Credit Risk Assessment

The New Lending System for Borrowers, Lenders, and Investors

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CHAPTER 1

Unpacking the Financial Crisis

A problem well-defined is half solved.

—John Dewey, educational pioneer

In September 2008, the subprime mortgage crisis emerged as a global economic crisis that rocked the world's financial system and triggered responses from governments of many countries. On October 3, 2008, the Emergency Economic Stabilization Act of 2008 was signed into law to provide for a troubled asset relief program (TARP). Under this program a $700 billion liquidity pool was made available to purchase or insure any troubled assets and to cover any administrative and custodial expenses associated with purchasing, insuring, warehousing, and selling those assets. Government officials felt tremendous pressure to take swift action because they feared that the global financial system might collapse. However, the global financial markets have remained unstable with elevated systematic risk indicators, despite some significant financial market adjustments through a series of interventions carried out by the U.S. Department of the Treasury and the Federal Reserve System. According to the Global Financial Stability Report (GFSR), the International Monetary Fund (IMF) estimates that losses on U.S. subprime assets and securities will total $1.45 trillion—more than 59% above April 2008 estimates of $945 billion.[1] The crisis has caused the U.S. economy to continue to shrink. On October 30, 2008, the U.S. government confirmed that the gross domestic product (GDP) declined at an annual rate of 0.3% in the third quarter, the largest contraction in seven years, while consumer disposable income declined 8.7%, the biggest drop on record.[2]

Based on these and other facts, it is entirely possible that the $700 billion initial allocation will prove insufficient to accomplish what is needed. The fact is that financial firms face simultaneous pressures posed by a reduction in assets, difficulties in raising capital, and challenges associated with implementing new business models. Hence, it is vital that we first seek to understand what is going on (that is, what caused the crisis, who played an active role in bringing it about, and what processes and controls failed to prevent it from reaching its enormous scope and scale). Failure to define a problem fully before solving it can result in flawed strategies that waste precious time and resources. In the business world, we call these "Ready, Fire, Aim" strategies. Only too often, they occur when there is never sufficient time devoted to fixing things right in the first place, but always enough time to repair them over and over again. It is in this spirit that we devote this first chapter to surveying various opinions concerning the causes of the current financial crisis; its impact, consequences, and implications; and finally the role of loan underwriting, which we see as being at the core of the problem.

It is abundantly clear that restoration of the public's trust in financial institutions, and in securities that are derived from the loans they make, demands that we fix the flawed processes in loan underwriting and associated securitization process. Fixing the problem will require a new generation of lending systems, not a Band-Aid, if we truly hope to avoid similar future crises. In this book, we share our ideas for a new, comprehensive, and systematic approach to credit granting that combines the best of science, proven credit principles, and common sense. The success of this new approach will hinge partly on the lending industry's willingness to invest time, effort, and resources to shore up gaps that have crept into our evolving consumer credit system over several decades.

This chapter provides an overview of the current financial crisis, the causes, the impact, consequences, and implications. There are many factors that are attributed as the causes of the crisis. Our focus here is on the major kinds of market participants, and how each of them is perceived to have contributed to, or been victimized by, the crisis. Our goal is to trace back from the events and consequences to identify the root causes, some of which remain obscured by layers of business processes and by proprietary systems whose accuracy historically has been taken for granted and whose data, assumptions, formulas, and logic were thought to be valid.

The Financial Crisis

The financial crisis started with a downturn in the housing market of the United States in 2005–2006 after the growth in home prices in 2004 had surpassed any increase in the previous 25 years.[3] Increased foreclosures on subprime mortgages raised concerns about the underwriting standards and the value of a number of mortgage-backed securities (MBS). These realizations became even more pronounced throughout 2007, and by 2008 the pervasiveness of the problems caused more widespread consequences and exposed severe weaknesses in the global financial system.

There have been many different financial crises in the past.[4] All were caused by a variety of factors, and they each had different magnitudes and impacts on the economy. The current financial crisis is of a magnitude not seen since the Great Depression of the 1930s. There are significant differences between today's situation and that of the Great Depression. Although it is still unclear how the current crisis will eventually play out, its breadth of scope and sheer magnitude are astonishing.

- **Scope.** The initial quality deterioration of U.S. subprime mortgages represented a credit event that rapidly transformed into a liquidity and solvency issue. This spilled over into a broader credit crunch and to many other financial products and market areas, further widening the economic crisis. Prime lending markets were affected because homeowners with more conventional loans saw their property values and equity decline. When homes in neighborhoods are left vacant in the aftermath of foreclosure, the impact is felt by all.[5] Around 40 million such homes will suffer price declines averaging almost $9,000, which translates to a $350 billion drop in value.[6] Current projections are that there will be nearly 2.2 million subprime foreclosures occurring in 2008 and 2009.[7] Investors, both domestic and foreign, saw the ratings of AAA MBSs severely downgraded, and banks withdrew loan products from the market that featured low down-payment, interest only option pricing loans, and adjustable rate mortgage products with teaser rates. As a result, speculators who bought homes hoping to flip them for a quick profit found it difficult to find borrowers who would qualify for higher monthly payments. And real estate developers who built spec homes and were in the process of developing entire subdivisions of single-family units also found housing demand slack off, and in many cases evaporate. Banks financing developers with acquisition and development loans found those loans slipping from pass credit grading to special mention or substandard status. This caused loan loss reserves to ramp up significantly. Liquidity shocks contributed to the rapid transmission of turbulence that began in the relatively small U.S. subprime mortgage market and spread to other financial markets in the United States and abroad.[8] According to the IMF, the ongoing deleveraging process has accelerated and threatens to become disorderly, increasing the risk of a severe adverse feedback loop between the financial system and the broader economy.[9]

- **Magnitude.** Losses have been astronomical. On a global scale there were write-downs of $585 billion by financial institutions, one of the most costly ones ever. There were meltdowns of large financial institutions including Lehman Brothers and Washington Mutual. Since January 1, 2008, owners of stocks in U.S. corporations have suffered about $8 trillion in losses, as their holdings declined in value from $20 trillion to $12 trillion. Losses in other countries have averaged about 40%.[10] Extreme fluctuations in financial markets have caused some investors to panic.[11] Volatility has ruled the markets, reflecting a general lack of investor confidence. Fear eclipsed greed as the primary driver in the equity markets, and it reached historically high levels. Holders of mortgages in the United States, approximately 70% of homeowners, have exhibited historically high delinquency rates.[12] A crisis of this magnitude is particularly troubling partly because it was not spotted in time to take preventative measures, and partly because top officials in the government and financial industry still appeared not to know how large the problem was at the time that the emergency legislation was passed.

In the next section, we explore thinking from a variety of sources who attempt to explain how and why the crisis came about.

Causes of the Crisis

There are many opinions and theories concerning the causes of the financial crisis.[13] In this section, we have attempted to capture as complete a range of opinions as possible. These are not our opinions, and we have taken the liberty to paraphrase what we have heard in order to provide the essence of what has been alleged. The list of suspects is long, and for ease of discussion we classified the causes into four categories: (1) market, economy, and regulations, (2) stakeholders and participants, (3) practices and products, and (4) human behavior and traits, as shown in Exhibit 1.1.

Market, Economy, and Regulations

- **Housing Market Downturn.** Loss of borrower equity and real estate liquidity. The financial crisis's "proximate cause was the end of the U.S. housing boom."[14] This was reflected by a large decline in housing prices, which reduced the incentive of homeowners to repay their mortgages. It was estimated in October 2008 that 23% of mortgage holders owe more than their houses are worth. This was expected to increase to 28% over the next 12 months. The median home prices in the country dropped 9% from September 2007 to September 2008.[15] The wave of foreclosures has had a dramatic effect on house prices, reversing the housing boom of the last few years and causing the first national decline in house prices since the 1930s. At present, there is a glut of four million unsold homes that is depressing prices, as builders have also been forced to lower prices to get rid of unsold properties.
- **Regulatory and Internal Controls.** Concerns of oversight adequacy and safeguard sufficiency. Massive failure in such a highly regulated industry raises questions. For example,
  - Where was risk limitation addressed, and what were the key risk indicators?
  - What were the thresholds, who set them, and how were they determined?
  - How often was risk monitoring performed, at what level, and by whom?
  - What capital is adequate to back loans and asset-backed securities, and what additional capital is required for off-balance assets?

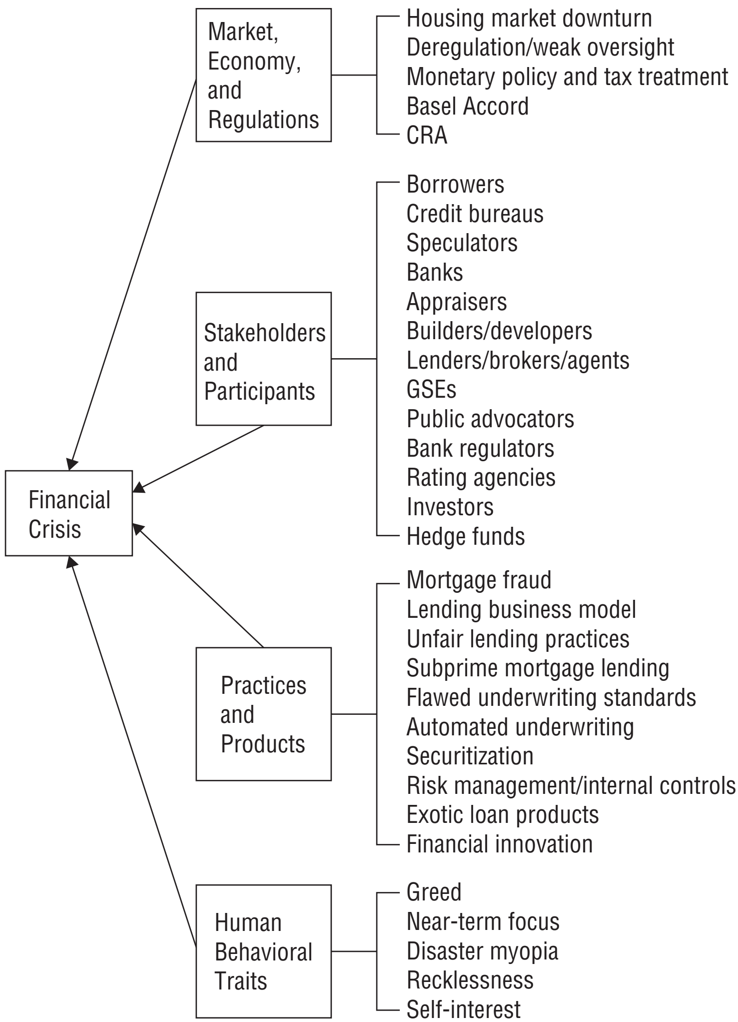

EXHIBIT 1.1 **LIST OF CAUSES OF THE FINANCIAL CRISIS**

- What stress testing methodology was utilized? Specifically, did stress tests, or performance simulations, include sufficient numbers of scenarios? To what degree did those scenarios capture measures that characterized business, borrower, and market realities, including extreme values of those measures that reflect the full range or risk that could be encountered? Credit risk models, in practice, have tended to underestimate the probability of extreme outcomes, while overestimating the risk associated with more common outcomes.

- **Tax Treatment.** Income and property tax incentives at federal and state levels. These include tax deductibility for home mortgage interest, no capital gains for home sales of less than $600,000, property tax relief via state homestead laws, and so on.[16]
- **Basel Accord.** Shifting risky activities off balance sheets. The 1988 Basel Accord encouraged banks to shift risky activities off balance sheets. The growth of structured investment vehicles (SIVs) and conduits were byproducts of regulatory guidelines dealing with capital adequacy. The creation of these off–balance sheet entities allowed banks to reduce the capital associated with a given risk profile. In addition, it reduced the transparency of risky activities and hid them from regulatory scrutiny.[17] The Basel Accord was also criticized for its lack of specific requirements for liquidity, and the accord's approach encouraged regulators to emphasize the importance of liquidity in their supervisory activities, and encourage loan securitization.[18]
- **Community Reinvestment Act (CRA).**[19] Encouragement of lending to unqualified borrowers. While CRA was intended to help improve the welfare of society, banks were criticized for not making enough loans to low- and moderate-income borrowers. Some have blamed banks for making too many subprime loans to those borrowers in response to CRA.[20]

Stakeholders and Participants

- **Borrower.** Financially unsophisticated and irresponsible borrowing. Borrowers knew what they were signing up for and threw caution to the wind. Sometimes they gave misleading information about their income or assets in order to get a loan that they could not afford. Borrowers knew that the rates were going to rise, but bet on the appreciation of their homes. They could get a subprime mortgage at a low rate for two or three years and then refinance before the rates reset at a lower fixed rate. Some used financial leverage to borrow more money for home, stocks, or other assets. It turns out the housing market went the other way, and with lower home values, refinancing was not an option.

- **Credit Bureaus.** Incomplete credit scoring models underestimated the borrower's risk. Traditional credit scoring has been less effective in credit assessment for new and innovative loan products. For example, "the once-vaunted Fair, Isaac and Company (FICO) credit scoring system" is now being blamed for failing to signal risky borrowers in the mortgage market.[21]
- **Speculators.** Evidenced by nonowner-occupied property purchases in real estate market for investment purpose. Speculation in real estate was suggested as a contributing factor to the subprime crisis. During 2006, 22% of homes purchased (1.65 million units) were for investment purposes, with an additional 14% (1.07 million units) purchased as vacation homes; nearly 40% of home purchases (record levels) were not primary residences. Speculators left the market in 2006, which caused investment sales to fall much faster than the primary market.[22]
- **Banks.** "[L]everaged losses" theory—banks have so much leverage, they contract their lending by a multiple of their credit losses in order to restore their balance sheets. The resulting contraction in bank lending then leads to a substantial decline in aggregate spending, because bank loans cannot be replaced by credit from other sources.[23] Many MBSs, which were funded with short-term borrowing, were kept on bank balance sheets.[24]
- **Appraisers.** Inflated valuations fueled a market bubble. Conservative appraisals of home values were abandoned in favor of higher valuation. According to a 2003 study by October Research Corporation, 55% of appraisers reported being pressured by mortgage lenders, brokers, consumers, and real estate agents to inflate home values. A follow-up study released earlier this year shows that 90% of appraisers are reporting pressure to inflate home values. Appraisers depended on mortgage brokers and lenders for new business, and some submitted fake documents, failed to actually inspect the property being appraised, or based the appraisal on outdated comps. Lenders and brokers have been willing to overlook these inflated values, the theory goes, because the loans have been bundled up and resold to unsuspecting investors.[25]
- **Builders.** Created oversupplies of new homes. The building industry makes up 15% of the U.S. economy, and in 2006 home

construction reached its highest level in 30 years. Many assert that housing is overbuilt on the high end and overpriced. According to William Wheaton, an economist with MIT's Center for Real Estate, there was a great deal of overbuilding, driven in part by home speculators, and this resulted in more than 1 million extra homes sitting in the market, even after home building had been cut by 50% and massive layoffs.[26]

- **Developer (house zoning).** Artificially increased housing prices. Zoning restrictions account for a high percentage of the total cost of housing in some of the nation's most expensive real estate markets. Restrictive zoning greatly increases housing prices by reducing the amount of land on which new housing can be built and also by reducing the amount of housing that can be built even in those areas where residential construction is permitted.[27] Higher housing prices helped cause the subprime mortgage crisis by forcing home buyers to borrow more money in order to purchase homes of a given size and location. It was suggested that if prices had been lower, so too would homeowner indebtedness. Fewer buyers would be on the verge of default as a result of a market downturn; their debt burden would likely have been much smaller relative to their income.
- **Lenders, Brokers, and Real Estate Agents.** They displayed commission-driven behavior: (1) practiced predatory lending and took advantage of borrower's financial illiteracy and (2) aggressively made the subprime loans for higher commissions, and offered low teaser interest rate under intensive competition from other lenders. Lenders were able to maximize their revenue by disproportionately marketing and underwriting subprime loans based on introductory interest rates that were, in the long run, much more expensive. They had strong incentives to originate mortgages in large volume and relatively little incentive to scrutinize whether the loans would perform satisfactorily over time. Lenders had little incentive to worry about loan performance, knowing that the loans would be pooled for sale in the secondary market and subsequently held by investors.[28]
- **Government Sponsored Enterprises (GSEs).** Creation of excessive MBS. Huge quantities of loans were bought and packaged into

mortgage-backed securities. These bonds removed hazard from the banks and shifted it to investors and the federal government.

- **Independent Mortgage Companies.** Less-regulated lenders were responsible for selling high-cost mortgages. About half the high-cost subprime mortgages came from independent mortgage companies, which are not subject to CRA or the same degree of oversight that banks operate under.[29]
- **Public Advocates.** They overpromoted financial innovation. The National Homeownership Strategy promoted the availability of affordable housing through the use of creative financing techniques.[30]
- **Securities and Exchange Commission and Federal Bank Regulators.** Regulations were insufficient. They encouraged the rapid growth of over-the-counter (OTC) derivatives and securities of all types of financial institutions.[31] There was failure to put in place sufficient regulations.[32]
- **Rating Agencies.** Inaccurate ratings. Recently, rating agencies have taken a lot of heat regarding their responsibility in the subprime crisis.[33] They underestimated the risk of structured financial products because rating agencies are paid by bond sellers, not buyers, and their revenue mainly comes from the investment banks that created the collateralized debt obligations (CDOs) and related structured products. The role of the rating agencies in the subprime crisis will be covered in detail in Chapters 5 and 6.
- **Investment Banks/Securitizers.** Creation of exotic financial products with opacity. These participants have been alleged to have been motivated more by issuance and arrangement fees and less by concern for the longer-run performance of these securities. They created exotic and innovative structured financial products backed by subprime loans, which stimulated subprime lending and also investor demand for securities derived from risky loans. Investment banks securitized assets and created the structured financial products that were not transparent and were well beyond the understanding of the average investor.[34]
- **Investors.** Overreliance on rating agencies and failure to perform due diligence. In the past, rating agencies have done a reasonably good job of helping investors determine the riskiness of a particular investment security. Investors needed transparent ratings for all

securities they are considering for investment, and their confidence has been shaken by massive downgrades of MBSs, some of which were rated as highest quality (AAA).

- **Hedge Funds.** They took large long and short positions in subprime MBSs. Their assets, liabilities, and trading activities are not transparent entities and not disclosed publicly. They are often highly leveraged, using derivatives or borrowing large amounts to invest. So other investors and regulators knew little of hedge funds' activities. Because of their leverage, their "impact in the global credit markets is greater than their assets under management would indicate."[35] Their activities at times were thought to exacerbate market volatility and security price declines.

Practices and Products

- **Mortgage Fraud.** Inflated prices. This was identified as one of the main drivers for subprime mortgage defaults. Typical fraud included misrepresentation of occupancy, suspicious items on the borrower's credit report, miscalculation of debt-to-income (DTI) ratio, and falsely stated income.[36] It was also suggested that some borrowers and intermediaries in the housing market inflated appraisals and overstated transaction prices, which increased foreclosure rates.[37]
- **Lending Business Model.** This provided little incentive to maintain loan quality. "A significant and distinctive contributing factor to the outbreak of the current turmoil was the proliferation of the originate-to-distribute model (OTD model) based on the financial technology of securitization."[38] Traditionally, banks have financed their mortgage lending through the deposits they receive from their customers. This has limited the amount of mortgage lending they could do. Over the past 20 years, banks have moved to a new model where they originate loans or purchase them from brokers and then transfer them to a third party who packages the loans into a CDO for sale to investors. This so-called originate-to-distribute model has made it much easier to fund additional borrowing but has also caused moral hazard, as Chairman Bernanke pointed out. This is because the model created some severe incentive problems. Commonly referred to as principal-agent problems, or more simply as

agency problems, these situations arise when an agent (the originator of the loans) does not have an incentive to act fully in the interest of the principal (the ultimate holder of the loan). Originators had every incentive to maintain origination volume, because that allowed them to earn substantial fees. However, originators had weak incentives to maintain loan quality.[39]

- **Unfair Lending Practices.** Predatory lending or steering. These include the practices that target minority or unsophisticated borrowers who are qualified for prime loans and then steer them into higher-priced subprime mortgages.[40] In some instances originators and borrowers collaborated to overstate income, misrepresent occupancy, and hide other details in order to get a loan.[41]
- **Subprime Mortgage Lending.** Excessive subprime lending. Subprime mortgages are based on lenders taking big risks on loans to people who could be considered less than qualified. Mortgage companies require little money down on many of these loans and offer "introductory" rates that were below the prime rate—yet subprime. Subprime mortgage originations grew from $173 billion in 2001 to a record level of $665 billion in 2005.[42] This caused a tremendous oversupply of homes, which, in turn resulted in the housing market bubble. Recent research has asserted that subprime lending drove house price increases in some areas. Mortgage credit underwriting standards were relaxed from 2001 to 2005 in zip codes with large numbers of high-risk borrowers and negative relative income and employment growth. Relaxed standards were associated with increased mortgage lending, rising house prices, and a subsequent increase in defaults, which caused the housing bubble to burst.[43]
- **Flawed Underwriting Practices and Standards.** Failure to gauge borrower ability to repay. Many subprime loans were awarded to borrowers without traditional screening processes, including checking the borrowers' income figures to make sure they could pay back the loans.[44] Models used to assess borrower risk in mortgage lending almost exclusively restricted their input to historical data. The driving analogy is that a rearview mirror is helpful, but not for seeing what is coming at you, such as the driver who crossed the center median and hit you head on, an event that is not supposed

to happen. Underwriting standards were too busy looking back at past loan performance to pay attention to their exposure to changes in future market states and borrower conditions. Furthermore, loans having teaser rates became accidents waiting to happen when their rates, and monthly payments, escalated due to rising interest rates.

- **Automated Underwriting.** Efficient but not effective. It has been recognized that development in automated underwriting technology has played a significant role in encouraging lenders to penetrate deeper into the subprime loan pool. Subprime lenders like automated underwriting because it is cheap and fast. A 2001 Fannie Mae survey found that automated underwriting reduced the average cost to lenders of closing a loan by $916. The software aims to quickly weed out the very riskiest of applicants and automatically approve the rest.[45] Obviously, automation breeds efficiency, but it must be designed in such a fashion as to also be effective. Otherwise, you have only succeeded in creating a faster way to lose money and put borrowers at risk!
- **Risk Management.** Separation of science and business. "All the drama and chaos of recent months obscures the most fundamental cause of the entire financial crisis: a basic misunderstanding of risk (abetted by heavy borrowing)."[46] We can put this observation in the broader category of ineffective risk management.[47] Because risk management techniques have become so complex and require a high proficiency of sophistication and quantitative expertise, we tend to see highly educated technicians creating the models that business people use. Unfortunately, as Stanford University Professor Sam Savage has noted, an "algebraic curtain" separates business people from the underlying science. Conversely, the scientists rarely possess sufficient knowledge of the business and market realities to ensure that their models are truly reflections of the real world. This observation extends from the use of credit scoring methodologies to the types of models used to develop mortgage-backed securities (MBSs), such as collateralized debt obligations.
- **Exotic Loan Products.** Some bank regulators have called these financial time bombs. These exotic products include (1) no down payment requirement; (2) no documented or verified income requirement; (3) an adjustable interest rate, coupled with a low

introductory teaser rate; (4) prolonged deferred principal repayment in the case of interest only option mortgages, which have a very low monthly payment for the first several years. An analogy to auto manufacturing has become common in subprime lending, where it appears one out of five subprime loans will end in foreclosure. The analogy poses the question "If one out of five cars of a specific make and model coming off the assembly line ended up in a serious accident, would people consider it a problem with the car or operator error?"[48] "Risky mortgage products, not risky borrowers, are at the root of the growing foreclosure epidemic."[49]

- **Financial Innovations.** These have spread confusion and trapped investors. Financial innovation fueled economic growth. However, over the last several years, many innovative financial products were sold on false pretenses. This led to "the creation of complex and opaque financial instruments that proved fragile under stress."[50] They were promoted as ways to spread risk and make investment safer. In fact, their creators made a huge profit and did not have to repay when it all went bust. Instead of diversifying risk, investors were lured to take on more risk than they realized.[51]

We also see human behavioral traits as playing a major role and it is doubtful that anyone can effectively change them.

Human Behavioral Traits

- **Greed.** Chasing excessive profits. Greed is a natural tendency, and it is ever-present; it overwhelms better judgment when not kept in check. We see this as one of the core drivers of the financial crisis, and it cropped up among borrowers, lenders, investors, and many other participants who had something to gain by perpetuating what became a spiraling catastrophe.
- **Near-Term Focus.** Neglect of future consequences. It is the tendency to act to reap immediate benefits and let tomorrow take care of itself. The consequences of loose underwriting standards are years away for a hybrid adjustable rate mortgage (ARM) product, and it is not surprising that a quota-driven sales force would not trouble themselves with concern about what might happen in the future when they have to meet more immediate expectations.

- **Disaster Myopia.** Tendency to forget bad events by investors. As time passes after a shock such as house price declines, interest rate shocks, or widespread credit defaults, lenders and investors discount the likelihood of its recurrence, and then underprice risk. This is particularly the case for subprime lending in which the aggressive investor bids for above-market security yields, plus an absence of investor vetting of the collateral behind the securities.[52]
- **Recklessness.** Especially in light of lack of accountability. This applies to executives who chased volume for volume's sake and ignored the latent risk in their business goals. It also applies to the secondary market players who packaged future problem loans for sale to investors with insufficient diligence and care and little regard for the consequences. It also applies to rating agency analysts who certified MBSs were of their high quality without performing sufficient stress testing and performance simulations under broad sets of assumptions that would have identified the true asset value exposures to a housing market downturn or hybrid ARM loan default exposures to rising interest rates.
- **Self-Interest.** The first priority is, as a rule, always to ensure that one's own interests are met. Self-interest is a healthy and basic motivational driver. It does not imply unreasonable or disproportionate expectations, and it must not be confused with greed. This applies to all players in the financial crisis at both individual and institutional levels. Borrowers pursued their priority interest to qualify for a loan for a home that they wanted to own. Lenders competed to gain market share, satisfy their regulatory and business goals, and to move risky assets off the balance sheet to adequately maintain and balance their multitiered capital position. Investors sought investment vehicles that would secure their desired return on investment.

The mess resulting from subprime mortgage defaults can be attributed to many more factors. It arguably is a collective creation of some combination of all of the stakeholders and their practices previously shown in Exhibit 1.1. "Complexity, transparency, liquidity and leverage have all played a huge role in this crisis. . . . And these are things that are not generally modeled as a quantifiable risk."[53] It is easy to fall into a loop of blame and to focus on penalizing suspected offenders. Our purpose here is more constructive. While we cannot change human traits, we can change the control structure within which the players must operate. Weakened performance and deterioration in quality of subprime loans are the key outcroppings of the underlying causes. The root cause traces back to the current lending system that approved the subprime mortgages based on an incomplete credit risk assessment.

Roles of Borrowers, Lenders, and Investors

As we showed in the previous section, there are various market stakeholders involved in this mess. However, the borrowers, lenders, and investors are the key players who contributed most to the crisis and also suffered most from it. As shown in Exhibit 1.2, the underwriting gap is the root cause of the problem. It relates to unaffordability of loans, opacity of securities, and deterioration of loan performance, which, in turn, caused market illiquidity and bank losses. Now let us describe in detail what happened to the three market players respectively.

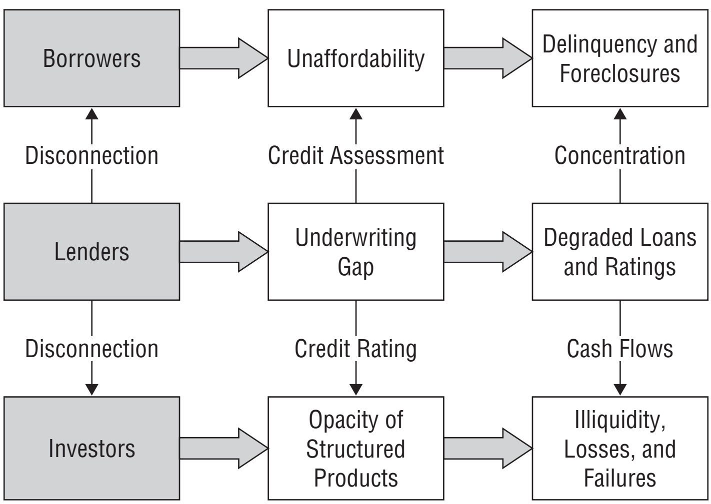

EXHIBIT 1.2 **BORROWERS, LENDERS, AND INVESTORS**

Borrowers

- **Situation.** The housing market was booming, house prices were increasing, and the interest rate was low.
- **Expectation.** Borrowers assumed home prices would continue to appreciate and refinancing at a lower rate would be available. They also assumed that home price appreciation and refinancing could generate equity to supplement income to support a higher standard of living.
- **Action.** The borrower obtains a nontraditional high risk mortgage that offered low introductory interest rates from a lender in order to purchase a home. Some borrowed to improve and flip properties in the hopes of turning a quick profit.
- **Reality.** The steady appreciation of U.S. home values started to slow early in 2006. The rate of home price increase fell sharply in the second quarter of 2006. With the interest rate and unemployment rate increase and the home value decrease, refinancing became more difficult. Some of the ARMs started resetting and resulted in much higher interest rates or payment shock. The borrowers were unable to refinance or make payments, which eventually led to foreclosures. These low rates did not last for long, though. After the fixed introductory period of two to three years, the rates often reset three percentage points higher. Rates then readjusted every sixth month thereafter, usually getting higher. These higher rates can drastically increase borrowers' monthly mortgage payment, oftentimes putting them in a situation where they could not make the payments and then ultimately defaulted. In the case of interest-only ARMs, the situation is even more pronounced because at some point the deferred principal repayment kicks in and the payment amount escalation is more dramatic, as the fully amortized principal and interest are included in the monthly payment.

Lenders (Brokers, Banks, Originators, GSEs)

- **Situation.** Increased housing prices and low rates boosted demand for mortgages, and ample funding was available for lending.

- **Expectation.** Lenders assumed a healthy economy would last and that they could sell the loans to the issuers and transfer most, if not all, risk to the investors.
- **Action.** Lowered underwriting standards and increased subprime lending to the borrowers with weak credit combined with intensive competition among mortgage banks. Lenders increased use of the secondary market in order to sell off mortgages to free up capital for more lending. They used inappropriate mortgage incentives such as buy-downs and short fixed term ARMs, coupled with rapidly rising adjustable mortgage rates.
- **Reality.** Decreased loan affordability and degraded loan quality resulted. Loan performance deteriorated.

Investors (Banks, Financial Institutions, and Anyone Else)

- **Situation.** Strong demand for complex structured financial products backed by subprime mortgage loans.
- **Expectation.** By securitizing mortgage loans they could reduce the market risk by diversification. Indications are that actual performance of the subprime mortgages in those securities were highly correlated with each other.
- **Action.** They invested in structured financial products without sufficient information to monitor or evaluate the performance of the underlying assets. Instead, they overly relied on credit ratings and did not perform due diligence.
- **Reality.** The performance of the subprime mortgage loans deteriorated, cash flow declined, value was lost, and capital levels were depleted.

Root Causes

The downturn of the U.S. housing market revealed serious problems with the current underwriting practices.[54] Although many other economic factors contributed to the near failure of the financial markets, the subprime mortgage crisis was the single largest factor, which was due to irresponsible lending practices. Exhibit 1.3 shows a chain of losses and how the financial crisis began with the failures to qualify borrowers for the appropriate loan products.

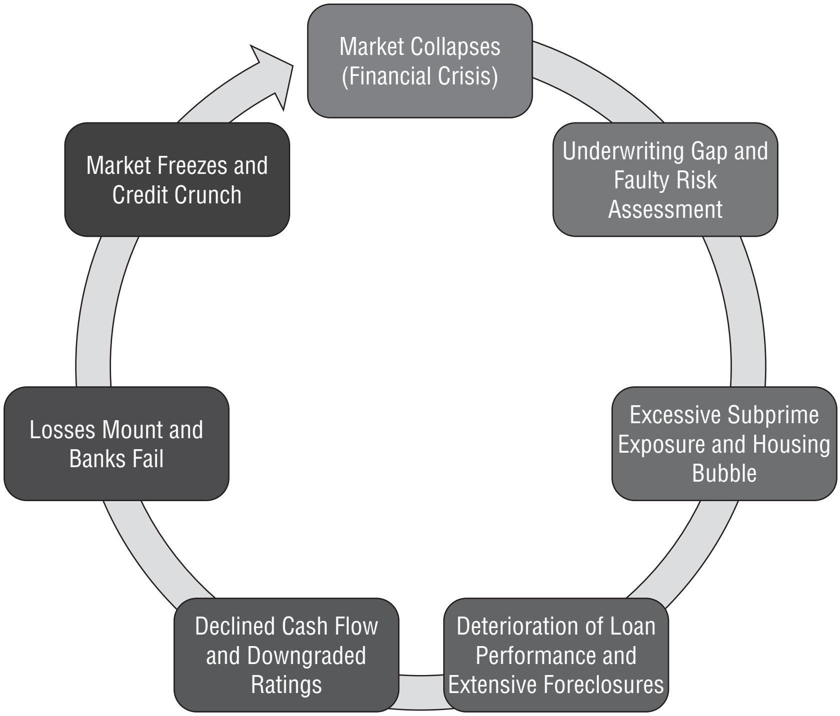

EXHIBIT 1.3 **ROOT CAUSE OF THE CRISIS**

The formation of the financial crisis consists of six milestones:

1. **Exposed Underwriting Gap.** This is the starting point representing the underwriting practices that deviated from the lending business reality and borrowers' loan affordability. This resulted in faulty credit assessment of borrowers and products.
2. **Excessive Subprime Mortgage.** Exposures were created with subpar loan quality and affordability. At the same time, this inflated a housing market bubble with housing oversupplies.
3. **Deteriorating Loan Performance and Excessive Foreclosures.** Loan pricing resets further undermined loan performance and affordability, and increased loan delinquency and foreclosures.
4. **Cash Flow Shortage and Downgraded Credit Ratings.** Deteriorating loan performance constricted loan pool cash flows to investors. Subsequent rating downgrades further shattered investors'

confidence. This caused investors to pull back from structured products in general.

5. **Losses Mount and Banks Fail.** The values of the securitized mortgages and structured securities on the balance sheets of financial institutions declined, resulting in extensive write-downs. Bondholders, such as pension funds, who bought subprime mortgage bonds, suffered huge losses. Those securities fell sharply in value. It is estimated that their residual worth is only 20 to 40% of their original value for most asset classes, even those considered safe by the ratings agencies.
6. **Market Freezes and Credit Crunch.** Banks and other lenders cut back on how much credit they were making available. They began rejecting more people who applied for credit cards, insisting on bigger down payments for home purchases, and looking more closely at applications for personal loans. The adverse effects on the mortgage market have been pronounced, with individuals finding it very difficult to get nontraditional mortgages, both subprime and "jumbo" (over the limit guaranteed by government-sponsored agencies). The banks were compelled to restrict lending in this way since the wholesale bond markets dried up and also because of the effect the crisis was having on their own balance sheets.

Key Drivers of the Crisis

The key drivers surrounding the chain of events explained in the previous section are shown in Exhibit 1.4.

Now we examine each of the drivers in turn.

Inadequate Risk Assessment System

The current risk assessment is plagued by the following flaws:

- *Fragmentation:* Those primary factors that were considered were evaluated serially, not in parallel.
- *Incompleteness:* Misuse of credit scores, past credit performance, and historical market conditions and not enough future-looking criteria.
- *Overlooking the obvious:* Five Cs of credit, namely borrower character, capacity, capital, collateral, and conditions.

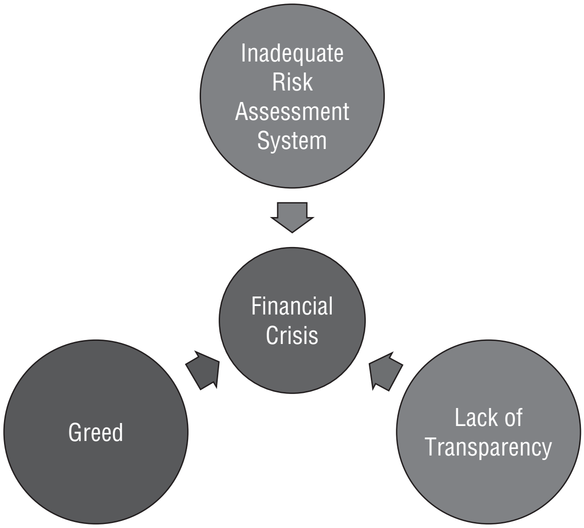

EXHIBIT 1.4 **KEY DRIVERS OF THE CRISIS**

- *Overreliance on risk quantification models* that, despite correct mathematics, are flawed due to bad assumptions and overly complex formulas that fail to reflect the true business, market, and borrower realities.

The impact felt by borrowers, lenders, and investors due to this driver is explored in depth in Chapters 3, 4, and 5.

Lack of Transparency

The borrowers, lenders, and investors all suffered from lack of transparency:

- Relative to borrowers, transparency issues include the following:
  - The risks associated with loan products are not transparent to the borrower.
  - Borrower qualification criteria are not transparent to borrowers themselves, which hinders financial literacy initiatives, and confuses borrowers when they attempt to make sound financial decisions.
  - Some borrowers did not provide adequate transparency relative to their income, employment, and cash reserves. There were so-called Ninja Loans made.[55]

    - Credit scores, which factor prominently in the credit granting process and also loan securitization process, are cloaked in secrecy, and scorecard developers have refused to divulge to federal regulatory agencies the details of their methodology. Borrowers are disadvantaged because scores may not accurately reflect their true risk, and they also do not know how to improve their score.
    - Relative to borrowers, there is lack of transparency in their loan qualifications and inconsistency relative to lending criteria across the spectrum of lenders.
- To lenders, transparency issues are mainly associated with the use of credit scoring. Credit scores play an especially important role in the approval and pricing of mortgage loans, the classification of borrowers into subprime tiers, the choice of products for which consumers can qualify, and so on. In the securitization process, credit bureau score bands are typically used to pool loans into homogeneous risk classifications and over the years the use of the credit score developed by Fair, Isaac and Company became almost as much of an American standard as apple pie. Unfortunately, the credit scoring formula, often referred to as the "secret sauce," is not at all transparent. Lenders did not foresee the perfect storm brewing that ultimately consumed many of them. The perfect storm consisted of the following main factors:
    - New loan products having risk attributes that were not sufficiently measured and monitored
    - A downturn in the housing market that saw home prices decline
    - Escalating mortgage loan payments for borrowers as their loan teaser rate anniversaries began to arrive
    - Loose standards on income and employment verification
    - Backward and fragmented underwriting system that attempted to risk rate borrowers from a variety of aspects and then classify them instead of first classifying them relative to all relevant factors and then risk rating them
- Lack of transparency was most pronounced for investors in MBSs. They were almost entirely at the mercy of the rating agencies to tell them the investment grade of these securities. There was no window into the risks associated with the underlying securities stemming from the following situations:

- The underlying loans, and their aggregate attributes, for a given security are not transparent to the investor.
- Deterioration in underlying asset quality is not transparent. Additional information needs to be included together with the rating agency supplied risk grade for a loan-backed investment security.
- How the loans were originally pooled, together with any diversification criteria. Investors want to ensure that any cause for a few of the loans in a pool to default does not correlate to the majority of the remaining loans in the pool!
- The ways in which loan concentrations were measured to gauge any skew in risk exposure associated with the security would consider such things as loan maturity, geography, borrower risk segments, types of mortgage products, delinquency, and prepayment rates.

Greed

The subprime crisis was preventable. Some would assert that the financial crisis resulted from the forces of greed among Wall Street participants, lenders, and speculative borrowers (property flippers) who hoped to make a quick and easy profit in a booming real estate market. A general definition of greed can be based on the notion that greed is present when a borrower, or a lender, or an investor attempts to extract a greater return than would be reasonable and customary for a given financial transaction, given the basic laws of economics, market conditions, and their particular circumstances. But the challenge lies in specifying what is a "reasonable return" for any financial transaction. In our capitalistic society, the answer back is only too often "Whatever the market will bear."

- For borrowers, that might translate to purchase of the most expensive home they can afford by choosing a loan product that affords the minimum monthly payment without proper regard for the risk embedded in the pricing and repayment terms and conditions.
- For a lender, the tone is set from the top of the organization, and chief executive officers (CEOs) and executive management are responsible for setting overall business goals and for painting the vision for success. In theory, since CEO compensation is significantly tied to the financial performance of the enterprise, CEOs are supposed to know what achievable results are. That said, CEOs

are faced with a dilemma. If they do not set stretching goals, staff may not try their hardest to achieve results. Still, there must be a bright line between what is achievable and goals that are unreasonable. In reality, personal greed can creep into the equation, and as a result those charged with executing the CEO's vision may attempt to meet their targets, whatever it takes. Every corporation has corporate polices, rules of the road, so to speak. But just as drivers who are in a hurry tend to speed, managers pressed to make their targets begin to apply undue pressure, and inevitably staff starts cutting corners. Some individual loan officers and brokers were overcharging the borrowers in order to maximize their commissions. In the case of loan officers, their institutions often have a policy that provides for splitting of the excess fees.

- For an investor, the usual framework is one of risk versus return. The higher the investor's risk appetite, the greater the potential return. Informed investors should be able to assess what is a reasonable and customary return under normal market conditions for rated securities falling into broad asset classes. Greedy and aggressive investors, looking for excess return, adopted a bull market attitude. It was suggested that a key contributing factor of the subprime crisis was the irrational belief of the lenders and investors that it is possible to generate above-average returns with little risk indefinitely.[56]

Greed is an ever-present emotion and not a special circumstance relative to this crisis. Greed is an emotion that must be kept in check in all areas of commercial and financial dealings in our capitalist economic system. We already have laws and controls in place to combat financial crimes and fraud. To counteract greedy tendencies, new controls need to be put into place that effectively remove inappropriate choices from the menu of options for borrowers, lenders, and investors. This will be discussed in subsequent chapters.

The Impact

The impact of the crisis is felt everywhere. The financial crisis will have a profound impact on the U.S. and world economy. Recent data shows that the U.S. household wealth has declined in the fourth quarter of 2007, the first time since 2002. This decline, together with rising foreclosures and unemployment, may further lead the economy into a deep recession.[57] As mortgage defaults and foreclosures continue to rise and housing prices continue to fall, and resets for ARMs mortgage loans in the pipeline continue to occur, more write-downs are expected.[58] It is estimated that over 100 banks in the United States will close their business because of the financial crisis. It is expected that it will take years for the United States to recover from such a mess.[59]

Effects on the Markets

The effects on the markets are profound at many levels. We have seen that the forced liquidation of some $3 trillion in private label structured assets is depriving the financial markets, and capital market liquidity has suffered, ranging from commercial paper to longer-term securities backed by loans. Credit markets have tightened, especially relative to consumer, construction, and commercial real estate lending. Concerning the secondary markets, there will be far greater care taken in constructing securitized loan portfolios. Reliance on credit bureau scores for default risk assessment will give way to more holistic methodologies that consider the full range of risk factors. In addition, there will likely be additional information required and reported to investors.

The wind of change is forcefully blowing through the financial services industry. The era of the investment bank ended when Lehman Brothers closed its doors, and Goldman Sachs and Morgan Stanley applied for bank charters. There is consolidation in the banking industry, with Wells Fargo's acquisition of Wachovia, Bank of America's purchase of Countrywide, PNC Financial's acquisition of National City Corporation, and many others. The brokerage industry has also been impacted, most notably the acquisition of a severely weakened Merrill Lynch by Bank of America. Bank business models are changing, and those changes will reflect less appetite for risk in the short run and shifts in business emphasis and mix. There will also be changes in their strategic and capital planning, which will impact their operations over the next three to five years, possibly more.

Relative to risk management, banks, secondary market agencies, and rating agencies will come under much greater pressure and scrutiny relative to their ability to identify, measure, manage, and control risk. Loan portfolio credit risk assessment, loss forecasting, balance sheet interest rate risk, corporate liquidity risk, and various forms of concentration risk will factor prominently in the strengthening of internal control processes, procedures, reporting, and risk governance. Policy adherence and exception reporting and tracking will also represent an area of renewed focus. Furthermore, the subprime crisis has increased lenders' vulnerability to a number of different types of claims, including predatory lending and possibly fair lending. As noted, underwriting standards represent a primary control point for ensuring that risks are adequately identified and taken into account, based not only on what has happened, but also based on what might happen in the future. Predictive analytics will need to be strengthened so that risk measurement models are not reliant solely on historical data. Qualitative risk assessment will also come into play more formally in this process. Hybrid models that incorporate both quantitative and qualitative factors will evolve to become the new standard for underwriting systems.

Effects on Mortgage Industry

This financial crisis has resulted in a new wave of consolidation of lenders. According to the Federal Reserve Board, 169 Home Mortgage Disclosure Act (HMDA) filers have dropped out in 2007.[60] Now the top four mortgage lenders represent 60% of total volume. Despite JPMorgan Chase's acquisition of Washington Mutual and Bank of America's purchase of Countrywide and Merrill Lynch, Wells Fargo is emerging as the top player in the residential mortgage market—and that is not even factoring in Wells Fargo's planned acquisition of Wachovia. Wells Fargo ranked first among top agency mortgage security issuers in the first three quarters of this year with \$164.0 billion in Fannie Mae, Freddie Mac, and Ginnie Mae business. At \$49 billion, Wells Fargo did more agency MBS volume than the combined Countrywide/Bank of America mortgage operation. JPMorgan Chase emerged in second place with \$35 billion.[61] Most recently, PNC acquired National City, the number six mortgage lender in the United States.[62]

Effects on Borrowers, Lenders, and Investors

The subprime crisis is affecting virtually everyone. However, borrowers, lenders, and investors are affected most as follows:

- **Borrowers.** The subprime mortgage crisis has caused significant financial problems for a large number of borrowers. In particular, resets on subprime ARMs are causing higher monthly payments for many subprime borrowers. Negative equity value, tighter credit and underwriting standards, and sluggish U.S. housing have reduced the borrower's ability to refinance. This has resulted in unprecedented defaults and foreclosures.
- **Investors.** Loss of confidence to the market. Some investors of mortgage-backed derivatives have lost confidence and attempted to liquidate and exit the market.
- **Lenders.** Investor reluctance to accept MBSs as collateral for issuing asset-backed commercial paper created a liquidity problem that spilled over to other markets. This reduced lenders' ability and incentive to make loans. At the same time lenders have significantly tightened their underwriting standards. It is out of necessity that lenders design new profit models and fee structures that incorporate more risk factors and economic scenarios.

The Consequences

Litigation

Litigation related to the subprime crisis is underway. From the beginning of 2007 through March 2008, 448 subprime-related cases had been filed in the federal courts. An even larger, but undetermined, number of such cases had been launched in state courts. It was estimated that the numbers of subprime cases is on a path that is likely to exceed the 559 legal actions that were commenced during and after the savings and loan crisis of the 1980s and early 1990s.[63] One study found that 43% of the cases were class actions brought by borrowers, such as those who contended they were victims of discriminatory lending practices. Other cases include securities lawsuits filed by investors, commercial contract disputes, employment class actions, and bankruptcy-related cases. Defendants included mortgage bankers, brokers, lenders, appraisers, title companies, home builders, servicers, issuers, underwriters, bond insurers, money managers, public accounting firms, and company boards and officers. Some actions of note include the following:

- The Office of Thrift Supervision (OTS) executed a Supervisory Agreement with AIG Federal Savings Bank (AIG FSB) for its failure to manage and control in a safe and sound manner the loan origination services outsourced to its affiliate, Wilmington Finance, Inc. (WFI).[64] The agreement provides for a $128 million reserve to cover costs associated with making affordable loans to borrowers whose creditworthiness was not satisfactorily assessed at underwriting and also to reimburse borrowers who were charged high fees by brokers and lenders at closing.
- The Federal Deposit Insurance Corporation (FDIC) issued a cease and desist order against Fremont Investment & Loan for operating without adequate subprime mortgage loan underwriting criteria, and for marketing and extending subprime mortgage loans in a way that substantially increased the likelihood of borrower default or other loss to the bank.[65] The order compelled the bank to underwrite subprime loans with an analysis of the borrower's ability to repay at the fully indexed rate and provide borrowers with clear information about the benefits and risks of the products.
- In a landmark decision, a Massachusetts superior court judge issued a preliminary injunction preventing California subprime lender Fremont Investment and Loan from foreclosing on mortgages in the state.[66] It was alleged that Fremont violated the Massachusetts deceptive trade practices act when it made adjustable rate mortgage loans to individuals who were unable to afford them after their interest rates reset following an introductory period. Specifically, the following four loan terms were singled out as crossing the line:
  (1) "[A]djustable rate loans with an introductory period of three years or less, such as the 2/28 or 3/27 ARMs where the interest rate is fixed for two or three years, respectively, and then varies based on an index-plus margin (known as the fully indexed interest rate)";
  (2) Loans "with an introductory or 'teaser' rate for the initial period that was significantly lower than the 'fully indexed rate,' that is, at least 3 percent below the 'fully indexed rate'";

(3) Loans "where the debt-to-income ratio would have exceeded 50 percent had Fremont's underwriters measured the debt, not by the debt due under the teaser rate, but by the debt that would be due under the 'fully indexed rate'";
(4) Mortgages with "a loan-to-value ratio of 100 percent or a substantial prepayment penalty (that is, a prepayment penalty beyond the 'conventional prepayment penalty' defined in the Act, G.L.C. 183C, § 2), or a prepayment penalty that extended beyond the introductory period."

- An Ohio Court granted a temporary restraining order in response to a complaint filed by Attorney General Marc Dann to bar New Century Financial Corporation from operating in Ohio.[67] Alleged violations included making false and misleading statements, accepting money from consumers to process loans even though the company knew it did not have the money to fund them, failing to promptly deliver promised services, and failing to act in good faith.
- An Illinois attorney sued Countrywide Financial and its chief executive, Angelo R. Mozilo, for allegedly defrauding borrowers in the state by selling them expensive and defective loans that quickly went into foreclosure, relaxing underwriting standards, structuring loans with risky features, misleading consumers with hidden fees and fake marketing claims (such as its heavily advertised "no closing costs loan"), and for creating incentives for its employees and brokers to sell questionable loans by paying them more on such sales.[68] California Attorney General Jerry Brown also sued Countrywide Financial Corporation and two of its top executives, alleging they used misleading advertising and unfair business practices to trick consumers into accepting risky home loans that would ultimately force them into foreclosure by the thousands.[69]

From a fair lending perspective, due to the virtual shutdown of the subprime mortgage lending market, and general tightening of underwriting standards in 2007, the 2007 HMDA data released in September 2008 reflected some increase in denial rates compared with the same data for 2006.[70] This will present lenders with another possible challenge—fair lending regulatory compliance. Relative to the subprime crisis, regulatory scrutiny will likely focus on increases in denials, possible steering into subprime products, and discretionary loan modification items such as fee waivers, prepayment penalty waivers, capitalization of fees, and the way in which the borrower's ability to repay the loan is measured. Federal banking regulators expect lenders to review their lending practices and exceptions to policies in preparation for more rigorous fair lending scrutiny and enforcement.[71] The rapidly growing volume of litigation launched against lenders, home builders, and other defendants eventually should lead them to be more careful in their underwriting and in their disclosures to home buyers.

Legislation and Regulations

Regulators and legislators are considering action regarding lending practices, bankruptcy protection, tax policies, affordable housing, credit counseling, education, and the licensing and qualifications of lenders. Regulations or guidelines can also influence the nature, transparency, and regulatory reporting required for the complex legal entities and securities involved in these transactions. Congress also is conducting hearings to sort out what happened and is applying pressure on the various parties involved to help identify solutions. Legislators and agencies at the state and national levels have stepped in, to attempt to soften the economic blow of the credit market crisis and the deteriorating housing sector. A wide variety of proposals have been introduced and/or adopted.

One of the most important developments is the Federal Housing Finance Regulatory Reform Act of 2008.[72] This legislation strengthens and modernizes the regulation of the government-sponsored housing enterprises—Fannie Mae and Freddie Mac (the enterprises) and the Federal Home Loan Banks (FHLBs or banks)—and expands the housing mission of these government sponsored enterprises (GSEs). In addition, it creates a new program at the Federal Housing Administration (FHA) that will help at least 400,000 families save their homes from foreclosure by providing for new FHA loans after lenders take deep discounts.

This government bailout originally involved purchase of the assets that are causing uncertainty and potential risk to the market. This was intended to boost the investors' confidence level by relieving the issuers of credit default swaps (CDSs) from having to make the payouts that would be required under the contracts. Those payouts would essentially have bankrupted those companies as well as many pension funds, retirement

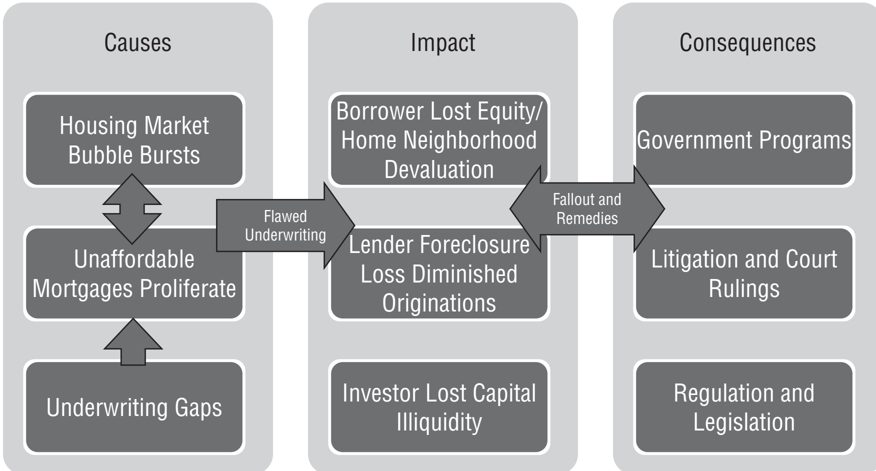

EXHIBIT 1.5 **CAUSES, IMPACT, CONSEQUENCES OF SUBPRIME CRISIS**

accounts, and individual investors in those markets. Part of the bailout may be targeted to the derivatives industry that is backed by the mortgage industry. The trillions of dollars of defaults caused by CDSs could have precipitated another economic disaster.

The Implications

While the drivers we just discussed (such as inadequate risk assessment, lack of transparency, and greed) were motivating forces in the crisis, we assert that the situation could have been better managed and controlled by means of a more comprehensive and integrated underwriting system. Such a system would not only strengthen the initial loan origination process, but it would also persist through the entire life cycle of the loans, regardless of whether they remain on the balance sheet, are sold to a secondary market maker, such as Fannie Mae, or are placed in a pool of mortgages for sale to investors in one form of security or another.

Exhibit 1.5 frames the major elements of the financial crisis. By considering these elements, and their interrelationships, we can trace back to the gaps in mortgage underwriting systems.

Loan origination is the event during which a host of business, market, and borrower realities collide with (1) limiting assumptions, (2) incomplete data, (3) unverified data, (4) absence of context, (5) inference by proxy,

(6) inflexibility, (7) proprietary aspects, and (8) the balkanized nature of today's loan underwriting systems. We refer to the collision areas as *underwriting gaps*, and we explain their nature and provide examples in Chapter 3, whose focus is on the lender side. Suffice it to say that these gaps allowed loans to be approved with loan amounts, pricing, and payment terms that were inappropriate relative to the current and range of possible future financial conditions of both the borrower and the valuations of the property being financed. These gaps evaded detection, in part, because there was no integrated view of all of the resulting risks and combined exposures of the various elements in play. Put another way, a fragmented view failed to identify the magnitude and nature of exposures resulting from the underwriting gaps. As a result, mortgages that would ultimately prove to be unaffordable proliferated, and the majority of them were sold and then repackaged for sale to investors in the secondary market in the form of MBSs or CDOs. These resulting securities were rated favorably by the rating agencies.

In the meantime, the increased ability of borrowers to qualify as home purchasers helped bolster housing demand, which in turn caused housing prices to appreciate rapidly in many markets. Anticipating that demand would continue unabated, builders pushed ahead with even more new housing development projects. This boom in the housing sector proved not to be sustainable, and by the second quarter of 2006 the market began to cool down. At the same time borrowers who had adjustable rate mortgages began to see their payments increase and as a result the incidence of past due monthly mortgage payments began to climb. After a dozen and a half cuts in interest rates over the past two years, the cost of funds began to rise for borrowers and lenders alike. As home prices continued their fall, foreclosures began to mount. Neighborhoods began to see their values diminish as more homes were vacated after foreclosure. As these events unfolded, lenders had to reserve more for losses due to rising loan defaults, and mortgage-backed securities experienced significant downgrades by the rating agencies, which caused market participants to shun them. At the same time, lenders decided to pull subprime mortgage products, such as 2/28 and 3/27 hybrid ARMs, off the market. With the growing illiquidity in the housing sector, mortgage volume dropped off, and lenders were hampered in efforts to set aside sufficient capital. Borrowing between banks also became more restricted, and this became an issue especially for larger institutions that saw their daily net borrowed position increase (smaller institutions are generally net sellers of federal funds, but this varies based on balance sheet asset/liability composition and maturity structure). Investor and borrower class action lawsuits began to pile up, some state attorney generals took legal action, and federal regulators issued cease and desist orders and formal agreements with subprime lenders.

A chain reaction of these elements caused a downward spiral in investor and public confidence, and the equity markets reflected growing concern and loss of investor risk appetite. Bank stocks took a big hit, and the Dow Jones Industrial Average (DJIA) and Standard & Poor's (S&P) major indices rapidly declined and then experienced wide swings from day to day. In response to these severe developments, Congress passed the Economic Stabilization Act of 2008 to provide needed liquidity to keep banks functioning, to keep markets open, and to unfreeze the mega–credit crunch that had formed as many lenders drastically cut back their lending operations.

The point we are making is that this type of housing market bubble boom and burst, as well as the subsequent financial crisis, can be prevented provided the gaps in underwriting are properly addressed, so as to significantly narrow, or eliminate, them. The result will be a more safe, sound, transparent, and well-behaved mortgage loan value chain that will benefit borrowers, lenders, and investors alike, and prevent future financial disruptions. The $700 billion question is "How can this be accomplished?" The remaining chapters of the book provide the answer as we unveil our comprehensive credit assessment framework (CCAF). We show how this new lending system can benefit lenders, borrowers, and investors, and offer effective crisis intervention and prevention. Exhibit 1.6 shows how this can be accomplished.

In Exhibit 1.6, each box corresponds to a chapter in the book. In the next chapter, we introduce a comprehensive credit assessment framework. After describing its form, components, and capabilities, we show in Chapter 3 how it effectively closes the underwriting gaps. In Chapter 4 we describe how it benefits borrowers by improving loan affordability and performance. In Chapter 5 we explain how the CCAF can benefit investors by promoting greater financial transparency. Finally, in Chapter 6 we share insights on the use of CCAF not only to manage loan underwriting better, but also how to anticipate systemic problems better, and to continuously monitor loan concentrations, quality, and exceptions to ensure

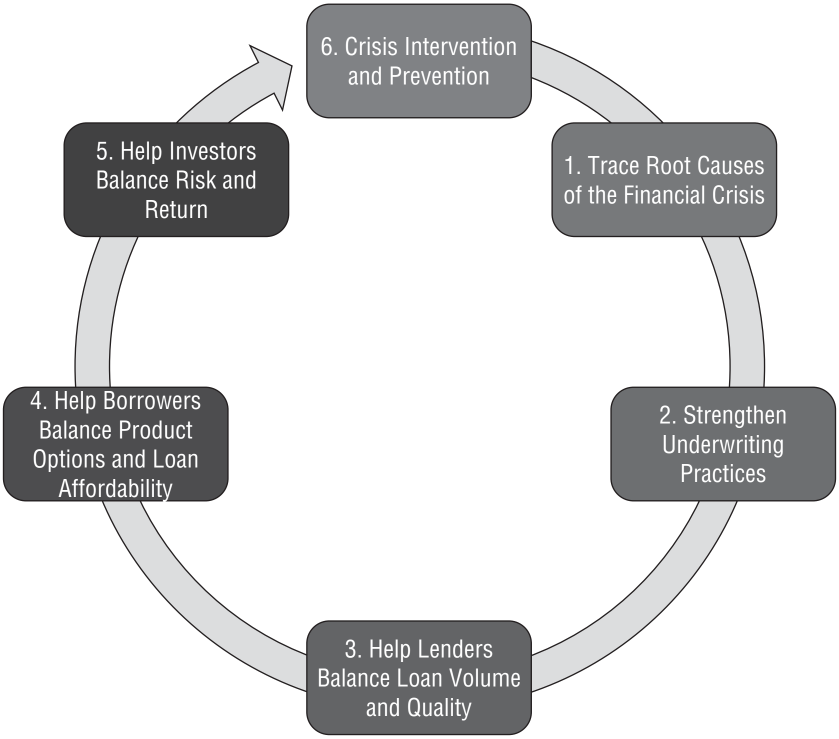

EXHIBIT 1.6 **ROAD MAP OF FOLLOWING CHAPTERS**

that we head off large-scale, system-wide problems such as we have recently witnessed.

Summary

There are many factors that can be attributed to the current financial crisis, and substantial research has been focused on the causes and lessons learned. In this chapter we have provided an overview of the current financial crisis and described the factors that contributed to the crisis from the perspectives of borrowers, lenders, and investors. We also discussed the impact, consequences, and implications of the crisis. We concluded that although many factors have contributed to the crisis, the root cause can be traced to severe flaws in the underwriting practices, which offered an incomplete credit risk assessment with lack of transparency and broken links among borrowers, lenders, and investors. Improving the current underwriting system requires a fundamental change in the loan underwriting framework that is accomplished through a new lending system.

CCAF enables lenders to improve their lending practices by effectively reducing and closing the underwriting gap. An improved lending system will better qualify borrowers for loans, and homes, they can afford, and as a result they will exhibit improvement in loan repayment performance and will experience less financial strain and worry about future unknowns. Investors will benefit not only from improved loan performance and cash flows, but also from the additional transparency, information, and more accurate ratings afforded by CCAF relative to both traditional and innovative mortgage-based investment securities. This will enable investors to perform a better initial investment assessment and also to track and measure structural changes in the risk profile of their investment, which is a leading indicator for its performance. With regard to intervention in the current crisis, and prevention of future crises, establishing an integrated loan performance monitoring and early warning system is the key. To that end, CCAF affords regulators with the information and necessary tools to enforce such a system and ensure lending safety and soundness. All those capabilities will transcend individual borrowers, lenders, and investors to encompass industry sectors, geographic regions, regulatory jurisdictions, and ultimately the credit side of the entire financial system.

NOTES

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2. David Leonhardt, "Economy Shrinks as Consumers Cut Back," *New York Times*, October 30, 2008.
3. Average U.S. home prices rose 13% in the year ending September 2004, and are up almost 50% over five years. This surpassed any growth in 25 years. See Armando Falcon, "OFHEO House Price Index: House Price Gains Continue to Accelerate," the Office of Federal Housing Enterprise Oversight (OFHEO), December 1, 2004.
4. Many crises that have occurred in developing countries were due to severe flaws in financial market structures, information technology, financial regulations, and technical competence. For a brief review of the past financial crisis, see Desjardins Economic Studies, "Financial Crisis: Neither the First Nor the Last—A Return on Historical Crisis of the Past 30 Years," *Economic Viewpoint,* October 3, 2008. See also Carmen M. Reinhart and Kenneth S. Rogoff, "Is the 2007 U.S. Sub-Prime Financial Crisis So Different? An International Historical Comparison," NBER Working Paper, February 5, 2008.

5. Each day from July through September 2008, more than 2,700 Americans lost their homes in foreclosures. See Alan Zibel, "5 Reasons for Housing Crash," *[Raleigh, NC] News & Observer*, October 27, 2008.
6. "Updated Projections of Subprime Foreclosures in the United States and Their Impact on Home Values and Communities," CRL Issue Brief, Center for Responsible Lending, September 23, 2008.
7. Ibid.
8. There were several important channels through which the crisis that began in the subprime market was passed on and became widespread panic. See Nathaniel Frank, Brenda Gonzalez-Hermosillo, and Heiko Hesse, "New Channels Spread U.S. Subprime Crisis To Other Markets," *IMF Survey Magazine*, September 23, 2008, www.imf.org/external/pubs/ft/survey/so/2008/RES092308A.htm.
9. "IMF Sees Heightened Risks to Global Financial Stability and Urges Comprehensive Action," IMF Press Release No. 08/235, October 7, 2008, www.imf.org/external/np/sec/pr/2008/pr08235.htm.
10. Yuliya Demyanyk and Otto Van Hemert, "Understanding the Subprime Mortgage Crisis," White Paper, Federal Reserve Bank of St. Louis and Stern School of Business, New York University, August 19, 2008.
11. On October 3, 2008, the U.S. stock market declined 22%, the worst week in its history.
12. Estimates range from 1 out of 12 to 1 out of 10 borrowers are late in making their payments as of late October 2008.
13. Various articles and research papers have discussed the causes of the crisis. See, for example, Financial Market Trends, "Financial Market Highlights—May 2008, The Recent Financial Market Turmoil, Contagion Risks and Policy Responses," OECD 2008, www.oecd.org/dataoecd/55/51/40850026.pdf; see Adam B. Ashcraft, and Til Schuermann, "Understanding the Securitization of Subprime Mortgage Credit," Federal Reserve Bank of New York Staff Report No. 318, March 2008.
14. Chairman Ben S. Bernanke, "The Future of Mortgage Finance in the United States," speech at the UC Berkeley/UCLA Symposium: The Mortgage Meltdown, the Economy, and Public Policy, Berkeley, California, October 31, 2008, http://www.federalreserve.gov/newsevents/speech/bernanke20081031a.htm.
15. Alan Zibel, "5 Reasons for housing crash," *[Raleigh, NC] News & Observer*, October 27, 2008.
16. Internal Revenue Service. 2007c, "Home Mortgage Interest Deduction," Publication 936, Cat. No. 10426G Internal Revenue Service. Fall 2007a, "Individual Income Tax Returns, 2005," Statistics of Income Bulletin.
17. See Barry Eichenggreen, "Ten questions about the subprime crisis," *Banque de France Financial Stability Review*, Special issue on liquidity, No. 11, February 2, 2008.
18. See Christopher Walen, "The Subprime Crisis—Cause, Effect and Consequences," Policy Brief, Networks Financial Institute at Indiana State University, March 2008.

19. The Community Reinvestment Act, a law passed in 1977 and implemented by Regulation BB, was intended to encourage depository institutions to help meet the credit needs of all segments of the communities in which they operate, including low- and moderate-income (LMI) neighborhoods, consistent with safe and sound banking practices.
20. Some blamed CRA by spreading the idea that the root cause of the crisis was that CRA forced banks into making imprudent loans to exceptionally risky borrowers. See Tim Westrich, "Setting the Record Straight: Blame Conservatives, Not CRA, for Subprime Mortgage Mess," Center for American Progress, September 30, 2008.
21. See Dean Foust and Aaron Pressman, "Credit Scores: Not-So-Magic Numbers," *BusinessWeek*, February 7, 2008.
22. Les Christie, "Homes: Big drop in speculation," CNNMoney.com, April 30 2007.
23. See David Greenlaw, Jan Hatzius, Anil K Kashyap, and Hyun Song Shin, "Leveraged Losses: Lessons from the Mortgage Market Meltdown," U.S. Monetary Policy Forum Report No. 2, 2008.
24. See Anil K. Kashyap, Raghuram G. Rajan, and Jeremey C. Stein, "Rethinking Capital Regulation," Working Paper, University of Chicago and NBER, September 2008.
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27. See L. Edward Glaeser and Joseph Gyourko, "The Impact of Zoning on Housing Affordability," Working Paper, Harvard Institute of Economic Research, March 2002.
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29. Jennifer Tescher, "Viewpoint: How to Shape the Next Version of CRA," *American Banker*, October 31, 2008.
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31. See Walen, "The Subprime Crisis."
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33. On October 22, 2008, executives of three rating agencies provided testimony in front of the Committee on Oversight and Government Reform, U.S. House of Representatives regarding rating agencies' role in the subprime crisis.

34. Martin Neil Baily, Douglas W. Elmendorf, and Robert E. Litan, "The Great Credit Squeeze: How It Happened, How to Prevent Another," Discussion Paper, Brookings Institution, May 21, 2008, pp. 61–62.
35. See Randall Dodd, "Subprime: Tentacles of a Crisis," *Finance and Development* 44, No. 4. (December 2007).
36. For a list of fraud activities and how they contributed to subprime mortgage defaults, see Diane Pendley, "Underwriting & Fraud Significant Drivers of Subprime Defaults," *Fitch Ratings*, November 13, 2007.
37. See Itzhak Ben-David, "Manipulation of Collateral Values by Borrowers and Intermediaries," University of Chicago Working Paper, February 2008.
38. Takafumi Sato, "Financial Innovation and Global Market Turmoil," FIA Asia Derivatives Conference, Tokyo, Japan, September 18, 2008.
39. Governor Frederic S. Mishkin, "Leveraged Losses: Lessons from the Mortgage Meltdown," speech at the U.S. Monetary Policy Forum, New York, New York, February 29, 2008, www.bis.org/review/r080306g.pdf. See also David Dodge, "Turbulence in credit markets—causes, effects, and lessons to be learned," remarks by David Dodge, Governor of Bank of Canada, to the Vancouver Board of Trade, Vancouver, September 25, 2007, www.bis.org/review/r070928c.pdf.
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53. Leslie Rahl, quoted in Steve Lohr, "In Modeling Risk, the Human Factor Was Left Out," *New York Times*, November 4, 2008.
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56. L. Havey Pitt, "Learning the Lessons of the Sub-Prime Crisis," Compliance Week, October 30, 2007.
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58. Approximately $2 trillion in ARMs will reset through the summer of 2012.
59. For a list of bank failures, see Akbar E. Torbat, "Global Financial Meltdown and the Demise of Neoliberalism," *Global Research*, October 13, 2008.
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62. Eric Dash, "PNC Gets National City in Latest Bank Acquisition," *New York Times*, October 24, 2008.
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64. Kevin Petrasic, "OTS Executes Supervisory Agreement with AIG FSB," Press Release OTS 07-041, June 8, 2007.
65. David Barr, "FDIC Issues Cease and Desist Order Against Fremont Investment & Loan, Brea, California, and its Parents," FDIC Press Release, March 7, 2007.
66. Findings of Fact and Conclusions of Law on Plaintiff's Motion for a Preliminary Injunction, *Commonwealth of Massachusetts* v. *Fremont Investment and Loan*, Superior Court Civil Action No. 07.4373-BLS 1, February 25, 2008.
67. Leo Jennings, "Attorney General Dann moves to shut down New Century Financial in Ohio," Press Release—Ohio Office of Attorney General, March 14, 2007.

68. Gretchen Morgenson, "Illinois to Sue Countrywide," *New York Times*, June 25, 2008.
69. James Temple, "State Attorney General Sues Countrywide," *San Francisco Chronicle*, June 26, 2008.
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71. See "Regulators Warn of Increased Fair Lending Scrutiny as Denials Rise," Inside Mortgage Finance Publications, Inc., November 12, 2007 sourced in "Underwriting in 2008," Transcript of Proceedings, Inside Mortgage Finance Audio Conference, November 15, 2007, 3:00–4:30 P.M. EST, pp. 60–62.
72. On October 3, 2008, President George W. Bush signed the amended version of the bill into law. In a news conference held at the White House on October 16, 2008, after weekend consultations with leaders of the 20 largest and fastest-growing economies in the world, President Bush said that keeping markets open for commerce and trade was key to restoring public confidence.