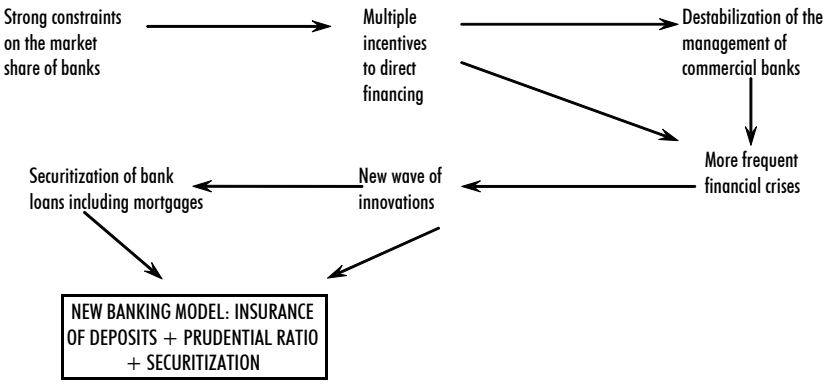
During a second phase, it was asset crises that threatened the commercial banks, when debtors were unable to pay back the loans made to them out of the bank's deposits. This necessitated a long learning process on the part of the bankers, to develop the principles and techniques enabling them to determine what proportion of their deposits can be transformed into short- and medium-to-long-term loans. Deposit insurance heightened the risk of imprudent loans, so that the practice of prudential ratios became widespread in the 1970s, requiring banks' own capital in proportion to its risks of losses. Thus, banking panic gradually disappeared in the countries with long-established financial traditions (Figure 9).

Figure 9 – More than a century of crises and trial-and-error in the regulations against banking panics



In the mid-1980s, commercial banks started to face competition from the financial markets, with which large companies deal directly. In the United States, the phenomenon of securitization was the most remarkable. To reduce asset risks, the banks pool them together by quality and transform them into securities that they sell to other financial intermediaries. It was thanks to this mechanism that US banks showed such surprising resilience after the internet bubble burst. In 2008, it was a large deposit bank, the Bank of America, that took over the ailing investment bank Merrill Lynch. Finally, the stability of deposits and activity with the customer base of households and small enterprises is an advantage compared to the high volatility of asset prices of the Wall Street investment banks. In a way, the quality of the supervision and methods of the commercial banks has become a competitive advantage in the general restructuring of the financial system. Thus, deposit insurance, prudential ratios and securitization define a relatively coherent model for the banks, even if securitization contributes to the diffusion and heightening of risks for other actors in the financial system (Figure 10).

Figure 10 – The pressure of direct finance induces a third innovation, stabilizing for banks, but destabilizing for the financial system



This dialectic between private innovation and public control could be a source of inspiration for resolving the mortgage crisis in the United States.

Prevent the outsourcing of risks to agents incapable of assuming them

The scale of the current crisis caught the directors of Lehman Brothers and Merrill Lynch unawares, as it did the former Wall Street CEO who was US Treasury Secretary at the time, Henry Paulson. It was not so much of a surprise to researchers, including Ben Bernanke, specialist in the 1929 crisis, or international organizations such as the Bank for International Settlements (BIS).

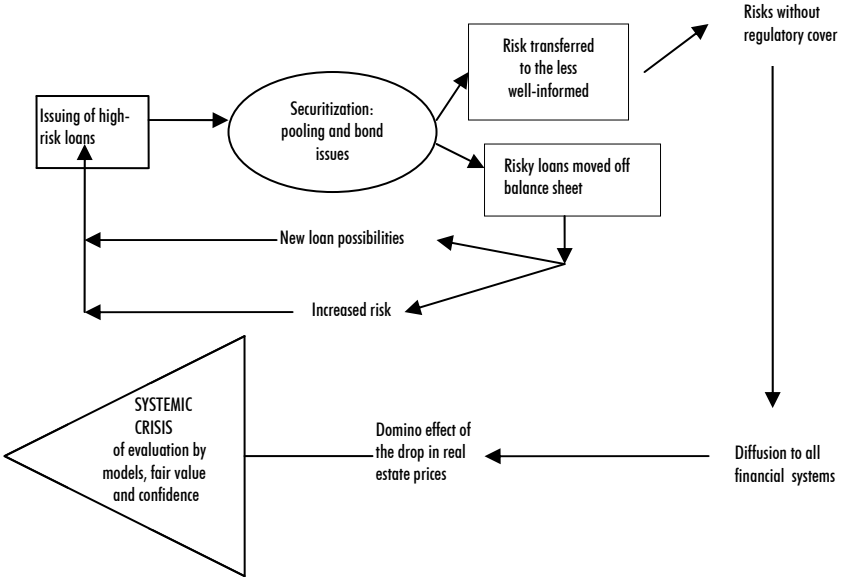
- From the beginning of the 2000s, the BIS expressed concerns about the *explosion* in derivatives, more and more differentiated and held by *agents not covered by the usual prudential regulations*, who exploited this fact to use huge leverage (BIS, 2000; 2003). In the United States, for example, the total volume of securitization rose from 685 billion dollars in 1996 to 1355 billion dollars in 1999 and then 3187 billion dollars in 2006. Furtherance of this phenomenon was, of course, problematic (Ertuk *et al.*, 2008).
- From the start, some experts had stressed the danger of selling risky assets to agents or individuals incapable of evaluating the risk and taking precautions against it. Symmetrically, mortgage banks took advantage of the fact that they could palm off the risk of default to increase their activity by writing ever more

risky loans. The process reached a point where financial organizations made loans to families whom they knew to be unable to pay them off.

It is the conjunction of these two mechanisms that explains the scale and gravity of the subprime crisis. It only needed an increase in late payments and defaults and a downturn in the housing market for the virtuous circle to turn into a spiral destroying the value of assets (Figure 11).

Among the many different derivatives, becoming ever more varied, derivatives of derivatives appeared, the risk evaluation of which was extremely difficult, even for the issuers. What can we say about the people who bought them without understanding the risk? This outsourcing of risk was particularly dangerous and could not result in a viable system because of the combination of two effects.

Figure 11 – Chronicle of a crisis foretold: the subprimes episode

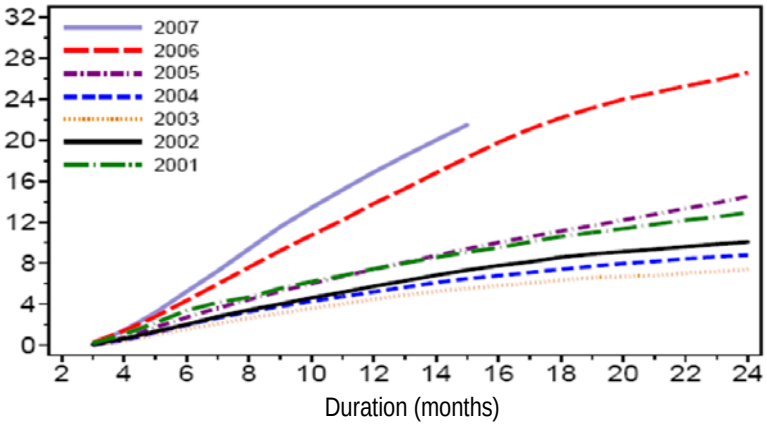


- It was so easy to avoid the risk of default that it was tempting for most of the actors to push the writing of mortgages to the limits. Thus, from 2006 to 2007,

there was an increase of nearly 40 per cent in the volume of these loans, while at the same time the other derivatives grew even faster.

- As time went by, the quality of the securities offered on the market deteriorated. The risk of crisis therefore grew even faster than the overall volume of mortgages. Abandonment of the bilateral relation between borrower and lender, essential to the neoclassical theory of agency under incomplete information, obviously led to irresponsibility. The default rate on mortgages climbed constantly from 2003 on; herein lies the origin of the US financial crisis (Figure 12). During the very period when the triumphant spread of shareholder value is supposed to align the interests of managers with those of shareholders – unsuccessfully, we should add in passing (Boyer, 2005) – financial innovation led to the pervasive spread of irresponsibility.

Figure 12 – Default rates of US mortgages (in per cent)



Source: Yuliya Demyanyk, Otto Van Hemert (2008), p. 1

The supervisory authorities should ensure that any transfer of risk is made *towards actors at least as well informed as the issuer*. This principle, applied to the letter, should drastically reduce the volume of derivatives founded on the inappropriate exploitation of imperfect information. This would no doubt provoke the classic objection of the financial community: regulating financial innovation endangers the dynamism of growth and encroaches on the freedom of enterprise, cornerstone of capitalism.

It is impossible to extrapolate from the growth regime of the last 15 years in the United States, especially since it has proved not to be viable over the long term without a radical reconfiguration of regulations and controls.

In fact, financial innovations occupy a singular place in the dynamic of growth: they have the property of destabilizing the existing growth regime before facilitating the emergence of a new one (Table 5). That is not the case for innovations resulting from scientific progress or technological know-how. We should not overlook organizational innovations either, since some of them – for example, manufacturing, assembly lines, clusters – end up shaping the institutional configuration and the implementation of technological advances, as was the case in the Fordist model of growth. The institutional innovation of the collective agreement linking wages to productivity, for example, played a decisive role in the viability of that macroeconomic regime. At the end of the 1930's depression and after the Second World War, moreover, finance was strictly regulated by state intervention, and yet the allocation of capital was relatively efficient and favourable to growth.

Is the United States facing, in 2008, a similar programme of re-regulation of finance intended to construct a viable growth regime? Since March 2008, public auditors have been present in investment banks facing situations of financial fragility. These banks are only allowed access to refinancing by the Fed in return for accepting stricter controls. Likewise, the strategy of certain actors appears to have exacerbated the depreciation in Lehman Brothers and Merrill Lynch shares, to the point where the authorities have proposed banning the short forward sale of shares, regardless of whether or not this mechanism was a key factor in the collapse of these investment banks. As neither the monetary weapon nor fiscal stimulus has succeeded in stemming the systemic crisis, the Treasury has been obliged to propose to Congress the creation of a huge fund (700 billion dollars) to enable a defeasance company to relieve the investment banks of their bad debts.

The prevailing ideology that was so opposed to state intervention has faded away, and it is once again possible to imagine the return of financial regulation being accepted by a financial community that has lost its credibility.

Table 5 – Financial innovations: one of the components of the process of growth

Type of innovation Impact	Characteristics	Impact on growth	Type of crisis	Reaction to crises and means of control
Scientific	Pure public good	Potentially high	• Abandonment of an outdated paradigm • Fall in return on R&D	• Validation by a community • Public character of basic research
Technological	Appropriable but strong externalities	Significant	Gradual erosion of rents from innovation	• Technical and environmental standards • State control of certain facilities
Organizational	Initially private, weak externalities	Slow and marginal except for epoch-making breakthroughs	Growing inaptness in relation to changes in the environment	• Role of consultants, management schools • ISO standards
Institutional	Interface between the individual and the collective	*A priori* modest, except in the case of a change in paradigm	Inability to reproduce the basic socio-economic relations	• Struggle to search for alternatives • Role of collective authorities (policy)
Financial	Most often of private origin, but probability of strong externalities, positive and negative	Impetus to growth followed by crises	• Bursting of a speculative bubble • Inability to evaluate financial assets	• Restriction on entry to the profession • Supervisory authorities • Accounting and prudential standards
Public health	Pronounced collective impact (e.g. epidemics)	Indirect on growth but strong on well-being	• Pandemics • Exclusion of social groups	• Authorization of doctors and drugs • Deontology

Innovation subject to collective rules

Under the pretext that the origin of innovations lies essentially in the private sector and that they must therefore be favoured, is it reasonable to exclude all government control over the conditions and consequences of these innovations? A brief comparison of different types of innovation refutes this hypothesis (Table 6).

Table 6 – Most innovations are regulated collectively

Innovation	Type of control
Scientific	• Methodology specific to each discipline • Deontology
Technical	• Multiple safety standards, prior to marketing • Quality certification by agencies
Organizational	• Banning of certain forms of organization (forced labour) • … and transactions (organs)
Institutional	• Political control • Control by law, citizenship
Finance Traditional products	• Rules governing issuing, disclosure of information, prevention of insider trading, accounting
New products	• None, to begin with
Health	• *Ex ante* on the effects of drugs • *Ex ante via* professional specialization
	• Deontology
	• Public approval of care establishments

In every domain, there are rules to regulate innovation. Scientists share the methods that are common to their discipline, and in some cases they must respect a deontology imposed by society. Technical innovation is vigorous and multiform, but the corresponding product or process cannot be brought onto the market or into practice unless it satisfies safety standards defined by the collectivity. We do not wait for a growing number of accidents to occur before imposing these standards from the design process on. This is no obstacle to economic dynamism.

Likewise, the law forbids certain contracts (which could, however, be mutually beneficial) and transactions involving goods that are considered to be of a non-commercial nature. Organizational inventiveness is reduced in favour of greater social acceptability of innovations that satisfy the rules of law or, more generally, of the prevailing ethics of the society involved. The domain of health is exemplary of the

multiplicity of state interventions governing access to the medical profession, the conditions of approval for drugs, daily medical practice, and so on. The transition from innovation to market is slowed down and made more expensive, and yet the dynamism of the biotech industries cannot be denied.

Table 7 – The US mortgage crisis as a discontinuity in financial organization

Components	Before 2007	After 2008
1. General design	Fundamentally self-regulating markets	Need for vigorous and multiform public interventions to avoid financial collapse in the United States
2. Leading products	Derivatives of all sorts, especially "over the counter"	Return to basic financial products
3. Key players	Wall Street, Equity Funds, IMF (for DCs)	Sovereign funds, the Fed, US Treasury, Central banks of DCs
4. Type of public intervention	"Horizontal" rules • Financial laissez-faire • Ideal of self-regulation by finance	"Vertical" rules issued by the state • Nationalizations, public takeovers • Guarantee of the state as last resort
5. Public opinion	"Let us get rich quickly, even if we don't understand why"	"Deliver us from predatory finance and protect our savings"
6. Regime of implicit accumulation	Finance-led… for all. The latecomers are the losers.	Sustained with great effort by budgetary, fiscal and monetary policy. The "latecomers" are called to the rescue to maintain the viability of the system

A change of direction for financial capitalism (October 2008)

As for finance itself, the most traditional products have long been regulated by the various rules that have accumulated to avoid the repetition of obvious abuses, financial crises or corruption. The whole question lies in the extension of this control to the new products of the financial market. When financialization was the source of the dynamism of the US economy, the financial community was well-placed to reject any public control of the processes that delivered such remarkable profits. After the summer of 2008, it was no longer in a position to assert that what is good for Wall Street is good for the US economy and society. This has been a cause for a reconsideration of the dichotomy which, by principle, made the market an efficient mechanism of allocation and state intervention by definition an obstacle to progress

and social well-being. Without a doubt, a great transformation of the US financial system is under way (see Table 7 above).

The reconstruction of viable financial systems

The above developments suggest the following propositions. They derive from the hypothesis, largely confirmed by the comparative historical analysis, that financial crises are not inevitable, and that we could take measures to reduce their frequency and/or gravity (Table 8).

Table 8 – Reducing the gravity of financial crises, instead of simply surmounting them

Approach	*Ex post*	*Ex ante*
Advantages	• Legitimacy due to need to restore financial stability	• Reduction in the cost of a possible residual crisis
	• No interference during the boom period	• Less volatility favourable to growth and the reduction of inequalities
Disadvantages	• Gravity of the crisis proportional to prior inaction	• Interference with private initiative
	• Cost in terms of growth and living standards	• Possible errors of diagnosis
	• Moral hazard	• Lack of instruments
Methods	• Lender of last resort	• Monetary policy taking into account the objective of financial stability
	• Defeasance structure using public funds	• Uniform regulations, limitation of leverage
	• Nationalizations	• Banning of innovations that are dangerous for stability
	• Restructuring on the initiative of the profession	

1. Draw lessons from the history of past crises to anticipate the next one.
2. Implement integrated supervision of commercial banks, investment banks and insurance companies to avoid repeating the subprime crisis.
3. Maintain the link of responsibility between borrowers and lenders; it is not enough to make the risk associated with derivatives more transparent.
4. Prohibit new financial products involving the transfer of risk from the better-informed towards the less well-informed.
5. Institute procedures of approval for new financial products incorporating clauses guaranteeing the absence of major macroeconomic externalities.
6. Recruit the best financiers for financial supervisory agencies to reduce the asymmetry between private and public sectors in terms of market finance skills.
7. Reaffirm, following Kárl Polanyi (1944), that the role of finance is not to control and organize society to its own benefit, but that it is up to collective processes, essentially of a political nature, to align the direction and intensity of innovation, including financial innovation, with the pursuit of society's well-being.

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