

# **Knowledge and Liquidity: Institutional and Cognitive Foundations of the SubPrime Crisis**

By Bruce G. Carruthers  
Department of Sociology  
Northwestern University  
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Abstract: This paper examines the central role played by credit rating agencies in the production of "knowledge" about financial instruments. That "knowledge," in the form of credit ratings, underpinned disintermediation in mortgage markets by giving investors confidence that they knew the risk-and-return properties of otherwise opaque collateralized debt obligations and mortgage-backed securities. Credit ratings helped to "standardize" structured financial products and create liquid markets. However, this cognitive machinery failed and liquidity collapsed during the current crisis. We use this failure to examine the role of institutionalized cognition in the production of market liquidity.

This is a very rough first draft, so please do not quote. Comments are most welcome and should be sent to [b-carruthers@northwestern.edu](mailto:b-carruthers@northwestern.edu).

Many factors have been blamed for the current financial crisis including, just to name a few, financial deregulation, financial innovation, a real estate bubble, disintermediation of financial markets, too much leverage, the perversions of CEO compensation, securitization, declining mortgage underwriting standards, and old-fashioned greed. Whatever the causes, one deeply problematic aspect of the crisis concerned the disappearance of liquidity: people stopped buying financial instruments; banks stopped lending (even to each other); organizations ceased to extend credit. When liquidity vanished in the fall of 2008, policymakers thought they faced utter economic catastrophe and so the conservative Republicans then in the White House undertook dramatic interventions that violated many of their laissez-faire tenets and which made headlines.

Here, I will focus on one piece of the overall process. But I think it is a central piece, because it relates to the fact that financial markets are driven by information, and therefore also by its absence. As many economists have argued (e.g., Stiglitz 2000), financial markets involve serious asymmetries of information. Borrowers know much better than lenders about their true willingness and ability to repay a loan. Lenders are eager to acquire such information, but it isn't as simple as having borrowers communicate directly with lenders about their true willingness and ability. The obvious problem is that since borrowers have an incentive to mislead lenders in order to look creditworthy, lenders tend to discount borrowers' claims (even when they are true).

Sociologists and historians have long appreciated that social networks are an important vehicle for the transmission of information between borrowers and lenders. Naomi Lamoreaux's study (1994) of New England banking in the early 19<sup>th</sup>-century

showed that lending flowed largely through the pre-existing social networks that linked bank directors to borrowers. Debts that were strongly embedded in relationships were not very liquid because, in a sense, it was not possible to buy or sell the relationship.

The role of social networks is not a mere legacy of the pre-modern world because networks remain important into the present, despite enormous economic change, for particular kinds of lending activity. Uzzi (1999), Uzzi and Lancaster (2003), and Berger and Udell (1995) demonstrate the importance of relationships between contemporary banks and their small and medium-sized business customers. Long-term, multiplex relationships between lenders and borrowers make it easy for the former to acquire reliable, timely, and finely-textured information about the latter. Again, however, such relationships are relatively illiquid.

Outside of the context of durable social relationships, matters are quite different. Information about borrowers is often scarce and unreliable. This is, however, where the credit rating agencies have played an important role. For the past century, investors and lenders have been able to look to private, for-profit rating agencies like Moody's, and later on Standard & Poor's, to provide information about the creditworthiness of debtors. Based on such information, an investor can decide whether or not to purchase an issuer's bonds and at what price. Such debt doesn't necessarily sit as an asset on a balance sheet until it is extinguished. Rather, it can be bought and sold like any other commodity. Their liquidity, i.e., the ease with which they can be bought and sold, depends critically on the belief of buyers and sellers that they know what the bonds are worth. In short, liquidity depended on knowledge (Carruthers and Stinchcombe 1999).

The scope and significance of these ratings grew over the 20<sup>th</sup>-century as rating agency coverage expanded from railway bonds to corporate bonds, sovereign debt (both foreign and domestic), and the debts of state and local governments. Initially, credit rating agencies generated revenue from the users of ratings (investors who subscribed to their service), but in the 1970s the agencies started to charge issuers (the firms who sought a rating for their bonds). Most recently the agencies have been rating structured financial products like collateralized debt obligations (CDOs) and asset backed securities (ABSs), and indeed they have enjoyed considerable growth by participating in these new financial commodities (Coffee 2006: 296). Increasingly exotic and complex instruments have been brought into the ratings system. Ratings grew in importance not only because more objects were rated and growing numbers of investors relied on the ratings, but also because governments and private parties came to use them in their regulations and contracts. For instance, prudential regulations for insurance companies and pension funds often use the ratings to define the “risky investments” that are prohibited, or to set levels of capital adequacy for banks. Ratings are used pervasively as “triggers” in private contracts (so that, for example, when a firm’s rating is downgraded, the firm has to post more collateral or accelerate repayment of its loans), and U.S. courts have protected fiduciaries from being legally liable to their beneficiaries when investments go awry if those fiduciaries purchased investment-grade securities (Coffee 2006: 293).

The significance of ratings has been boosted even more by financial disintermediation (Davis 2009: 112-116), and the corresponding shift from relationship banking to the “originate and distribute” model. Traditionally, commercial banks made loans and then kept those loans in their own portfolios. Through the negotiation,

extension and repayment of a loan, banks developed long-term relationships with their customers, and earned profits from the spread between interest received from performing loans and interest paid out on bank deposits. Now, banks are eager to get loans off their balance sheets, and so they “originate” loans, securitize them, and then sell the resulting securities to investors (who care deeply about the rating given the security they purchase). The banks receive the money they loaned to the borrower back from the investors, and earn a profit on the fees they charge for engineering the deal. Overall, traditional banking has been replaced by market-based institutions in the extension of credit (Adrian and Shin 2009: 1). One consequence has been a decrease in the importance of a bank’s internal credit evaluation system, and an increase in the importance of the public ratings devised by the rating agencies.

In this paper, I examine the role of credit rating agencies in helping to produce the knowledge that maintained liquidity in financial markets. That role has been cast in stark relief because of how liquidity disappeared from the market. Firms, investors and institutions that thought they knew the value of particular assets suddenly discovered that they didn’t, and that nobody else knew their value, either. Securities that had recently received very high ratings suddenly plummeted in value. Many eyes turned to the credit rating agencies, wondering how they could have gotten their ratings so “wrong,” especially for the highest-rated securities. Of course, the significance of the “knowledge” rating agencies helped to create depended not only on the ratings themselves (their format, the methodology behind them, etc) but also on the audience for ratings. As I argue below, the financial community is a distinctive audience, tightly-integrated, self-aware, and prone to various kinds of herding and emulative behavior.

## Securitization and CDOs: turning debts into things

Among other things, a debt is a dyadic economic relationship that binds a debtor to a creditor. One particular entity owes money to another entity, and the relationship between them persists until the debt is fully extinguished (which in the case of long-term debt could be many years). If the debtor fails to pay, only the creditor has the right to enforce the debt. For the creditor, a debt is an asset (which, barring default, is worth the net present value of the future stream of loan payments). But it can be a highly illiquid asset if debts are not transferable, or if they are hard for persons outside of the dyad to value.

People have developed ways to release debts from relationships, to disembed them and give them “thing-like” qualities, and to make them liquid. Once reified (turned into things), debts can circulate freely, and be bought and sold on markets. Back in 18<sup>th</sup>-century England, the development of legal “negotiability” gave to promissory notes and other formal debts thing-like qualities that allowed them to be traded on financial markets. Whoever held the debt could enforce it against a non-paying debtor as easily as the original lender. Securitization is another and more recent way to reify debts, and is particularly relevant to the current financial crisis.

Securitization comes in different forms, but it is not just a contemporary invention. In fact, private farm mortgage lenders in states like Kansas and Nebraska were securitizing loans in the 1870s and 1880s: pooling mortgages together and then issuing securities against the cash flow coming from the entire mortgage pool. The resulting “pass through” securities were then sold to eastern investors (Snowden 1995). This early

wave of activity declined, however, as mortgage companies defaulted. Farm mortgage securitization returned after World War I, but because of bad prior experiences the rating agencies were enlisted to assess the creditworthiness of the bonds that were issued. This new arrangement didn't last as it in turn was swept away by the Great Depression.

Modern securitization began in the U.S. with the activities of the Federal National Mortgage Association (“Fannie Mae”), the Federal Home Loan Mortgage Corporation (“Freddie Mac”) and the Government National Mortgage Association (“Ginnie Mae”) in support of home mortgages (Stuart 2003: 21-22). These government-sponsored agencies acquired home mortgages that conformed to certain underwriting standards (set by the Federal Housing Administration), pooled them, and then issued and sold to investors the mortgage-backed securities they created. They successfully established a secondary market for mortgages, but the financial structure of these “pass through” securities remained simple.

Starting in the 1990s, financial innovators devised more complex forms of securitization, given the name “structured finance.” These methods were applied to subprime mortgage loans (other things being securitized included credit card receivables, car loans, commercial mortgages, home equity loans, etc), to create the mortgage-backed securities and collateralized debt obligations (CDOs) that figured so prominently in the financial crisis. The anatomy of a CDO is fairly straightforward, but it depends heavily on the credit raters.

Suppose an investment bank wanted to issue a CDO.<sup>1</sup> First, it would collect a set of assets, say mortgage loans, to form the basis for the CDO. Then, it would set up an

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<sup>1</sup> This description roughly follows the discussion in SEC 2008: 6-10, and Coval, Jurek and Stafford 2009.

independent and “bankruptcy remote” legal entity to own and service the pool of assets. The trust (also sometimes called a “special purpose vehicle”) receives the payments from the mortgage loans and pays out revenue in accordance with the terms of the CDOs that are issued, and its “bankruptcy remote” status protects it if financial difficulties happen to beset the investment bank. In a simple “pass through” arrangement, the trust would issue new securities that drew on the cash flow generated by the pool as a whole. Purchasers of the new security would enjoy the benefit of diversification (so long as the defaults on the underlying mortgages weren’t perfectly correlated with each other). Instead of holding a single mortgage, an investor could hold the equivalent of a single mortgage, for example, one-one-thousandth of a pool of one thousand home mortgages, but with much less risk.

The structure is more complex in the case of a CDO. Here the new securities are organized into tranches that differ from each other in terms of seniority.<sup>2</sup> That means, the cash flow generated by the underlying mortgages would go first to the most senior tranche, then to the second tranche, then to the third, and so on down to the most junior tranche (often called the “equity” tranche). In this waterfall-like arrangement, only after the financial obligations to a more senior tranche are fully satisfied can money go to a more junior tranche. Thus, the risk of any shortfall (occurring, perhaps, because people are defaulting on their mortgages) is born first by the bottom tranches. That means junior tranches are riskier investments than senior tranches, and correspondingly will get a lower credit rating.

Ordering tranches by seniority is one of a set of “credit enhancements” used to make the CDO an attractive investment. Investment banks also over-collateralize (so that the principal of the mortgage pool is greater than the principal of the issued securities),

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<sup>2</sup> A typical CDO arrangement has between 6 and 8 tranches (Benmelech and Dlugosz 2009: 27).

build in excess spread (the trust's interest income exceeds its liabilities), and actively manage the asset pool (the trust manager can alter the underlying pool of assets by trading them). While the details of the trust are still in the design phase, the investment bank will also approach one of the rating agencies to obtain a preliminary judgment about the likely rating the proposed securities will get. Depending on the response, the bank can make further changes (or even switch to another rating agency).

Having finalized a trust with a particular financial structure, the investment bank will then return to the rating agency, seeking to learn what ratings the various tranches of securities will receive (and after paying to the agency a lucrative fee). In response, the rating agency will typically appoint a single analyst to go through the deal, and make an internal recommendation. This recommendation then goes before a rating committee and it is either approved or not on the basis of a simple majority vote (Langohr and Langohr 200: 161).

The incentive to securitize in this fashion stems from the fact that the overall ratings given to the CDOs, across all the tranches, are substantially higher than the ratings for the original underlying assets, and investment banks try to maximize the difference.<sup>3</sup> Higher ratings make the CDO more attractive to investors, and more profitable to the investment bank. The complexity of CDOs makes them hard for rating agencies to rate (as compared to the traditional single-name bonds), but also makes them much more profitable to rate. But the magic of securitization allows the bank to turn assets with a middling credit rating into CDOs with a much higher rating. Securitization also removes assets from the bank's balance sheet (since they are transferred to the trust), so there is no

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<sup>3</sup> On the impressive magnitude of the gains, see Benmelech and Dlugosz 2009, figure 5.

need to comply with capital adequacy rules, and if the borrowers fail to repay it is the owners of CDOs who bear the brunt of the losses.

In evaluating the proposed securities, rating agencies relied heavily on mathematical and statistical models to predict each tranche's probability of default under a range of scenarios. Higher probabilities of default meant greater risk and lower ratings. However these probabilities were calculated, the ratings offered a powerful signal to potential investors that a CDO was a well-defined financial commodity with risks that could be precisely calibrated. And because the very same rating categories were used to classify CDOs as had been applied for decades to vanilla corporate bonds, the effect was to "tame" or "domesticate" the exoticism and mystery that CDOs would have otherwise possessed. Without a rating from one of the main agencies, CDOs would have been viewed with suspicion by many prospective investors. A rating functioned like a seal of approval.

In the case of structured finance, the securitization procedure can be applied multiple times. That is, first stage securitization takes mortgages (or something similar) and turns them into CDOs. But the operation can be applied iteratively, so that it starts with CDOs and by additional pooling and tranching turns them into CDO<sup>2</sup>s. And of course it can be applied yet again to produce CDO<sup>3</sup>s. In all its variants, securitization represented a shift towards "originate and distribute" finance. From the beginning of the recent boom in securitization, the intent has been to turn illiquid debts held by banks or corporations into financial commodities that can be easily bought and sold: "In order to have broad appeal to capital market investors, the securities must have characteristics that

permit liquidity. They must be comparatively cheap and easy to appraise, buy, hold, and sell” (Hill 1997: 67).

### The Failure of Rocket Science

In the current crisis, it became dramatically apparent that the rating agencies had failed. Throughout 2006 and especially 2007, structured financial instruments based on subprime mortgages started to default at rates that far exceeded what their AAA-ratings would have suggested. What were supposed to be extremely unlikely outcomes began to occur with frightening regularity. Consequently the rating agencies downgraded the ratings of billions of dollars worth of securities, and the downgrades were largest for the very highest-rated securities (Benmelech and Dlugosz 2009: 11). Something had gone terribly wrong, and the severe downgrades hurt not only the reputation of CDOs, but also that of the rating agencies. The downgrades were exacerbated by the fact that as subprime lending expanded (from about \$190 billion in 2001 to \$600 billion in 2006), the proportion of subprime loans that were being securitized also grew, from 50.4% in 2001 to 80.5% in 2006 (Gorton 2008: 20). Securitization had become the most important procedure for putting investor’s money into subprime mortgages.

Several factors drove rating agencies’ impressive misjudgment. The rating agency models used lots of historical data to estimate the probabilities of default, and one problem concerned these data. Large-n data sets collected over long periods of time give more robust estimates of the probabilities. But because subprime loans were a relatively recent innovation, data sets only went back in time about 10 years. And this time period was atypical in that it did not include an episode in which U.S. housing prices

systematically dropped (Brunnermeier 2009: 81, SEC 2008a: 35). The performance of subprime mortgages is very sensitive to housing prices, and default rates climb dramatically if housing prices decline (Bajari, Chu and Park 2008: 31, Mayer, Pence and Sherlund 2009: 46). While the rating agencies do have extensive time-series data upon which to calculate the likelihood that a corporate bond will default, they had less data to work with when it came to subprime mortgages. And so they underestimated the likelihood that subprime borrowers would default.

It also appears that underwriting standards weakened as the real estate bubble inflated, and that lenders were making subprime loans to borrowers who were less creditworthy than before. The use of labels like “Liar’s loans,” “lo-doc” and “no-doc” signaled the fact that in the frenzy of mortgage loan production lenders were not being very careful about who they were lending to (Sherlund 2008: 2). Thus, even before the securitization process had turned mortgages into CDOs, the quality of the underlying assets had diminished (Mayer, Pence and Sherlund 2009: 40). But this decline wasn’t reflected in the initial ratings given subprime mortgages originated in 2005 and 2006. When combined with their data limitations, the rating agencies underestimated even more the probabilities that subprime borrowers would default. And one important consequence of the securitization process for CDOs is that it magnified those errors. Small mistakes in estimated default probabilities for mortgages became large mistakes for the CDOs, and even larger mistakes for CDO<sup>2</sup>s (Coval, Jurek and Stafford 2009: 9). Securitization involved a “multiplier effect” for errors.

A further source of error came from the estimated correlations among the defaults. The overall performance of a securitized financial instrument depends on the

performance of the underlying assets (e.g., whether the annual default probability for mortgage A is 0.0001 or 0.0002), but also on the correlations among the assets (whether the correlation between default of mortgages A and B is 0.0 or 0.1; see Nadauld and Sherlund 2009: 11-12, Duffie 2008 18-19). Assets that default independently of each other are not such a problem, but assets with highly correlated defaults will severely hurt the performance of the securitized instrument. When it came to the correlations, the rating agencies were again too optimistic. As Partnoy (2006: 78) points out, Standard & Poor's set these correlations, by assumption, at unrealistically low levels.

It may be human to err, but since the rating agencies are in the business of evaluating risks, it is important to consider exactly why the rating agencies made these mistakes so systematically. Partly, their data sets were limited in ways they didn't anticipate. Partly they embraced convenient assumptions that made their models tractable (rather than accurate). The volume of business grew so quickly that while the rating agencies earned record profits, they and their staff were overwhelmed and overworked (SEC 2008a: 10-11). They also diverged from their own internal procedures and models in ad hoc and undocumented ways (SEC 2008a: 14-16). And the very possibility of fallibility seemed to be discounted because of the way the entire rating process was enshrouded with images of "rocket science" and quantitatively-rigorous analytical methods.

Many suspect that conflict-of-interest also played a significant role in the production of error. Rating agencies competed with each other for issuers' business, and having obtained it worked closely with the issuer so that the financial product had a structure that received the highest rating possible (Nadauld and Sherlund 2009: 3). Their

customers wanted high ratings, and if forced to choose between customer satisfaction and accurate (but lower) ratings, it is clear that the agencies were tempted to side with their customers. It isn't clear that rating agencies had a sufficiently "arms-length" relationship to their customers.<sup>4</sup> As the SEC put it: "There does not appear to be any internal effort to shield analysts from emails and other communications that discuss fees and revenue from individual issuers" (SEC 2008a: 24-25).

In sum, then, the end of the real estate boom hit the subprime market hard, in part because of the vulnerability of subprime mortgages to declining home prices. Rising numbers of subprime defaults then hit the new financial instruments that were manufactured out of subprime mortgages, and which had helped to fuel subprime lending activity. For a number of years, investment banks and others had successfully transformed mortgage loans into liquid and tradable commodities, and the rating agencies played a central role in the transformation because they rated CDOs and similar instruments. Rating an otherwise complex and opaque CDO placed it into a familiar and legitimate category system that had been used for decades to signal the risk attached to simple corporate bonds. Very high ratings convinced investors that CDOs were very low-risk investments. But the rating agencies were wrong. Economists and regulatory agencies have diagnosed the problem (e.g., SEC 2008a) largely in terms of conflict-of-interest, suggesting that in their rational pursuit of profit, rating agencies became too eager to please their customers. Undoubtedly that was part of the problem, but there are other aspects best examined from a more sociological perspective.

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<sup>4</sup> Matters were made even worse by the tendency of rating agency clients (hedge funds, investment banks, etc) to hire away the best analysts in the rating agency (Lo 2008: 27).

## “Performativity” and Rating

One common version of the rating process views it as akin to idealized scientific measurement: a rating simply measures a particular aspect of pre-existing and independent objects. The better the rating system, the more accurately it mirrors the object it rates. Ideally, complications like “reactivity” (when the object changes simply by virtue of being measured) don’t arise, although that seems unlikely when the rated objects involve human beings. The particular rating method used by a credit rating agency is proprietary and part of its intellectual property. Most CRAs will describe their methods only in general terms, but they are willing to show that their ratings have predictive value (by providing tables that show that the probability of default increases monotonically as the bond rating declines: higher rated bonds are safer investments than lower rated bonds). Over time issuers could presumably have learned, through experience, what was necessary to achieve a high rating. But they would not have had direct access to the rating method itself.

The situation was very different when it came to structured finance and the CDOs that underpinned sub-prime lending. In particular, not only were ratings central to the construction of value in structured finance (Langohr and Langohr 2009: 141), but the methods used to establish ratings were made available to issuers. In a very direct way, issuers were allowed to securitize knowing how their securities would be rated. The banks that put together structured financial products worked very closely with the rating agencies, in part because both sides earned so much in fees from these deals (Brunnermeier 2009: 81, Tett 2009: 55). Rating agencies even posted technical details of their rating models on the internet (Tett 2009: 100). Among other things, this allowed

issuers to pool and tranche so that they extracted the maximum value of highest-rated securities for the minimal value of underlying assets. Overall, this active collaboration between issuers and rating agencies constituted a co-performativity of the models embodied within the rating methods (Callon 1998: 2). It also reinforced suspicions that rating agencies had a serious conflict of interest since the fees they charged originators made a substantial contribution to their own profits.

### The Social Life of Finance

The impact that ratings have had on knowledge about financial objects, and thus their liquidity, also depended on the audiences for ratings. Although the popular image of investment bankers and financiers views them as driven by a relentless and single-minded focus on the “bottom line,” the financial community is very much a social community (MacKenzie 2004). Electronic trading and on-line markets have created the possibility that market actors can live virtually anywhere and trade in markets with almost complete anonymity. But that is not how things work in practice. For one thing, market actors form relationships with each other and acquire reputations even when electronic transactions replace open-outcry or face-to-face bargaining. Geographically concentrated in a few locations around the world (New York’s lower Manhattan, the City in London, Tokyo, etc), financial communities are subject to the same kinds of internal social influences that affect all communities. Such social dynamics can affect what the financial system, as a whole, does. As the Bank of England’s Executive Director for Financial Stability put it: “... ‘keeping up with the Jones’s’ was a potent force within financial firms during the upswing” (Haldane 2009: 11).

Given that information is the basis for knowledge, and that knowledge undergirds liquidity, the social networks that run through a community have an effect by how they transmit information. A growing body of evidence suggests that networks affect a variety of financial decisions. For example, how professional fund managers invest their portfolio (Cohen, Frazzini and Malloy 2008) is shaped by their “old school” connections to corporate management. Mutual fund managers are influenced in their decisions about holdings and trading by other fund managers working in the same city (Hong, Kubik and Stein 2005). These connections likely contribute to the kind of “herding” behavior among institutional investors described by Choi and Sias (2009). Wall Street analysts are more likely to cover a firm listed on the NASDAQ market if many of their peers have already done so (Rao, Greve and Davis 2001).<sup>5</sup> Hochberg, Ljungqvist and Lu (2007) examined a more speculative area of finance, venture capital (VC), and concluded that better networked VC firms performed better.<sup>6</sup>

Some parts of the financial community have been deeply shaped by how they are recruited. In particular, Wall Street investment banks have over the last several decades drawn heavily from a small number of elite undergraduate institutions and prestigious business schools. The very self-conscious elitism that differential recruitment produced also helped to create a collective sense of being among “the best and brightest” (Ho 2009: 11-12, 42-72). As well, financial sector wages underwent an extraordinary increase starting about 1980 and this simply reinforced the message in regard to status (Philippon

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<sup>5</sup> The resulting information cascade can be reversed when analysts recognize that a firm isn't performing well

<sup>6</sup> At the level of ordinary households, Hong, Kubik and Stein (2004) find that more sociable households are more likely to invest in the stock market, particularly if the communities they live in also invest. Brown et al. (2008) use a national sample of taxpayers to show that individuals who live in communities with high stock market participation are themselves more likely to participate, other things being equal.

and Reshef 2009). Such widespread and deeply-entrenched self-regard set the stage for hubris.

As if social and educational exclusivity weren't enough, Wall Street also began to recruit "quants," mathematicians and physicists whose technical skills made them extremely useful in the design of trading strategies and new financial products (e.g., Derman 2004). Deregulation of the financial sector allowed for a burst of innovation, and much of this exploited the talents of the so-called "rocket scientists." These technicians formed a sub-community within the financial community, and new ideas could quickly diffuse through their networks. One important example is the Gaussian Copula, a method for estimating correlations between risks that proved very useful for the construction of structured financial products like CDOs. Univariate probabilities of default for a single security can be easily estimated from historical data, but when assembling large pools of assets, securitizing them, and then constructing separate tranches of securities, it is important to know something about the multivariate distribution of default across all the underlying securities. In particular, it is critical to know the correlations between separate assets. The Gaussian Copula method, as applied to finance, was introduced when David Li published an article in 2000 in the Journal of Fixed Income. Almost instantly, other quants recognized this as a "solution" to the problem of how to calibrate default correlations within their models, and so the method became widely adopted. Consequently, its failings became equally widespread since those who produced structured financial products underestimated the correlations among defaults.

The social peculiarities of the financial community appear to have made it prone to hubris and herding. Widespread confidence in the technical methods used by rating

agencies to evaluate structured financial products combined with strong social integration among an elite to produce an audience that only late in the game realized that it didn't really know what it thought it knew. Because of the "Keynesian beauty contest"-quality of the situation, even those who questioned the ratings put aside such doubts so long as many others continued to rely on the ratings.

### Rating and Knowing

To place something in a conceptual box, to categorize it, is a fundamental cognitive act (Gracia 2001). It is a form of knowledge. Visual recognition, for example, occurs when someone perceives a shape and is able to classify it (as a dog, or a sunset, or a person's hand). For all varieties of human cognition, there are many different classificatory schemes. Within the modern economy, a much narrower set of category systems are relevant. For example, Benner (2007) notes that modern securities analysts typically use a set of categories defined by industry, and develop a set of specialized metrics to evaluate and compare firms within the same category. Firms that violate or straddle such category systems are likely to be discounted by analysis (Zuckerman 1999). For modern credit markets, however, what particularly matters is information about creditworthiness.

Creditors have always had access to private information about borrowers. A bank, for example, will know a great deal about the financial situation of a long-time business customer, and therefore can make a well-informed decision if that customer requests a line of credit. But as financial markets expanded, investors and lenders increasingly dealt with borrowers that they knew little or nothing about. Drawing on the long-term

experience of the original rating agencies (which focused on unsecured trade credit for small businesses), bond rating agencies like Moody's and Standard & Poor's knew that investors and creditors were comfortable with a categorical format for credit assessments. The precursors of Dun and Bradstreet had been operating since the 1840s and had developed an ordinal category system to convey to their clients information about the creditworthiness of firms. This simple format was deliberately adopted by John Moody when he began to rate railroad bonds in the early 20<sup>th</sup>-century, in part because the format was already legitimate and familiar to the U.S. business community (Partnoy 1999: 637-8). By 1929, the ordinal category format had become firmly institutionalized in the bond rating business (Partnoy 1999: 642). And although the methods used to generate the ratings, and the information upon which ratings were based, have undoubtedly changed since then, the basic style has not: borrowers or the debts they issue are still classified into an ordinal category system that conveys information about their creditworthiness. Consequently, the rating system used by R.G. Dun in 1859 would have seemed familiar to someone working with Moody's rating categories from 1929, or 2009 (Partnoy 1999: 648).

The legitimacy of contemporary rating schemes stem from a number of different sources. Certainly, duration is one of them. Ratings have been an important part of U.S. commercial practice for such a long time that they are familiar parts of the landscape. Ratings have also been reinforced because they have been adopted, both privately and publicly, by third parties. On the public side, ratings have been incorporated into many different kinds of regulation at both the federal and state level. Starting in the 1930s when prudential regulations prohibited insurance companies from investing in securities that

were not “investment grade,” regulations have often made use of the ratings given by the rating agencies (Partnoy 1999: 687-689). Langohr and Langohr (2008: 431) report that today no less than 8 Federal statutes and 47 Federal rules make reference to credit ratings. And, as noted earlier, ratings have been incorporated into many private contractual arrangements. All of this affirms the ubiquity and taken-for-granted status of ratings.

Although the ordinal categories used for ratings seem almost self-evident, this format may have contributed to the dramatic collapse that occurred in 2008. Once it became clear that one kind of CDO was suspect, those based on subprime mortgages, the problem quickly spread. Here, the distinctively categorical format of ratings played a role.

#### Cascades

The insight of the basic cascade model is that decision-makers sometimes rely on the decisions of others when making up their own minds (Bikhchandani, Hirshleifer and Welch 1998). This can produce herding behavior. Such cascades depend on two kinds of equivalence: similarity among decision-makers, and similarity among options. The first sets the relevant peer group for a decision-maker. If people are influenced by the decisions of those like them, who together form a peer group, then who is considered “alike” or “unlike” can be a powerful influence. A variety of extant categories and identifications shape perceived peer groups. Some categories are legal (“commercial bank,” “pension fund”) or occupational (“investment banker,” “fund manager”), while others derive from common parlance (e.g., “hedge fund,” “vulture fund”). The second similarity concerns the options that decision-makers weigh: someone wondering which

new car to purchase isn't likely to be interested in how others, even peers, chose among a dissimilar set of options (e.g., favorite movies, preferred desserts). The classification of investment alternatives has been shaped by the law ("debt" vs. "equity"), and product categories, but also by the rating agencies themselves. By promulgating a single, encompassing, rating schema, they have helped to make various financial instruments commensurable (Espeland and Stevens 1998). Having the same rating scale for sovereigns, financial institutions, corporate bonds and structured financial instruments made it easy for investors to apprehend a wide range of financial alternatives and to regard the differences among them as quantitative (involving more-or-less risk) rather than qualitative (Langohr and Langohr 2008: 44,90). This holds true even though sovereign governments, for-profit corporations, banks, and special purpose vehicles are rather distinct debtors. As Ashcraft and Schuermann put it: "... an investor can assume that, say, a double-A rated instrument is the same in the U.S. as in Belgium or Singapore, regardless whether that instrument is a standard corporate bond or a structured product such as a tranche on a collateralized debt obligation" (Ashcraft and Schuermann 2008: 37).

In the case of structured financial products like CDOs, the equivalences set up by the rating agencies (i.e., that security A was similar to security B because both had been similarly classified) induced a cascade of doubt that spread through financial markets and led to a general unwillingness to buy or hold CDOs. The transitive logic embedded in ordered categories facilitated the transmission of skepticism about value from the top down: basically, if AAA-rated securities become suspect, the doubt then spreads to lower-rated securities (because, according to the classification scheme, they are all riskier

than high-rated securities). There were no internal “firewalls” in the credit rating category system to prevent doubts about value from having a contagion effect downward. And since in this case the uncertainties started at the top, eventually their effect would become pervasive.

The rough logic behind contagion goes like this. Securities A, B, C .... have all been highly rated (e.g., A1 or AAA) by a rating agency. High ratings mean that the debt instrument is a safe investment. But suddenly, investors discover that security A is in fact much worse than expected, and that it is a much riskier investment than was believed beforehand. They now sell off A and the price drops, but they also think: if A could be such a bad deal, even though it was rated very highly, what about all the other very highly rated instruments which from a ratings standpoint are equivalent if not identical to A? Perhaps they also are in bad shape. Problems for A beget doubts about all securities equivalent to A, and that equivalence is induced via the rating category into which A was placed. Suddenly all debtors similar to A are under suspicion. The doubts can cascade downward too since the rating system implies that firms rated BBB are riskier than firms rated AAA. Thus, if AAA firms are worse than expected, so are BBB-rated firms.

The brutal force of cascading doubt became apparent when in 2007 first Moody’s and then Standard & Poor’s suddenly cut the ratings of billions of dollars worth of CDOs, including the very highest-rated tranches. As Tett described it: “It was shocking news for investors. After all, the entire structured credit edifice had been built on the assumption that AAA was ultrasafe and AA almost rock solid, too. Now that pillar of faith was crumbling. It was impossible for anyone to know exactly how the downgrades might affect the value of particular CDOs.” (Tett 2009: 202).

## Accounting Rules and Value

The cloud of uncertainty that descended over value didn't just affect market activity, it had some serious ramifications for accounting. In addition to credit ratings, accounts are another important form of "knowledge" that is used by market participants to evaluate the status of firms and organizations. The production and interpretation of accounting numbers is constrained by a set of public rules (GAAP, or generally-accepted accounting principles), but these can be applied in a variety of ways depending on the discretion (and professionalism) of the particular accountant. Nevertheless, when applied diligently to the financial situation of a particular firm, accounting rules and disclosures are supposed to supply investors and creditors with accurate information so that they can make rational decisions (SEC 2008b: 15-16).

The recent crisis problematized the use of mark-to-market or fair-value accounting. The particular controversy concerned how financial institutions should value the assets on their balance sheets, and whether those valuations should reflect short-term changes in the market value of the assets (Laux and Leuz 2009). For those who believe in the superior ability of markets to discern value, market price is the best indicator of value and should be embraced whenever possible. Disclosure on the basis of market prices is intended to enhance transparency. But in a crisis, it is possible that market prices will diverge from their "fundamental" values over the short run (e.g., "fire sale" prices, "distressed" sales), even if they eventually converge in the long run. Clearly, banks would be hurt by plunging market prices for their assets if they had to recognize those losses in their accounts. Declining asset values would require banks to raise additional

capital, perhaps by selling off the very assets whose prices had dropped. Such a measure could produce a downward spiral as declining asset prices mean forced-sales, which lead to more price drops, and so on.

In 2008, both the SEC and the main U.S. accounting body, the FASB (Financial Accounting Standards Board), came under considerable political pressure to suspend or modify fair-value accounting rules simply because compliance with them would further hurt financial institutions that were already skating on thin ice. In April of 2009, the FASB issued three Final Staff Positions that reaffirmed adherence to fair-value accounting, but which gave financial institutions more leeway in how they valued their assets.

In the current episode, the economic shock has been sufficient to dislodge a number of market constituents from their prior commitment to market prices as the final and most legitimate arbiter of economic value. Accounts provide an important kind of knowledge, but when markets “go crazy” or cease to function, people become reluctant to tie accounting numbers to market prices. Instead, accounting knowledge is generated in some other fashion.<sup>7</sup> Within the FASB, accounting rules were adjusted to give more flexibility in how accountants could generate their knowledge.

## Conclusion

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<sup>7</sup> During the Great Depression, a number of policy measures replaced “market values” with alternatives like “normal value” or “fair and warranted value” because market prices had become so problematic. Thus, the Home Owners’ Loan Corporation (HOLC) offered home mortgages calibrated to the “normal” value of a home, not to its current market value. See Stuart 2003: 45-46. Under the circumstances, New Deal institutions were ready and willing to discard market value and replace it with something else.

Many factors contributed to the disastrous disappearance of liquidity, but the failure of knowledge was one of them. In markets beset by information asymmetries, the rating agencies produced knowledge about financial instruments that investors depended on. In the early 2000s, investors proved eager to buy and sell securities that they really didn't understand, like CDOs and CDO<sup>2</sup>s, if these were given a high-enough credit rating. But at some point, knowledge failed, its failure became widely recognized, investors stopped buying, and liquidity dried up. Markets require information and so Karl Polanyi's old insight about the institutional foundations for markets can be extended to include knowledge.

The contrast between rating and accounting, both forms of economic knowledge, allows us to develop the Polanyian insight that markets are non-self-sustaining. As the crisis unfolded, both forms of knowledge-production resulted in unwelcome economic assessments (low asset values for banks, and downgraded ratings for investors). But whereas fair-value accounting could be adjusted within the existing political-institutional framework of the SEC and FASB to compensate for the problem of tying asset values too closely to market prices, it wasn't so easy to fix rating methods. For one thing, rating methods failed too dramatically, in part because of their standardized categorical format (which induced cascading doubt) and because their primary audience was a financial community prone to self-emulation and herding (a community which much prefers making mistakes together than making them alone). In addition, ratings had become pervasive. They are no longer just for investors who wonder whether to buy a corporate bond, but have been absorbed deeply into the contractual and regulatory infrastructure of modern financial capitalism. So their failure ramified widely. Furthermore, the

proprietary status of rating methods, in combination with the almost complete lack of public oversight over the rating agencies, meant that there was no political-institutional framework within which to negotiate a new set of rating methods. Once ratings were discredited and markets seized up, it was difficult to organize a short-term response and provide different information about creditworthiness to investors, regulators and the other constituents for credit ratings. Even now, as financial regulatory reform proceeds, many policy-makers and politicians are just not sure what to do about the rating agencies.

It is not clear what the future holds for financial intermediation in the U.S.. The recent period of disintermediation has helped to commodify debt in evermore complicated ways, and has given growing importance to credit ratings. Perhaps in reaction to the crisis relational banking will undergo a resurgence. But whatever happens, the liquidity of financial markets will continue to depend on the production of credible information that gives buyers and sellers a sense that they know the value of financial commodities. If that knowledge production fails, financial markets will again crash. And when that knowledge production is itself market-based, the financial system is doubly vulnerable to the risks and uncertainties that markets characteristically generate.

## References:

- Adrian, Tobias, and Hyun Song Shin. 2009. "Money, Liquidity, and Monetary Policy," Federal Reserve Bank of New York Staff Report no. 360. New York: Federal Reserve Bank of New York.
- Ashcraft, Adam B., and Til Schuermann. 2008. "Understanding the Securitization of Subprime Mortgage Credit," Federal Reserve Bank of New York Staff Report no. 318. New York: Federal Reserve Bank of New York.
- Bajari, Patrick, Sean Chu and Minjung Park. 2008. "An Empirical Model of SubPrime Mortgage Default from 2000 to 2007," NBER Working Paper 14625. Cambridge: National Bureau of Economic Research.
- Benmelech, Efraim and Jennifer Dlugosz. 2009. "The Alchemy of CDO Credit Ratings," NBER Working Paper 14878. Cambridge: National Bureau of Economic Research. [fix this, two versions]
- Benner, Mary J. 2007. "The Incumbent Discount: Stock Market Categories and Response to Radical Technological Change," Academy of Management Review 32(3): 703-720.
- Berger, Allen N. and Udell, Gregory F. 1995. "Relationship Lending and lines of Credit in Small Firm Finance," Journal of Business, 68: 351-381.
- Bikhchandani, Sushil, David Hirshleifer, and Ivo Welch. 1998. "Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades," Journal of Economic Perspectives 12(3): 151-170.
- Brown, Jeffrey R., Zoran Ivković, Paul A. Smith, and Scott Weisbenner. 2008. "Neighbors Matter: Causal Community Effects and Stock Market Participation," Journal of Finance 63(3): 1509-1531.
- Brunnermeier, Markus K. 2009. "Deciphering the Liquidity and Credit Crunch 2007-2008," Journal of Economic Perspectives 23(1): 77-100.
- Callon, Michel. 1998. "Introduction: The Embeddedness of Economic Markets in Economics," pp.1-57 in The Laws of the Markets Michel Callon ed. Oxford: Blackwell.
- Carruthers, Bruce G. and Arthur L. Stinchcombe. 1999. "The Social Structure of Liquidity: Flexibility in Markets and States," Theory and Society, 28(3): 353-382.
- Choi, Nicole, and Richard W. Sias. 2009. "Institutional industry herding," Journal of Financial Economics doi:10.1016/j.jfineco.2008.009.
- Coffee, John C. Jr. 2006. Gatekeepers: The Professions and Corporate Governance. Oxford: Oxford University Press.

- Cohen, Lauren, Andrea Frazzini, and Christopher Malloy. 2008. "The Small World of Investing: Board Connections and Mutual Fund Returns," Journal of Political Economy 116(5): 951-979.
- Coval, Joshua, Jakub Jurek, and Erik Stafford. 2009. "The Economics of Structured Finance," Journal of Economic Perspectives 23(1): 3-25.
- Davis, Gerald F. 2009. Managed by the Markets: How Finance Re-Shaped America. New York: Oxford University Press.
- Derman, Emanuel. 2004. My Life as a Quant: Reflections on Physics and Finance. Hoboken NJ: John Wiley & Sons.
- Duffie, Darrell. 2008. "Innovations in Credit Risk Transfer: Implications for Financial Stability," BIS Working Paper No. 255. Basel: Bank for International Settlements.
- Espeland, Wendy N. and Mitchell L. Stevens. 1998. "Commensuration as a Social Process," Annual Review of Sociology 24: 313-343.
- Gorton, Gary B. 2008. "The Panic of 2007," NBER Working Paper 14358. Cambridge: National Bureau of Economic Research.
- Gracia, Jorge J.E. 2001. "Are Categories Invented or Discovered? A Response to Foucault," Review of Metaphysics 55(1): 3-20.
- Haldane, Andrew G. 2009. "Why Banks Failed the Stress Test," Speech given at Marcus-Evans Conference on Stress-Testing, 9-10 February 2009, London: Bank of England.
- Hill, Claire A. 1997. "Securitization: A Low-Cost Sweetener for Lemons," Journal of Applied Corporate Finance 10(1): 64-71.
- Ho, Karen. 2009. Liquidated: An Ethnography of Wall Street. Durham: Duke University Press.
- Hochberg, Yael V., Alexander Ljungqvist, and Yang Lu. 2007. "Whom You Know Matters: Venture Capital Networks and Investment Performance," Journal of Finance 62(1): 251-301.
- Hong, Harrison, Jeffrey D. Kubik, and Jeremy C. Stein. 2005. "Thy Neighbor's Portfolio: Word-of-Mouth Effects in the Holdings and Trades of Money," Journal of Finance 60(6): 2801-2824.
- Hong, Harrison, Jeffrey D. Kubik, and Jeremy C. Stein. 2004. "Social Interaction and Stock-Market Participation," Journal of Finance 59(1): 137-163.

- Lamoreaux, Naomi. 1994. Insider Lending: Banks, Personal Connections, and Economic Development in New England. Cambridge: Cambridge University Press.
- Langohr, Herwig M., and Patricia T. Langohr. 2008. The Rating Agencies and their Credit Ratings. Chichester: John Wiley & Sons.
- Laux, Christian and Christian Leuz. 2009. "The Crisis of Fair Value Accounting: Making Sense of the Recent Debate," Initiative on Global Markets Working Paper No. 33, Chicago: University of Chicago, Booth School of Business.
- Lo, Andrew W. 2008. "Hedge Funds, Systemic Risk, and the Financial Crisis of 2007-2008," Testimony before the U.S. House of Representatives Committee on Oversight and Government Reform November 13, 2008 Hearing on Hedge Funds. Washington D.C.
- MacKenzie, Donald. 2004. "Social connectivities in global financial markets," Environment and Planning D: Society and Space 22: 83-101.
- Mayer, Christopher, Karen Pence, and Shane M. Sherlund. 2009. "The Rise in Mortgage Defaults," Journal of Economic Perspectives 23(1): 27-50.
- Nadauld, Taylor D. and Shane M. Sherlund. 2009. "The Role of the Securitization Process in the Expansion of Subprime Credit," Finance and Economics Discussion Series Working Paper #28. Federal Reserve Board: Washington D.C.
- Partnoy, Frank. 2006. "How and Why Credit Rating Agencies are not like other Gatekeepers," University of San Diego Law School Research Paper 07-46. University of San Diego Law School: San Diego.
- Partnoy, Frank. 1999. "The Siskel and Ebert of Financial Markets?: Two Thumbs Down for the Credit Rating Agencies," Washington University Law Quarterly 77(3): 620-715.
- Philippon, Thomas and Ariell Reshef. 2009. "Wages and Human Capital in the U.S. Financial Industry: 1909-2006," NBER Working Paper 14644. Cambridge MA: National Bureau of Economic Research.
- Rao, Hayagreeva, Heinrich R. Greve, and Gerald F. Davis. 2001. "Fool's Gold: Social Proof in the Initiation and Abandonment of Coverage by Wall Street Analysts," Administrative Science Quarterly 46(3): 502-526.
- Securities and Exchange Commission. 2008a. Summary Report of Issues Identified in the Commission Staff's Examinations of Select Credit Rating Agencies. Washington D.C.: Securities and Exchange Commission.
- Securities and Exchange Commission. 2008b. Report and Recommendations Pursuant to Section 133 of the Emergency Economic Stabilization Act of 2008: Study on Mark-to-Market Accounting. Washington D.C.: Securities and Exchange Commission.

Sherlund, Shane M. 2008. "The Past, Present, and Future of Subprime Mortgages," Finance and Economics Discussion Series Working Paper #63. Federal Reserve Board: Washington D.C.

Snowden, Kenneth. 1995. "Mortgage Securitization in the United States: Twentieth Century Developments in Historical Perspective," pp.261-298 in Anglo-American Financial Systems. Michael Bordo and Richard Sylla eds. New York: Irwin Publishing.

Stiglitz, Joseph E. 2000. "The Contributions of the Economics of Information to Twentieth Century Economics," Quarterly Journal of Economics 115(4): 1441-1478.

Stuart, Guy. 2003. Discriminating Risk: The U.S. Mortgage Lending Industry in the Twentieth Century. Ithaca: Cornell University Press.

Tett, Gillian. 2009. Fool's Gold: How the Bold Dream of a Small Tribe at J.P. Morgan was Corrupted by Wall Street Greed and Unleashed a Catastrophe. New York: Free Press.

Uzzi, Brian. 1999. "Embeddedness in the Making of Financial Capital: How Social Relations and Networks Benefit Firms Seeking Financing," American Sociological Review 64: 481-505.

Uzzi, Brian and Ryon Lancaster. 2003. "Relational Embeddedness and Learning: The Case of Bank Loan Managers and Their Clients," Management Science 49(4): 383-399.

Zuckerman, Ezra. 1999. "The Categorical Imperative: Securities Analysts and the Illegitimacy Discount," American Journal of Sociology 104(xxx): 1398-1438.