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Marketing and the global financial crisis of 2008: a theoretical analysis

Abstract

It is widely recognized that the global financial crisis (GFC) of 2008 began when subprime borrowers defaulted on loans made by sellers. Complex dependencies among various players in the mortgage industry further exacerbated this problem. For example, derivative products like mortgage backed securities were created from loan tranches of varying quality leading to erroneous ratings by credit agencies and inefficient signaling outcomes. This study looks at the 'marketing' side of the GFC. Given marketing's emphasis on the exchange paradigm, the basic premise of this paper is that buyer-seller interactions in the mortgage market can be gainfully studied using a 'marketing' lens. To achieve this objective, this paper develops a two-sided model of agency relationships in the mortgage industry and identifies fault lines that contributed to the GFC meltdown. The paper discusses several approaches for designing efficient markets and delineates implications for academics and practitioners.

Keywords: market failure, agency theory, signaling theory, information asymmetry, mortgage markets, market design, credit rating agencies.

JEL Classification: M31, N20.

Introduction

It is widely believed that the global financial crisis (GFC) of 2008 began when home buyers defaulted on subprime home loans issued by mortgage sellers such as banks and financial institutions. The mortgage contagion then spread like wildfire across the entire world economy with devastating and debilitating consequences. For example, since the GFC unfolded, investors helplessly watched almost \$3 trillion of their collective wealth evaporate in the US alone even as the global economy crawled to a virtual standstill. The unemployment rate in the US reached epic proportions (almost ten percent in March, 2010), while iconic and seemingly invincible institutions like Lehman Brothers and Merrill Lynch were obliterated. While discussions, analyses, and debates are ongoing, there is no doubt that the mortgage mess and its domino effects have shaken the core foundation and principles of the capitalistic model of economic organization. Not surprisingly, business leaders, policy makers, politicians, scholars, and the general population are searching for answers to myriad questions surrounding the current crisis.

Till date, the GFC has received saturation coverage in a variety of media outlets like newspapers, magazines, television programs, and internet blogs. These conversations have covered a plethora of issues such as origins of the subprime meltdown, the evolution and misuse of exotic financial products like mortgage backed securities (MBS), the role of credit rating agencies, failure of regulatory agencies, unrestricted

global capital flows, and lax oversight. Overall, these discussions converge on two broad themes. First, it is widely believed that the GFC meltdown was caused by opportunistic behavior of sellers (financial firms) and home buyers, and second, strict oversight and coordinated governmental regulation is the key to preventing such problems in the future. While useful, these conclusions are somewhat non-diagnostic and offer rather limited insights into our understanding of the mortgage crisis and its implications for advancing theory and practice. Not surprisingly, academic scholars (Bradlow, 2009; Reibstein, Day, and Wind, 2009) have called for a systematic, rigorous, and in-depth analysis of the causes and consequences of the financial crisis.

Marketing has a vested interest in studying certain aspects of the GFC because relationships between mortgage sellers and home buyers are typical of the exchange paradigm that defines the discipline. Our field boasts of a rich and growing body of literature on the structure, process, and outcomes of buyer-seller relationships. Of particular relevance to mortgage exchanges are studies anchored in agency and signaling theories (Bergen, Dutta, and Walker, 1992; Soberman, 2003; Sorescu et al., 2007; Mishra, Heide, and Cort, 1998; Kirmani and Rao, 2000) that examine how safeguards such as incentives and signals can be used to design efficient markets (Roth, 2007). Recall that the mortgage industry was crippled by market failure because environmental uncertainty, information asymmetry and product complexity created incentives for parties to behave opportunistically and unilaterally expropriate economic gains (Wathne and Heide, 2000). In sum, marketing theories of buyer-seller exchanges involving agency and signaling concepts appear to hold considerable promise for analyzing market failure.

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In view of the preceding discussions, the main objectives of this paper are: 1) to use marketing (agency and signaling) theory concepts and provide an analytical discussion of the salient causes and consequences of the GFC; 2) to suggest design mechanisms and safeguards that can minimize market failure; and 3) to delineate general implications for marketing practitioners and academics.

It may be noted that mortgage markets involve complex exchanges between multiple buyers (principals) and sellers (agents) who concurrently face risks of opportunism and information asymmetry. Hence, standard agency models which focus on dyadic buyer-seller relationships require adjustments to accommodate the expectations and behaviors of multiple entities. In this paper I draw upon relevant literature (Bhattacharya and Lafontaine, 1995; Gürtler and Kräkel, 2008) to extend the standard agency theoretic logic by studying how opportunism concerns manifest themselves as *two-sided problems*, e.g., *double-sided moral hazard* and *double-sided adverse selection* respectively. As I subsequently discuss, market design mechanisms for resolving two-sided problems involve fairly complex safeguards and additional considerations.

The remainder of this paper is organized as follows. Section 1 outlines the basics of agency and signaling theories and notes their relevance to buyer-seller exchanges in the mortgage market. Section 2 develops a conceptual model of double-sided moral hazard and double-sided adverse selection problems facing mortgage buyers and sellers. Section 3 describes the salient origins of the GFC by analyzing

the interplay between new product introductions, third-party certification signals, e.g., Moody's ratings, and double-sided agency problems. The concluding Section discusses several approaches for designing efficient markets and delineates implications for marketing academics and practitioners.

1. Agency and signaling problems in the mortgage industry

Buyer-seller exchanges usually involve information asymmetry, in the sense that one party possesses more relevant information and knowledge than the other (Mascarenhas et al., 2008; Rao and Mahi, 2003; Soberman, 2003; Shapiro, 2005; Sharma, 1997). For instance, mortgage sellers such as banks and financial institutions face considerable ambiguity in discovering hidden information about potential buyers (loan applicants).

Two potential information problems exist for the mortgage supplier. First, risky buyers may misrepresent themselves to sellers by making false claims (Eisenhardt, 1989). In Akerlof's (1970) terminology, a supplier's inability to ascertain customers' intrinsic characteristics is termed an *adverse selection* problem. Second, a *moral hazard* problem may also arise for mortgage suppliers since customers might knowingly default on payments after a mortgage loan is approved. If unresolved, adverse selection and moral hazard can lead to market failure or the classic lemons problem (Akerlof, 1970) in the mortgage industry¹. A figure depicting these agency problems is shown in Figure 1.

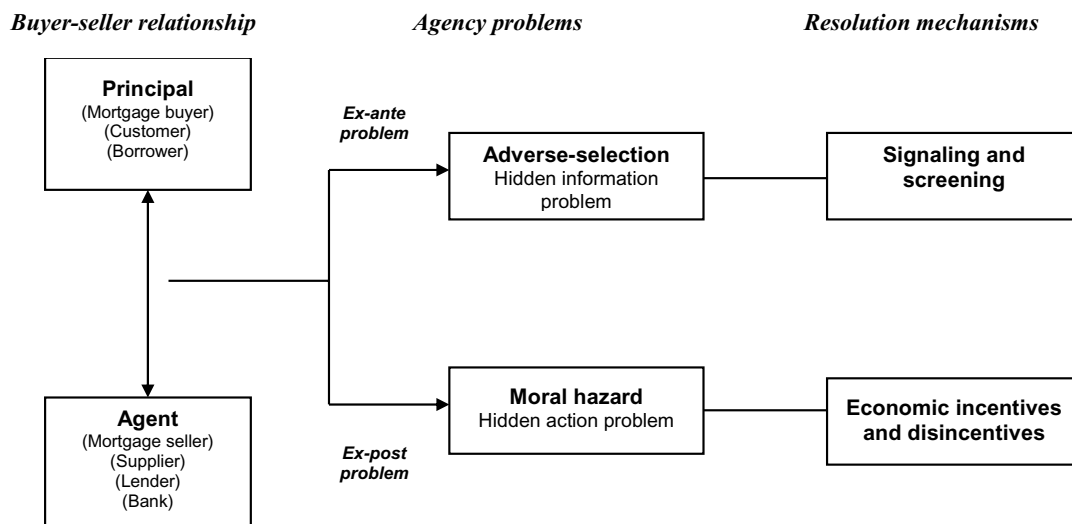


Fig. 1. Agency issues in the mortgage industry

¹ Common agency problems have been labeled in a number of different ways (Bergen, Dutta, and Walker, 1992). Adverse selection has also been referred to as the ex-ante or the hidden information problem whereas moral hazard is also associated with the hidden action and ex post monikers. I choose the labels of adverse selection and moral hazard to be consistent with the existent vernacular (Mishra et al., 1998; Rao and Mahi, 2003).

Agency theory prescribes general mechanisms for the resolution of moral hazard and adverse selection. The traditional approach holds that one party designs mechanisms and incentives to prevent opportunistic behavior by the other. For example, mortgage suppliers can reduce the risk of moral hazard (loan default) by requiring customers to make up-front deposits and buy private mortgage insurance (PMI) coverage. Stated differently, borrowers face strong economic disincentives for willingly defaulting on loans.

Adverse selection problems can be minimized if mortgage suppliers can screen buyers on certain criteria. Often, this process involves interpreting signals that buyers transmit to the marketplace. For example, in mortgage markets, customers with high Fair Issac Corporation (FICO) credit rating scores signal that they have expended significant effort over time for acquiring a desirable credit profile. It therefore makes little sense for such a customer to willingly default on payments and lose a valuable reputational asset.

Signaling theory, a close cousin of the agency literature, identifies a set of signals and their usefulness under varying circumstances. For signals to be maximally effective, they should unambiguously communicate a party's intention not to take advantage of the other. Senders achieve this goal by communicating that they will incur significant penalties for opportunistic and self-interested behavior. In this sense, signals are self-enforcing (Ippolito, 1990) because the signaling entity will not knowingly undertake activities that lessen its reputational capital.

Signals differ primarily in the timing of the potential economic loss incurred by the sender. For example, *default contingent* signals are effective because a cost is imposed on the sender *ex-post* or after default¹. Warranties are an example of such signals since firms incur repair/replacement costs after a quality claim is not met. In contrast, *default independent* signals involve *ex-ante* investments because costs have already been incurred up-front as in case of brand names and reputation (Klein and Leffler, 1981). As has been noted earlier, one example of a default independent signal is the FICO credit score used to gauge a person's creditworthiness. Typically, good ratings require

consistent non-opportunistic behavior by a borrower over a long-period of time.

Considered as a whole, agency and signaling theories offer an analytical approach to fix market failure by designing markets with appropriate safeguards and mechanisms.

2. Two-sided agency problems

Agency theory, in its original formulation (Fama, 1980; Jensen and Meckling, 1976) implicitly considers one-party's perspective in designing safeguards to curb opportunism in a principal-agent relationship. In the mortgage example discussed earlier, the principal is variously labeled as the buyer, the customer, and the borrower, while the agent is referred to as the supplier, the seller, or the lender. While we have assumed that the agent has to cope with adverse selection and moral hazard, the principal faces identical challenges because agents can also engage in opportunism. For instance, it is widely believed that agents precipitated the crisis by selling loans that had fine print clauses which made monthly payments unaffordable for most sub-prime buyers. Hence, in the mortgage industry, opportunistic behavior such as moral hazard and adverse selection can simultaneously arise from both sides of the principal-agent dyad. These problems are characterized as double or two-sided agency problems.

While economists have recognized the existence of two-sided agency problems for some time, application of this extended framework to marketing is virtually non-existent. Notice that market design for two-sided agency problems is not a simple linear summation of safeguards for either side. Absent a detailed consideration of interdependencies and governance considerations, such simple design specifications may be inadequate. In view of the preceding discussion, this Section describes two-sided problems and their application to the mortgage industry. Next, it reviews various market design mechanisms that have been used in these two-sided markets over the years. The basic idea behind two-sided agency problems is depicted in Figure 2. Note that while borrowers experience significant uncertainty in real estate transactions (Levitt and Syverson, 2008) such as locating real estate agents, searching for and assessing the quality of homes, inspection fees and taxes, etc., the focus of this study is on the exchange between the borrower and the lender.

¹ I invoke a basic signal categorization scheme to illustrate the general application of signaling concepts in the mortgage industry. However, additional categorization schemes are also available. For instance, signals may be further classified into revenue or cost risking, sales dependent or sales independent, etc. A more detailed description of signals and an associated typology is available in Kirmani and Rao (2000).

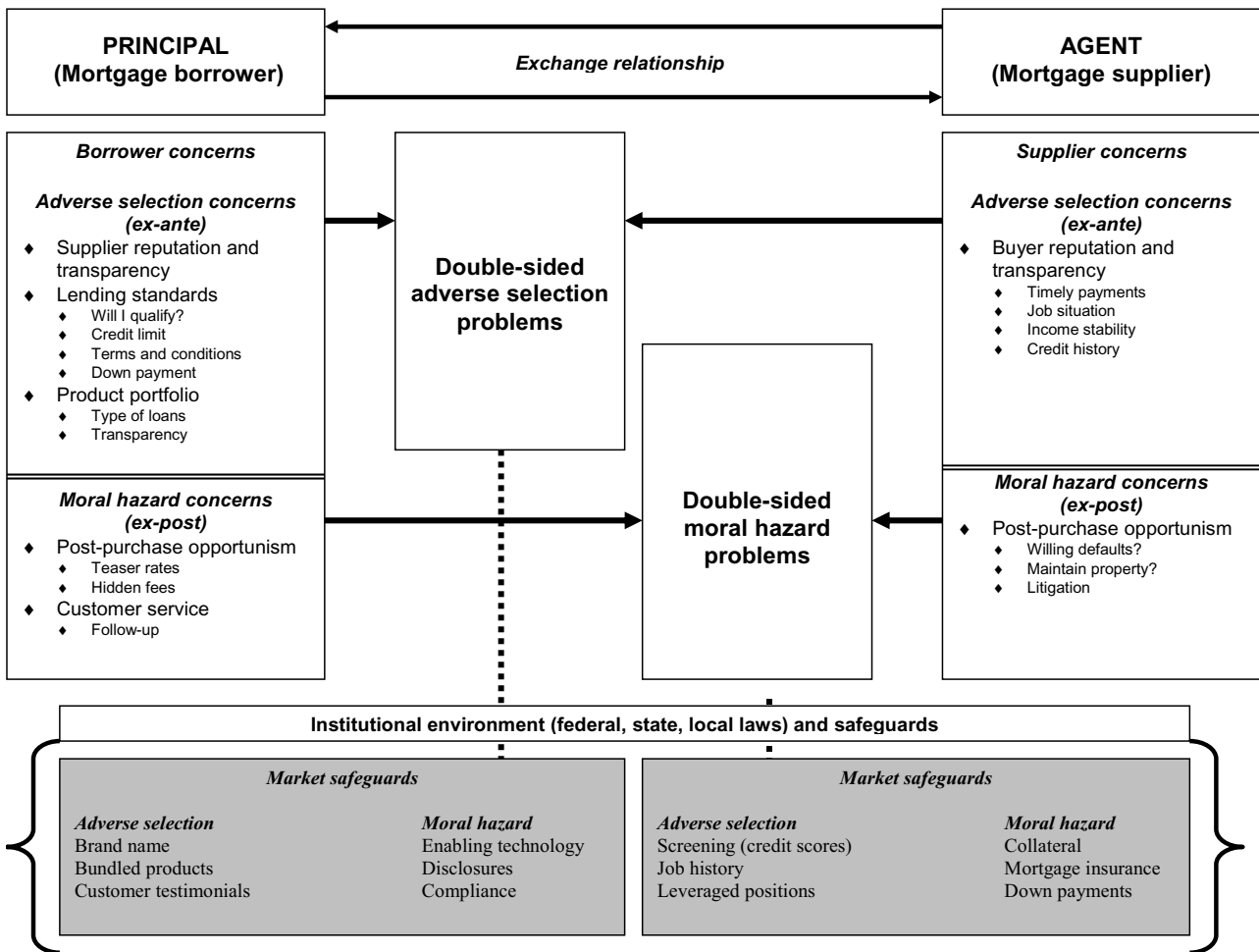


Fig. 2. Double-sided agency problems in the mortgage industry

The basic exchange relationship depicted in Figure 2 involves two sides: 1) the mortgage buyer or the principal as per agency theory parlance; and 2) the mortgage seller or the agent who is typically a lending institution like a bank, credit union or mortgage broker. Each party faces adverse selection (ex-ante) and moral hazard (ex-post) concerns. These double-sided problems are then resolved via market safeguards of various kinds. In addition, the institutional environment comprising a welter of laws and regulations at different levels further impacts mortgage exchanges.

First, consider adverse selection and moral hazard concerns from the mortgage borrower’s perspective. The borrower’s main adverse selection concern revolves around reputation of the mortgage company. Given a mix of lenders, borrowers worry that non-brand name firms might behave opportunistically. More specifically, borrowers realize that lenders have the discretion to influence borrower pre-qualification, the amount of loan sanctioned, interest rates, the amount of down payment required on a home, closing costs, etc. In addition, there is no

standard loan package in the sense that lenders have considerable product information advantage and discretion to approve a loan package containing a mix of interest rates, repayment duration, credit limits, etc. Consequently, supplier opportunism becomes a real possibility. While comparison shopping may mitigate opportunism, this process is quite stressful for the average borrower to undertake (Levitt and Syverson, 2008). Hence, buyers use supplier signals to minimize adverse selection concerns.

Brand names (Kirmani and Rao, 2000; Rao, Qu, and Ruekert, 1999), and umbrella branding (Wernerfelt, 1988) where lenders offer several financial products under one brand, are important supplier signals that allay customers’ adverse selection concerns. For example, JP Morgan Chase offers several banking products under its eponymous umbrella brand, which sends a quality signal to potential borrowers. Likewise, firms that bundle several products together lower information asymmetry and stand to gain from increased customer patronage. For example, Virgin’s Royal Bank of Scotland, Charles

Schwab, and others offer customers bundled accounts where they can seamlessly navigate between mortgage, checking, savings, credit cards, fixed deposits, and investment accounts. Customers who are already satisfied with one product in the bundle are more likely to transfer this affect to related product lines like mortgages. Hence, bundled products are also effective quality signals. Finally, many banks use customer testimonials in their advertisements to buttress quality claims.

A related customer concern involves ex-post or moral hazard considerations. Typically, customers are most concerned about initial teaser rates giving way to steep borrowing costs in the future, hidden fees that are not fully disclosed at closing, and lack of customer service quality ex-post.

Sellers appear to use several quality assurance strategies to address moral hazard issues. First, given the Internet, firms have successfully instituted self-service technologies whereby full information disclosure and 24/7 account access is possible (Meuter et al., 2005). Having timely and relevant information alerts borrowers to potential opportunistic behavior. For instance, if a 'hidden' fee is discovered by the customer as soon as it shows up in the transaction history, this customer is more likely to be proactive. Second, sellers also consciously signal that they are in full compliance with laws enacted by the institutional environment. For example, in certain states, pre-payment penalties for mortgage loans are considered illegal.

Similar to the agency challenges faced by borrowers, mortgage suppliers, or lenders also have to guard against choosing the wrong type of customer to transact with. The main adverse selection concern entails discovering hidden information about a potential borrower. Suppliers worry about whether potential customers will make mortgage payments in a timely manner over the term of the loan. As such, it becomes important for the seller to screen this customer on several dimensions such as credit scores, job history, and how he has dealt with other major loans in the past. As I discuss in a later Section, one innovation in recent years has been the summary credit rating score compiled by firms such as the Fair Issac Corporation. This firm's product known as the FICO score is the most widely used summary credit rating score that lenders use to screen borrowers. While the FICO score is a widely used signal to minimize sellers' adverse selection concerns, as I discuss later, it is as best a partial safeguard against buyer opportunism.

Sellers also face potential moral hazard problems, with the risk of borrowers' loan default being the

most salient. The general means of reducing moral hazard is for lenders to hold title to the property and use it as collateral. However, homes represent illiquid assets and sellers may not be able to convert them into cash immediately. Furthermore, when buyers are faced with imminent foreclosure action, they may no longer maintain homes in a saleable condition. While these moral hazard concerns may remain insurmountable, lenders address the problem in a limited way by requiring borrowers to make significant down payments and buy private mortgage insurance which protects the seller.

In summary, safeguards on both sides of the market create balanced conditions that enable flow of capital between exchange partners and create home ownership. The next Section explores how this stable equilibrium was punctured, creating fault lines that contributed to the crisis.

3. Origins of the global financial crisis

Owning a home is the quintessence of the American dream. As such, a supportive institutional environment has emerged which facilitates exchange of capital between borrowers and lenders, culminating in home ownership. For example, with the exception of few countries like the US, most developed countries do not allow citizens to deduct mortgage servicing costs from their individual income taxes. To this day, the double-sided exchange model described earlier provides the foundation for the basic exchange process in mortgage markets.

Recall that lenders typically held collateral in the shape of an illiquid asset, e.g., the home. This created a major problem for banks because home loans were usually made by them at fixed rates of interest for long periods of time (30 years) and held to maturity. In the meantime, if interest rates in the environment rose, banks found it difficult to offset losses on deposits from the lower interest home mortgage loans. This basic imbalance led to widespread failure of banks and the so called Savings and Loan (S&L) crisis of the 80's.

One way to get around the illiquid assets is to securitize a mortgage (convert it to a bond) so that it can be readily traded in the market. Essentially, a borrower makes a promise to the lender to repay a loan at a certain rate of interest for a fixed time. To facilitate securitization of mortgages, the Federal government established two enterprises: Fannie Mae and Freddie Mac. These firms are also known as government-sponsored enterprises (GSE's). Eventually both these GSEs became privately owned publicly traded companies. GSEs set strict standards in the securitization process by buying loans which had less chance of default. In turn, GSEs held title to

homes, bundled loans purchased from several banks, and sold them by guaranteeing principal and interest payments to the bond holder. Notice here that since the GSEs guaranteed principal and interest repayment, they screened purchased loans in a stringent manner by requiring the loan-to-value (LTV) ratio to be below 80%. Using a lower LTV ensured that they secured sufficient collateral to protect their investment. In sum, mortgage backed security bonds being traded in the market were of good quality with interest rates and principal guaranteed by the GSEs. In terms of the agency model discussed in Figure 2, GSEs did a good job of controlling adverse selection by proper screening of loans and often employing additional criteria beyond just FICO scores to evaluate quality. For example, GSEs typically insisted upon additional information regarding income, employment history, and leveraged positions of borrowers. Moral hazard was also addressed because of the relatively low LTV ratio of 80%.

In the 1990s, a class of mortgage loans was originated by banks which started lending to customers with sub-par credit histories. These subprime loans charged a higher rate of interest, but provided customers with an opportunity to buy homes and own a part of the American dream. The political environment also encouraged subprime loans given past stringent standards of GSEs that effectively shut out many low income people with poor credit histories. In effect, the subprime innovation was hailed by politicians as the best vehicle for creating home ownership for disadvantaged customers and ushering in economic development. Originators who made subprime loans did not hold on to them till maturity. In fact, 'flipping' loans became commonplace. On the other hand, these loans followed exactly the same strategy employed by the GSEs in respect of securitization.

Notice that subprime loans involve pools of high risk individuals who were screened primarily on their FICO scores. More often than not, intermediaries created esoteric combinations of high, low, and medium risk pools called tranches which were securitized and sold as bonds to the market. Given that these bonds were mixtures of different risk pools, it became important to: 1) determine the overall quality of the combined security; and 2) communicate this quality to the potential buyers. Recall that since GSEs employed rather stringent screening standards, most mortgage backed securities in circulation were of uniform quality with low risk of default.

Private intermediaries who created loan concoctions sold them by first obtaining a rating or signal of quality from one of the three major credit rating

agencies, i.e. Standard and Poor's (S&P), Moody's, and Fitch. These firms were well known for their past experience in ranking debt instruments and financial products for investment banks. Often, these firms employed simple letter ratings to denote the quality of loans. For example, Moody's Aaa rating for a bond means that obligations are judged to be of the highest quality, with minimal risk. In contrast, the C rating implies a class of bonds which are typically in default with little prospect for recovery of principal or interest. Simply put, ratings are a type of signal that agents use to solve the adverse selection problem for potential buyers.

Given net foreign cash inflows into the US economy, demand for mortgage backed security products skyrocketed. As more and more people qualified for subprime loans, property prices shot up, and buyers often took out additional home equity loans given appreciated home values. However, in the end, despite booming economic times, the underlying product being exchanged was a bond that did not meet the basic criteria of addressing moral hazard and adverse selection concerns. As I subsequently discuss, the complexity of pooled securities made it difficult for rating agencies to put a quality signal on them and solve the adverse selection problem. Hence, many bonds were erroneously ranked as high quality ones. Second, and more importantly, the entire subprime philosophy was based on avoiding moral hazard by knowingly lending money to people without an ability to repay loans in a timely manner. Specifically, the FICO score used to qualify subprime borrowers was a poor surrogate for predicting the future. In addition to its other deficiencies, the FICO score did not consider income and current employment status. Hence, using this score in isolation made the moral hazard problem worse.

Given that subprime loans and their derivative bonds or mortgage backed securities were so widespread, it is only natural to expect that a small proportion of people falling behind on payments would affect the entire economy and create a domino effect. As mortgage debt soared to unsustainable levels, the subprime market eventually collapsed, bringing down the entire world economy.

Conclusion and market design considerations

The purpose of this paper has been to appraise the salient marketing aspects of the mortgage crisis. To this end, I undertook a systematic discussion of the major forces that shaped the crisis, conducted an analysis using agency and signaling theory concepts, and delineated the major fault lines of the economic meltdown. The general conclusion of this study is that marketing theory, rooted in the funda-

mentals of exchange relationships contains a welter of concepts for conducting a diagnostic and detailed study of past practices in the mortgage industry. For example, attention to basic signaling design guidelines could have prevented agencies from playing such a conspicuous role in mortgage securitization and creating a largely fictional, inefficient, and unsustainable secondary market. In the following paragraphs I outline a few important elements of market design that academics, practitioners, and policy makers should pay more attention to.

Market design for addressing adverse selection issues

Securities rating signals. Simply put, the three major agencies (Moody's, Standard and Poors, Fitch) did not understand how complex mortgage backed securities should be rated. It often takes a long time and expertise for a firm to fully gauge how esoteric derivative financial products like mortgage backed securities and credit default swaps work. Given this incomplete understanding, simple 'letter grade' bond ratings provided by agencies ended up being faulty, misleading, and inaccurate signals of quality. Recall from marketing theory (Kirmani and Rao, 2000; Mishra, Heide, and Cort, 1998) that for a signal to be maximally effective, it should unambiguously communicate an economic loss to the receiver in the event of non-performance. For example, warranties signal that issuing firms shall incur an economic loss in case of product failure. A rating or certification signal issued by the three agencies failed this simple test. In other words, *signal vulnerability* was compromised because if a bad quality bond was mistakenly rated as a stellar performer, no economic loss could be imposed on the rating agency which was compensated by the issuer based upon the amount of bonds sold in the market. While one might argue that inconsistent ratings, over time, can dent the reputation of agencies, there are two arguments against this possibility. First, rating agencies certify a slew of financial products and have some cushion to offset the impact of negative events given accumulated reputation. Second, mortgage securities being relatively new products, negative effects are less likely to spill over to the corporate brand since firms can always use the 'honest mistake' argument to justify ratings failure.

An important signal design consideration involves organizational issues such as staffing and selection of experts who eventually provide inputs into the rating process. Given the relative newness of the product and the shortage of talent, most rating firms did not assign enough qualified personnel to their mortgage security ratings department (Chan, 2010). In addition, overreliance on historical models of risk

was out of place given the paucity of data for such new products. Hence, one important signal design element is to appraise organizational structure issues and ask who monitors the monitors (Shapiro, 2005). For example, when faulty signaling possibilities emerge, buyers can conduct more due diligence by drilling down to the organizational structure level and uncovering information about the quality of personnel involved in the rating task. Uncovering this information is similar to data disclosed by mutual fund companies about qualifications, experience, and job tenure of fund managers.

In addition to designing product signals, a second consideration involves assessing the reputation of ratings firms. In this vein, contest ratings (Graffin and Ward, 2010; Wade et al., 2006) can provide additional diagnostic information to the marketplace. Examples include Business Week rankings of schools, and Consumer Reports' comparison of the relative performance of different brands. To begin with, there appears to be potential for designing signals that rate firms on the basis of past performance across different financial product lines. However, the rather lumpy nature of the ratings industry with just three dominant players makes the design challenge fairly complex. In other words, with a limited set of firms, what should be the metric for separation and comparison? A simple rank order may have to be supplemented with composite scores which evaluate firms' ratings on multiple dimensions.

FICO rating signals. It is generally agreed that the mortgage crisis owes its origin to borrowers purchasing homes they could not afford. Mortgage providers screened buyers by relying on their credit history. The United States and most developed countries have systems to capture, store, and organize data on the credit utilization patterns of individual customers. While specifics differ, several bits of information are collapsed into a summary score that determines the creditworthiness of an individual. In the US, the FICO score is the most popular summary rating signal used by mortgage sellers to screen buyers. While useful, the FICO signal has several inherent limitations that call for a radical redesign of the instrument (Foust and Pressman, 2008). First, the score is based on past credit utilization which limits predictability of future behavior. Second, since the score does not consider income levels of borrowers, predicting default rates is inherently tricky. Third, customers often 'game' their scores using several methods. For example, a customer with a bad credit history might become an 'authorized' user on another person's account and can improve his score over time. Likewise, a customer might simply continue disputing past delin-

quencies and negative events, often by hiring third parties that specialize in improving credit scores. In sum, the FICO score, although widely used as a screening signal, needs extensive redesign.

Since scores like FICO and other summary ratings are rather imperfect signals, it behooves upon suppliers to design and consider a set of multiple signals for screening buyers. Screening on the basis of multiple criteria such as income, past pattern of employment, net household income etc., provides a better basis for uncovering the true quality of a borrower and makes defaults less likely.

Social embeddedness signals. The notion that economic exchanges are embedded in a web of social relations was first articulated by Granovetter (1985). In marketing, several discussions of the embeddedness concept are available (Grayson, 2007; Heide and Wathne, 2006; Vishwanathan et al., 2010; Wathne, Biong, and Heide, 2001). In brief, embeddedness theory holds that under certain conditions, social norms may serve as stronger safeguards of non-opportunistic behavior than economic mechanisms like collaterals, deposits, and financial penalties. Since individuals live in a web of social relationships, they run the risk of losing face and reputation within their social structure if they default on loans. In fact, the entire micro-financing and bottom of the pyramid (BOP) industries (Prahalad, 2005) are structured around the primacy of social embeddedness in economic exchanges. That's why, in such subsistence markets, borrowers repay loans on time to lenders in a timely manner, even when conventional safeguards like collateral is not present (Viswanathan et al., 2010).

It is important for marketers to consider how social control mechanisms like trust, norms, etc., can be gainfully used to design, interpret, and use signals. Intuitively, there is some basis for judging the effectiveness of social controls even in the current mortgage crisis. For example, as a group, the credit union industry experienced the least number of home mortgage delinquencies. One could argue that credit unions, which typically restrict membership to certain social groups, were better positioned to understand the true creditworthiness of their customers and used more judicious lending standards. Proximity to the customer's place of residence and work gave credit unions an additional dimension of social control, e.g., familiarity, which they gainfully used as a screening signal. The idea of social control is very similar to the notion of offsetting investments discussed by Heide and John (1988) who studied how insurance agents use social mechanisms such as personal friendships to structure relationships

with end customers. Future studies should consider potential extensions of social control and embeddedness signals in the mortgage industry. Notice however, that there is an emerging body of literature outside marketing (Uzzi, 1997) which makes the opposite argument regarding effectiveness of social control mechanisms. For example, over-embedded relationships may contain a dark side and create negative outcomes. The design challenge for marketers is to tread the middle ground and bridge the gap between these over and under-socialized perspectives.

Market design for addressing moral hazard issues

Compensation of rating agencies. For a long time, agencies were compensated only when they were selected to rate a mortgage backed security, and the level of compensation was a function of the dollar amount of security sold in the market by the investment bank. Furthermore, there was competition among rating agencies for the bank's business. As such, agencies had every incentive to compromise their standards and provide favorable ratings to gain market share. Such opportunistic behavior could have been minimized had agencies been compensated on the basis of a flat fee as opposed to commissions¹.

Recall that the marketing field has studied several aspects relating to optimal agency and salesforce compensation mechanisms (Bergen et al., 1992). Briefly, this literature holds that agents' opportunistic tendencies can be curbed by using behavior based (salary) as opposed to outcome (commission) based compensation systems. Several extensions of this basic compensation model involving combinations of salary and commission (hybrid modes) have also been studied. From a market design standpoint it may be useful to draw upon findings in the salesforce and agency compensation literature.

Collateral quality. Historically, a buyer's home has been the primary collateral against which sellers have lent money. However, as the current crisis evolved it became apparent that this collateral was a rather inefficient safeguard. First, given their illiquid nature, banks could not instantaneously foreclose upon homes and convert them to cash. Second, the foreclosure process itself was long and drawn out involving several legal hurdles. Finally, many borrowers committed moral hazard by knowingly damaging foreclosed homes so that they could not be

¹ Subsequent to the crisis, several reform measures have been implemented in this industry. For example, in 2009 the rating agencies reached agreement with the State of New York about a fee-based compensation structure.

resold immediately by banks. All these imperfections call for greater attention to how homes are valued and the nature of collateral assets used by lenders to fund home purchases. While a complete understanding of different aspects of collateral valuation is beyond the scope of marketing, efforts should be undertaken to use other types of collateral, e.g., the notion of social control mechanisms mentioned earlier to supplement conventional approaches (Whitehouse, 2009).

Temporal aspects. As noted earlier, one significant moral hazard issue was economic agents' proclivity to 'flip' assets with virtually no lead time between acquisition and disposal. The phenomenon of flipping unfolded at several levels in the mortgage industry involving home buyers, mortgage backed security buyers and sellers, investment banks, and other financial institutions. Given a virtually non-existent waiting period, flipping led to rampant moral hazard and widespread speculation in property prices which ultimately spiraled to unsustainable levels.

One way to tackle rampant speculation is to impose minimum waiting periods that curb opportunistic behavior. In marketing and agency models, many exchange situations involve 'waiting periods' for customers. For example, before joining a health insurance pool, customers are often required to wait for a specified period of time so that any hidden medical conditions can be revealed. Such waiting time models can be gainfully used to study moral hazard design elements in more detail.

In summary, researchers would do well to focus on the study of market design mechanisms in the mort-

gage industry. Such an emphasis would provide diagnostic information regarding the efficacy of various safeguards in markets characterized by information asymmetry among parties. It is somewhat ironic that the marketing discipline's approach to the current crisis has been to conduct more studies on the impact of marketing actions on stock prices. For instance, a recent issue of *the Journal of Marketing* (November, 2009) was devoted to studying how several marketing events such as product recalls, etc. affected the stock market. While such studies are useful, it is imperative to pause and ask a basic question: *Given how much inefficiency was built into stock prices, their subsequent meltdown, and informational asymmetries among exchange partners, is it worthwhile to persist with the stock market as a viable dependent variable?* This paper adopts a different stance and suggests that marketers should complement stock price based methods with other approaches.

Instead of adding to the plethora of studies on the effect of a certain event on stock prices, it is important for marketers to focus on the event itself and develop a deeper understanding of structural mechanisms, their interrelationships, and outcomes. For example, the gamut of issues leading to the mortgage meltdown can be best studied by a focus on fundamental industry factors, multiple exchange partners and their motivations, the institutional environment, and the complex web of social and economic interactions across different parties and levels in the industry.

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