



## Collateral Value and Subprime Loans

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### Abstract

In this paper, we overview studies on the subprime crisis and consider how the lending boom translated into a crisis by focusing on the role of collateral. In brief, the cause for the commencement of subprime lending was optimistic expectations that housing prices would increase continuously such that lenders could seize sufficient value of collateral to cover the entire loan repayment. However, once prices deteriorated, investors began to sell assets and the collateral value depreciated. Accordingly, subprime loans were no longer solvent, and this obliged investors to further sell the underlying assets. We discuss how the specific nature of subprime lending affects this boom-bust phenomenon.

JEL classification codes: E30; G01; G21

Keywords: bubble, collateral, the subprime crisis

### 1. Introduction

From 2004 to 2006, there was a record boom in the US housing market. Previously, the US economy had enjoyed stable economic growth with high employment and expanding consumption combined with growing asset prices. However, housing investment began to fall and housing prices decreased from 2006. On June 2007, the subprime mortgage market crisis began, ultimately affecting not only the US, but also Asia, Australia, and Europe in the form of financial failures.

An important aspect of the crisis is collateral-based lending. During the boom, lenders provided credit, even to very risky borrowers, because they could seize a sufficient amount of collateral if the borrowers failed to repay. However, during the crisis these same lenders displayed a considerable reluctance to lend for fear that the mortgage market would depreciate and they would be unable to obtain the full value of credit. In this paper, we especially

overview the theoretical literature dealing with the subprime crisis from the viewpoint of collateral. After discussing this body of work, we find that these contributions have common ground with asset bubbles found in many countries in the past, e.g., Japan and Scandinavia. However, the exact form of ‘subprime’ lending has some specific aspects that also deserve attention.

The paper is structured as follows. Section 2 introduces the literature and the conduct of subprime lending during the housing market boom. Section 3 explains the mechanism underlying the downward market spiral after housing prices deteriorated. Section 4 concludes.

## 2. A subprime lending boom

What does the term ‘subprime’ mean in the first place? According to the Office of Thrift Supervision of US department of the Treasury, it refers to the credit characteristics of individual borrowers which may include one or more of the following:

- Two or more 30-day delinquencies in the last 12 months, or one or more 60-day delinquencies in the last 24 months;
- Judgment, foreclosure, repossession, or charge-off in the prior 24 months;
- Bankruptcy in the last 5 years;
- Relatively high default probability as evidenced by, for example, a credit bureau risk score (FICO) of 660 or below (depending on the product/collateral), or other bureau or proprietary scores with an equivalent default probability likelihood;
- Debt service-to-income ratio of 50% or greater, or otherwise limited ability to cover family living expenses after deducting total monthly debt-service requirements from monthly income.

(Office of Thrift Supervision, “Expanding Guidance for Subprime Lending Programs”, 2001)

Note that it is also described that this list is illustrative rather than exhaustive and is not meant to define specific parameters for all subprime borrowers and this definition may not match all market or institution specific subprime definitions. Although this is not an exact definition, what we call subprime borrowers typically has weakened credit histories and may also display reduced repayment capacity as shown by the list. Therefore, it can be said that subprime loans have a higher risk of default than loans to prime borrowers.

In the first half of the 2000's, housing prices increased rapidly in the US. The Federal

Reserve Board cut the interest rate and the population number was increasing then. Accordingly, adjustable-rate mortgages became used especially among subprime borrowers. These are loans secured by the mortgage where the interest rate is periodically adjusted based on a variety of indices. If the situation becomes worse, they are forced to pay higher rate. Borrowers believed that housing prices would increase continuously, and, therefore, they expected to be compensated by rapidly increasing home prices. Consequently, they thought that the high collateral value would permit them to refinance at a lower rate. The risky form of borrowing came out in this way.

Lenders (typically, banks) also believed the housing prices would rise and this belief made investment decisions or monitoring attitudes loose. Niinimäki (2009) constructs a theoretical framework in which banks lend subprime borrowers and their loans are secured by house property (collateral). Even when a borrower fails to earn sufficient income to repay the loan, the bank does not face a loan loss if the housing price rises during the loan period such that it covers the amount of repayment. More specifically, most borrowers have the ability to repay their loans and a few borrowers are unable to return the debt, but the bank can seize the collateral and extract the whole loan repayment. Therefore, each loan yields the repayment and the bank makes handsome profits if the collateral value rises. If the price of the house property depreciates, the bank fails, since the defaulted loans yield low income to the bank due to the depreciated collateral value. In these settings, they show that the banks are de facto gambling with the future value of house property; that is, the bank finances risky projects against collateral and relies on the rising collateral value. Shiller (2008) provides evidence that banks did not prepare for the risk. He described as follows: "...by the end of 2007 banks were begging to be relieved from the requirements of Financial Accounting Standard 114. This rule, issued by the Financial Accounting Standard Board, requires banks to report bad loans (so-called impaired loans) based on the present value of future cash flows. It is an attempt to standardize the reporting of such liabilities and thus make it harder to conceal them in regulatory filings. The banks prospected that they had never developed the computing power to handle the volume of such loan restructuring. They didn't develop it because they absolutely did not see the crisis coming." Moreover, banks financed these risky investments with short-term debt.

Even regulators could not expect the sudden price decrease of houses. Alan Greenspan described in his autobiography that he considered the possibility of bubbles. However, he concluded that the bubble was not tangible enough to justify any policy change (Greenspan 2007). Any policy stance to prevent the risky lending had not been taken until the 2006's collapse of housing prices.

### 3. The collapse of collateral value and the subprime crisis

US home prices began to fall in the middle of 2006. As the housing market deteriorated, the perceived risk of subprime lending increased because banks failed to seize sufficient value of collateral to cover the entire loan repayment. Moreover, it became difficult to roll over short-term loans against these mortgage-based lending. Banks were thus forced to sell the assets they could no longer finance, and the value of these assets decreased. As valuation losses eroded bank capital, banks found it even harder to obtain the necessary short-term financing. Kashyap et al. (2008) called such a feedback loop that spawned a downward spiral as 'fire sale' externalities. They explain a basic mechanism of this externalities as follows: when bank A adjusts by liquidating assets — e.g., it may sell off some of its mortgage backed securities — it imposes a cost on another bank B who holds the same assets: the mark-to-market price of B's assets will be pushed down, putting pressure on B's capital position and in turn forcing it to liquidate some of its positions. Thus selling by one bank begets selling by others, and so on. Moreover, such a vicious circle slowed the whole economy. A lot of theoretical contributions have studied this kind of externalities-e.g., Allen and Gale (2005), Brunnermeier and Pedersen (2009), Kyle and Xiong (2001), Gromb and Vayanos (2002), Morris and Shin (2004), and Shleifer and Vishny (1997). However, these studies have not dealt with subprime loan crisis specifically.

Bebchuk and Goldstein (2010) focus on the aspect that financial firms have displayed considerable reluctance to extend loans to nonfinancial firms (as well as households) in the subprime crisis. They construct the model in which banks rationally avoid lending to nonfinancial firms (operating firms) that have projects that would be worthy if banks did not withdraw from the lending market en masse. Banks do so out of self-fulfilling fear, validated in equilibrium, that other banks would withhold loans and that operating firms would not be able to succeed in an environment in which other operating firms fail to obtain financing. Moreover, they derive several policy implications.

Indeed, the potential for contagion effects has been of particular concern in the financial panic of the crisis where insolvent bank liquidations and asset sell offs impose fire-sale externalities on the economy at large. Benmelech and Bergman (2010) use a novel dataset of secured debt tranches issued by US airlines which includes a detailed description of the underlying assets serving as collateral and shows that bankrupt firms impose negative externalities on their non-bankrupt competitors through a collateral channel mechanism in which industry bankruptcies lead to reductions in collateral values of other industry participants. This, in turn, increases the cost of external debt finance across the industry.

#### 4. Conclusion

The principal explanation for the beginning of subprime lending was optimistic expectations that US housing prices would continuously increase such that lenders could seize sufficient collateral to cover credit. However, once housing prices began to fall, investors began to sell assets and collateral values depreciated. As a result, subprime loans were no longer solvent and this obliged investors to sell the underlying assets. According to Shiller (2008), most people in the US, including borrowers, lenders, and regulators, did not expect that prices would fall rapidly during the housing market boom. This is a typical phenomenon when asset prices are booming (Kindleberger, 2005). Moreover, the opinion that the optimistic expectation of future collateral value causes reckless lending was a commonly held view during the 1980s in Japan, Norway, Finland, and Sweden. As there, reckless lending sowed the seeds of the ensuing crises. A specific feature of the subprime crisis is that subprime borrowers are typically risky and these directly influence collateral values because subprime borrowing during the crisis period is usually for the purchase of housing. The increase in subprime lending raises the collateral value (the price of housing property) and this ultimately increases lending to subprime borrowers. In contrast, the decrease in lending reduces collateral value because demand in the housing market decreases if the subprime borrowers cannot obtain funding and fail to purchase housing assets. Furthermore, this decrease in collateral value will heighten the prospect that the lenders become insolvent as subprime borrowers are more prone to default than prime borrowers. Consequently, lending will decrease in a form of fire sale externality. Indeed, many theoretical studies argue that collateral-based lending amplifies the business cycle: see the seminal work by Kiyotaki and Moore (1997). It would then appear that subprime loans strengthen amplification of the business cycle. Further, subprime lending during the period of the boom could also be the cause of subsequent downturns, although more detailed analysis is required on this matter.

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