

## PART I

# Expert Views

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## CHAPTER 1

# Origins of the Crisis and Suggestions for Further Research

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*We review several of the factual failures that the 2008 subprime crisis has revealed and analyze the root causes for these. Credit rating, regulation, models, accounting, leverage, risk management, and other aspects are reviewed. In each case, we survey solutions proposed as well as suggest directions for further research.*

### 1.1 Introduction

The many roots of the 2008 financial crisis have been well covered in several publications. The aim of this review is to provide a short list of the ones most frequently raised and in each case try to distill one important aspect of the problem, the current proposals, and, possibly, what could be a direction of research to better understand the issue. A lesson from past decades is certainly that crises are not easy to forecast in terms of timing and magnitude, and when they occur (we can only forecast that they *will* occur), it is not always easy to separate, to paraphrase a famous quote from financier J.P. Morgan,<sup>1</sup> what was wrong as a matter of judgment from what was wrong as a matter of principle. These same questions apply in today's modern finance of sophisticated markets, products, and models, with the additional complexity of separating, when something went wrong, a technical failure of the "machine" (or of the principles on which it is built) from a failure of the "user" (or its judgment). To use an analogy (I find it useful)—investing is like riding a bicycle, and there is always a trade-off between performance and risk and improvements from better machines or better driving.

After working 20 years in the financial markets, including roles at two investment banks in equity and credit derivatives,<sup>2</sup> I have witnessed several stages of their development. I was lucky enough to reach levels of responsibility giving me a view on how decisions are made, good and bad, individually or collectively. Being mostly in the “engines room” kept me in the front lines of crises and allowed me to see how things work in practice on investment banks’ trading floors. Last, having been present at early stages of the developments of these markets helped me to keep a healthy sense of pragmatism about them: The following paragraphs are personal reflections on the drivers of the crisis.<sup>3</sup>

In the remainder of this article, the various topics are organized into three sections: actors and markets, methods and products, and finally a last section on global risk management. To use an analogy with transportation, the first section would be about geography and population preferences; the second section about engineering of roads, airplanes, railways, and so on; and the third section about the rules of the road, safety procedures, and so forth. The choice of these three sections helps to distinguish the different natures of the topics, but the topics are greatly interrelated and overlap the sections in several ways.

## **1.2 The Real Economy: Actors and Markets**

In this section, I review the issues in the 2008 financial crisis that are more closely related to the natural needs and organization of the real economy. This may be where the most important roots of the crisis lie, but also where alternatives are not easy to propose or to achieve quickly, or even possible to do so, especially when it comes to human behavior.

### **1.2.1 Loan Origination**

With regard to the subprime crisis, it’s legitimate to start with loan origination. Although no one yet knows what the full extent of the damage will be, the gradual deterioration of U.S. retail loan quality standards over the years is a fact. The negative incentives of securitization markets (originate to distribute), the flaws (and fraud) on documentation and appraisal values, the political environment supportive to increase home ownership, the lack of intervention by federal regulatory authorities despite several local whistle-blower cases all played a role (Berner and Grow 2008). The irony is that the United States was by far the most advanced country in terms of retail credit scoring (FICO scores, etc.).

The new regulatory proposals will force loan originators to keep more “skin in the game,” with a vertical slice of any securitization (not cherry-picking a part of the origination).<sup>4</sup> Further research could also explore what is the right balance between statistical credit scoring and proximity and human judgment, with all its diversity, and for which there is no substitute, in credit decisions.

### 1.2.2 Macroeconomic Imbalance

The increased Asian savings following the 1997 crisis, compounded with the surplus of China and oil-exporting countries, created a large supply of liquidity and a formidable demand for (apparently) high-quality fixed-income assets. Despite the large supply of notes and bonds from Western government deficits, the low-interest-rate environment fueled a demand for higher-yielding fixed-income assets. Wall Street engineered the products that met such demand, which was broadly characterized by a risk aversion for idiosyncratic risk (first-loss or nonrated products), but generally complacent for systemic risk, favoring highly rated products (especially AAA), albeit from complex structures and rating techniques.

Low interest rates also favored the emergence of the financial bubble in real estate prices, construction, and infrastructure, boosting growth and job creation—all welcomed by politicians and their communities.

The new regulatory proposals favor the creation of a systemic regulator<sup>5</sup> to monitor these imbalances, and to raise concerns with persuasive (yet nonbinding) powers.

Further research could now explore what anticyclical macro policies can be global, targeting all countries at once, to avoid diplomatic crises.<sup>6</sup>

### 1.2.3 Rating Agencies

Rating agencies regularly and successfully improved their methodologies to take advantage of the increase in computing power and the increased availability of financial and market data. The wider availability of external ratings became a key component of regulation with Basel II, increasing furthermore the need for ratings. The irony is that the rating agencies' worst failures relate to credit products that were, by design, built on credit ratings, such as collateralized debt obligations (CDOs) of mezzanine asset-backed securities (ABSs).

In fact, the rating agencies have been hurt by the consequences of the weak parts of their business models: Who pays obviously makes a difference, sophisticated quantitative methodologies should not be pushed beyond their limits, and critical human judgment must always remain (McCreevy 2009).

As concerns further research, one wonders whether perhaps ratings should incorporate some external or open-source elements (academics' and practitioners' contributions, etc.) to their methodologies or reports to keep pace with innovation and information (in particular for complex or new structures).

### 1.2.4 Hedge Funds

After the precedent of Long-Term Capital Management (LTCM) in 1998, there had been growing fears in the years before 2007 about the growth of the hedge fund industry, but hedge funds were not at the origin of the 2008 crisis (High-Level Group on Financial Supervision in the EU 2009). A few hedge funds failed (Amaranth, etc.), and many had to trigger gates, causing damage to their investors, but all of these

were idiosyncratic events. Obviously, withdrawing excess liquidity from Bear Stearns or Lehman Brothers added to the runs on these banks, but hedge funds were no different in this respect than corporations or mutual funds, and they also withdrew excess liquidity from Goldman Sachs, Morgan Stanley, and others. The irony is that prime brokerage contracts are all about haircuts, independent amounts, stress tests, daily margining, and so on, designed to protect the banks from the hedge fund risk, and suddenly these contracts backfired against the banks' liquidity, as hedge funds were scared about the risk of their prime brokers and were left little choice (their deposits are not guaranteed like retail depositors' are). The other irony from the Lehman bankruptcy is that hedge funds active in derivatives ended up better than funds invested in cash securities (in particular in jurisdictions with no segregations of securities).

Regulators should enforce that hedge funds' play by the technical rules of the markets. Beyond that, encouraging through regulatory best practices for collateral handling seems the best direction in order to limit the systemic impact of hedge fund failure.<sup>7</sup>

### 1.2.5 Remunerations

For many thinkers, the remuneration of human capital is the main engine of progress.<sup>8</sup> It is also a source of excess and injustice. However, the irony is that Wall Street, in the language of economists, is one of a very few examples of Marxist industries, where the greatest share of added value is kept by workers, instead of the capitalists' "surplus-value." In this field, a delicate balance must be found: a better alignment of remuneration horizons in order not to give up-front rewards for long-term risks, while the virtue of division-level cash compensation budgets necessarily moderates payoffs and therefore the moral hazard that can be associated with corporate-wide stock options plans.

Further research should explore whether the remuneration problem is an extension of the shareholder versus bondholder governance issue (Billet, Mauer, and Zheng 2006). For example, should bondholders of highly levered entities have a vote in the top remunerations schemes?

### 1.2.6 Leverage

The social benefit of the financial system is to transform information into liquidity for the rest of the world: Assets that are illiquid but good risks are transformed by banks and markets into liquid liabilities (that are liquid assets for the rest of the world). Yet the 2008 crisis is also a consequence of an excessive leverage from banks and from the shadow banking system of banks' vehicles, money market funds, and hedge fund financing: Basel I created an incentive for banks to use off-balance-sheet vehicles for certain (apparently) low-risk assets; money market funds were also competing for the same assets with lower regulatory and capital constraints; and providing leverage to hedge funds is a highly collateralized lending and fee-generating business.

As banks' regulatory capital ratios are risk weighted and do not directly control leverage, the current discussions revolve around the accounting of a universally accepted leverage ratio (as is currently the case in the United States and Switzerland).

Further research could be conducted as to whether, for that purpose, full debt consolidation would be desirable, with the necessary accounting precaution to differentiate the part of consolidated debt that is associated with the minority interests in the equity (or minority debt).

### **1.3 The Financial Techniques: Products and Methods**

In this section, I review the issues in the subprime crisis that are more related to the technical choices that have been made historically or more recently by the financial world to provide or facilitate its business. This may be the part where correcting mistakes is more a matter of time and experience. In financial markets, like everywhere else, progress is not linear, and knowledge is built on both successes and mistakes of prior periods.

#### **1.3.1 Mathematics**

Whether the representation of the real world by mathematics is adequate must partly involve the mathematicians' responsibility, especially as they indirectly expect to get a higher demand for their services. Initially, there is a virtuous circle where practitioners' rules of thumb can be rebuilt by more formal approaches that confirm one other and allow further innovations. After a while, innovations can go too far; naive assumptions taken for granted are no longer valid but no longer questioned; teachers and students place theory before practice; and so on. The irony is the parallel with rating agencies: a possible excess of sophistication that is not counterbalanced by experience.

There is ground for further research on what assumptions in financial mathematics should not be made by convenience. Shouldn't there be more academic refutations, counter-examples according to their consequences if they aren't verified?

#### **1.3.2 Models**

Models generally do not take well enough into account the potential for markets to deviate far from equilibrium, especially illiquid assets. In this case, third-party models based on reasonable assumptions (such as rating agency models) usually underestimated tail risks, which were envisioned only by internal stress tests, and the later ones were often judged as lacking plausibility. Proprietary models used for their own accounts generally performed better as long as they were nimble enough to allow the user's critical eye and the ability to continually correct deficiencies. It can be preferable to have several (albeit simpler) competing models that can bring different inputs to the same risk, instead of an ultrasophisticated monolithic approach that might miss the point. The irony is again a possible excess of sophistication, crowding out caution.

Further research: From the past experiences of macroeconomic and financial models, what is the right level of complexity not to be fooled by equations?<sup>9</sup>

### 1.3.3 Derivative Products

The social benefit of a derivative product should be the same as that of any other financial market instrument: allowing the transfer of risk and reward from a willing seller to a willing buyer, and providing information to the rest of the world about such transfer to help further decisions to invest, produce, consume, and so on. Even with turbulence, market risks are preferable to Knightian uncertainty (Knight 1921). The successful product innovation of derivatives growth is twofold: more customized products to fit transfer preferences, more vanilla products to build liquidity and market information. The industry must balance both aspects for success.

Derivative structures are also part of the tool kit used by services offered by the financial industry. It is in such services that possible conflicts of interest are more likely.<sup>10</sup> Last, although the management of counterparty and legal risks in derivative transactions has made tremendous progress, it is still an area of concern due to the size of these markets.

Further research: Exchanges and central clearing can improve liquid derivatives. What about public initiatives in favor of third-party collateral schemes<sup>11</sup> to address the broader needs of bilateral contracts?

### 1.3.4 Funding

Historically, funding was somewhat an exception to the risk management trend to push the responsibilities of all risks as closely as possible to their originators. Trading desks have usually few options in their funding policy. The bank or institution treasury takes care of long-term cash provided by certain activities on the bid, while funding the debits of other desks at the offer: Term funding is typically not the problem of trading desks.

Moreover, financial models are doing the same by discounting risk-free future cash flows at short-term interbank “XIBOR” rates and using swap rates for medium and long-term maturities.

The global crisis of 2008 demonstrated how funding risk can derail the normal arbitrage relationship between cash and related unfunded products: The short-term London Interbank Offered Rate (LIBOR) is a real loan (and can incorporate a funding risk premium), while swap rates, which are unfunded, can significantly miss the point of prices driven by fire sales or unwinds of riskless but cash-funded products.

Further research should quantify how a global systemic short-term funding squeeze translates not only into temporary negative interest margins, but also fire-sale transactions on the basis of cash capital as term funding of last resort, prompting negative long-term swap spreads, large negative basis on cash bonds versus credit default swaps (CDSs), and so on.



### 1.3.5 Short Sales

In the 1990s crises (both Latin America 1994 and Asia 1997), short sales were blamed for declining markets, and authorities hastily changed the rules of equity lending and borrowing and short sales (Malaysia, Taiwan, etc.). Even though G-7 countries' markets have constant surveillance against price manipulation (as they should), similar moves happened in G-7 countries in the autumn of 2008: This is more surprising but obviously understandable. At the same time, the worst daily market moves (such as limit down days) occur when the panic of long investors finds no bid from a lack of short interest. Only the shorts are buying during crashes. Also, markets with no ability to sell short are more prone to the creation of bubbles and subsequent disasters (real estate being a prime example). In summary, the irony is that past short sales are the most natural financial market contracyclical mechanism.

In the future, we could see an interesting duality from regulators toward short sales: While market regulators continue to actively regulate the appropriate execution and reporting of short sales, shouldn't newly established systemic regulators want to encourage more efficient frameworks for term borrowing? And why not encourage a sufficient amount of long-term short interest?

### 1.3.6 Accounting

Accrual accounting was at the root of many disasters where banks had negative economic net worth while remaining liquid in the 1980s: Accrual accounting can allow poor management for too long. Fair value accounting was brought in to provide investors (and management) financial results where the flexibility of accrual accounting is replaced by binding market levels (directly or indirectly through predefined valuation models). Bank managers should have known that markets can be brutal; the rules applying to individual traders were suddenly applied at an entirely different scale, leading to severe systemic consequences. In particular, illiquid markets with granular positions are inefficient, and the unwinding of one losing position creates further losses and further forced sales.

Proposals seem to go in the direction of a middle ground: a simplification of doubtful refinements around available for sale (AFS), held to maturity (HTM), and so on, with the possibility of some management judgment to overrule aberrant market prices (either too high or too low), whenever necessary to reflect a reality based on prudent accounting, and not misleading automatic rules (IASB Exposure Draft 2009).

Further research could explore whether taxes can also play a role to promote prudent accounting, and also potentially reduce the volatility of tax revenues.

### 1.3.7 Legal

The proper handling of legal risks is critical for the financial industry where so much of the business relates to promises of future performance. To limit the temptation to walk away from wrong past decisions requires a strong legal framework. The capital

markets are also very technical, and precise rules of compliance must be followed in order to prevent manipulations, trading on inside information, false rumors, and so on. The markets' legal environment has made great progress on all of this. The crisis pointed out a few important problems: strictly national bankruptcy laws where assets can be frozen in one country against the legitimate rights of alien owners (collateral transfers and rehypothecation) (King 2009). Also, certain derivatives terminations or interpretations by the nondefaulting counterparts of Lehman Brothers are controversial and being disputed (Ng and Spector 2009).

Immediate proposals call for broader use of transaction documents where the legalities are closer to the economic intent, and based on electronic format (FpML) instead of paper.

However, further research should review whether an international bankruptcy standard could be enforceable for asset conveyance—for example, by transferring the disputed asset in a third-party jurisdiction.

## **1.4 The Global Risk Management Challenge**

In this last section are grouped issues that relate to the organization and control of the interactions or the communication of information between all the moving parts. Although they do not belong—strictly speaking—to the previous two sections, they participate directly or have great influence indirectly on the real world itself and the corresponding financial techniques.

### **1.4.1 Regulation**

Basel I allowed a better capitalization of the banking systems following the crisis of the 1980s. Basel II was designed to correct Basel I undifferentiated risk weights, which created incentives for banks to take assets off balance sheets. Basel II greatly reduced these regulatory arbitrages but potentially increased systemic risks with the reliance on external ratings and models. The irony is that the subprime crisis—and the collapse of many off-balance-sheet structures<sup>12</sup> inspired by Basel I—struck at the time Basel II was coming into effect.

It is critical that regulations anticipate and be aware of unintended consequences: Many of the toxic off-balance-sheet vehicles were a consequence of Basel I, and much of the demand for toxic highly rated fixed-income products was a consequence of Basel II.

Further research could explore how to address quickly regulatory weaknesses, which otherwise are systemic and procyclical by nature. A practical solution could be through fast-track specific additional disclosures required under Basel II's Pillar 3.

### **1.4.2 Diversification**

If first-loss risk is the fear of the individual credit analyst, concentration risk is the fear for the portfolio manager. The search for diversification benefits, the avoidance of measurable concentration risks, and the continued innovation in the securitization

and derivative markets were indirectly responsible for the globalization of certain risks. The last-named, combined with the increase of correlations, probably outweighed the diversification benefits. Yet many studies had previously shown how quickly adverse selection could cancel out diversification (Acharya, Hasan, and Saunders 2002). More simply, whatever the subordination, the most senior positions of a securitization will remain affected by the troubles of the vehicle, or of the entire asset class, and command a discount.

Further research should look into what share of any asset class corresponds to systemic, truly undiversifiable risk, which one way or another will remain in the global economy, and more systematically how this aggregate exposure compares with the net worth and leverage of the global economy.

### **1.4.3 Counterpart Risk**

Certain institutions were weak in the management of counterpart risk, and in particular lacked judgment on the realization of wrong-way risks from monoline insurers. Counterpart risk management, from the internal governance of credit authorities, risk assessments, limits, collateral, and so on down to the stop-payment instructions, is operationally hugely complex. From there, counterpart credit valuation adjustment (CVA) is naturally a challenge.

It is also entangled with disputable accounting rules for the credit risk on your own liabilities—or debit valuation adjustment (DVA): Your liabilities are assets for others; if their losses are your gain, should poor investments be globally a zero-sum game? More importantly, isn't what matters to one's balance sheet the fair value of the liabilities (and assets) independently of the host (e.g., if they were the liabilities of any acceptable replacement party)?

The debate is not closed on the DVA (Dimon 2008), and current proposals go in the direction of central clearing for standardized products as a way to reduce circular counterparty risk from multiple entities with large portfolios among them (Duffie 2009).

Further research should be dedicated to the level and nature of interbank and regulatory communication channels that are needed to avoid the potential failure of a central counterpart (Tett 2009).

### **1.4.4 Risk Policy**

Being overly restrictive in the risk tolerance of visible factors of risk can translate into more invisible risks being built into the system. Many institutions involuntarily replaced market risks with even more toxic credit, counterpart, or legal risks. In effect, the risk management policy has shifted some quarterly volatility to potentially more disastrous consequences. The lessons are very clear: Risk management must consider all risks, not only vanilla or easily measurable ones; and owners and managers must have tolerance for a level of acceptable profit and loss (P&L) volatility, fully understanding that under a certain level, it is simply unrealistic to be in the business.

Further research: Banks are not all the same, and have subtle differences of risk attitude, aversion, and tolerance, which depend on their internal culture, their history, the background of their managers, and so on. Shouldn't bank regulators' focus be directed to finding such weaknesses in relation to the previous items, which by definition are difficult to know from the inside?

#### 1.4.5 Disclosure

The disclosure of financial data has generally kept pace with the possibility offered by information technology. The quantitative amount of text and data does not necessarily increase the information and its usefulness if standards are different, and with the difficulty to process it due to formats, access costs, lack of standards, extensive list of fields with missing or incorrect data, and so on. Pillar 3 of Basel II officially mandates the standards of quantity and quality of risk information that must be provided by banks. In practice, it is, however, still quite difficult to reconcile many of the data. Is more data always better?

Alternatively, more efforts should take place to determine the simplest and minimum data that could be reported by all firms (and possibly governments and public entities), with universal interpretation (and minimal possibility of manipulation), and yet capture the biggest density of information about risks and rewards.

#### 1.5 Conclusion

Credit risk is at the core of the 2008 crisis: first, because of its retail U.S. subprime origins, and also more importantly in all the dimensions that allowed the contagion: lack of depth of secondary markets, interbank market freeze, credit crunch, and so on. Banks have clearly suffered from liquidity risk, overleverage, and possibly also lack of capital; regulations will be revised accordingly. The lessons are that models insufficiently took into account the potential for market prices to deviate far from equilibrium due to a simultaneous increase of risk premium and lack of cash-funded risk capital. At the same time, management and control of the visible main risk factors—which are quantified—must not indirectly favor more toxic risks that are less visible. Ultimately, the crisis demonstrated that sophistication can give a false illusion of risk management ability; extremely smart techniques can fail where commonsense caution may not.

Research must take up the challenge: The equations are not an end in themselves but merely tools for improving the merits of investing. Experience and judgment matter; otherwise, too much talent (young and old) is being wasted.

#### Notes

1. "Since we have not more power of knowing the future than any other men, we have made many mistakes (who has not during the past five years?), but our mistakes have been errors of judgment and not of principle."—J. P. Morgan Jr., excerpt from statement made before the U.S. Senate, 1933.

2. Managing Director, JPMorgan and Société Générale.
3. These are not reflective of views of former colleagues, clients of JPLC, or partners of the CRIS consortium.
4. The 5 percent rule of Article 122 of the EU Capital Requirement Directive (2009).
5. European Systemic Risk Board (ERSB) of the European Union.
6. It is legitimate to assume that systemic regulation is subordinated to diplomacy.
7. Such rules could also apply to limit the systemic risk of central clearing in periods of crisis.
8. Jean Bodin: *Il n'est de richesses que d'hommes*.
9. Improving bikes takes as much from driving experience as from pure engineering.
10. Derivative structures—with a dedicated derivative contractual setup—are opposed here to derivative products whose contractual setup is standardized.
11. Collateral of counterparts is held by an appropriate third party.
12. Structured investment vehicles (SIVs), conduits, and so on.

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