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Using Minsky's Cushions of Safety to Analyse the Crisis in the U.S. Subprime Mortgage Market

Jan Kregel

Abstract

Hyman P. Minsky's financial fragility hypothesis appears highly relevant in understanding the current crisis in the financial systems of developed countries. His most important contribution to our understanding of the logic of repeated financial crises under capitalism is that of endogenous instability, expressed in terms of a declining 'margin' or 'cushion' of safety in financial transactions and an increase in financial leverage that he called 'layering.' However, the paper also argues that the current crisis differs in important respects from the traditional analysis of a Minsky crisis. These differences have had a significant impact on the way the crisis has evolved.

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The author is Distinguished Research Professor,
Centre for Full Employment & Price Stability,
University of Missouri, Kansas City, USA and
Senior Scholar, Levy Economics Institute of Bard
College, USA

Email: jankregel@yahoo.com

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Jan Kregel*

Minsky Redux

Many commentators have noted the relevance of Hyman P. Minsky's financial fragility hypothesis to understanding the current crisis in the financial systems of developed countries. Indeed, Minsky has recently appeared in the pages of traditional financial media such as the *Economist*, the *Wall Street Journal*, and the *Financial Times*.¹ He is described as the "obscure economist" who identified highly speculative "Ponzi finance" as an underlying factor in such crises. But identifying Ponzi finance is not the most important contribution Minsky has made to our understanding of the logic of repeated financial crises under capitalism. His approach was based on the idea of endogenous instability—that stability in the economic system generates behaviours that produce fragility, and increasing fragility makes the system more prone to an unstable response to change in financial or other conditions that are relevant to the return on investment projects. Minsky expressed this idea in terms of a declining 'margin' or 'cushion' of safety in financial transactions and an increase in financial leverage that he called 'layering.' However, the current crisis differs in important respects from the traditional analysis of a Minsky crisis. These differences have had a significant impact on the way the crisis has evolved.

Financial Fragility and the Declining Cushion of Safety

Central to Minsky's analysis of financial fragility was the concept of a cushion of safety, an idea associated with the legendary security analyst and hedge fund investor Benjamin Graham.² The 'cushion' covers the margin of error between anticipated returns and the periodic financing costs for an investment project. Minsky analyzed the investment decision from the point of view of the difference between prospective cash receipts and cash commitments that represent the margin of safety. For example, the margin of safety

for a banker lending to a businessman for a particular project would be determined by the difference between the amount loaned and the amount required to finance the project. The margin could also be determined by the realization value of the collateral required of the borrower, the amount of compensating deposits, or any other factor that the banker believed would allow him to recover his loan if future income from the project disappointed expectations.

The idea of increasing financial fragility is built around the slow and imperceptible erosion of margins of safety during conditions of relative stability. When margins have been sufficiently reduced, even the smallest departure of realizations from expectations creates conditions in which firms have to change plans in order to meet fixed cash-flow commitments. This change can mean delayed payments, distress borrowing, or even distress sales of inventory and productive assets. Indeed, the banker may request possession of the collateral behind the loan. The result is a debt deflation process in which “position has to be sold to make position” and the downward pressure on prices raises real debt burdens. Lower prices increase the necessity to sell and reinforce the excess supply, making it even more difficult for the investor to fully repay his/her loan from asset sales.

Endogenous Financial Fragility and Financial Instability

Minsky’s main contribution to the description of these events was to point out that they were inevitable, in the sense that sustained periods of economic stability produce increasing financial fragility. It is common to describe the process of the endogenous creation of financial fragility as one of euphoria, or “bubble” mania. But Minsky always maintained that bankers, who are usually better informed about the overall market environment and potential competitors, are inherently skeptical of the borrower’s estimate of future cash flows, and thus insist on margins of safety. In short, bankers are neither gullible nor irrational. Thus, an endogenous evolutionary process leading to a reduction of margins of safety must be based on something more than euphoria or excessively optimistic expectations.

Even though bankers may have better general knowledge of local competitive conditions or the future plans of competitors, they can have no better knowledge of future conditions than anyone else. As a result, the basic decision to lend is based on the J. P. Morgan rule of “trust” and the creditworthiness of the borrower, not the inherently uncertain predictions about the future success of an investment project.³

Further, since the bank is an ongoing enterprise, the banker not only wants to know how the borrower will repay the loan but also, more importantly, whether the bank can lend to this client again. The decision will be based on the client's credit history (past repayment performance) as much as by expectations of future cash flows. This implies looking backward rather than forward.

In conditions of steady expansion, where errors in estimating future returns are less significant, it is not necessary to assume that bankers become less skeptical or diligent in making credit assessments, or more optimistic in evaluating future earnings, before reducing the margins of safety. It's simply that the universe of borrowing experiences becomes increasingly positive: the expansion itself, rather than any change in evaluation on the part of lenders, validates riskier projects.⁴

The problem of declining margins of safety, then, is the result of the method used to evaluate risk. Based on the J. P. Morgan principle, this process should centre on the credit risk of the borrower, and the use of his/her credit history to determine whether to lend. This is not to say that the banker will not look at the riskiness of the project itself, but as John Maynard Keynes noted, "our knowledge of the factors which govern the yield of an investment some years hence is usually very slight and often negligible" (Keynes, 1936: 149-50). It is thus reasonable that the assessment of the project should align with conventional opinion—that is, lending undertaken by other banks. Over time, bankers will lend to borrowers that they previously refused or to existing borrowers at declining margins of safety, and they will concentrate on lending to projects in particular areas simply because other banks are doing so.⁵ As in any evolutionary process, the participants need not realize what is actually taking place—namely, that the banker is reducing the margins of safety. Indeed, as far as the banker is concerned, the ability of clients to make interest payments is, if anything, improving relative to their past performance. Therefore, the margin of safety does not appear to be declining, since the weight the banker attaches to borrowers who accumulate a positive repayment history increases with continued timely repayments. An analogy is a frequency distribution of success and failure that becomes more and more concentrated around success as the mean—a two-standard deviation margin of safety represents a declining absolute difference between cash inflows and cash outflows.

Both the borrower and the banker become more confident, without any necessity for euphoria or excessive optimism. Thus, increasingly optimistic expectations of the ability to meet cash commitments in a cyclical

expansion represent a rational reaction to the evaluation of past events, as expressed in higher probabilities of success. But, as Keynes pointed out, this success is usually due, not to any particular expertise on the part of the entrepreneur, but to the expansionary environment. The results are excess borrowing, overinvestment, and concentration of risk.

The Sub-prime Crisis, Cushions of Safety, and Ponzi Finance

While it is clear that the current sub-prime mortgage crisis involves both Ponzi financing and declining margins of safety, it is important to recognize that these conditions are produced by a very different process from that described above. Following the decline in the earnings of commercial banks in the United States in the 1980s, regulations limiting banks to deposit-taking and short-term lending were relaxed to allow a wider range of capital market activities, in particular, the creation of affiliates not previously engaged in these activities.

Section 20 of the Glass-Steagall Act of 1933 restricted commercial banks from affiliating with firms “engaged principally” in potentially profitable activities, such as underwriting and dealing in securities. In a series of rulings in the 1980s, the phrase “engaged principally” was interpreted to expand the ability of banks to engage in these activities. The Federal Reserve (Fed) authorized an exemption for such a subsidiary in 1987, and the first securitized investment vehicle was created the following year (reputedly by employees of Citibank London). This regulatory relaxation also allowed securities firms and insurance companies to acquire certain types of depository institutions and “unitary thrifts.”

Thus, the banking system that emerged from the 1980s’ real estate crisis no longer primarily serviced business lending, nor was it primarily dependent on net interest margins for its income. Rather, the system was based on the ability of the banks’ proprietary trading desks to generate profits and, on Section 20 affiliates, to produce fee and commission income. This breakdown in the New Deal regulations eventually led to a major reform of U.S. banking regulation in 1999—the Gramm-Leach-Bliley (Financial Services Modernization) Act—which allowed the creation of bank-holding companies to carry out virtually all types of financial activities. At the same time, the introduction of the Basel minimum capital standards in 1989 encouraged banks to continue to increase their fee and commission incomes by moving lending to unrelated affiliates, and off their balance sheets.

This system has produced a new form of bank operations now known as “originate and distribute”, in which the bank seeks to maximize its fee and commission income from originating assets, managing those assets in off-balance-sheet affiliate structures, underwriting the primary distribution of securities collateralized with those assets, and servicing them.⁶ Under this system, the banker has no interest in credit evaluation, since the interest and principal on the loans originated will be repaid to the final buyers of the collateralized assets. The deterioration in cushions of safety caused by the evolution of the bank’s evaluation of the borrower’s credit risk through periods of stability plays no role here. The bank is only interested in its ability to sell the asset it has originated in order to earn a fee or commission, not to hold the asset in its loan book for a return determined by the net interest margin.

The Cushion of Safety in an Asset Securitization

For a bank, the process of making loans without holding them in its loan book is made possible by asset securitization, and usually involves the creation of a standalone “special purpose entity,” or SPE. An SPE is a legally independent financial institution that issues its own liabilities in order to acquire the assets originated by the bank. Any credit risk associated with the bank’s assets is transferred to the SPE and to the investors that have financed the entity by buying its liabilities or who provide credit enhancements or payment guarantees to the buyers. However, in order for the liabilities of the SPE to be sold to institutional investors such as insurance companies, pension funds, and beneficial trusts or foundations, those liabilities must carry an investment-grade rating from a nationally recognized statistical rating organization.

Thus, the credit rating replaces the process of credit evaluation that was formerly undertaken by bank loan officers and credit committees; that is, the credit evaluation is performed by the credit rating agencies. This feature represents one of the basic differences between the “originate and distribute” model of banking and Minsky’s original analysis of declining margins of safety. It also means that the present crisis will be different from the traditional Minsky crisis.

Unlike J. P. Morgan himself, or bank loan officers, the credit rating agencies have no personal knowledge of the faith and credit of the original borrowers of the assets that provide the underlying collateral for the securitized loans. Banks had already developed credit assessments based on scoring the attributes of the

borrower rather than on personal knowledge of his/her character.⁷ Bank assets are no longer represented by “trust” but by a number, generated by an algorithm that represents the statistical probability that the borrower will have the same creditworthiness as other borrowers with the same score.

In the absence of direct knowledge of the borrower, credit rating agencies appropriated the methods used by statistical arbitrageurs by seeking statistical correlations between groups of assets with aggregated credit scores and the probability of repayment. However, this procedure was not applied after the securitization of the assets, but it soon came to be applied in the construction of the loans to be included in the pool to form the collateral, or corpus of assets, held by the special entity. The assets were thus selected to meet a particular probability of repayment that would qualify as investment grade, not by the past history of the borrowers. This process creates a sort of pre-selection bias in which a combination of loans is chosen to produce a particular creditworthiness as measured by the probability of default. While using statistical time series is a backward-looking procedure, it is different from the traditional Minsky process described above in that it does not incorporate the accumulation of knowledge about borrowers over time in stable conditions. Instead, it seeks to use the history of previous borrowers to make a forward-looking prediction of the credit risk of the current group of borrowers.

On the other hand, the credit rating agencies did possess more detailed information than was made available to investors in the offering memoranda for the structured securities, making it difficult for investors to assess differences in the credit risks of these investments. In addition, it was not always made clear to investors that investment grade ratings given to collateralized securities were not comparable with those assigned to more traditional instruments. For example, David Einhorn (2007) notes major differences across different securities for major NRSROs. For example, the 10-year default rate on an A rated municipal bond is 1%; while the rate on a corporate bond is 1.8%; and for a CDO 2.7%. An A rated municipal bond has the same chance of default as a AA/AA- corporate bond or AA+ CDO. The expected recovery rate for municipal bonds in default is 90%, compared to 50% for corporate bonds and CDOs. Absent this information comparing nominal returns across different investment grade securities will not give comparison of risk-adjusted returns, even if the rating models are accurate.

The Cushion of Safety in Collateralized Subprime Mortgage Obligations

The securitization of nonconforming mortgage loans—so-called subprime and Alternative-A loans that do not qualify for a guarantee from a government-sponsored entity such as Fannie Mae or Freddie Mac—is a relatively recent innovation, and a relatively small part of the total population of mortgages.⁸ There is no series of performance measures to determine the correlations between the credit scores of borrowers and the probability that they are able to meet their cash commitments. Further, most of these loans originated without proper documentation as to the borrower's income, wealth, and employment status. Thus, the information that would have been required to make a credit assessment based on scoring was not available, and in many cases, it was fabricated.⁹

In addition, the vast majority of subprime mortgages were written against adjustable interest-rate or optional interest-rate repayment schedules that allowed for very low and, in some cases, zero-interest payments for the first few years of the mortgage.¹⁰ After this period, the interest rate would be reset to the prevailing market rate for adjustable rate mortgages; in the case of an interest-only balloon mortgage, the principal of the mortgage would have to be completely refinanced.

Analysis of subprime mortgages according to Minsky's determination of the margin of safety (created by the expected cash inflow relative to the cash commitment on the mortgage) suggests that these mortgages had an inbuilt decline in their margins of safety. On the presumption that the borrower had sufficient income to meet the (reduced) cash commitments for the initial period of the loan with an appropriate cushion of safety, maintaining a similar cushion after the interest-rate reset date would require that (1) market mortgage interest rates remain at or below the very low levels at which the mortgages were originally written (which most originators recognized as unlikely given the Fed's intention to return rates to more "normal" levels), or (2) the borrower's income would increase by the amount of the increased cash commitment due to the higher interest rate (also unlikely given the failure of average real incomes to rise in the recent expansion), or (3) the price of the property underlying the mortgage would remain stable or rise sufficiently so that, in the event the borrower could not meet his/her payments, the property could be sold to liquidate the outstanding balance of the mortgage (also considered problematical as most experts considered property prices to have entered a "bubble").¹¹

What appears to be a hedge or speculative financing scheme (in Minsky's terms) in the initial years of the mortgage resets to the equivalent of a Ponzi financing scheme because of the likelihood that the cash commitments can only be met by increased borrowing or refinancing at some future date to meet the shortfall between the higher interest costs and the borrower's income. While subprime mortgages may have had a positive net present value (NPV) when evaluated initially (under reasonable expectations for interest rates, income growth, and house prices), the NPV is now limited to the realization value of the underlying property. Alternatively, initial NPV could only be maintained if the rise in housing prices continued at a rate sufficient to offset the rise in interest rates. This also relied on a Ponzi process in which the demand for houses financed by continually increasing lending to subprime borrowers increased house values sufficiently rapidly. Thus, the value of the assets provided as collateral for the Residential Mortgage Backed Securities that were given investment grade and sold by the SPEs to final investors depended directly on one or the other of these two Ponzi processes.

As mentioned above, the liabilities issued by the SPEs to fund the purchase of the subprime mortgage collateral from the originating banks have to be investment grade to allow the major institutional investors to buy them. How was this possible when the subprime mortgages were already nonconforming, usually undocumented, and, on any reasonable set of future conditions, would achieve values far below expectations?

The answer is that this was accomplished by structuring the securitization vehicle using a number of different risk classes of liabilities. The senior (sometimes called "super senior") class offered a guaranteed rate of return and a fixed maturity. For a single mortgage, such a guarantee is impossible, because a mortgage in the United States can be repaid at the pleasure and economic interest of the borrower.¹² Thus, securitization initially required statistical estimates of repayment rates, something that had been in practice since the first use of securitized mortgages in the 1970s. In this way, it was possible to provide a mix of borrower characteristics so as to produce securities with particular risk profiles and maturity durations.

In the case of subprime mortgages, there was also the possibility of nonperformance, which would cause the return on the vehicle to decline. This was solved by overcollateralization of the senior securities. While these securities represented less than 100 per cent of the value of the underlying mortgages, they had senior claim on the interest and principal payments from all of the mortgages in the collateralized obligation. In the case of repayment or default on some of the underlying mortgages, the guaranteed return could still be paid.

The rate of overcollateralization (determined by the statistical probability of the rate of default on the underlying mortgages) represents what Minsky called the margin of safety, since the contractual income from the pool of mortgages included in the securitization was a large multiple of the interest and principal payments promised to the buyers of the senior securities. In Minsky's terms, the senior class of security could be represented by a hedge profile, in that the expected income from the mortgage pool was far in excess of what had been pledged to the purchasers of the senior securities. As such, these securities were rated investment grade by the credit rating agencies, despite the fact that they were backed by subprime mortgages that resembled Ponzi financing schemes. It was the cushion of safety that made this possible. In terms of the cash inflows and cash commitments of the collateralized mortgage obligation, there would be an excess of income relative to commitments for the life of the vehicle (representing the rate of overcollateralization).

The remaining funds required to purchase the underlying subprime mortgages were raised through the issue of intermediate and residual securities. The class of intermediate securities would receive the income remaining after payment of the commitments on the senior securities, and thus had a much lower margin of safety. This class would show variable cash income that might occasionally fall short of the payment commitment but would, on average, have a positive NPV. In Minsky's terms, this class would exhibit a speculative financial profile.

Finally, a residual security was sold whereby investors would receive income only if there were no refinancing, prepayments, or defaults on the underlying mortgages. In terms of payment streams, there was no cash income to meet the cash outflow until the two superior securities had been paid. If defaults and prepayments were within the estimated statistical probabilities used to determine the overcollateralization, these residual securities would receive a much higher rate of return than that paid on the senior securities, but with a zero margin of safety. Indeed, the residuals represented the margin of safety, and their return could be zero. These noninvestment-grade securities were sold to hedge funds willing to take higher risks for higher returns, or they were grouped together and used as collateral for yet another securitization that issued an over-collateralized investment-grade senior security, an intermediate security, and a residual security. Here, it was the estimated probability of default of the original securitization that determined a cushion of safety that was more apparent than real.

Since an investment-grade rating was crucial to the success of these instruments, financial institutions consulted with the rating agencies on the appropriate composition of the corpus collateral of the instrument, as well as on the structure of the liabilities. Thus, it was again the rating agencies that determined the appropriate margin of safety, which was determined by the agencies' assessment of the statistical probability of the prepayment rate and the default rate of the underlying subprime mortgages. Although they initially relied on the models of the banks, these agencies eventually developed their own techniques, which were then sold to originators.

As the rise in house prices continued after the collapse of the dot-com bubble in 2001, and as mortgage rates continued to fall despite an increasing federal funds rate brought about by the eventual reversal of Fed policy (mortgage rates are usually set relative to the rates on 10-year U.S. Treasury securities, which were falling over most of the period as the yield curve flirted with inversion), the positive performance of the collateralized subprime loans led to the expected erosion of the cushion of safety in the form of the declining overcollateralization of the senior securities. But this had nothing to do with any increase in the assessed creditworthiness of the underlying holders of the mortgages. It had to do only with the fact that the continued expansion of the housing market more than offset any rise in default rates, and that none of the adjustable rate mortgages had yet hit their reset dates.

The interest of the banks in these structures was not only the release of capital when mortgages were transferred to these structures and removed from their balance sheets, but also the various (sizable) fees that accrued to them—for origination and underwriting of the loans, management of the SPEs, and servicing of the loans (which were also often securitized). Thus, the banks were eager to increase the rates of origination and distribution and, to this end, were also buyers of mortgages originated by independent mortgage brokers and other nonbank financial intermediaries. Many of these intermediaries also issued their own securitizations.

Liquidity Risk, Interest Rate Risk, and Maturity Mismatching Redux

In order to sustain the increase in originations, another set of special entities (known as structured investment vehicles) was created to ease distribution by acting as buyers of the senior securities of the collateralized mortgage obligations. These entities financed the purchase of structured paper (e.g., securitized credit

card receivables, automobile loans, and, in the large majority, collateralized mortgage obligations) through the issue of short-term asset-backed commercial paper and medium-term investment notes and subordinated capital. The cushion of safety was again given through the overcollateralization of commercial paper and the residual and subordinated nature of other liabilities.

Additional credit enhancement was usually provided in the form of a guarantee from a monoline insurer or a credit-default swap written either by an insurance company or by the originating bank itself. Since commercial paper was backed by investment-grade senior securities of collateralized loan instruments, it also received an investment-grade rating, and provided an attractive option for the short-term money market mutual funds offered by most financial institutions. For these structured vehicles, income was determined by the difference between the short-term money market borrowing rate and the higher interest rates on the senior collateralized mortgage securities. In effect, they represented borrowing short and lending long: the net interest margin income the banks had given up to concentrate on fees and commissions had now returned—but off the banks' balance sheet.

Because this was spread income, the vehicles were also highly levered. The banks that originated these vehicles benefited from the management and servicing fees, as well as the spread. But these vehicles held not only credit risk, but also liquidity and interest rate risk; in particular, as the Fed tightened, the spread narrowed, and the sporadic inversion of the yield curve created the possibility of negative spreads. What cushion of safety that existed was again provided by the overcollateralization of the commercial paper relative to the riskier investment notes. It seems clear that the credit rating agencies concentrated on the credit risk of the assets in these vehicles rather than face liquidity and interest rate risks.

Here we can see the process of layering and ratings arbitrage at work. The collateral assets backing the commercial paper were senior mortgage obligations whose collateral asset-backing was a pool of overvalued subprime mortgages. As house prices continued to rise and originations continued to increase, the ephemeral margins of safety built into these structures were revealed and their fragility became apparent. However, the increase in fragility was not due to the process of a positive credit performance over time and a decline in the margin of safety. Rather, it was the simple revelation of the insufficient margins of safety that had been produced by the statistical analysis of the correlations between the credit characteristics of previous borrowers in relation to changes in financial conditions. It was the composition of the pool of assets and defaults, not

the behaviour and credit history of borrowers, that narrowed the margin of safety. The fragility and insufficient safety margin had always been present, but it was revealed only as the crisis evolved rather than when the probability of crisis increased in response to the borrowers' inability to adequately respond to unexpected events.

Where were the Cushions of Safety?

As the above discussion makes clear, the determination of credit quality and the assessment of adequate cushions of safety are no longer undertaken by the banks issuing mortgage-backed securities in the subprime collateralized mortgage market. What had been the basic function of the banks has implicitly been passed on to the credit rating agencies. But, as noted above, for most structured products, additional credit enhancement was also provided through guarantees from bond insurers (the monoline insurers) or the purchase of credit protection through credit default swaps or the above-mentioned liquidity puts.

As already noted, the credit rating agencies provided ratings on the basis of experience in the rating of corporate bonds for structured securities that did not have a similar history or behaviour. The same use of a traditional line of business was true of the monoline insurers who started providing guarantees for municipal bonds in the 1970s. In exchange for an enhancement fee they provide an unconditional guarantee of payment to holders of bonds in the event of a verifiable default event. They are called monoline because state regulators imposed requirements on the capital structure of these insurers and restricted the type of risk they could take to the liability for third-party debt. The capital regulations were sufficiently strict to provide the monoline insurers with a AAA rating from credit rating agencies, and this rating was thus passed on to the securities they insured. The monoline insurers started underwriting structured assets in the 1990s as tighter credit spreads reduced the potential premium income in their traditional business. By the beginning of the new millennium insuring asset-backed securities became their major source of income.

Thus, the credit rating agencies were responsible for both the overcollateralization on the structured assets, and for rating the insurers that provided the credit enhancement and the rating for the assets. It has been suggested that it was the credit rating agencies themselves that urged the insurers to take on more structured securities insurance in order to increase their income and thus ensure their continued AAA rating that was required for their successful operations.

“The poor decisions of holding company executives are the primary cause for the bond insurers’ problems, but the rating agencies also share responsibility. The rating agencies encouraged the bond insurers to diversify into structured finance risks and gave them additional rating credit for doing so. The rating agencies understated the risks of the new strategy while earning much higher fees for rating these structures. The rating agencies’ profits soared along with the growth in structured finance issuance. Insurance regulators relied on the rating agencies and management teams to assess the risk of these new structures. The rating agencies were paid by the issuers of these securities and helped in structuring these exotic instruments to meet the ratings agencies’ insufficient standards for Triple A ratings. The rating agencies only received their full fees if they approved the Triple A ratings for these transactions (Ackman, 2008).

Since the same procedures were employed by both the credit rating agencies assessing the risks of the collateralized bonds and the risks of the monoline insurers and the monoline insurers assessing their risks in insuring collateralized bonds, it is clear that they did not provide independent assessments of risks and the required cushions of safety for the assets or proper indications of the credit quality of the assets being rated and insured.

Finally, credit default swaps (CDS) were also used along with guarantees as credit enhancements. A CDS is similar to a monoline guarantee in that the buyer of protection pays a fixed fee or premium to the seller of protection for a period of time and, if default occurs, the protection seller pays compensation to the protection buyer by purchasing the protected asset at its issue price. The basic difference is that the contracts are not regulated, they are not traded in organized markets and there is thus little assessment of counterparty risk—that is the ability of the seller to actually protect the buyer from default loss. Already in 2005 questions were raised about standard settlement procedures for these contracts and the potential risk raised by the fact that for a number of issues, credit protection sold exceeded the protected securities. Since settling the contract usually requires delivery of the defaulted asset, if the outstanding swap contracts exceed the bonds that are available for delivery, problems arise for buyers. For example in October 2005 when Delphi, an auto parts maker, filed for bankruptcy the credit default swaps on the company’s debt were ten times the value of underlying bonds. Without possession of the bonds buyers of protection received only 36 cents per dollar of coverage (See Morgenstern, 2008). This is most likely the case for a large number of the credit default swaps used as credit enhancement for the subprime structures. Thus, not only were many of the underlying subprime mortgages in Ponzi condition when they were written, the

cushions of safety provided by the credit ratings and the credit assessment that were to provide overcollateralization were largely illusory.

Revealing the Inbuilt Insufficiency of the Cushion of Safety

Once the first adjustable mortgages hit their reset dates, followed by increasing rates of default and foreclosure, the rate of increase in house prices began to decelerate and then decline. Market mortgage interest rates did not decline to the levels of the introductory rates on adjustable mortgages. Banks that had written liquidity puts in the form of stand-by credit lines for the securitized mortgage instruments found that buyers were returning their securitized mortgages. In the case of Citibank, this response added roughly half of the \$55 billion that parent company Citigroup reported as their exposure to subprime borrowers in the third quarter of 2007 (in addition to the warehoused mortgages awaiting securitizations that could not be completed). As the defaults quickly outpaced the overcollateralization, many investors in investment-grade senior securities found that they were not being paid their guaranteed returns. Senior securities quickly transformed into the value of their underlying subprime collateral.

Finally, the credit rating agencies, noting that their evaluation models of the risks of default on securitized mortgages had proven incorrect, revalued and downgraded their ratings on an ever-increasing number of structures backed by subprime loans. This action confirmed that their original estimates had been incorrect and the margins of safety misrepresented. Institutional investors who were restricted to investment-grade ratings could no longer hold these assets and were forced to sell them. Monoline insurers, other writers of credit-default insurance, and creditors who sought underlying collateral also increased the sales of subprime mortgages. Eventually, the credit rating agencies were faced with the problem of the ratings on the monoline insurers who were suffering losses as they had to use their capital to meet the increasing losses on their portfolios of insured subprime assets. For example, when monoline insurer ACA was downgraded from A to CCC by Standard and Poor in December 2007, it was reported that Merrill Lynch was forced to write off \$1.9 billion of assets that had been insured with ACA. In addition, any downgrading of the monoline insurers will also lead to pressure in the municipal bond market as investors who are limited to investment grade assets are forced to sell. Thus, the debt deflation process began for the subprime mortgage market, and the owners of the structured investment vehicles found that they could no longer sell commercial paper.

To avoid default, they called on the banks for supporting lines of credit and returned collateralized assets to the bank originators.

Assets that the banks had sought to move off their balance sheets through securitization came back to them when the banks were called upon to provide liquidity to the off-balance-sheet structures they had created. Although no bank has seen its capital adequacy fall below Basel standards, many of them found it difficult to increase lending and support these entities within their desired capital ratios. Although the losses taken so far are within the limits of bank income, the full extent of the debt deflation has yet to be seen. Many banks continue to act as prime brokers to highly leveraged hedge funds that hold valueless residual securities from collateralized subprime entities. These banks have also written credit default swaps with their affiliates that they have to honour by taking the devalued subprime loans back onto their balance sheets at full initial value. Many insurance companies have done the same thing, while many monoline guarantee institutions may also have to satisfy substantial claims as house prices continue to decline and default rates continue to rise, causing the collateralized vehicles to converge to the value of the underlying collateral—which in some cases may be close to zero.

Is This Debt Deflation?

What are the implications of all this for the U.S. economy? Estimates of total losses on outstanding mortgages have risen sharply since the summer of 2007, when Fed Chairman Ben Bernanke estimated subprime-related losses in the range of \$50 billion to \$100 billion. Subprime mortgages account for more than half of expected credit losses and are now forecast in the range of \$300 billion to \$400 billion. Since 2005 (the majority of adjustable rate mortgages have been written in the past two years), roughly \$1.5 trillion of subprime mortgages and \$1 trillion of Alt-A mortgages have been originated. If house prices fell by 30 per cent, there would be a write-down of approximately twice these figures, not taking into account additional defaults. In addition, there has been an unexpected increase in prime mortgage defaults that could bring the total close to the high estimate of \$900 billion. The losses would be distributed among borrowers, creditors and banks. For nonbank holders, there would be a wealth loss and an impact on activity that is difficult to calculate. But the impact on short-term money markets and consumer lending is more significant. Both of these financial entities have more-or-less stopped functioning because of the uncertain creditworthiness of financial institutions that has been caused by layering and the lack of adequate cushions of safety.

If a well-capitalized bank attempted to recoup its losses by restricting lending and rebuilding capital ratios, every \$1 loss would reduce lending by approximately \$8 to \$10. It is likely that the (resistant) U.S. consumer who had financed most of his/her spending on the back of bank lending against housing collateral created by an over exuberant real estate market may finally start to retrench. Thus, the economy will be caught between the Scylla of falling consumer spending and the Charybdis of increasingly restrictive credit conditions. The offset of an increase in exports due to the dollar's decline would not be sufficient to prevent a recession.

Conclusion

The commentators were right to draw attention to the fact that the current crisis has all the attributes of a Ponzi financing scheme that risks turning into a full-scale debt deflation. However, it is clear that the crisis is not the result of a traditional endogenous Minsky process in which narrowing margins of safety lead to fragility.

In the current crisis, the cushions of safety have been insufficient from the beginning—they are a structural result of how creditworthiness is assessed in the new “originate and distribute” financial system sanctioned by the modernization of financial services. The crisis has simply revealed the systemic inadequacy of the evaluation of credit—or, what is the same thing, the undervaluation and mispricing of risk. This is basically due to the fact that those who bear the risk are no longer responsible for evaluating the creditworthiness of borrowers.

In the traditional Minsky process, bank profitability depended on the ability to evaluate the credit of borrowers and to hedge the risk of borrowing short and lending long. In the current situation, the profits of the credit rating agencies are independent of their ability to correctly evaluate risk. It has been suggested that the agencies' profits are correlated with the overestimation of creditworthiness and the undervaluation of risk. This is a crucial failing in a modern system that is supposed to excel in the pricing of risk and the distribution of risk to those who are best equipped to bear it. But if there is no efficient means of evaluating risk, it cannot be distributed efficiently.

This situation has two related consequences. The first is that the attempt to provide increased transparency for the balance sheets of financial institutions in order to provide a more efficient evaluation of risk (by

requiring that the value of assets be reported on a market rather than book value basis, or “marking to market”) may be counterproductive when there is no market for the assets held by those institutions. This is precisely where the credit agencies have failed to provide correct evaluations. If the prices are determined by the risks as assessed by models of statistical correlation, then the values are no better than the models that produce them—that is, they are no better than the presumption that the future will replicate the past, which is not true except in periods of stability. Indeed, this is one of the reasons why the current crisis started with an inbuilt deficiency of safety. The calculation of the required cushion based on a past history of stable results makes the decline in safety instantaneous, and already embodied in current assessments. The introduction of FASB 157 and 159 accounting regulations for measuring the fair value of these types of Level 3 assets was intended to ameliorate the problem. However, it now appears to provide additional imprecision in the methods used to evaluate risk.

While the present crisis is often presented as a “repricing” of risk, it is telling that the investment vehicles to meet the crisis, such as a superfund to purchase and provide a safe haven for the assets of financial structures, will tend to reproduce the existing systemic causes of mispricing. There does not appear to be a transparent method of determining the prices of assets acquired by the investment vehicles. Indeed, the notion of “repricing” risk can only be justified on the presumption that current prices are undervalued, and that the market will eventually provide correct evaluations. But if the market is not capable of valuing these structured assets correctly, the marking to market is not the best method by which to judge the solvency of the institution that used them. The alternative, whereby the originating banks take the assets back onto their balance sheets, also confirms that there is no effective pricing mechanism for collateralized obligations.

The second consequence of the inability to evaluate risk is the ironic fact that, in November 2007, the various U.S. financial regulatory and supervisory agencies finally agreed on the method for implementing the Basel II risk-based capital framework. Under this framework, credit rating agencies are given a major role in evaluating the credit risks of bank assets. Instead of improving risk management, the present crisis suggests that Basel II may provide an inbuilt bias in favour of the underestimation of risk, and thus the undercapitalization of banks, that produces a more fragile financial environment. This is underlined by the fact that Basel II does not recognize the difference in risks for similar ratings on different instruments noted above, creating the possibility for the same kind of arbitrage that was present in the original accord.

The crisis also raises the question of the U.S. regulatory structure. While the Fed is charged with regulating bank and financial holding companies, most of the difficulties have involved holding company-created special entities that issue securities and are thus subject to securities market regulations. These entities bear a close resemblance to the bank affiliates that were the source of fraud and malfeasance in the 1920s (the New Deal regulations were designed to eliminate such illegal practices). The Enron crisis was caused by similar abuses by off-balance-sheet “unaffiliated” affiliates; so, banking regulators will have to find a way to bring them within the effective control of financial supervisors.

The crisis not only suggests lacunae in the current regulatory and supervisory system but also raises questions about the ability of the Federal Reserve to ensure stability by supporting asset prices, as suggested by Minsky. Martin Mayer’s book *The Fed* (2001) has already addressed the difficulty of controlling bank lending through actions that influence bank balance sheets when banks *no longer hold* loans on their balance sheets. In the “originate and distribute” system, the amount of lending was determined by the ability to distribute—that is, by the appetite of capital markets for securitized loans. The Fed’s only method of control was to influence capital market–interest rate expectations.

Chairman Alan Greenspan proved an adept and fortunate practitioner of this approach, which, with one exception, is more an art than a science. In his recent autobiography, Greenspan admits that the Fed is powerless to rein in expectations that lead to asset bubbles.¹³ However, he suggests that this does not represent a crucial policy defect because the Fed can always deal with a bubble’s collapse. He is presumably basing this observation on the Fed’s experiences in 1987, 1989, and 2000; however, these years experienced equity market bubbles that were cured with a quick injection of liquidity to ensure the solvency of institutions and to stabilize market-traded equity prices. The present crisis presents much greater difficulties, as banks express extreme liquidity preference and attempt to offset real losses by rebuilding capital. The discount window cannot provide funds to rebuild bank capital.

From this perspective, the current crisis has little to do with the mortgage market (or subprime mortgages per se), but rather with the basic structure of a financial system that overestimates creditworthiness and underprices risk. The bottom line is that the system has been structured to make credit too cheap, leading to the assumption of excessive risk in order to provide higher returns. There is nothing that can be done to eliminate the inevitability of financial fragility as Minsky defined it. Fragility can only be damped by systemic

policies that Minsky identified as being the purview of Big Government (e.g., a government expenditure or employment plan to support incomes and employment) and a Big Bank (e.g., a central bank willing to support asset prices through the discount window). It is, however, possible to eliminate fragility that emerges as a direct result of flaws in the structure and regulation of the system itself. This is the task that confronts the U.S. financial system today.

Notes

- * An earlier version of this paper appeared as Levy Public Policy Brief No. 93, "Minsky's Cushions of Safety: Systemic Risk and the Crisis in the U.S. Subprime Mortgage Market". I am grateful to Mario Tonveronachi, Andrew Cornford, Randall Wray and Rob Parenteau for helpful comments and suggestions, without implicating them in the final result.
- ^{1.} See, for example, the London *Economist* (2007); E. Chancellor (2007); P. McCulley (March 2007); G. Magnus (2007); and J. Lahart (2007).
 - ^{2.} Benjamin Graham and David L. Dodd (1934) introduces the concept in the discussion of earnings coverage, and notes that the term was first used by Moody's *Manual of Investments* prior to 1930 to mean the ratio of the balance after interest to the earnings available for interest on a bond (p. 108). The "Exceptional Margins of Safety as Insurance against Doubt" (p. 231) comes closest to Minsky's idea. It is also possible that Minsky was influenced by an essay of Keynes ("The Consequences to the Banks of the Collapse of Money Values", August 1931, republished in Keynes (1932: 170-1)): "For the banks allow beforehand for some measure of fluctuations in the value of both particular assets and of real assets in general, by requiring from the borrower what is conveniently called "margin". That is to say, they will only lend him money up to a certain proportion of the value of the asset which is the "security" offered by the borrower to the lender. Experience has led to the fixing of conventional percentages for the "margin" as being reasonably safe in all ordinary circumstances."
 - ^{3.} According to J. P. Morgan, "A man I do not trust could not get money from me on all the bonds in Christendom." Quoted in Ron Cernow (1990: 154).
 - ^{4.} This approach is outlined more fully in J. A. Kregel (1997).
 - ^{5.} As Keynes noted in *Essays in Persuasion* (1932), bankers will always prefer to fail in a "conventional way" by following the decisions of others rather than risking being unconventionally right. This is still true today, as can be seen in the declaration of Charles Price, the former head of Citigroup, as questions arose over the subprime mortgage crisis: "When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing" (quoted in the *Financial Times*, July 10, 2007).
 - ^{6.} For an early presentation of this aspect of banking and its implications for monetary policy, see M. Mayer, *The Bankers: The Next Generation* (1997), and *The Fed: The Inside Story of How the World's Most Powerful Financial Institution Drives the Markets* (2001).
 - ^{7.} Most banks use Fair Isaac Corporation-generated FICO scores, originally developed for applicants for credit cards and automobile loans, and they have virtually no history in assessing subprime borrowers. According to HSBC Finance Director Douglas Flint (quoted in Molenkamp, C. 2007, "In Home-Lending Push, Banks Misjudged Risk", *Wall Street Journal*, 8 February). 2007), "What is now clear is the FICO scores are less effective or ineffective"

when lenders are granting loans in an unusually low interest-rate environment.” These scores were then used in automated underwriting programs, such as those developed by Edward N. Jones, a former NASA engineer for the Apollo and Skylab missions. Through his private software company in Austin, Texas, Jones and his son, Michael, designed a program that used the internet to screen borrowers with weak credit histories in seconds. The old way of processing mortgages involved a loan officer or broker collecting reams of income statements and ordering credit histories, typically over several weeks. But, by retrieving real-time credit reports online and then using algorithms to gauge the risks of default, the Joneses’ software allowed subprime lenders “to grow at warp speed” (see Browning, 2007).

8. Mortgage securitization have been part of US financial markets since the 1930s, and residential mortgage backed securities (RMBS) became particularly important after the savings and loans crisis of the 1980s. The simplest variety is a participation certificate that gives the holder the right to the interest and principal payments of a pool of residential mortgages. The holder of a mortgage backed bond (MBB) receives income from underlying mortgages, whose value exceeds the face value of the bond sufficient to meet prepayment and default. Pass-through securities are the most common mortgage backed securities (MBS), with credit ratings determined by probability of default and may have additional credit enhancements provided by the originator. The introduction of REMICs in the Tax Act of 1986 made it possible to create separate cash flows from the underlying mortgages to provide particular payment and risk profiles such as interest only or principal only securities. The collateralized mortgage obligation (CMO) combines the two previous varieties but with multiple types of mortgage-backed bond having different rights to the cash flows of the underlying mortgages. The current crisis is characterized by the creation of RMBS with subprime and Alt-A mortgage collateral. Subprime mortgages represented an average of 8 per cent of all originations in the 2001–03 period, rising to an average of 20 per cent in the 2005–06 period, when over 80 per cent of such mortgages were securitized with an average value of approximately \$450 billion per annum. For additional detail on the statistical data provided in these notes, see L.R. Wray (2007).
9. About half of the originations in 2005 and 2006 were classified with little or no documentation.
10. In the 2004–06 period, an average of approximately 90 per cent of subprime mortgages were at adjustable rates, with interest-only, balloon-repayment subprime mortgages representing 40 per cent in 2005. It is important to note that these are not the equivalent of a European style variable rate mortgage in which the payment varies with changes in market mortgage rates. Rather they provide for an adjustment of the rate regime at some future date. A common variety called a two-step 2-28 or 3-27 provides a low introductory rate of an initial period of two or three years and then resets to a fixed rate for the remaining period determined by the market rate at the time, plus a margin. Another hybrid ARM known as n/1 starts out with a low introductory rate that lasts ‘n’ years and then is adjusted annually, with ‘n’ varying between 3 and 10 years.
Unlike standard fixed rate mortgages, ARMs often include a pre-payment penalty.
11. According to a speech by Robert L. Rodriguez (2008) Fitch reported that their credit rating models were primarily determined by FICO scores and a continuation of the prior 50 year experience of home price appreciation. Fitch admitted that if prices were to decline by 1% to 2% for an extended period of time the model would break down completely and impair tranches as high as AA or AAA.
Richard Bitner (2008) notes that while 90 per cent of the families with fully documented adjustable rate subprime loans from his mortgage company had debt interest payments to income ratios below 50 per cent when they were originated, after the first interest rate reset that ratio had fallen to 60 per cent.
12. Conforming mortgages cannot contain pre-payment penalties, but most subprime mortgages did have such penalties and, in the case of adjustable rate mortgages, the penalty period always covered the reset date, making it difficult to repay a mortgage before the increase in the interest rate.
13. In his recent autobiography Greenspan (2007: 200-2) suggested that his attempts to use interest rates to halt expectational bubbles only aggravated them.

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