

Behavioural Finance as an Explanation of the Subprime Crisis of the World

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Abstract. Behavioral finance has gathered a lot of attention during the last few years as a subject challenging the economic paradigms of rationality of investors and efficiency of markets. Lessons from behavioral finance about the origins of the subprime crisis and the likelihood of averting the next ones, though belatedly, is now being talked about quite vigorously. We argue in this paper that the crisis highlights the need to incorporate behavioral finance into our economic and financial theories as explanatory variables in understanding subprime crisis in a holistic way. Psychology, including aspirations, cognition, emotions, and culture, is at the heart of behavioral finance. This psychology and its reflection in the behavior of investors and the institutions, including corporations, governments, bankers, mortgage lenders and markets is what we have explored in our discussion.

Our discussion includes Keynes' view that psychology drives economic booms and busts. It also encompasses efficient markets and free markets, bubbles, links between financial markets and the real economy, debt financing and financial innovation, and a culture where homeownership is prized beyond its rational economic benefits. Our discussion revolves around the ideas from psychology which may be helpful for thinking about the subprime crisis of 2007-2008. We focus on the surge in house prices in the years leading up to 2006; the large positions in subprime-linked securities (CDO) that many banks had accumulated by 2007; and the dramatic decline in value of many of the risky assets during the period followed by subprime crisis. Number of psychology-based anomalies including over-extrapolation of past price trends; and belief manipulation, overconfidence, representative heuristics, cognitive dissonance are being explored as the explanatory factors of the subprime crisis.

Keywords: Behavioural Finance, Subprime, Securities, Crisis

1 Introduction

A housing bubble inflated in the mid 2000's in US. Homes were financed by mortgages that were increasingly securitized. Although the quality of mortgages deteriorated over a period of time when the proportion of subprime buyers increased exponentially, the securities into which these mortgages were packaged (mortgage backed securities or MBS) were perceived to be safe and received AAA ratings. Financial institutions such as banks and dealer banks retained substantial exposure to the real estate market, through direct holdings of commercial real estate,

direct holdings of MBS, but also implicit guarantees of special investment vehicles they organized, which hold MBS and financed them with commercial paper.

The subprime crisis that peaked in 2008 is still roiling many of the economies through its spillover effects. Can we avoid the next financial crisis? We argue that behavioral finance offers some of the answers to these questions. The answers are rooted in the psychology that move us in the baffling uncertainty in which we live, including our aspirations, cognition, emotions and therefore mental biases reflected in our irrational behavior.

Can behavioral finance offer a useful perspective on the subprime crisis of 2007-2008? In particular, can ideas from psychology help us to make sense of the crisis? I am sure that they can. In this short paper, we sketch a few specific ideas from behavioral finance can help us easily understand the strong explanatory power of behavioral finance for the subprime crisis. The field of behavioral finance investigates whether certain financial phenomena are the result of less than fully rational behavior on the part of some agents in the economy. For guidance on *how* people deviate from full rationality, it advocates a close reading of research in psychology. The field has focused, with some success, on the areas like the pricing of financial assets; and the behavior of managers of banks, insurance companies & rating agencies as well regulatory authorities like Federal Reserve Board.

Some of the economists like Keynes (1936) highlighted the role of psychology in economics long before behavioral economics and finance were formed as a formal subject of study. He argued that sentiment, reflecting unrealistic optimism or pessimism, leads to booms and busts. He noted that securities prices or asset prices often diverge from their intrinsic values. Keynes' framework is as relevant to our financial crisis and Great Recession as to the Great Depression he studied during 30's. Even economists like Minsky (1986) argued that financial innovations can create economic euphoria for a while before destabilizing the economy and pushing it into crises rivaling the Great Depression of 30's. The effects of innovations in mortgages and mortgage securities are quite vivid when MBO/CDO/CDS were created by economists and mathematicians hand in gloves.

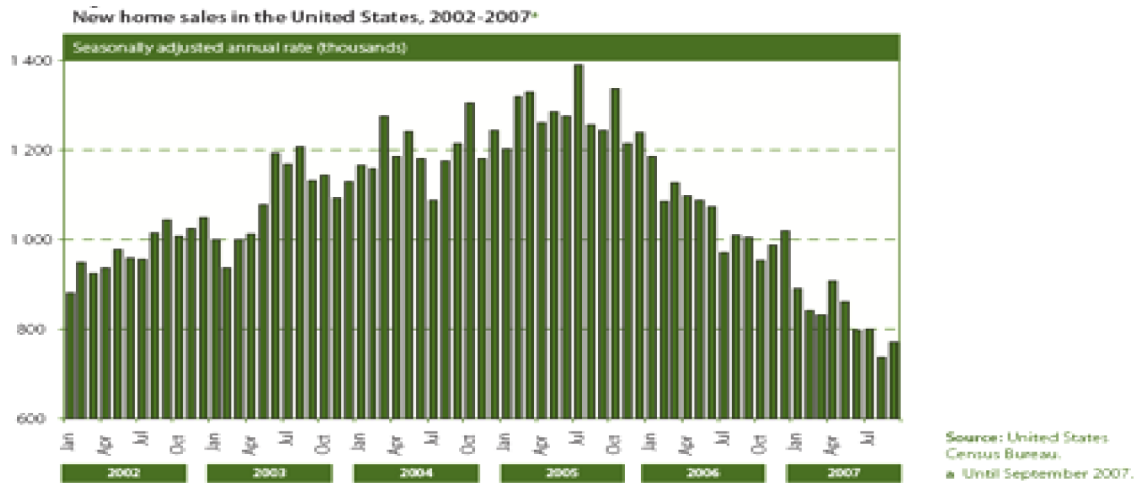
Houses are at the heart of subprime crisis, and their psychological appeal extends beyond utilitarian benefits. Homeowners' aspirations propelled many into houses they could not afford and these aspirations evoked emotions and cognitive errors, blinding homeowners to risk. A

mortgage banker wrote that home buyers were willing to sign anything placed in front of them. “After witnessing literally thousands of signings,” he wrote, “I will tell you that most people are so focused on getting into their new home that they have no idea what it was they just signed.” (Sanders, 2007). This led to a real estate “bubble”: that, by 2006, due to, irrational thinking, real estate prices had been pushed up to unsustainably high levels. According to a common narrative, the bubble burst, triggering widespread defaults on subprime loans, dragging down the value of banks’ subprime-linked holdings, and setting off a run on the banking system. The economists accused the sudden increase in the interest rates by the federal reserve board by seventeen times during this period.

Almost all the institutions connected with the housing loans were afflicted by behavioural biases. *Overconfidence* is being expressed when Aspirations for wealth and status blinded both buyers for homes as well as bankers to the risks they were taking when mortgages and mortgage securities were issued by bankers after converting the loans. Risk assumptions by home owners describe some of the biases that affected managers of companies associated with mortgage securities as they sped along the road which ended in the subprime crisis. Overconfident Merrill Lynch executives sidelined their company’s most experienced risk managers and proceeded to boost their company’s exposure to subprime mortgages. Investment bankers at UBS were under the biasness of *confirmation errors*, searching for evidence confirming their rosy assessments of the subprime markets and ignoring disconfirming evidence gathered by their own analysts. Analysts at the financial products division of AIG were also misled by *categorizing errors*, effectively relegating to a single category the credit default swaps (CSD) they were selling, ignoring differences in the subprime composition of mortgage pools. And executives at Standard and Poor’s, aspiring to enhance their wealth and position, chose to lower their standards for rating mortgage securities rather than lose business to competitors. American culture of owing the homes, encouraged by government, deepened the crisis further. The culture of owing home gets substantiate by the statement from President Clinton who declared in 1994: “More Americans should own their own homes, for reasons that are economic and tangible, and reasons that emotional and intangible, but go to the heart of what it means to harbor, to nourish, to expand the American Dream. So did a culture where mortgage debt is accepted, even applauded. Corporations were eager to cater to the culture of homeownership, financed by mortgages. Countrywide Financial was the largest mortgage lender in the country before it nearly collapsed

into bankruptcy in 2008 and was acquired by Bank of America. The whole institutional set up was propagating the subprime borrowers to go for mortgages. the biases at the background were overconfidence to confirmation errors to extrapolation of the trend.

Figure 1: Drop in New Home Sales



However, this greed to get richer by buying the lottery of home ownership blinded the economists. Even Ben Bernanke said in 2005 that home-price increases “largely reflect strong economic fundamentals.” This comes out of the great faith in the rationality of the investors and efficiency of the markets arguing that prices of assets are always right. Four years later, testifying before Congress in 2008, the same and now sane economist Greenspan said: “Those of us who have looked to the self-interest of lending institutions to protect shareholders’ equity, myself included, are in a state of shocked disbelief.” And in a 2010 speech Bernanke placed blame for the housing bubble on financial innovations. Bernanke (2010) said: "The availability of these alternative mortgage products...is likely a key explanation of the housing bubble." This is clearly an acceptance by the economists to irrational behaviour of borrowers and overconfidence of the bankers. Desire for homeownership and a culture fostering homeownership interacted with mortgage securities innovated by banks, insured by credit default swaps, and rated erroneously by rating agencies like Standards and Poors or FITCH all explain the irrational behaviour. Unrealistic optimism which Keynes associated with booms was paramount, to explain the subprime lending at a feverish pitch. U.S. home prices increased from 1997 to 2006 by

approximately 85 percent, adjusted for inflation, fostering the largest national housing boom in the nation's history. The cost of owning houses relative to renting them increased dramatically from 2003 to 2006, suggesting the existence of a bubble, where home prices greatly exceeded their intrinsic values.

The belief in efficient financial markets blinded many, if not most, economists to the emergence of the biggest financial bubble in history. And efficient-market theory also played a significant role in inflating the housing bubble in the first place." The belief that prices are always right gave further fillip to the house prices. However, Bubbles cannot exist in rational markets because bubbles imply deviations of prices from intrinsic values. Gaps between prices and intrinsic values can widen during months and years, before they narrow. This anomaly in the market is a clear reflection of the *cognitive biases*. Investors might not have sufficient funds or courage to sustain their investments during extended periods when their estimates of intrinsic values are right prices in the markets continue to be wrong due to irrationality pervading . "the subprime residential mortgage securities (RMBS) bonds resulting from the securitization often populated the underlying portfolios of collateralized debt obligations (CDOs), which in turn were often designed for managed, amortizing, portfolios of asset-backed securities (ABS), RMBS, and commercial mortgage securities (CMBS). CDO tranches were then often sold to various investors all over the world. Moreover, additional subprime securitization risk was created... synthetically via credit default swaps as inputs into CDOs. This nesting or interlinking of securities, structures, and derivatives resulted in a loss of information and ultimately in a loss of confidence. It was almost impossible to looking through the underlying mortgages. These were deliberately created risky innovative products and everybody was ready to accept these risky instruments. Acceptance of these risky instruments was primarily on the faith and *overconfidence* that the products are right and shall not default.

Over extrapolation of trend: Investors who even inferred that current prices exceed intrinsic values still chose to ride the bubble by buying overpriced assets rather than sell them, expecting the bubble to inflate further, and hoping to sell later on before the bubble deflates. This is known in the behavioural finance as over extrapolation of the trend. Such investors move prices further away from intrinsic values rather than closer to them. This clearly substantiates the argument that irrationality in the real world can prevail for longer than the justifiable periods of time.

Cognitive errors and bubbles: Investors in a real world are hampered by a failure of securities prices to properly aggregate bits of information available to each investor into complete mosaics reflecting the intrinsic values of securities or other assets. For example, some investors might be excessively optimistic, some excessively pessimistic, whereas others are ‘smart-money’ investors, free of cognitive errors and misleading emotions. When majority of these investors are overly bullish the bubble gets formed and may continue for longer than expectations and when they get highly demoralized because of the fear of price crash ,the bubble gets busted and the decline continues .

Availability bias and Limits to arbitrage: Rational prices exist when investor errors are not systematic or not concentrated. Yet there is much evidence that errors tend to be systematic. For example, investors are commonly misled by availability bias, where they overweight bits of information readily available to memory, while underweighting equally important bits of information not readily available to memory. To understand the role of concentration in the formation of non-rational prices, consider the evolution of a bubble. Imagine a stock market / housing market with optimistic investors and pessimistic ones. Assume that errors at the outset are neither systematic nor concentrated, such that stock/house prices are rational initially, equal to their intrinsic values. Now imagine a long run of good news, accompanied by increases in stock / property prices. Optimistic investors find that their bets have paid off handsomely, while pessimistic investors find that their bets have not. As a result, wealth shifts to optimist investors who took the buying positions.

If these hopefuls remain optimistic, then the shift in their relative wealth leads optimism to be concentrated among the more wealthy investors. This concentration tends to inflate the prices of assets above their intrinsic values, creating bubbles. Optimists might even ride these bubbles with leveraged positions/ Mortgage loans. Moreover, if bubbles last long enough, some pessimists might become persuaded that they were wrong to be pessimists and turn into optimists. These turncoats –bears getting converted into bulls because they missed the bus in terms of rising prices of houses shall go for borrowing to buy houses which shall perpetuate bubbles. Some pessimists may remain true to their pessimistic beliefs and these beliefs are indeed directionally correct. They can engage in arbitrage, making bets large enough to eliminate bubbles by pushing prices down to their rational levels. But pessimists are not likely to make

large bets because large bets are very risky. This limits arbitrage and leaves bubbles inflated. That explains the continued prices rise of houses from 1996 till 2006 without interruptions making people believe that house prices can never come down. This acted as a strong premise for overconfidence of borrowers as well lenders.

Inefficiency of the markets: Behavioral finance is perceived by some as a repudiation of the efficient markets hypothesis. And the subprime crisis seems to provide one more piece of evidence, if one were needed, that markets are indeed not efficient. Yet discussions about market efficiency are muddled because the definition of efficient markets as rational markets is confused with their definition as unbeatable markets. *Free markets* are markets where, in their extreme form, government puts no imprint on economic activities. In their moderate form, they are markets where government puts little imprint. Free markets are often confused with efficient markets in their form as rational markets.

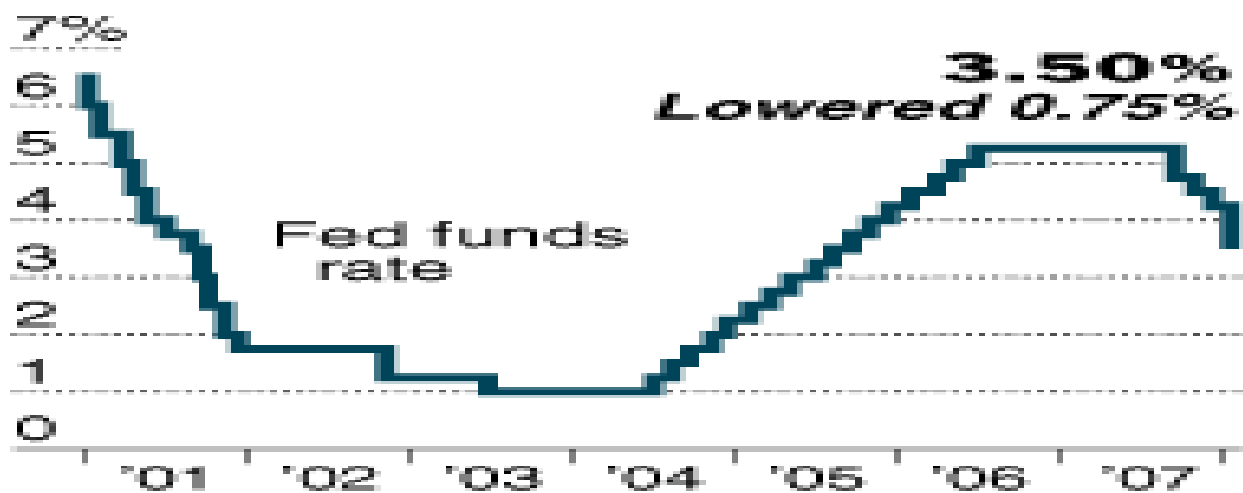
That there exists no serious danger of a derivatives-induced financial collapse was the outcome of the strong belief that the markets are rational as well free markets and some of the economists went to the extent and argued that the " and that financial market disasters tend to be policy disasters committed by government entities, such as the Federal Reserve Bank, rather than by free financial markets. However, behavioural finance economists will have different answer for these financial disasters.

It is argued that free markets can easily be confused with rational markets version of efficient markets because proponents of one are often also proponents of the other too. But the two are distinct. Consider a rational market which is also free of government regulations of pollution emitted by power plants owned by utilities. Now imagine that the government enacts regulations limiting pollution, imposing fresh costs on utilities and reducing the intrinsic value of their shares. The market can remain rational if share prices drop instantaneously to equal the new intrinsic value, but the market is no longer as free as it has been. A central bank of a country takes interest in financial markets, in major part, because markets serve as allocators of capital. Capital is allocated productively in rational markets since prices which equal intrinsic values send correct signals as to where capital should be allocated. But capital is misallocated in bubbles, when prices deviate from intrinsic values or when irrationality is profusely pervading. If people keep on buying the shares of Enron in US and Satyam in India because of the bubbles it is

primarily on account of the excessive greed which throws sanity and sensibility up in the air. Free markets are best if they result in rational markets, but central bank intervention, such as popping bubbles, might be called for in markets which are not rational.

Federal Reserve Bank which identifies bubbles is likely to pop real bubbles, doing much good, or illusory bubbles, doing much harm. A belief that bubbles cannot exist is dangerous, but so is a belief that bubbles are easy to identify. “We know when irrational exuberance unduly escalates asset values, which then become subject to unexpected and prolonged contraction after the bubble has busted? The dot-com bubble did not bust for another five years, busting only after the Fed raised interest rates six times from June 1999 to May 2000. So the cause cannot be thought to be Federal Reserve Board but the cause of excessive greed and overconfidence followed by excessive fear. The housing bubble of 1997-2006 came to an end after the Fed engaged in seventeen consecutive interest rate hikes between June 2004 and June 2006. There was no consensus that a bubble was underway before it burst. The great economists like Greenspan too learned that after a long time when the subprime crisis busted that the bubble was getting formed.

Figure 2: Fed’s Benchmark Rate



Sources: Federal Reserve

2 Bubbles and Behavioral finance

The perspective on rational prices and bubbles corresponds to Keynes’ ideas on economic expansions and downturns, bubbles, financial crises, rational pricing, and psychology. Keynes

had written long ago extensively about psychology and focused on concepts at the centre of behavioral finance, such as optimism, confidence, and sentiment. Keynes applied these concepts in assessing conditions where securities prices are not rational, and in describing how bubbles develop and burst. Writing about the psychology of financial booms and crises, Keynes noted: “The later stages of the boom are characterized by optimistic expectations as to the future yield of capital goods...of speculators who are more concerned with forecasting the next shift of market sentiment than with a reasonable estimate of the future yield of capital assets, that when disillusion falls upon an over-optimistic and over-bought market, it should fall with sudden and even catastrophic force. Moreover, the dismay and uncertainty as to the future which accompanies a collapse in the marginal efficiency of capital naturally precipitates a sharp increase in liquidity preference... it is not so easy to revive the marginal efficiency of capital, determined as it is by the uncontrollable and disobedient psychology of the business world. The concept of “animal spirits” and a beauty contest analogy describes the behavior of investors in financial markets and the impact of their behavior on asset prices.

3 Asset Prices and Average expectations

In the beauty-contest analogy, Keynes argued that the price of a stock does not necessarily equal its intrinsic value. Rather, it equals the average of investors’ subjective valuations of that stock. Moreover, investors are not driven to find the intrinsic values of stocks. Instead, they are driven to buy the stocks other investors will find ‘beautiful.’ “Thus certain classes of investments are governed by the average expectation of those who deal on the Stock Exchange as revealed in the price of shares”. The analogy was applicable during subprime borrowing when people were buying houses in US even when prices had already risen and they continued to buy because people were considering that the public in general were still liking them and calling them beautiful.

Keynes was forceful in his view that an assumption that prices are rational is unwarranted. He wrote: “We are assuming, in effect, that the existing market valuation, however arrived at, is uniquely *correct* in relation to our existing knowledge of the facts which will influence the yield of the investment, and it will only change in proportion to changes in this knowledge; though philosophically speaking, it cannot be uniquely correct, since our existing knowledge does not provide a sufficient basis for a calculated mathematical expectation. In point

of fact, all sorts of considerations enter into the market valuation, which is in no way relevant to the prospective yield.” This clearly vindicates the argument that prices of various assets like stocks, bonds, gold or houses may not be expected to be formed out of rational behaviour of an economic man. However, the neoclassical economists forgot the impact of the behaviour on the asset valuations. While economists assimilated some of Keynes’s insights into standard economic theory, they failed to grasp the connection between the financial and real sectors. Specifically, finance is missing from macroeconomic theory, with its focus on capital structure, asset-liability management, agency theory, and contracts. He wrote: “Keynes’s theory revolves around bankers and businessmen making deals on Wall Street. One of the peculiarities of the neoclassical theory that preceded Keynes and the neoclassical synthesis that now predominates economic theory is that neither allows the activities that take place on Wall Street to have any significant impact upon the coordination or lack of coordination of the economy...”.

This inability of the economists to appreciate the real man in action in the real financial world and Financial institutions, such as banks, who become increasingly innovative in their use of financial products when the business cycle expanded, boosting their leverage and funding projects with ever increasing risk provides an explanation of the financial booms and busts. During expansionary periods, new financial instruments and new ways of financing through innovative instruments like CDO’s or CMO’s were created. The defects in these innovative instruments and the new institutions were revealed when the crunch came. This is exactly what happened when CDS were found to be misused for speculation rather than hedging.

4 Financial innovations and subprime crises

Two kinds of housing-related financial innovations were central to the crisis. One relates to the originations of mortgages and the other relates to their securitization. Adjustable rate mortgages (ARMs) have been singled out as financial innovations contributing to the crisis, contrasted unfavorably with fixed-rate mortgages. Yet ARMs come in many varieties, some helpful and likely more stabilizing than fixed-rate mortgages, and some harmful and destabilizing. Plain ARMs can be very helpful, especially when coupled with substantial down-payments. These typically include rates of interest that increase or decrease with a benchmark rate, such as that of one-year Treasury bills. But the initial interest rates in plain ARMs is usually lower than the corresponding rate in a fixed-rate mortgage. Plain Vanilla ARMs can serve

homeowners as hedges superior to fixed-rate mortgages.

Securitization was innovated by Lewis Ranieri and his Salomon Brothers team in the late 1970s, and became popular after the Savings and Loan crisis of the 1980s. The Resolution Trust Corporation, the government body that held nonperforming thrift assets, found it convenient to sell pools of assets instead of individual assets. Second is collateralized debt obligation (CDOs), which divided cash flows from mortgage-backed securities into tranches prioritized by default risk. Mortgage-backed securities were quite opaque, combining many mortgages, and their tranches were even more opaque. Investors gained confidence about holding mortgage-backed securities and their tranches with the introduction of their ratings by rating agencies. Ratings were familiar to investors, whether AAA rating or BAA, and rating agencies, such as Standard & Poor's, were considered as objective and reliable judges of securities quality. The overconfidence in the ratings assigned by the rating agencies was the behaviour explanation of the crisis. Third is the credit default swap (CDSs), effectively an insurance policy against bond default. Actual credit default swaps were used to create synthetic credit default swaps. This again bolstered up the confidence on the financial world that if any default takes place in the loans repayment the bonds are still safe because they are insured by insurers like AIG.

Securitization is not the villain. Abuses in securitization are to blame. "What went wrong?" over-leveraging at every level - beginning with the homebuyer, the lender, the speculator, the Government Sponsored Enterprises, while rating agencies and Wall Street turned a blind eye. Home buyers began treating homes like ATM machines; lenders began offering products that preyed on unsophisticated borrowers, the GSEs loosened their standards and encouraged Alt-A lending and subprime lending, and Wall Street supported their activities and generated fees on the expanded products without any real liability.

Indeed, mortgage securities, like most financial innovations, begin as attempts to do good, helping people buy houses. Yet the promise of good and the profits generated along the way tend to blind the players. Mortgage securities did not have to make it easy for homeowners to treat their houses like ATMs, but they did. Mortgage securities did not have to lead lenders to lower their lending standards, but they did. Money market funds played a role in the crisis, as they bought the commercial paper sold by the financial firms in order to purchase mortgages to package into mortgage securities.. Money market funds were also interesting financial

innovations, on their own, illustrating how the desire to provide benefits, including psychological benefits, can exacerbate crises. The belief in the rational investors and efficient markets generating right pricing as well overconfident environs created a strong premise of the bubble which had to burst one or the other day.

Prospect Theory: It may be useful to look at the theories of asset market overvaluation that already exist in the behavioural finance literature explain the subprime crisis. The theories can be categorized based on whether they focus on investor *beliefs* or on investor *preferences*. One of the belief-based theories of overvaluation argues that bubbles arise because investors extrapolate past outcomes – returns, earnings growth, price rise or default rates -- too far into the future. This assumption is usually motivated by Kahneman and Tversky's (1974) representativeness heuristic. According to this heuristic, people expect even small samples of data to reflect the properties of the parent population.

As a result, they draw overly strong inferences from these small samples, and this can lead to over-extrapolation. One implication of Kahneman and Tversky's (1979) prospect theory, articulated in Shefrin and Statman's (2000) behavioral portfolio theory, is that people whose incomes fall short of their aspirations are inclined to take great risk as they strive to reach their aspirations. People whose wealth exceeds their aspirations are less inclined to take risk. Indeed, Koedijk, Pownall and Statman (2011) found that people whose aspirations exceed their incomes are more willing to take risk than people with equal incomes but lower aspirations. They also found that competitive people are more willing to take risk than people with equal incomes who are less competitive. This explains that the subprime borrowers who were have less or no incomes were more inclined to go for borrowings to buy houses through mortgages.

Overconfidence: Reasoning for the subprime crisis out of bubble formation is based on overconfidence -- specifically, on the idea that people overestimate the precision of their forecasts .According to this theory, when investors, in an effort to estimate an asset's fundamental value, gather and analyze information, they become overconfident about the usefulness of this information. For example, if they uncover favorable information about the asset, their overconfidence about how reliable the information is leads them to push the price of the asset up too high.

House Money Effects: While most models of bubble formation are belief-based, there are also

some preference-based models. One theory, for example, argues that, after investors experience gains in their holdings of an asset, they become less risk averse because of a “house money” effect: in short, having experienced gains, they are less concerned about future losses because any losses will be cushioned by the prior gains. Their reduced risk aversion leads them to buy the asset even more enthusiastically, thereby pushing its price up even further.

Overweighing Low probabilities: Another, quite different preference-based model of overvaluation argues that bubbles are particularly likely to occur in stocks related to a new technology. The reason is that investors view these stocks as lottery-like: should the new technology deliver on its early promise, some of the stocks may experience huge increases in value. Given that many people have a strong preference for lottery-like payoffs – perhaps because, as Kahneman and Tversky (1979) argue, the brain overweighs low probabilities – they may overvalue these stocks. A theory of this type may be particularly suited to thinking about the high valuations of U.S. technology stocks in the late 1990s.

For understanding the recent behavior of the real estate market and subprime crisis is the model that argues that bubbles occur because, perhaps due to the representativeness heuristic, people over-extrapolate the past when making forecasts about the future. On one level, we can apply this idea to home buyers and say that, when forecasting the future growth in house prices, they over-extrapolated the past growth in these prices. This led them to overpay for their new homes and to take out loans with excessively high loan-to-value ratios. This gets also supported by the argument that overconfident investors & bankers felt that prices can’t come down.

In order to generate a real estate bubble, however, it is not enough to assume that households were over-extrapolating. Even those people involved in the provision of this outside financing were *also* over-extrapolating as well as overconfident about the escalating house prices. A real estate bubble formed because of an oversupply of credit to home buyers, principally in the form of subprime loans. This, in turn, occurred because, through the process of securitization, the subprime loans could be used to manufacture securities that investors were very enthusiastic about, namely securities with AAA ratings. Crucially, investors were *too* enthusiastic about these securities, because the AAA ratings were often not truly deserved.

It is here, in the rating agencies, that over-extrapolation may have had its greatest impact. The agencies may have given AAA ratings to securities that did not truly deserve them because

they extrapolated the past growth in home prices too far into the future, which, in turn, led them to severely underestimate the level of future subprime defaults. They too were overconfident that house prices shall always soar. The over-extrapolation may have occurred because analysts naively applied the representativeness heuristic; but it may also have occurred because they *wanted* to believe that house prices would keep rising, a belief that the *representativeness heuristic* made it particularly easy to embrace.

5 Cognitive Dissonance as an Explanation of Behavior Bias of Banking System

The plunge in real estate prices was far more devastating to the U.S. economy over the course of several years leading up to 2007, banks built up large holdings of subprime loans and of subprime-linked securities. When house prices started falling, the value of these holdings also fell, triggering a crippling run on the banking system. This, in turn, led to a reduction in the supply of credit to the economy. How can we understand banks' large holdings of subprime loans and of related securities? Banks' subprime-linked holdings carried some very significant risks. If house prices were to fall, the value of these holdings would drop precipitously. Given that the banks were highly levered, often with short-term debt, this could have severe consequences. A crucial puzzle therefore remains: Why, in spite of the risk, did banks take on the exposures they did? People on the mortgage desks of banks were *aware* that, through their activities, they were exposing their institutions to significant risk; but that they simply did not care, because their compensation schemes did not force them to face the consequences of the risks they were taking. In many cases, they were compensated largely on the size of the deals they were structuring, and not on the long-term performance of those deals. The people on the mortgage desks of banks were genuinely unaware of the risk embedded in their subprime holdings, and that this was due to faulty reasoning. For example, they, too, may have extrapolated the past growth in real estate prices too far into the future. The models they used to value their positions incorporated this faulty belief, and, as a result, did not reveal any alarming risks. Traders on mortgage desks were vaguely aware that their business model might entail serious risks. However, by *manipulating their beliefs*, they deluded themselves into thinking that their business model was *not* risky, but rather, worth pursuing.

One way to put this idea on firmer psychological footing is through the concept of *cognitive dissonance*. Cognitive dissonance is the discomfort we feel when we take an action that

conflicts with our typically positive self-image. Of particular importance is what people often do to remove the feeling of discomfort: they manipulate their beliefs. If a trader on the mortgage desk of a bank begins to sense that the holdings of subprime securities he is building up may pose serious risks to his institution and to the broader financial system, this will threaten his positive self-image – specifically, his self-image as an upstanding person whose work is valuable to society – and will therefore create uncomfortable dissonance. After all, he does not want to believe that, while enriching himself, he is putting many others at risk. To remove the dissonance, he could resign his position – but that would be financially costly. Instead, he manipulates his beliefs, telling himself that his business model is *not* that risky. For example, he might stop himself from inspecting the quality of the subprime loans he is working with too closely, lest he stumble on some disturbing information. The cognitive dissonance therefore explains the continued risky lending by the bankers despite their acceptance of the fact the their lending is risky to the financial system.

A similar mechanism had been at work in the credit rating agencies. On the one hand, an analyst at a rating agency who was being asked, by an issuing bank, to give a subprime-linked product a AAA rating, had a strong financial incentive to do so, even if the rating seemed undeserved: by rating the product AAA, he would avoid losing the business to another rating agency, thereby allowing both him and his firm to earn more money that quarter. On the other hand, the analyst would also want to be able to maintain a positive self-image: to be able to think of himself as a responsible person providing a useful service to society. Giving a AAA rating to a product that did not deserve one would make it hard to maintain a positive self-image and would immediately induce dissonance.

As with the traders on the mortgage desks of banks, the analyst may have reacted to the uncomfortable feeling of dissonance by manipulating his beliefs: by telling himself that the product he was analysing was perhaps not that risky after all, and therefore deserving of the AAA rating. For example, he may have told himself that, since house prices had been rising for years, they were likely to keep rising, thereby ensuring that subprime defaults would remain low. The *representativeness heuristic* would have made this argument seem quite plausible: after all, according to that heuristic, people have a natural tendency to believe that past trends *will* continue into the future. The representative heuristics helped the cognitive dissonance take a

strong footing and the misdeeds continued with great belief in the financial system that it is too strong to collapse.

6. Aspirations and Subprime Crisis

The subprime crisis could have been prevented. There would have been no foreclosures of homes financed by subprime mortgages if no subprime mortgages were granted, and no failures of banks holding them. Yet consider aspirations for houses, tradeoffs in crisis prevention, and tugs-of-war powered by ideology and self-interest continued with the subprime lending as a normal business of borrowing and lending.

"Men will and do take great risks to distinguish themselves even when they know what the risks are," wrote Friedman and Savage (1948). It is easy to characterize poor subprime borrowers as risk seekers, eager to buy houses as one buys lottery tickets, and losing them in the crisis. But aspirations for houses of their own drove subprime borrowers, and risk was merely payment for a chance to reach their aspirations. Sharon and Russ Gornie, a young couple with children aspired to own a dream house. "This is our dream house," said Sharon, pointing to blueprints of a house. "We look at it when we are off to work in the morning and when we come home tired. . . . Isn't it beautiful?" The rich, whether on Wall Street or Main Street, often join the poor in aspirations for more. Some with two houses aspire for three. Since the price of the first house went up it bolsters up the confidence to buy the other one with mortgage borrowing --- an expression of the overconfidence bias.

One implication of Kahneman and Tversky's (1979) prospect theory, articulated in Shefrin and Statman's (2000) behavioral portfolio theory, is that people whose incomes fall short of their aspirations are inclined to take great risk as they strive to reach their aspirations. People whose wealth exceeds their aspirations are less inclined to take risk. Indeed, Koedijk, Pownall and Statman (2011) found that people whose aspirations exceed their incomes are more willing to take risk than people with equal incomes but lower aspirations. They also found that competitive people are more willing to take risk than people with equal incomes who are less competitive. Aspirations for homes of our own drive us even if we should be guided by utilitarian benefits to rent rather than own. We are seduced by the expressive and emotional benefits of beautiful dream houses. We take pride in home ownership and feel powerful, knowing that no landlord can kick us out. We take comfort in our freedom to drill holes in walls

for hooks to hold our favorite paintings. The pull of home ownership remains strong even now, when the pain of the crisis is searing. A 2011 poll by New York Times/CBS News revealed, as Streitfeld and Thee-Brenan (2011) wrote, that "Owning a house remains central to Americans' sense of well-being, even as many doubt their home is a good investment after a punishing recession. Nearly nine in 10 Americans say homeownership is an important part of the American dream...". Aspirations and the culture in which they are embedded explain subsidies extended to American homeowners for many decades, channeled through Fannie Mae, Freddie Mac, and the Federal Housing Administration. As Shiller (2010) wrote, American culture contains "a long-standing feeling that owning homes in healthy communities is connected to individual liberties that embody our national identity. Historically, homeownership has been associated with freedom, while renting — often in tenements or mill villages — has been linked to the oppression of a landlord."

7 Conclusions

Psychology is at the centre of behavioral finance and psychology underlies much of our subprime crisis. That psychology includes aspirations, cognition, emotions, biasness, sentiments, and perceptions of fairness. Expectations of the lottery like profits propelled many renters into houses they could not afford, evoking emotions and cognitive errors that blinded subprime borrowers to risk. And a culture where house ownership is central to the American Dream deepened the crisis further. Aspirations for wealth and status blinded bankers and mortgage lenders to the risk of mortgages and mortgage securities. Overconfident bankers side-lined risk managers and proceeded to boost their company's leverage by borrowing more and more . And much of the public and its political leaders were impressed upon that regulations are unnecessary because free markets are not only inherently efficient, but also inherently fair was their presupposition. This overconfidence in the efficiency in the market and fairness of the prevailing prices perpetuated the excessive financing support by banks to subprime borrowers. Cognitive dissonance of the bankers made them turn a blind eye towards the risky business they were continuing.

Psychology is also at the centre of much of the writings of Keynes. Long ago, Keynes identified the psychology that hurls financial markets and economies up into booms and down into busts. The destabilizing effects of financial innovations, the role of euphoria, and the skill of

bankers at outmaneuvering regulators were the source of the crisis. These policies include a role for the Federal Reserve Bank in restraining speculative finance, and government actions in the wake of a crisis, running budget deficits, instituting direct employment programs, and acting as a lender-of-last-resort. However, the keynes was forgotten when the foundations of the subprime borrowings were laid down.

In general, the field of behavioral finance takes a favorable view of financial innovation. After all, a major theme of behavioral finance research is that people often make suboptimal financial decisions. If this is the case, then financial innovations can play a useful role in helping people to make better decisions. Indeed, over the past few years, a new branch of behavioral finance has emerged – a branch sometimes known as “prescriptive behavioral finance” – whose goal is precisely to design innovations that can help people achieve better financial outcomes. While financial innovations can be useful in preventing psychological factors from leading people astray, the discussion above suggests that the same psychological factors can make certain innovations dangerous. This may be particularly true for innovations that are complex. If an innovation is complex, it is easier for people supplying the innovation to convince themselves that it is not flawed, even if in fact, it is; this may then lead them to market the innovation too aggressively. Moreover, the failure of a complex financial innovation may have large amplifying effects because it may cause investors to feel less competent at analyzing risky assets in general and hence to drive the prices of these assets down. The financial innovations like CDOS, CMOS and CDS were wonderful instruments helping the subprime lending.

Most of the ideas for financial reform that have been proposed over the past few years were aimed at the institutional failures that contributed to the crisis. While it is true that psychological factors were also central to the crisis. As such, it may be important to think about reforms that can address both the institutional and the psychological failures. In short, the financial crisis presents finance researchers, and perhaps behavioral finance researchers in particular, with a challenge: to design a financial system that can mute the impact of irrational thinking, and prevent it from adversely affecting the real economy in the way that it did during subprime. This is a difficult challenge – but it may be one of the most important facing us today. Can we hope that next time will be different? Financial crises come much too often to leave us without much hope. The crisis of 1974-75 was almost as long and severe as the Great Recession

of 2007-2009. The twin Reagan-era recessions of the 1980s brought high unemployment and were followed by a sovereign debt crisis and an S&L crisis. The foreign currency crisis of the 1990s required action to dispose of Long Term Capital Management without breaking the global financial system. And the recent subprime housing bubble followed a stock market bubble and crash in the stock prices not only in US but in majority of the other countries too.

Our world will always be uncertain, unfolding in unexpected ways. Hindsight misleads us into thinking that we can see future crises as clearly as we can see past ones, and find policies which can avert them. That would help us easily prevent future crises. Moreover, we would be unable to implement policies which prevent crises even if we could identify them because those who would lose stand in the way. Limiting bank leverage might be good policy for averting crises, but bankers have the clout to resist it. We are left to remind ourselves of our psychological fallibilities and behavioral biases so that we can avert some crises and mitigate others. We need, therefore, to awaken ourselves that the behavioral understanding and its teaching to the financial mathematicians called Financial wiz kids so that they delimit their support for financial innovations to a level where the misuse of these financial innovations with great overconfidence lead to financial crises.

8 References

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