LEAPTEC
Analytical Report

Designing New Federal Financial Guarantee Programs

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Introduction: Designing Programs that Work. This document is part of a series reporting on a study of federal financial guarantee programs. The study is concerned with how to design future guarantee programs so that they will be more robust, less prone to problems. Our focus has been on internal (that is, endogenous) weaknesses that might inadvertently be designed into new programs.[1] Such weaknesses may be described in terms of causal loops.[2] Consequently, the study is concerned with (a) identifying the causal loops that can give rise to problematic behavior patterns over time,[3] and (b) considering how those loops might be better controlled.

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[1]By a new guarantee program we mean a program designed to support an asset that heretofore has not benefited from Federal guarantees other than Federal deposit insurance for depository institutions which benefits most assets. A new program would include:

(a) Government backed enterprise(s), like FNMA or FHLMC, which would purchase loans originally granted to finance the purchase of the asset; and/or,

(b) a federal loan insurance program, like the FHA, which would insure loans issued to finance the purchase of the asset.

A consideration of an existing program would require a reinterpretation and extension of the design principles described in this Report.

[2]For a discussion of causal loops -- or the feedback concept -- in the social sciences see Richardson (1991). Richardson provides a good definition of feedback (Section 1.2), and also discusses its role in the social sciences. In general:

> Within the last forty years, the engineer's concept of feedback has entered the social sciences. The essence of the concept ... is a closed loop of action and information....In some areas of the social and policy sciences the feedback loop, by whatever name it is known, has become a fundamental center of attention, a vital concept in the analysis of societal problems and the construction of theory. In other areas, however, the concept is noted but its applicability and explanatory power are seen to be very limited. In still other corners, the concept is largely unrecognized.
> (Richardson 1991, p. 1).

Our goal here is to bring the explanatory power of feedback to the consideration of financial guarantee programs, an area where such a view has been lacking heretofore.

[3]Such problems include increased defaults and rising asset prices.

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These design issues have been analyzed at greater length in previous LeapTec Analytical Reports. This document summarizes those issues and provides a more extended discussion of ways in which the program design might be augmented to compensate for potential weaknesses.

We want to emphasize that the design weaknesses considered here result from the pursuit of basic goals of the programs themselves, rather than from a failure of either law or regulation. These design considerations are similar to those encountered in designing a large sailboat. To increase the speed performance of the boat, one may increase the sail area. In order to increase the sail area, the masts must be taller. But increasing the sail area and the mast height will raise the center of gravity of the boat, increase the lateral pressure from the wind and cause the lateral pressure to occur higher -- multiplying the torque on the boat. In brief, trying to increase the boat's performance makes it more prone to capsizing. The solution is not to give up on higher performance, but to place a heavy weight on the keel, which will automatically produce a torque in the opposite direction -- and dramatically stabilize the boat.

Designing guarantee programs is far more difficult than designing sailboats -- and is a much more recent design activity. But just as in the case of sailboat design, the solution may not be to eliminate the objectives of the programs, or the programs themselves, but to find a point of leverage that can compensate for the design weakness.

Each of the seven following sections (Sections 1 - 7) begins with a description of one design issue and then turns to an examination of how to augment the design in order to compensate. Finally, we conclude with a summary.

1. Credit Expansion From Establishing Government Backed Enterprises

1.1. Design Issue[4]

A new guarantee program may include the establishment of government backed enterprises (GBEs) to provide locally limited credit markets with access to national and international capital. The prominent and largest examples are in the housing finance market where Ginnie Mae, Fannie Mae, and Freddie Mac fund about 25% of home mortgages in the U.S.A. But, other important GBEs exist elsewhere: Sallie Mae funds about half of all guaranteed student loans, and Farmer Mac holds one third of the farm real estate debt in the U.S.A. (Stanton 1991, p. 14).

Although details vary from enterprise to enterprise and from enterprise to enterprise, the basic transaction is for an originator to sell a loan to the GBE. The GBE pays the originator. Then the GBE may do one of two things: (1) It may *securitize* the loans by bundling similar loans together and selling the bundles to investors to whom the GBE issues its own guarantee that principal and, perhaps, interest, will be paid. Or, (2) the GBE may keep the loan in portfolio and pay for it by issuing debt. The two cases are more similar than might at first appear: In each case, the GBE receives money from an investor (either a purchaser of a securitized loan or a purchaser of the GBE's own bonds) and uses that money to buy loans from the originator. In each case the GBE guarantees the instrument purchased by the investor, and in each case the investor receives a stream of payments which comes directly, or indirectly, from interest and principal payments on the original loan. What integrates the GBEs into the system of federal guarantees is that the obligations of a GBE -- as our terminology suggests -- are backed or guaranteed (implicitly or explicitly) by the federal government.

The purpose of a GBE is to provide local lenders with access to national credit markets in order to finance the purchase of a particular asset -- a house in the case of Fannie Mae, an education in the case of Sallie Mae, agricultural land in the case of Farmer Mac. But a side effect of the design, is to create a hole in the Federal Reserve System's reserve requirements, a hole that permits an expansion of credit involving the banking system.

To simplify matters a bit, the Fed requires banks to maintain a set fraction of their deposits as *reserves*, either as cash in the vault or as deposits with the Fed. A bank can lend from its free reserves, that is, those in excess of required reserves. The borrower uses the loan proceeds to pay a seller of some asset (a house, farm land, a ship, etc.). If the seller deposits his payment in the same bank that made the loan, the bank will not experience a decrease in total reserves, because what it lent out is returned. But, it will experience an

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[4] (For a more detailed and rigorous treatment of the design issue concerning credit expansion from establishing GBEs see LeapTec Report 1.4a: "Two Theories of Problems in Guarantee Programs: Explanation and Evaluation", pp. 11-17).

increase in deposits, and hence in required reserves. With required reserves up, the amount of reserves available for lending will be correspondingly reduced.

If the seller deposits in a different bank, one must shift focus from an individual bank to the banking system as a whole, but the story remains essentially unchanged. If the deposits go to a different bank, that bank's reserves and deposits will increase, while the reserves of the bank which lent the money will decline. *Total* reserves in the banking system will be unchanged; *total* deposits will increase. Hence the *system's* required reserves will increase, and the *system's* reserves available for lending will be reduced.

Every loan increases required reserves by increasing deposits. Eventually, required reserves will equal total reserves; free reserves will be zero, and lending must stop.[5] This is a primary mechanism by which credit expansion is controlled in the banking system.

This mechanism for controlling credit expansion is deactivated when GBEs are introduced into the picture. An investor withdraws deposits to pay the GBE for its bonds or securitized loans. The GBE does not deposit the funds, but rather, uses the funds to buy loans from the bank. Consequently, deposits are permanently reduced. This reduction in deposits will be of about the same magnitude as the increase in deposits that occurred when the asset seller deposited the loan proceeds. The two balance and there will be no net increase in deposits. Consequently, there will be no net increase in required reserves; no net decrease in free reserves. And, the banking system's ability to make more loans will not have been reduced by making the loan.

If originators sell 100% of their loans to GBEs, there will be no reserve-induced limit to credit expansion. If originators sell *almost* all of their loans, there will *almost* be no limit to credit expansion. Further, if the fraction of loans sold to GBEs rises, the system will be able to support a rising amount of loans -- that is, the liquidity of the system will increase. A source of liquidity or credit in the banking system, is a high or growing fraction of loans sold to the GBEs.

Our concern is with new systems of financial guarantees, and hence new GBEs for which there can be no data. However, available data on existing GBEs in the housing market is consistent with the idea that GBEs may be an important

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[5]Free reserves can go negative. Banks can borrow from the Fed, so required reserves can be greater than unborrowed reserves -- in which case free reserves would be negative. The Fed frowns on this kind of borrowing, and the borrowing banks will need to reduce their borrowing (the system will need to reduce lending). The banking system will tend to control actual reserves (via interest rates, credit standards, and credit rationing) to a level that is not too far from required reserves (for a discussion see Hines 1987, p. 24). So, if free reserves are strongly positive, a credit expansion will ensue; and if free reserves are strongly negative, a credit contraction will ensue.

1.2. Design Weakness

Certainly, there may be periods when a credit expansion is desirable, and the Fed changes reserves in part to expand or contract credit. However, a credit expansion caused by creating a GBE does not occur as part of Fed policy, and the expansion is funneled through one particular asset. There are at least two potential adverse consequences of credit expansion via GBE creation: deteriorating credit standards and rising prices of the underlying asset being financed.

Increasing credit (or money) expansion in general is linked both empirically and theoretically to rising general price levels. It should come as no surprise that if the credit expansion is funneled through a particular asset, that asset can experience above-average price increases. Because GBEs operate by buying and selling loans for particular assets, they funnel credit expansion through those assets. It may be no coincidence that both houses and tuition -- two assets whose financing involves GBEs -- have experienced above average increases. Figure 3 below shows the real price of houses, and Figure 4 shows the real average cost of 4-year colleges. The growth of GBEs in these markets may have played a role in the price increases.

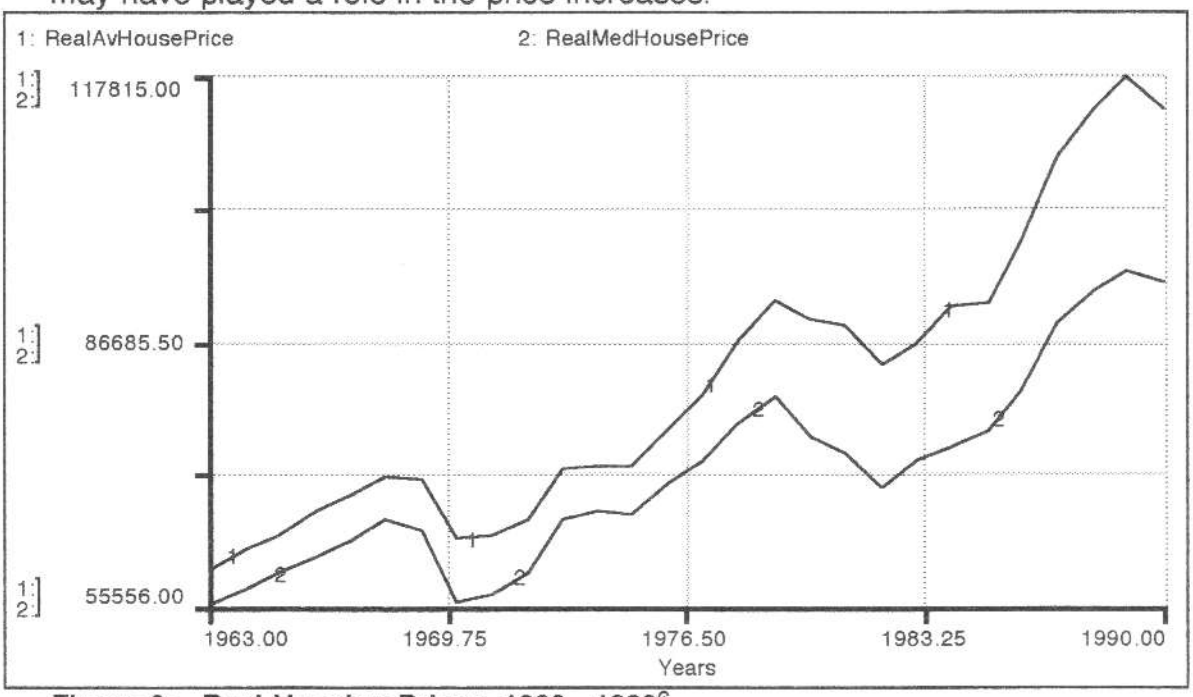

Figure 3: Real Housing Prices, 1963 - 1990[6]

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[6] Source: Nominal prices for new houses were compiled from U. S. Census Bureau, Construction Statistics Division data from *Current Construction Reports*, Series C-25, New Single Family Houses Sold, Unpublished History File, January 1991. Real prices for house values were calculated using the implicit GNP price deflator from Table B-3, *Economic Report of the President*, February 1991. Data plot by LeapTec.

House prices were deflated using the GNP implicit price deflator. A problem with using any generally available price index is that the index itself will include changes in the price of the

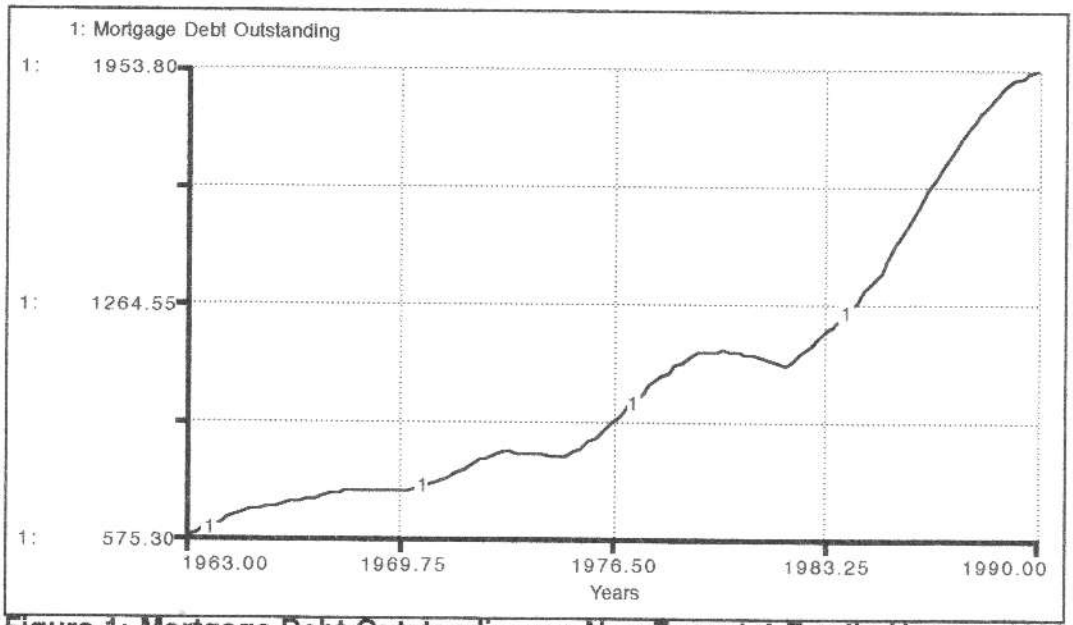

Figure 1: Mortgage Debt Outstanding on Non-Farm 1-4 Family Homes, 1963-1990, in constant dollars. Source: Data plot by LeapTec from Table B-3 Implicit price deflators for gross national product, 1929 - 1990 and Table B-73, Mortgage debt outstanding by type of property and financing, 1939 - 1990 from the Economic Report of the President, February 1991.

source of credit. Figure 1 above shows the real increase in mortgage debt since 1963. It should be compared with Figure 2 showing a rising fraction of total housing credit that is funded by GBEs.

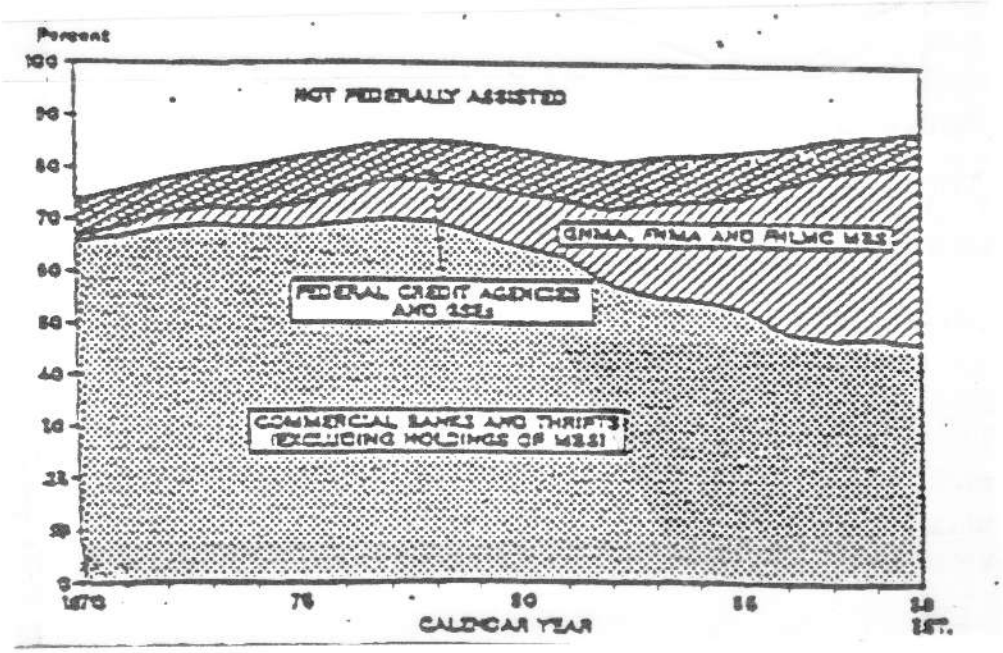

Figure 2: Housing Credit -- Percent of Total
Source: *Budget of The U. S. Government*, FY 1991, Section VIB, *Recognizing Federal Underwriting Risks*, page 234.

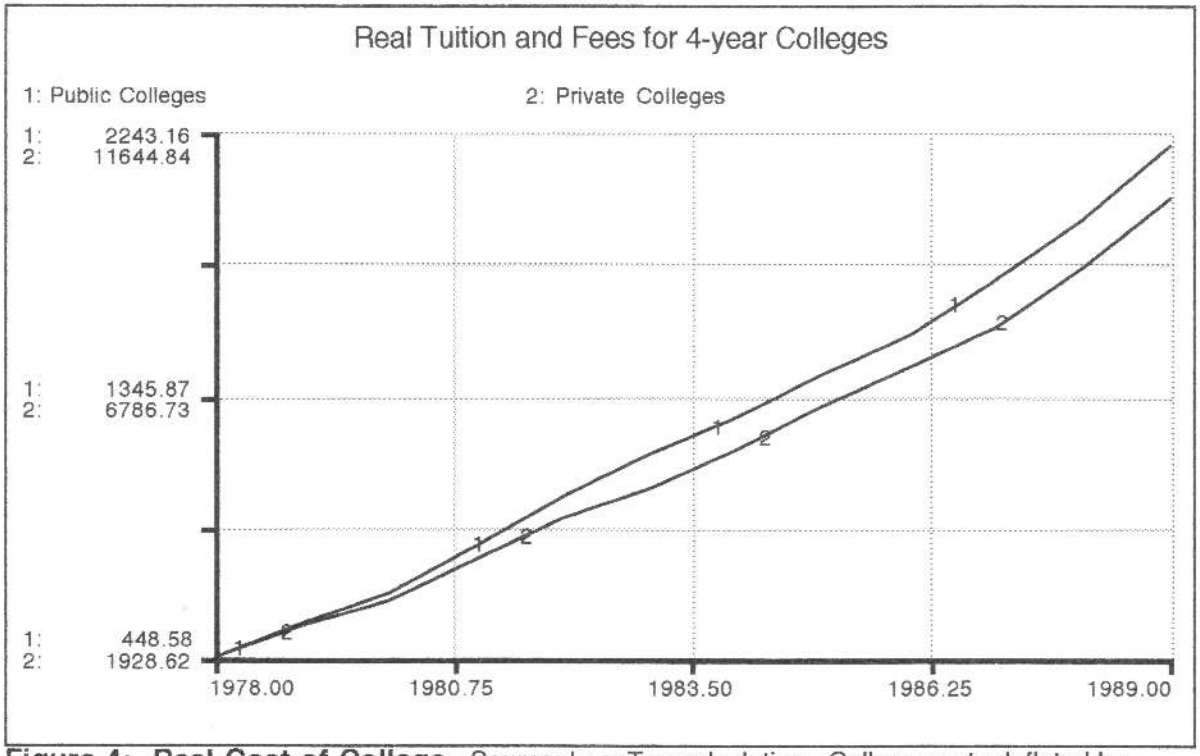

Figure 4: Real Cost of College. Source: LeapTec calculation. College costs deflated by consumer price index. Source of nominal figures for college costs Wright (1992, p. 279). Source of consumer price index U.S. Department of Commerce (1984, table 320) and Wright (1992, p. 227).

What is the operational mechanism of a price increase? It comes from an increase in the demand for the asset in question. Mere availability of credit does not of itself produce increased demand for assets. Rather lenders must react to their liquidity in ways that will lead people to want to borrow and purchase. Although reducing interest rates is the most commonly discussed means for inducing people to borrow more, interest rates are only one of the characteristics of a loan. As important are credit standards[7]. In order to induce more people to buy, lenders may reduce standards thereby making the asset more affordable, because people who previously could not get financing now will be able to.[8] The increased number of people buying will tend to put price-

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good being deflated. Including the good in the price index will make the "real" price increase appear less dramatic if the price of the good in question has increased faster than other prices. For many uses, this is not a significant problem because the product in question represents only a small part of the price index. But, the price of housing may represent a large component of the price index. Hence the rise in "real" house prices shown in Figure 3 probably understates the actual rise.

[7]In a fundamental sense decreasing standards or decreasing the interest rate is the same: A decrease in standards necessarily implies that the interest rate for a *given quality* of loan has dropped. Similarly, a decrease in interest rates necessarily implies that the standards for loans of a *given interest rate* have dropped. And, in either case the result may be that the default premium does not compensate for the probability of default.

[8]Evidence on the motivations for managers to reduce credit standards is difficult to obtain, as the decisions are not made in public. The authors, however, have direct experience with commercial

pressure on the asset in question. This mechanism can produce simultaneous asset price increases and credit quality decreases.

Figure 5 below gives a sense for how credit standards can decline. The graph shows the average loan to price ratio for conventional mortgages. (Note that a rising ratio indicates a declining credit standard -- the originator requires a smaller down payment.)

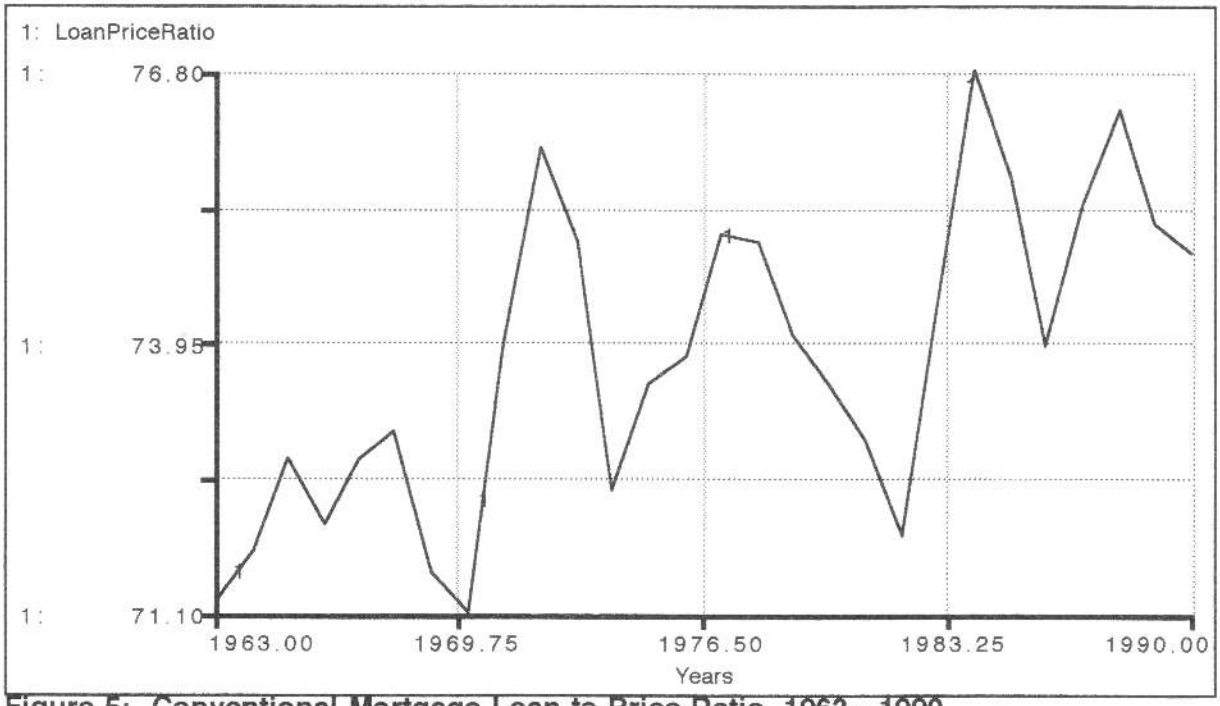

Figure 5: Conventional Mortgage Loan-to-Price Ratio, 1963 - 1990
Source: *Rates & Terms on Conventional Home Mortgages,* Federal Housing Finance Board, 1990, Table 3, Terms on Conventional Single Family Mortgages: Annual National Averages, Previously Occupied Homes. Data plot by LeapTec.

1.3. Augmenting The Design

Congress should be made aware of this design weakness in establishing new GBEs. One solution is not to establish GBEs in the first place, which corresponds to lowering the mast and cutting sail area in our sailboat analogy. Congress may be able to do better, however, by augmenting their design to include features that make up for inherent weaknesses. We consider three design options here:

1. Controlling the loan fraction sold;
2. Automatic reserve draining; and,
3. Reserve requirements for the GBEs.

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banks, one as a bank officer and the other as the treasurer of a NYSE company. The notion that bank managers reduce standards in order to lend more accords with this experience. Also, news reports suggest that regulators use credit standards as a way of increasing lending (See, for example, "Bush Approves Treasury Plan Easing Loan Standards to Help Credit Crunch" *Washington Post* ,10/9/91 and "U.S. Seeks Eased Rule for Loans", *New York Times* 12/24/91).

The third option may be more desirable than the other two. We will discuss each one separately.

1.3.1. Loan fraction sold The fundamental problem is that originators sell a high fraction of loans to GBEs and one direct lever is to control that fraction, that is, to limit the fraction of an originator's portfolio that can be sold (to institutions which are not other primary lenders). Such a limitation would limit credit expansion.

A limitation might be created by authorizing the relevant regulatory agencies to set a maximum fraction of loans that commercial banks or thrifts could sell.[9] Alternatively, Congress could authorize the appropriate regulators to restrict purchases by a GBE to a maximum fraction of the selling bank's loan portfolio. Control of loans sold can be implemented in either way.

As a means for limiting credit expansion, a maximum loan fraction sold will be effective in the degree to which it limits the role of GBEs. This is a lowering-the-mast policy. To be totally effective -- that is, to eliminate GBE-induced credit expansion entirely -- would require a maximum loan fraction sold of zero. That is, it would require eliminating the participation of the GBEs which by definition solves the problem, but unfortunately does away with the benefits of GBEs as well. Consequently, setting a maximum loan fraction sold is not a high-leverage point in the system for eliminating excess credit expansion.

1.3.2. Automatic reserve draining Another possible design change would be to tie expansion of the GBEs to a requirement that the Federal Reserve Board simultaneously drain reserves. In this case, the Federal Reserve system would monitor the purchases of loans by GBEs. Each period, the Federal Reserve would remove reserves equal to a fraction of the loans purchased during that period. The fraction would be set equal to the effective reserve requirement on deposits.

People hold deposits in a variety of forms including savings accounts, demand deposits, money market funds, and even bonds of the bank (to consider function, rather than the usual definition of "deposits"). Hence, the appropriate fraction would be a weighted average of the requirements on each form of deposits (zero for a bank's bonds), where the weights would be the proportion of bank funding represented by each type of deposit.

The sale of a loan to a GBE reduces required reserves as argued above. The result of this policy would be to reduce actual reserves by the same amount, so that free reserves don't go back up to where they were before the original loan was made. With this policy, lending reduces free reserves, just as in the absence of GBEs.

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[9]It would also be necessary to restrict the sales by non-bank originators into the secondary market.

This proposal may have a practical problem: It requires the Federal Reserve Board to coordinate its actions with other regulators or with the intent of Congress. This erosion of the Fed's independence may be undesirable, and almost certainly would be controversial, having policy and authority ramifications far beyond the confines of whatever markets the GBE is intended to serve. The policy calls into play a set of factors having a complexity that may surpass the complexity of the problem it is designed to solve. Consequently, this lever may be undesirable to use because it is too complex and because it threatens the independence of the Federal Reserve System.

1.3.3. Reserve Requirements for GBEs Our last -- and perhaps best -- recommendation here is to require that GBEs hold reserves. The GBE reserve requirement would be based on the GBE's total loan portfolio, whether held in house or securitized. There are at least two ways to implement the requirement: One would be to place the requirement on the portfolio, that is, literally base it on the value of the portfolio, whether held in house or securitized. The second possibility would be to base the requirement on the money raised by the GBE, whether through bond sales or sales of the securitized loans. This latter way of implementing the proposal would be similar to the current system of assessing requirements on banks. Just as a bank's requirements are assessed on its liabilities (i.e., the deposits), the GBE's reserve requirement would be assessed on its liabilities -- direct in the case of its own bonds, and indirect in the case of securitized loans that it guarantees.

The reserves need not be held by the Federal Reserve system but could be held by any government agency. The important point is to remove a fraction of deposits from the banking system. Where the reserves go, is not important as long as they don't go back into the hands of banks or citizens. (The reserves should not be considered government assets or revenues to be spent). If an agency other than the Federal Reserve holds the reserves, that agency should not be permitted to change the fractional reserve requirement nor to take any other actions normally associated with the Fed, such as lending reserves to the GBEs. Such activities would be very similar in their effects to the actions of the Fed and could complicate the Fed's job.

The fraction that should be assessed on either loans or liabilities should be the effective reserve requirement on deposits, as discussed above: the weighted average reserve requirement on bank deposits. The GBEs will still channel a flow of deposits from investors to banks, but a fraction of that flow will not be returned to the banking system; so reserves will decline. Before, for every dollar withdrawn from the banking system by investors, a dollar was returned to originators by GBEs -- and, originators' reserves did not change in aggregate. Now, for every dollar withdrawn by investors, some fraction is not returned to the banking system, so banking reserves decline by that fraction. The effect of this is to divert a fraction of the stream of investor's deposits out of the banking system -- an effect very similar to that of draining reserves discussed above, except that it operates more directly via the GBEs.

2. Profits - Lending - Defaults Spiral

2.1. Design Issue[10]

The basic characteristic of financial markets at issue in this section is that the revenues, and, hence, the profits of banks and GBEs[11] are tied to the size of their portfolios, whether held or securitized and sold. Net interest income for GBEs or originators is proportional to the size of the portfolio held. Similarly, a GBE earns fees that are proportional to the size of its portfolio that is securitized. If an institution gets into trouble with feeble profits or losses, it may be strongly motivated to increase the size of its portfolio in order to increase interest income.

In order to increase their portfolio, institutions may seek to increase the number of people who might become borrowers or to increase the size of each loan. One way of doing both is to reduce credit standards. Here, we mean credit standards in the broadest sense. Reducing credit standards might mean a reduction in paper work, making it easier for a borrower to qualify and making the financial institution offering the reduced paper work more attractive. Alternatively, reduced credit standards even more obviously make it possible for people to qualify who would not have qualified before, increasing the potential number of borrowers. Or, reduced credit standards might make it possible for a borrower to buy a more expensive asset (for example, a more expensive house), and consequently, the financial institution may be able to lend more for each transaction. Finally, lower credit standards may mean a higher average loan-to-value ratio -- meaning the lending institution will lend more on each transaction. In these ways reducing credit standards will tend to cause the loan portfolio to increase, which will increase profits and correct the profit inadequacy.

Unfortunately, reducing credit standards also translates into reducing the quality of the portfolio which eventually means increasing the proportion of loans which go bad. Defaults are expensive -- particularly if an increased loan-to-value ratio has reduced the relative amount of collateral. Rising numbers of bad loans will eventually cause a decrease in profits, exacerbating the very problem the more lenient credit standards were designed to solve. Consequently, a downward spiral may ensue in which inadequate profits prompt managers to loosen

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[10]For a more detailed and rigorous treatment of this design issue and for evidence from historical programs, see Analytical Report "Lending Your Way Out of Problems" in LeapTec Report 2.1 and Analytical Report "Credit Standards and Purchasing Your Way Out of Problems" in LeapTec Report 2.3.

[11]Here, we use the term "profit" in a non-technical sense, to mean the excess of revenues over expenses. Government-owned GBEs, like Ginnie Mae, may term the difference between revenues and expenses as a "surplus" (if positive) or a "deficiency" (if negative), rather than use the term "profit". For the current purpose, the terminological difference is not substantive: Government-owned GBEs are motivated to make a surplus, or at least avoid operating a (too great) a loss. As a consequence, they come under similar pressures as private-sector institutions.

standards, and lower standards cause higher defaults which cause profits to decline even further.

Evidence consistent with this mechanism among banks is shown in Figure 6 below. The figure presents profits and charge-offs as a per cent of loans. The increase in charge-offs appears to account for the fundamental pattern of falling bank profitability.

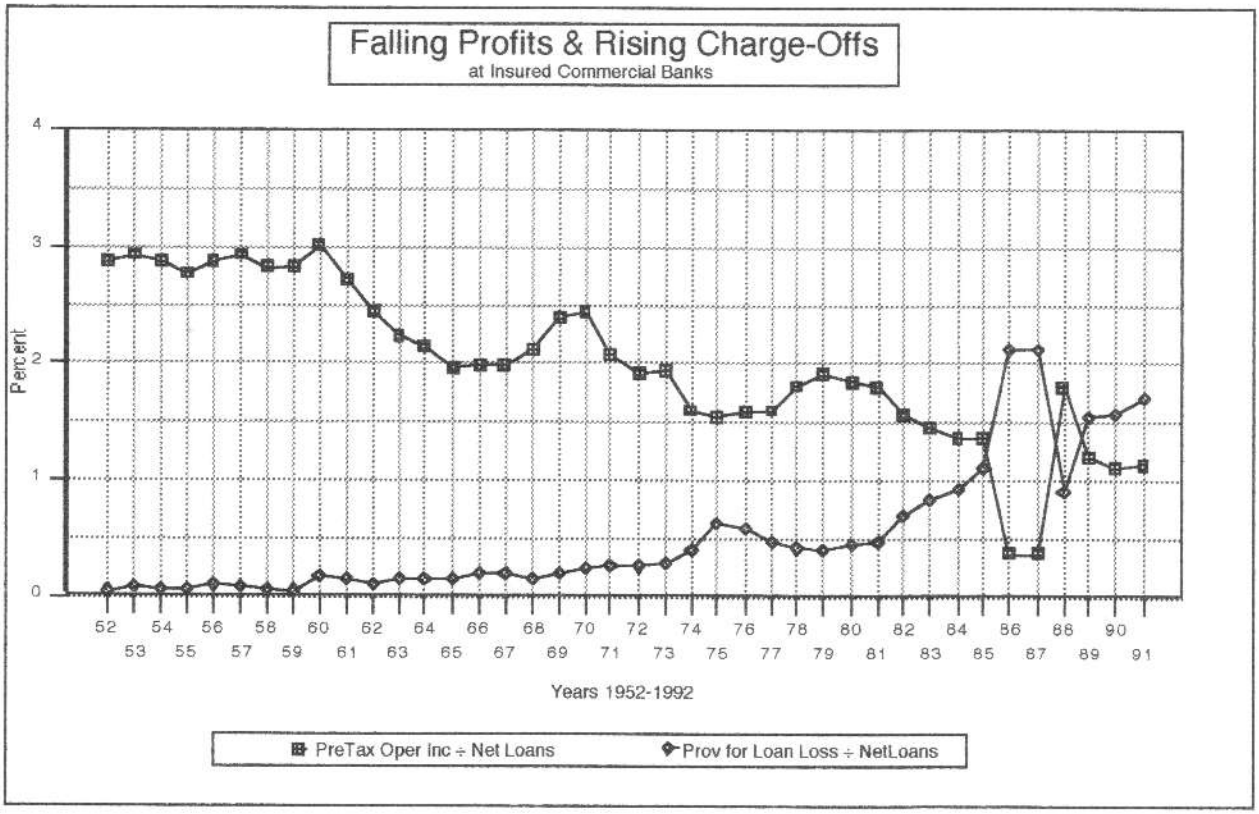

Figure 6: Falling Profits and Rising Charge-off Expense At Insured Commercial Banks[12]

The mechanism described here accounts for falling credit standards (for example the rising LTV in Figure 5), and falling profits and rising charge-offs (Figure 6). Because falling standards will increase demand, it also accounts for rising real prices on the assets being financed. (See Figures 4 and 5.)

[12]Source: Data for the graph are from Preliminary Table CB-12, Assets of Insured Commercial Banks, Domestic & Foreign Consolidated, December 31,1934 - December 31, 1991; Preliminary Table CB-17, Liabilities of Insured Commercial Banks, Domestic & Foreign Consolidated, December 31,1934 - December 31, 1991; and Preliminary Table CB-7, Income, Expenses and Net Income of Insured Commercial Banks, Domestic & Foreign Consolidated, December 31,1934 - December 31, 1991, Division of Research and Statistics, Federal Deposit Insurance Corporation Special Report. Balance Sheet data received September 3, 1992. Income and expense data received September 23, 1992.

2.2. Design Weakness: A Causal Loop Description

The situation described here is one in which an intended corrective process is weakened or reversed by an unintended self-reinforcing process. The corrective process is one in which inadequate profits are corrected by rising income on an increasing portfolio. The unintended self-reinforcing process is one in which inadequate profits are met with reduced credit standards which cause higher defaults and a further deterioration in profits. Because the fee and interest income from a loan begins to be received immediately, it may appear at first that the corrective process dominates, even if the self-reinforcing is actually dominant. Managers or regulators initially may be encouraged by the results of credit loosening and portfolio building, only to be surprised later by a rising tide of bad news.

The two processes can be presented in a causal loop diagram.[13] As shown in Figure 7, the corrective process is the inner, negative loop, and the self-reinforcing process is the outer, positive loop. The term lending, as used here, corresponds most precisely to the activity of a bank. However we employ the term in a broad sense to include loan *purchasing* in the case of GBEs.

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[13]A causal loop diagram may be interpreted as follows: The variable at the tail of an arrow causes or influences the variable at the head of the arrow. There is no implication that the causes shown in the diagram are the only causes or influences -- there may be others not shown on the diagram. A plus sign at the arrow head indicates that the caused-variable changes in the same direction as its cause (i.e. the partial derivative of the variable with respect to the cause is positive).

A loop can be assigned an overall polarity -- either positive or negative. A negative polarity -- indicated by a negative sign enclosed by a looping arrow -- means that a change in any variable in the loop will tend to be negated as its influence flows around the loop. As a consequence, negative loops are spoken of as being goal seeking, controlling, or balancing.

A positive polarity indicates that a change in any variable will be reinforced as its influence flows around the loop. Consequently, positive loops are often considered to be self-reinforcing.

More detailed explanations of causal loop diagrams (or influence diagrams) may be found in Richardson and Pugh (1981, pp. 25 ff.) and Roberts (1981, Chapter 1). Senge (1990, pp.73 ff) offers an explanation in a more managerial context, and Richardson (1991) offers an explanation in tracing the historical development of the notion of feedback in the social sciences. Morecroft (1982) provides a critical review of diagramming techniques.

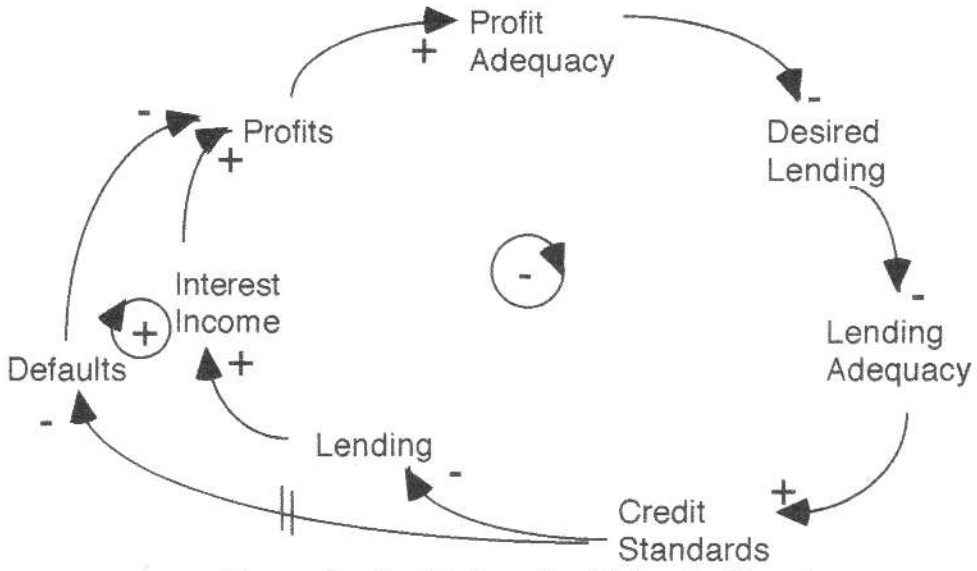

Figure 7: Profits/Lending/Defaults Structure

The design weakness is of particular concern when the depositors, bond-holders, or equity investors are protected from the consequences of lower standards by deposit insurance or by implicit or explicit government guarantees on indebtedness. In the absence of these protections people who invest or deposit in banks or GBEs have a strong incentive to monitor the loan portfolio of the institution, and seek higher standards, higher interest rates, or alternative investment opportunities if an institution's management embarks on a risky course. In the presence of these guarantees, however, this automatic monitoring safeguard is weakened or non-existent. This weakening is, of course, a side effect of the real purpose of these guarantees: To give the GBEs access to national credit flows and to prevent runs on depository institutions.

2.3. Augmenting the Design

The above design weakness is of long standing in the banking system. It has been part of the creation of most GBEs and, more importantly for our purposes, will likely characterize the creation of new GBEs. We consider here four design options:

1. Limiting the guarantees;
2. Tying standards to profits;
3. Tying charges for the guarantees to portfolio risk; and,
4. Capital Requirements.

The fourth of these options may be the most desirable and is already in place at depository institutions. We will discuss each in turn.

2.3.1. Limiting the Guarantees One solution, is to limit the guarantees. The hallmark of the design weakness identified in this section is that standards fall as an institution grows in size. Consequently, one might consider reducing

the extent of the guarantees as an institution grows in size. Presumably, such a policy would mean that depositors or other creditors of an institution would become increasingly vigilant as the institution grows.

The impact of this idea is to augment the design by adding another negative or controlling loop as shown below.

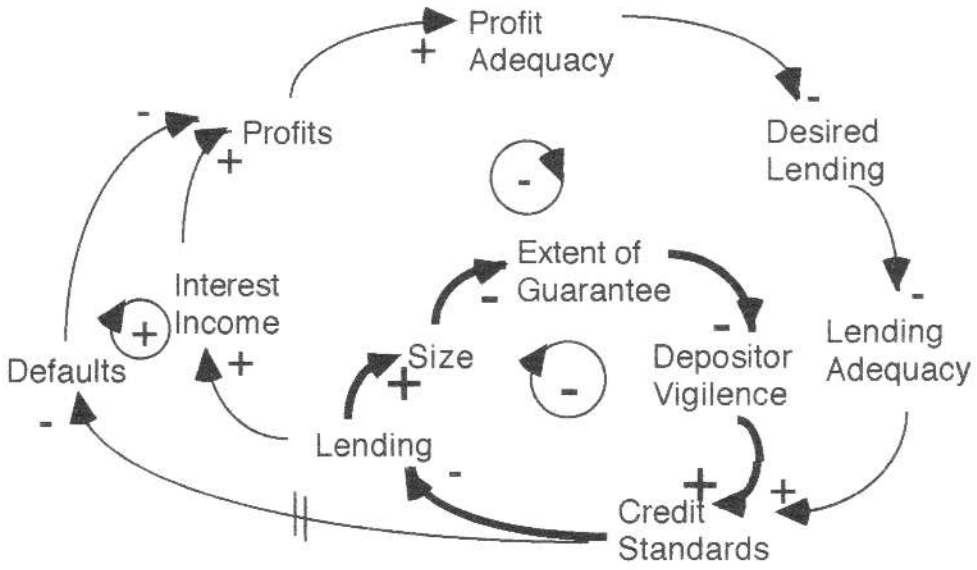

Figure 8: Limiting Guarantees

However, a number of disadvantages may be identified for this policy. First, the policy will create a bias toward smaller institutions. Smaller institutions are not necessarily more efficient and, hence, the policy may be counterproductive. Even more important, there are many reasons for growing besides imprudent credit standards. For example, an institution that fills a vital need or that is simply well managed may grow in size. Consequently, it may be undesirable to create a design that discourages growth no matter what the reason. The fundamental weakness of a guarantee-limiting approach is that it is a lowering-the-mast sort of solution: It operates by eliminating the benefits as well as the weaknesses of the guarantee programs. Indeed, eliminating the guarantees altogether would strongly restrict a manager's ability to weaken portfolios.[14] Of course, it would also do away with all the benefits.[15]

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[14]Note that this does not eliminate the processes but only (re)introduces strong incentives for the private sector to monitor the situation. Private sector actions -- like runs on banks -- may themselves be undesirable. Indeed, deposit insurance was designed to eliminate runs on banks.

[15]Limiting the guarantee as an institution grows is a potential solution whenever a design weakness results in a larger financial institution. Consequently, this potential design response could also apply to the weaknesses discussed in Sections 3, 4, and 5 below. Because this is a lowering the mast solution, however, we do not bring it up again until the summary (Section 7) where we specify all the design issues to which it might apply.

2.3.2. Tie Standards to Profits One way of viewing the design weakness is that weak profits impel managers to reduce standards. One possible solution, therefore, is for the appropriate regulators to require the opposite. That is, as profits fall regulators could require banks to tighten standards.

Such a policy adds a positive loop to the system as shown in Figure 9.

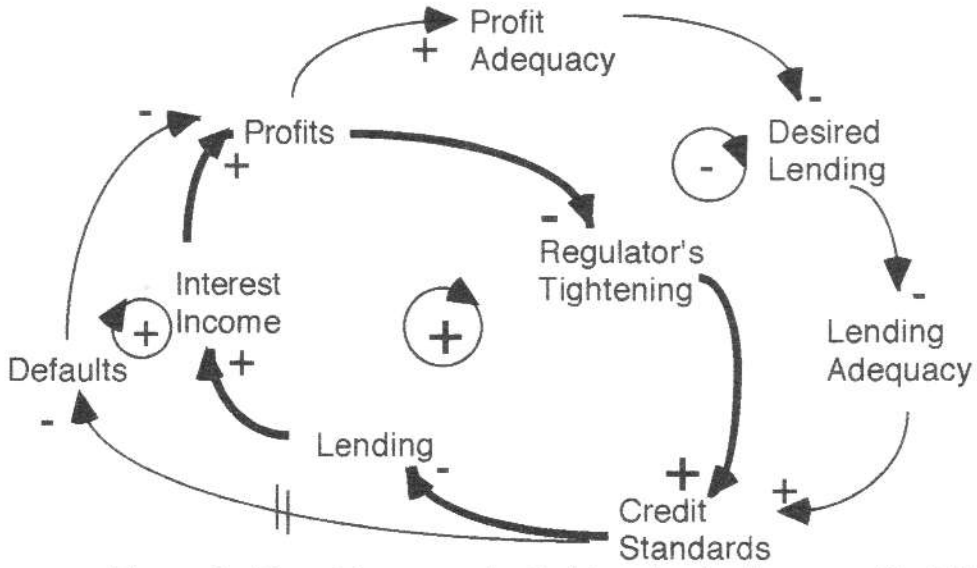

Figure 9: Regulators require tighter standards as profits fall

This design change has the benefit of obviousness but suffers from a number of flaws. On a technical level, stabilizing a system with a positive loop is unusual[16] The loop may create problems, given the delay between higher standards and (potentially) higher profits. While waiting for defaults to be reduced, the bank may experience an immediate reduction in interest income from a smaller portfolio, and the consequent reduction in profits might prompt regulators to tighten again -- causing a further reduction in lending and in interest income and profits. This problem could perhaps be overcome by measuring profits as a return on the loan portfolio, but other problems remain.

First, there are many reasons profits might fall. For example, profits could be abnormally high for a period of time, when they return to normal, there would be a decline. Or, a temporary business downturn could cause a profit decline. Or, an institution might be tightening standards or otherwise shrinking and experiencing a profit decline. It is unlikely that Congress would want each of these events as well as countless other possibilities to all cause regulators to insist that the institution tighten. Finally, there is an issue of timing. If regulators do not act promptly, the institution may lower standards and realize an

[16]Use of positive feedback for stabilizing a system is not unprecedented. In Section 4 we discuss how a positive loop can be stabilizing in the situation of the financial system.

immediate increase in profits due to the lag in defaults. As a consequence, this policy may not be as effective as it first appears.

2.3.3. Tying charges for guarantees to portfolio risk We mention the policy of risk-based premiums, not because we recommend it, but because it appears to be counter-productive from the current perspective. Ramping up an expense (insurance or guarantee premiums) as standards decline may create another self-reinforcing process similar to the once that causes standards to decline. The loop introduced into the design of the system is shown in Figure 10.

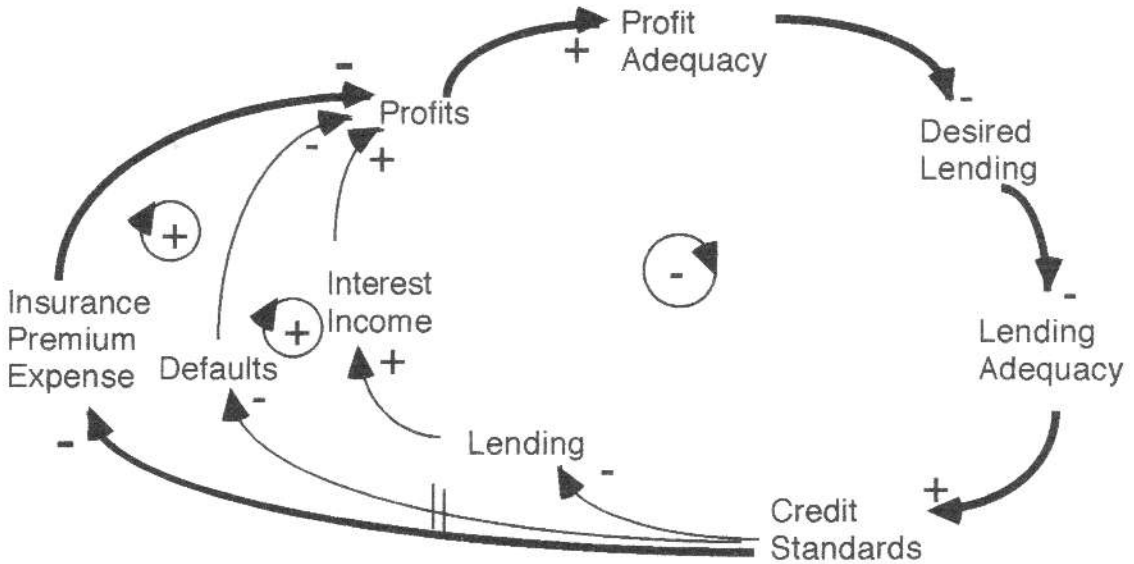

Figure 10: Risk-based premiums add a positive loop

The process would have the following flaw: Lenders may respond to reduced profits by attempting to increase lending in order to boost interest income. One way of increasing lending is by reducing standards. But, if reduced standards prompt higher premium expense, profits may decline again -- causing yet lower profits and a further motivation to reduce standards. Linking premiums to portfolio risk could itself contribute to a deterioration in credit standards.

2.3.4. Capital Requirements Capital requirements are a powerful addition to design. Capital requirements have recently been formalized for commercial banks and could be established for GBEs.[17] When capital requirements are binding, managers of financial institutions have an incentive to shrink their operations. This is because capital is evaluated relative to assets. Capital standards add a new, balancing loop to the system as shown below.

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[17]There were no formal capital requirements for depository institutions prior to the 1980's. For a good discussion of capital standards see Eubanks et al (1991)

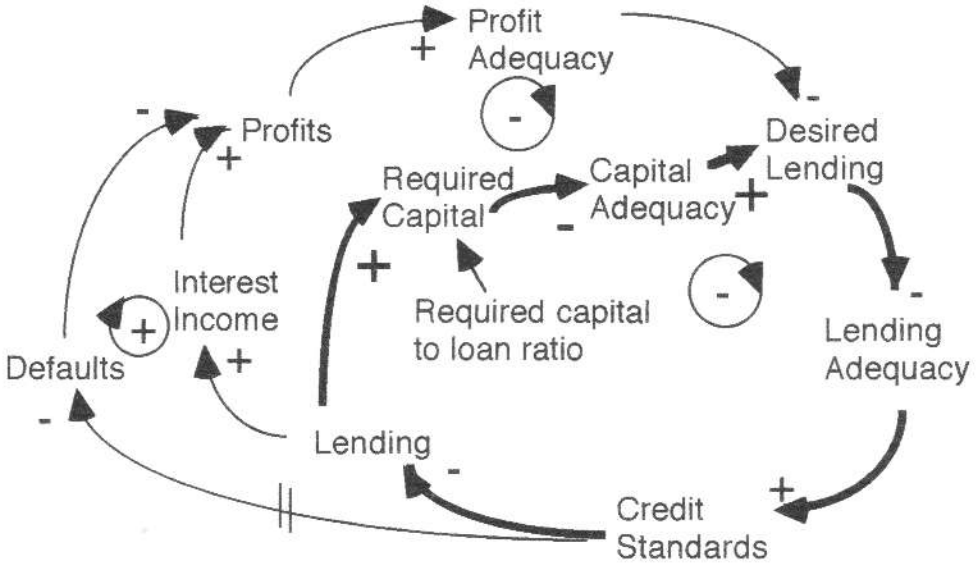

Figure 11: Capital standards add a negative loop to the system

The process would work as follows. Initially, lenders still might respond to a profit inadequacy by desiring to increase lending. However, as lending increases, required capital -- which is calculated as a fraction of loans (and other assets)[18] -- increases as well. Increased required capital means that capital adequacy will decline. A financial institution has two ways of alleviating inadequate capital: it can raise more capital, or -- more importantly in the present discussion -- it can reduce its lending (or loan purchasing)[19]. The desire to reduce lending will prompt a strengthening in standards. In other words: pressures to increase lending, and hence drop standards, will be counteracted by opposing pressure coming from the need to meet capital standards.

There are at least three ways to implement the lever:

a. The lever could be placed in the hands of regulators by charging them with setting appropriate standards for the institutions in their purview;
b. A fixed ratio could be established; or,
c. The capital ratio could be tied to the credit quality of the loan portfolio.

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[18]The fraction is 8% on loans for depository institutions. The fraction differs for other assets. See Eubanks et al (1991).

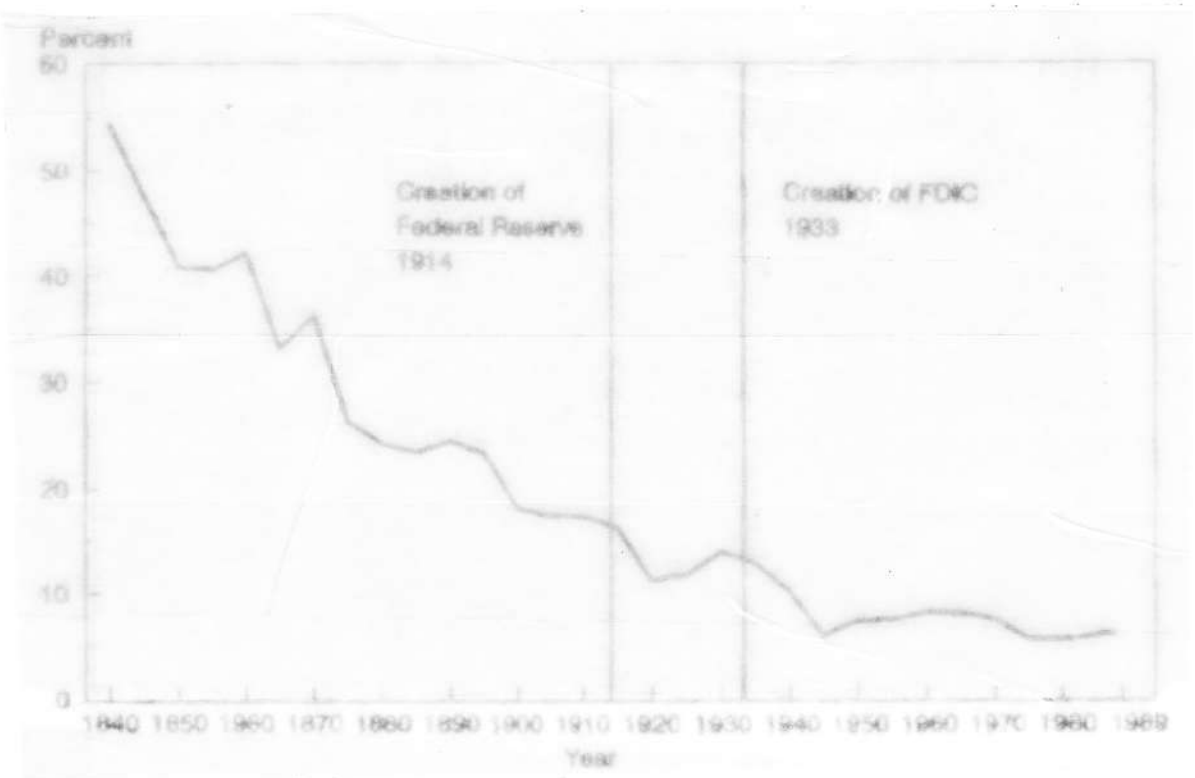
[19]Depository institutions can also reduce other assets or can shift from loans to assets carrying a lower capital requirement ratio.

Eubanks et al (1991, p. 8) report that depository institutions had difficulty raising new capital. A partner at a national accounting firm in charge of bank audit practice for a metropolitan office reports that some banks in his area are seeking to shrink because of capital requirements. (Interview Notes dated 8/18/93 in LeapTec Report 2.1)

The first possibility, placing the lever in the hands of regulators, is essentially the situation of the banking system prior to the 1980s. This requires regulators to use their judgment concerning the proper capital standards.

A problem with this approach is that regulators can come under pressure to permit a decline in capital ratios. At the least, such a policy should include provision for tools for regulators to determine whether it is appropriate to raise or lower standards at any particular time. To ground this discussion in data, Figure 12 shows the history of the capital ratio for commercial banks in the U.S. since 1840; prior to the 1980s regulators had discretion to set capital standards.[20]

Equity as a Percent of Assets for all Commercial Banks*



*Ratio of aggregate dollar value of bank equity to aggregate dollar value of bank book assets.

Figure 12: Equity as a Percent of Assets for All Commercial Banks
Source: U. S. Department of the Treasury. *Modernizing the Financial System.* Washington 1991. Discussion Chapters, II, n.p., from Figure 1, Equity as a Percent of Assets for all Commercial Banks, Eubanks et al (1991).

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[20]This time series is quite interesting. Among other things it shows that a declining capital ratio did not suddenly begin with the establishment of the FDIC or even the Federal Reserve System. Naturally, one does not know what the time series would have looked like in the absence of regulators; however at least one can observe that regulators did not reverse the decline of the ratio.

Either setting a fixed ratio or tying the ratio to the quality of the loan portfolio represents a policy that works automatically and does not require a judgment to be made by regulators.[21] A ratio that is tied to the quality of the loan portfolio creates an additional negative loop as shown below, but may require more active oversight. With this policy, as loans with lower standards are booked, required capital would rise not only because the portfolio was rising but also because the portfolio quality was declining.

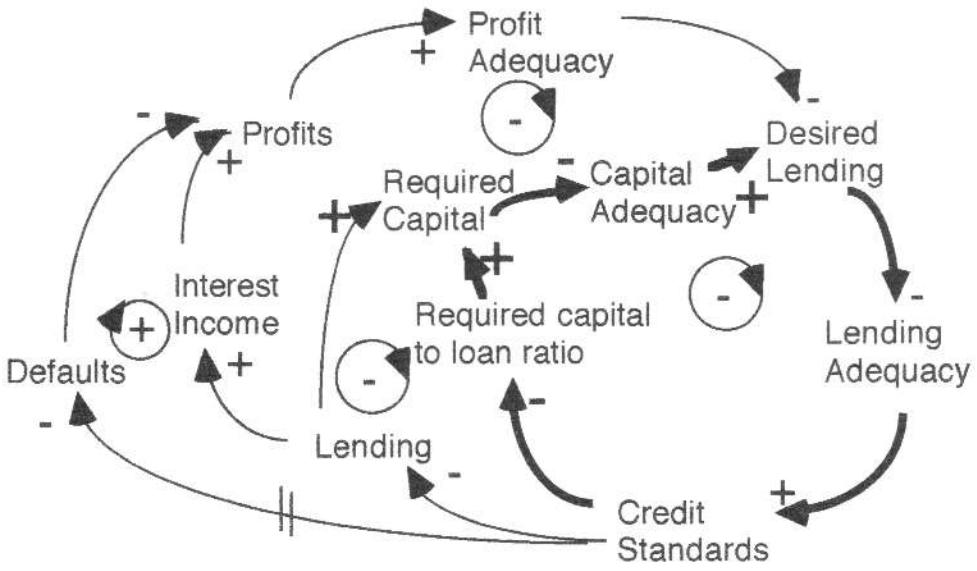

Figure 13: Required capital to loan ratio as a function of lending

[21]The requirements for depository institutions currently represent a point between these two options. Currently, all loans require 8% capital. However, taking a broader view of a bank's portfolio; non-loan assets require different amounts of capital. For example, assets collateralized by government securities require 1.6% capital (20% of 8%). See Eubanks et al (1991, p. 5 ff).

3. GBE Competition

3.1. Design Issue[22]

In Section 2 we observed that a GBE may respond to an inadequate purchasing rate by lowering its credit standards. In this section we examine a potential situation in which reducing credit standards fails to increase purchasing, and hence, a further round of credit standard reduction is generated. This situation can arise when two or more GBEs compete in the same market.

If there are two or more GBEs in a single market, they may compete against each other for a larger share of loan purchases. Among the ways a GBE may compete for loans is by trying to become a more attractive partner to originators. Being more attractive may translate into accepting loans of lower credit standards -- or accepting less rigorously documented loans, which in practice probably means lower credit standards, too.[23] It should be clear that something analogous to an arms race may result.[24] Each GBE may continually try for an advantage that is continually wiped out by the response of the other GBE.

The result of this process may be steadily declining credit standards of GBEs which will influence the credit standards of originators and result in a decline like that shown in Figure 5 for the home mortgage market (Note: Figure 5 shows the loan-to-value ratio, which rises as credit standards decline.) Lower credit standards will tend to increase demand which may cause prices to rise as Figure 3 indicates for the housing market.

3.2. Design Weakness: A Causal Loop Explanation

The process for a single GBE may be diagrammed in a way similar to the inner negative loop of Figure 7. For two GBEs, the process may be represented as shown in Figures 14 and 15:

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[22]For a more detailed and rigorous treatment as well as for supporting evidence, see the Analytical Report "Credit Standards and Purchasing Your Way Our of Problems" in LeapTec Report 2.3.

[23]That the GSEs compete with one another and that this competition results in lower credit standards is supported by Interview Notes of January 25, 1993 and Interview Notes of September 21, 1992, in LeapTec Report 2.3.

[24] This process is seen in a number of contexts, for a managerial discussion of the process in management see Senge (1990, pp. 384-385)

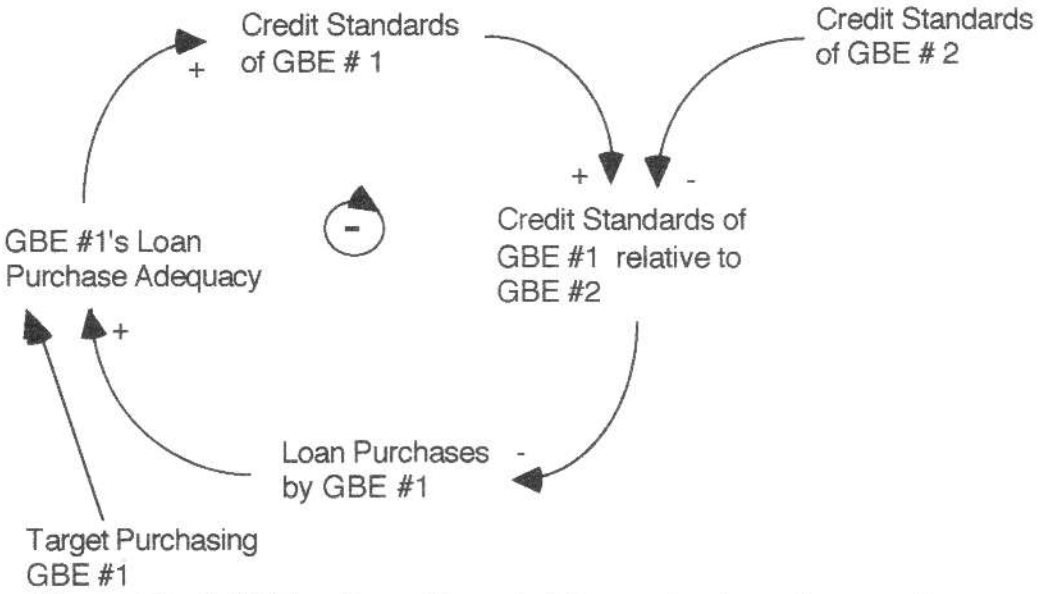

Figure 14: A GBE's attempt to maintain purchasing adequacy forms a negative loop

The loop illustrated in Figure 14 is a balancing loop whose goal is to bring actual purchasing into line with target purchasing. If GBE #2 reduces credit standards, GBE #1's purchasing will fall; and, GBE #1 will lower credit standards to compensate. The structure changes radically, however, when GBE #2 is represented a bit more fully, as in Figure 15.

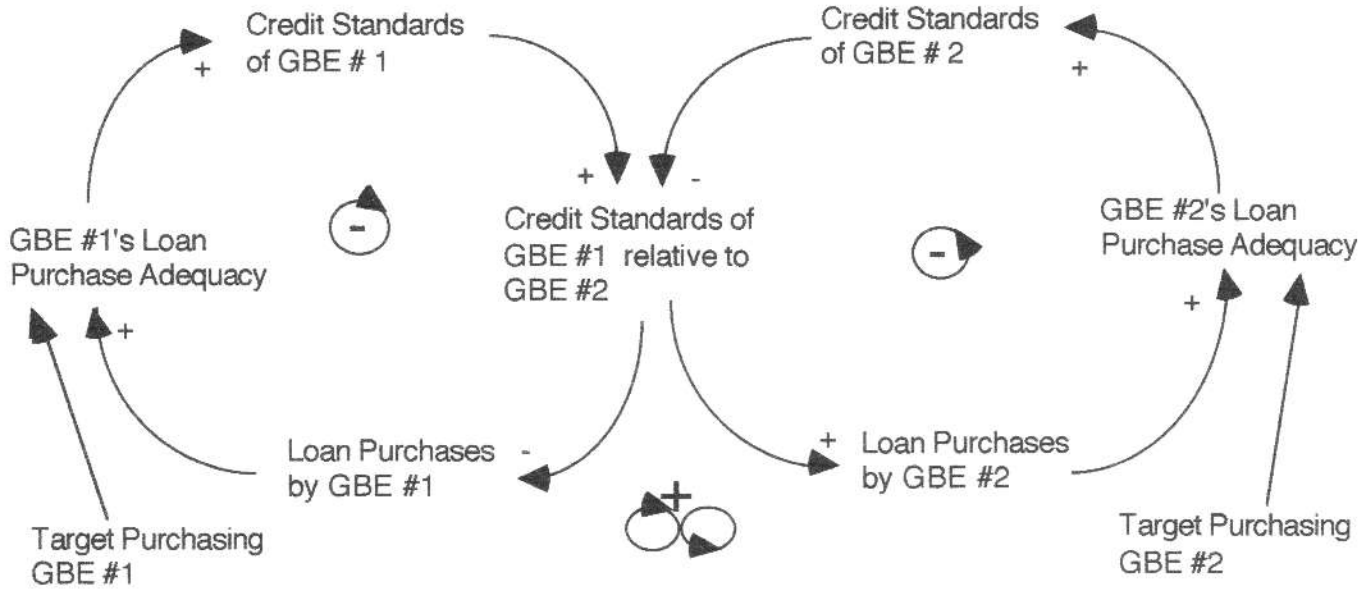

Figure 15: GBE competition: Two negative loops forming a positive loop

There are three loops in Figure 15: Two negative loops which together make a third loop in the shape of a "figure-8". The negative loops represent the structure that makes understandable the tactic of accepting loans "more easily": If a GBE believes its loan purchasing is inadequate relative to goal, the GBE can reduce its credit standards relative to its competitor's. A loan originator will find it easier to do business with that GBE -- a greater percentage of its loans will be acceptable. Originators will tilt toward the "better" GBE. Consequently, that GBE will get more purchases.[25]

The positive "figure-8" loop represents the self-reinforcing process that results from putting two competitors together whose target shares sum to more than 100% of the market. Say that GBE #1 has inadequate purchases. GBE #1 will try to become a "better partner" by reducing its standards and, hence, will become more attractive than GBE #2. As a consequence, the share of loan purchases by GBE #2 will decline. If GBE #2's share was adequate before, it will be adequate no longer. And, GBE #2 will reduce its standards, thereby boosting its attractiveness. GBE #1's share of purchases will now decline, becoming "inadequate" again. GBE #1 now tries to become an even better partner, and the process repeats. The result is a continuing deterioration of credit standards. The process illustrated here involves two GBEs; the principle holds for larger numbers.

3.3. Augmenting the Design

The negative loops involved in this process are essentially the same as the negative loop shown previously in Figure 7 and discussed above in Section 2. It is hardly surprising that the design additions discussed in Section 2.3, may be helpful here as well. To the extent that the lower credit standard swell the size of the GBEs, capital standards may be effective for precisely the reasons discussed in Section 2.3. Limiting guarantees on the basis of size, also discussed in Section 2.3, will have the same strengths and weaknesses.

In addition to the design augmentations already mentioned, several specific to GBE competition might be mentioned. First, Congress might consider establishing a single GBE for each market served. Alternatively, Congress might legislate the maximum market share that each GBE can take. Either one

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[25]The GBE will not get *all* the purchases if experience from Fannie Mae and Freddie Mac is a guide. It is likely that originators believe that they will be doing business in the future with *both* GBEs. Consequently, they believe it is important to maintain a relationship with both, and to maintain the relationship they give some business to the less attractive GBE. Indeed, the GBEs are aware of the fraction of business they get from a particular originator, and understand that if they get less than 50% their terms were less attractive. That is, the share of purchases that a GBE gets is a source of information of its competitive position -- GBEs adjust how they compete on the basis of their share of purchases. See Interview Notes, September 21, 1992, LeapTec Report 2.3. The fact that originators believe they will be dealing with both GBEs probably results from the fact that they *are* in keen competition: An advantage of one relative to the other does not last long.

of these would be effective in eliminating the problem.[26] However, these are lowering-the-mast policies which do away with the benefits as well as the dangers of competition.

[26]Legislating maximum market shares will be effective as long as the maximums only sum to 100%. Congress is currently considering a program of direct student loans which would bypass Sallie Mae. Although, not directly comparable to a situation in which two real GBEs are established, it is possible that the new federal program will compete with Sallie Mae. Congress is considering setting a 50% market share limit on the new Federal program. However, there is no such limit on Sallie Mae. Consequently, a situation may still ensue in which the target market shares of each organization sum to more than 100%. (For example, the new federal program might target 50%, while Sallie Mae targets 80%.)

4. Extrapolative Expectations

4.1. Design Issue[27]

Extrapolative expectations and the closely related positive loop involved in speculative bubbles have been discussed by social scientists for at least a century and a half.[28] The basic idea is that if potential buyers interpret a price rise as part of a continuing trend, they may be drawn into the market by their expectation of continuing price rises,[29] thereby swelling demand and causing prices to continue rising.

Most discussions emphasize the destabilizing or deviation-amplifying potential of the positive loops in which extrapolative expectations play a key part.[30] However it is important to realize first that not all positive feedback is destabilizing, and second, that extrapolative expectations in different sectors can have different effects. In the present context, extrapolative expectations operate in two different kinds of sectors: First in the consumer sector -- that is, among people who are thinking of purchasing the underlying asset -- and second, in the financing sector.[31]

In the consumer sector, a potential buyer may believe that prices will be higher in the future, if prices have been rising recently. Hence, he will believe that he

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[27]For a more complete and rigorous discussion and supporting evidence, see the Analytical Report "Extrapolative Expectations in Financial Guarantee Programs" in LeapTec Report 2.2.

[28]John Stuart Mill (1848) described such a process. The process recently was described in a real estate context by Thornton (1992, pp. 43-44,50-54). Smith and Williams (1992) describe speculative bubbles in experimental markets.

[29]Statements about the behavior of people is subject to empirical validation. Our statements here concerning extrapolation come from LeapTec's experience with people in decision making roles and from empirical observations and tests made by others. See particularly, Sterman 1987,1988; Andreassen and Kraus 1990, and Thornton 1992, as well as the Interview Notes in LeapTec Report 2.2 .

[30]It is a common observation that positive feedback is destabilizing (an early and excellent example is Goodwin (1951). However, one must be open to the possibility that it will be stabilizing. In the 1940's, a patent was initially denied to Gordon Brown and Jay Forrester for a mechanism that used positive feedback to stabilize a hydraulic servomechanism. The patent office believed that positive feedback could not be stabilizing. The inventors argued that the mechanism was stabilizing and that the patent office's reaction was precisely why the patent should be granted. The inventors prevailed and patent #2409190 (Remote Control System) was issued to Gordon Brown and Jay Forrester in 1946. (Jay Forrester, personal communication. See also Forrester (1991, p. 7).) Graham discusses an important stabilizing role of positive feedback (Graham 1977, Section 4.2).

[31]Extrapolative expectations also operate in the asset-supply sectors. We have not considered the supply (i.e. construction, production, servicing) sectors. However, an examination of these sectors in the context of what we have already accomplished would likely be fruitful.

will pay more if he waits and that he might make money if he buys now. Further, if the buyer must finance his purchase, he will be comforted by a belief that he can sell the asset to pay off the loan if some misfortune befalls him. These considerations increase an individuals willingness to buy now. A greater willingness to buy, spread over the whole population, will mean an increase in demand and thus a continued increase in prices.

In the financing sectors, a perception that prices will continue to trend upwards makes managers of financial institutions more comfortable with lower credit standards. They feel more certain that they can get their money out, if the lender defaults. Further, because loans do not default immediately when made, financial managers may tend to evaluate standards -- particularly standards involving the value of collateral -- in terms of the future. For example, the loan-to-value ratio on a loan might not meet the target *now*; but, if prices continue to rise, the ratio might be better than target at, say, three years *in the future*. As a consequence, the currently acceptable loan to value ratio might be pegged higher than the target standard. (Note: a higher loan-to-value ratio is less credit worthy). People will find that they can get the financing they previously were denied. Demand will increase and prices will continue to rise.

As we discuss in Section 4.2, the dynamic consequences of extrapolative expectations depend on the sector in which they occur . In particular, extrapolative expectations on the part of lenders may be destabilizing, as one who is familiar with the literature on speculative bubbles might expect. However, extrapolative expectations on the part of buyers may stabilize the Profits/Lending/Defaults Spiral structure described above.

4.2. Design Weakness: A Causal Loop Explanation

Extrapolative Expectations structure may interact with the Profits/Lending/ Defaults Spiral structure in ways that may change the action of both sets of processes. We will consider the interaction of extrapolative expectations on the part of buyers first. As we will see extrapolation here is not necessarily a design weakness at all.

4.2.1. Buyers' extrapolative behavior Buyers extrapolations can be diagrammed as in Figure 16 below. A perception that prices will continue to rise will draw people into the market and will also reduce the amount of time they spend looking for the asset in question. Both of these factors will increase demand, and hence the price. As the price continues to rise, the perception that a trend is working is strengthened.

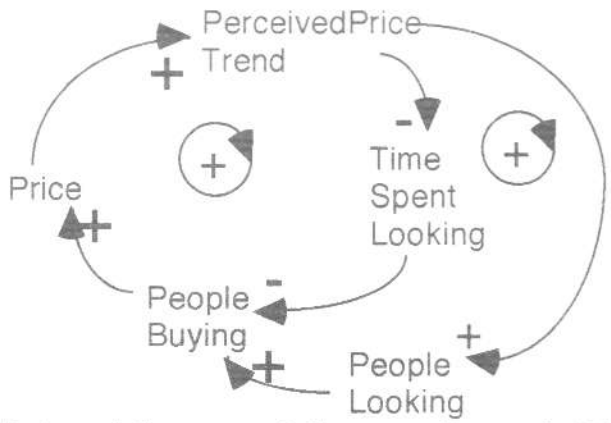

Figure 16: Extrapolative expectations on the part of buyers

The above structure interacts with the process described above that can lead to a Profits/Lending/Defaults Spiral. In that process, bankers address a profit inadequacy by seeking to boost interest income via an expanding loan portfolio. To attract borrowers and swell the portfolio, bankers may decrease standards. Decreased standards, in addition to leading to more loans, may (later) reduce profits via a consequent increase in the default rate.

Figure 17 below represents this process. (Figure 17 is a version the earlier Figure 7, modified appropriately for this section.) A profit inadequacy leads to an increase in desired lending which causes bankers to reduce standards. Reduced standards increases lending in two ways: First, lower credit standards means that the asset will be more affordable and, hence, more people will be buying, and hence borrowing. Secondly, reduced credit standards may take the form of a higher loan to value ratio, which means that the bank will lend more on any given-size transaction -- and, hence, the loan portfolio will increase. The profit inadequacy is combated via these two transmission channels. Unfortunately, lower credit standards also lead to increased defaults, which will exacerbate a profit inadequacy and lead to yet lower standards, yet more defaults, and yet lower profits.

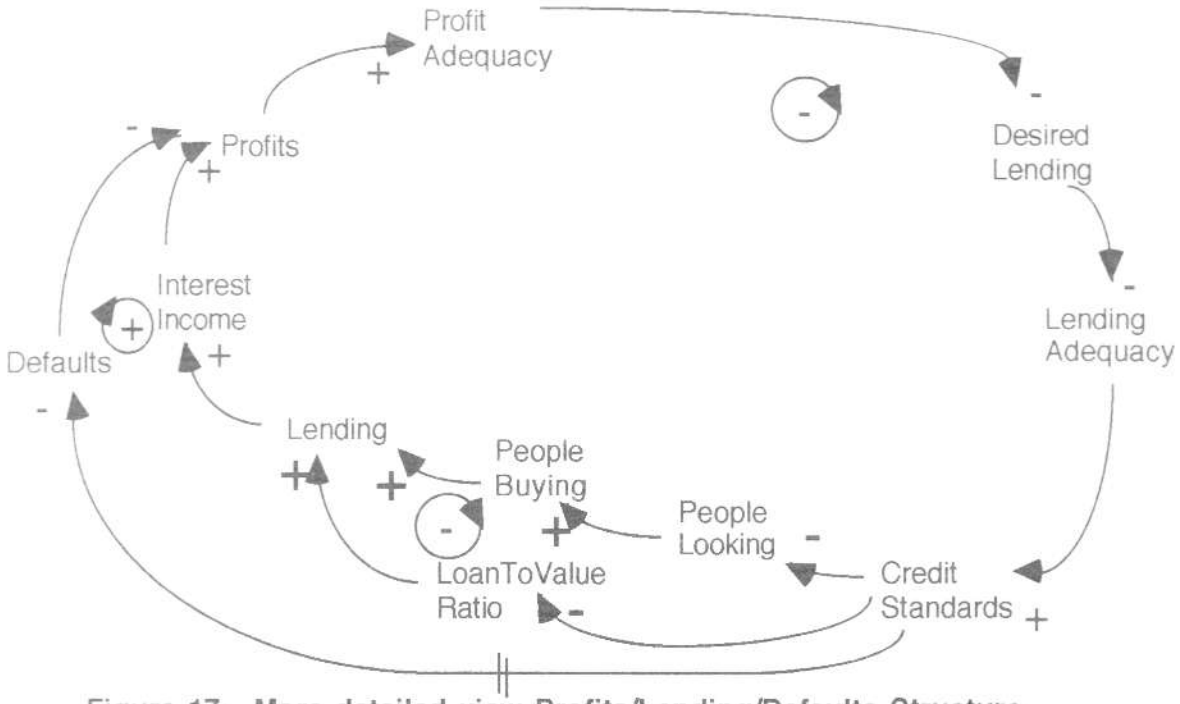

Figure 17: More detailed view Profits/Lending/Defaults Structure

The new structure of extrapolative expectations may supercharge the demand-increasing effects of lower standards, and make it less likely that banks will need to reduce standards to an extent so great as to jeopardize profits. In terms of Figure 17, the structure will strengthen the inner-most negative loop.

We show this beneficial impact graphically below in Figure 18 which combines the earlier Figures 16 and 17. The positive loops of Figure 16 act to strengthen the inner-most stabilizing loop of Figure 17. Extrapolative loops magnify the impact of reduced credit standards on lending, and hence interest income. The effect operates without magnifying the impact on defaults. Consequently, it is quite possible that buyers' price-extrapolation might be stabilizing in its effect on the market.

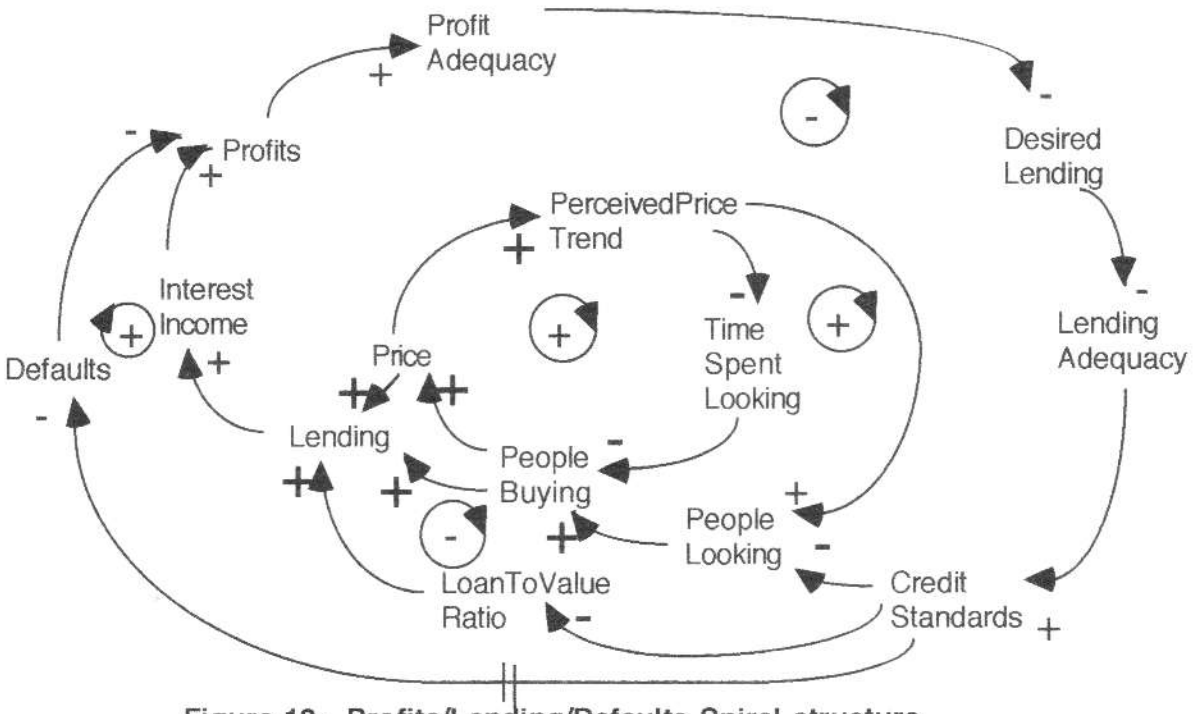

Figure 18: Profits/Lending/Defaults Spiral structure with buyers' extrapolation

4.2.2. Lenders' extrapolative behavior The lenders' extrapolative loop may be drawn as shown in Figure 19. Figure 19 shows that a perceived upward trend in prices will make bankers comfortable with looser credit standards which will increase the number of people buying, and therefore the price -- and, thereby, add more fuel to the trend.

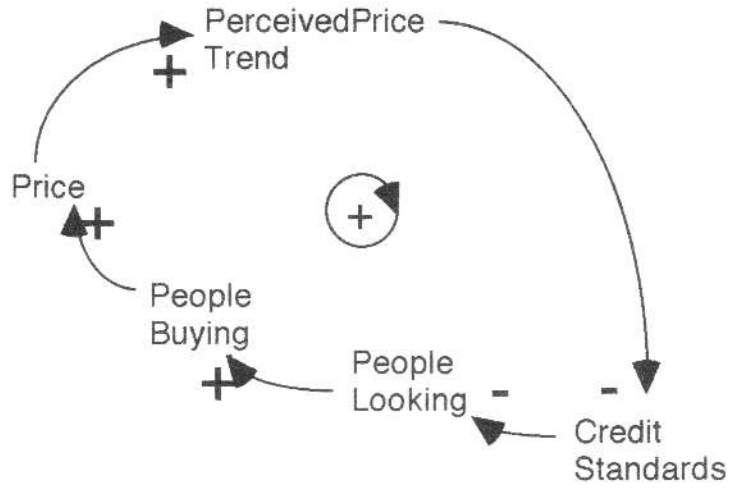

Figure 19: Lenders' extrapolative expectations

This loop, too, should be seen in a context that includes the Profits/Lending/Defaults Spiral. Lenders' extrapolative expectations have adverse effects on credit standards. Consequently, it will boost demand and, unlike buyers' expectations, also increase defaults.

Figure 20 below places Figure 19 in the context of the earlier Figure 17. The fundamental difference between buyers' and lenders' extrapolative loops is clear. Lenders' extrapolative loops influence credit standards and thus are a part of the default-generating loop. In contrast, buyers' extrapolative loops influence people looking and hence do not reinforce defaults.

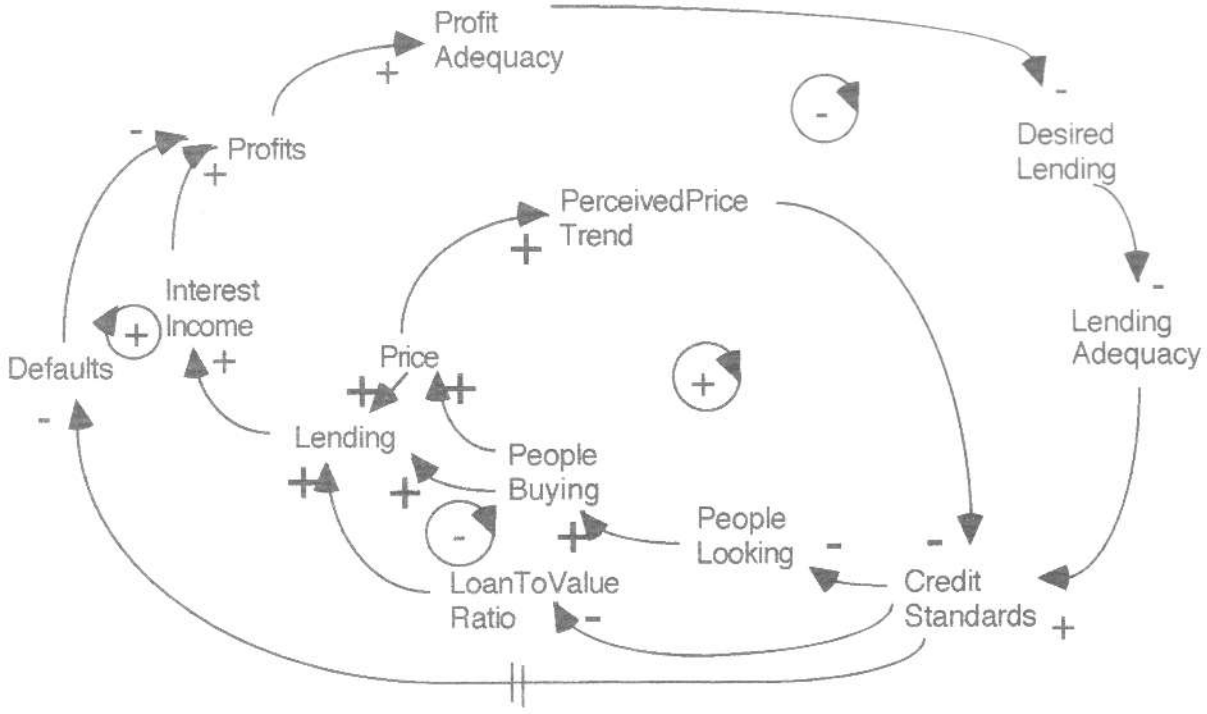

Figure 20: Lenders Extrapolative Loops with Profits/Standards/Defaults Structure

Price extrapolation on the part of lenders can lead to declining credit standards and increasing prices. (See Figures 3, 4, and 5 for time series from particular markets.)

4.3. Augmenting the design

In this section we consider design modifications intended to ameliorate the potential for adverse consequences of lenders' price extrapolation. We do not offer levers for buyers' extrapolative expectations, because extrapolation by buyers might be beneficial to aspects of the system as argued above.[32]

4.3.1. Capital Requirements Because a reduction in credit standards increases lending, capital requirements as discussed previously may help this situation, too. (See Section 2.3.4.)

4.3.2. Information Requirements Another possibility is to give managers of financial institutions information concerning the historical length of price trends, and the historical impacts of turn-arounds in prices on profits. It might be possible to enlist the aid of the financial institutions themselves in this effort by asking them to provide information concerning the impact on foreclosures of changes in asset price trends -- say, flat prices, a 10% per year reduction, and a 20% per year reduction. The question would include how the number of foreclosures would change, as well as how the proceeds on collateral sold would change.

Financial institutions also could be required to explicitly recognize the impact of price changes on their income statements. Financial institutions could recognize as non-operating income the gain (or loss) attributable to changes in prices of collateral sold in settlement of indebtedness. The simplest way of doing this would be to have the financial institution calculate how much of the gains or losses is attributable to a change in the price of the asset, using regional or national data on price movements for that asset. Take home mortgages as an example: If the average price of houses in, say, the Northwest increased by 10% from the time the loan was made, and if a foreclosed house sold for $100,000, the bank would recognize $10,000 as non-operating income.

Structurally, the purpose of these possibilities is to weaken or eliminate the link between prices and perceived trend and the link between the perceived trend and credit standards. (See Figure 20 above.) The first idea operates diffusely in the sense that it only creates an environment in which lenders might become more aware of the problems of extrapolating past price trends. The second idea is much more precise, but only addresses part of the problem. Income is affected not just by the price impact on sales of foreclosed assets, but also by the effect of price on preventing or encouraging defaults in the first place. This second effect of prices on income may be very large, but is quite difficult to estimate and capture in financial reports.

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[32]We do not recommend the controversial policy of actually encouraging extrapolative behavior on the part of buyers because of the potential for adverse consequence on oscillatory dynamics (which is beyond the scope of our study). Some of these adverse consequences are discussed in the Analytical Report "Extrapolative Expectations in Financial Guarantee Programs" in LeapTec Report 2.2. Note particularly page 12, note 10, and pages 14-16.

4.3.3. Tie Standards to Prices Another policy that targets the link between price trends and credit standards involves tying standards to asset prices. The problem is that rising prices provide a justification for, and a comfort with, reducing credit standards. One solution, therefore, might be to require the opposite -- that is, to require that banks increase their credit standards in the presence of rising prices (and vice verse). Unfortunately, this structure is one in which regulators and financial managers may have similar views. And, regulators might be prone to loosen supervision when prices are rising for precisely the same reason that bankers are prone to lower credit standards. As a consequence, it may be difficult to find a way of institutionalizing this design change in a way that would lead regulators to do what is probably the opposite of what they believe they should do. Who would regulate the regulators?

5. Federal Loan Insurance Program Boundary Expansion

5.1. Design Issue[33]

Federal loan insurance programs, along with GBEs, are hallmarks of federal efforts to provide benefits via financial guarantees. GBEs were discussed above in Section 3. In this section and in Section 6, we turn our attention to the federal loan insurance programs.

A federal loan insurance program (FLIP) is a federally backed program that insures lenders against borrower default on loans meeting certain criteria -- chief among which is that the loan finance a particular kind of asset.[34] Although our focus is on FLIPs that might be established in the future, historical examples include the FHA which helps buyers finance houses and the federal guaranteed student loan program which helps students finance college education.

The basic issue discussed in this section arises from the fact that defaults do not occur immediately upon loan origination.[35] Consequently, some income will be received prior to the default. Particularly, in a situation in which a FLIP is expanding, income may exceed defaults for an extended period, even if the FLIP is writing business that technically (and eventually) is not profitable.

Unfortunately, the very forces giving rise to a FLIP in the first place -- namely the desire to make a socially desirable asset (like a house or an education) more affordable -- may exert continuing pressures to expand the FLIP, that is, to make the FLIP more accessible to more needy people. The principal mechanism is to reduce credit standards. The natural counteracting mechanism -- rising concern about the adequacy of reserves -- may be significantly weakened by the mechanism of concern here.

Consider a simple example. Say that a FLIP insures $5 million in long-term loans for a fee of 1% per year. Say that the probability of default is not distributed evenly over the life of the loan, but that during the first two years

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[33]For a more detailed and rigorous treatment of this design issue, see the Analytical Report "Expanding the Boundaries of Federal Loan Insurance Programs" in LeapTec Report 2.4.

[34]Other important criteria determine the maximum amount of the loan, the maximum price of the asset being purchased, and the minimum credit standards that a borrower must meet. The kind of future loan insurance program we have in mind would be something like the current FHA.

[35]The average time between loan origination and default will vary depending on the asset being financed, the term of the loan, and other factors. However, the time can easily be a number of years. Consider the cases of two current federal loan-insurance programs. The FHA insures loans on houses. Typically a defaults on a mortgage peak 3-5 years after origination (Gale 1990, p.4). Guaranteed student loans default only after the student has left school which is typically some years after the initial loan is made.

there are almost no defaults. At the end of year 3, 6% of the loans go bad, and after that, 2% per year go bad. In this case, the FLIP adds to its reserves during the first two years, but the losses of the third (and subsequent) years wipe out the gains. Ordinarily, the FLIP would record a loss in the third year and its reserves would decline, sending a clear (if tardy) signal to raise standards or fees. But, the FLIP will still appear to be making money in year 3 and reserves will still be growing if in the meantime the FLIP has continued growing (writing, say, $10 million dollars in the second year and $20 million in the third year). The income from newly insured loans offsets the losses on old loans. And this net income may itself provide the signal that continued growth is O.K.[36]

The process can continue until the growth of the FLIP slows or stops. When growth slows or stops, losses will be evident, and the FLIP may be forced to raise standards -- causing it to shrink and making further losses even more visible.

We are concerned with future guarantee systems, for which no data can be available. However, to identify potential threats to future programs and to confirm the possibility of those threats we have looked to the history of existing programs, primarily the housing finance system. Available data for the FHA is consistent with the mechanism described above. Figure 21 below shows the FHA housing expense ratio. The ratio increases (indicating *deteriorating* credit standards) until the early 1980s at which point the ratio begins decline (indicating strengthening standards).

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[36]Naturally, generally accepted accounting principles (GAAP) will require estimates of the future defaults and will recognize those defaults before they occur. However, the use of GAAP may not be required of federal loan insurance programs. FHA for example has insured houses for sixty years but did not adopt GAAP until the late 1980s. (See Interview Notes, LeapTec Report 2.4, dated March 5, 1993 with C. Austin Fitts and Interview Notes dated May 26, 1993 with an audit partner of an independent accounting firm.) And, even if GAAP is adopted, the estimated loss rate must be derived from actual default experience, and that experience must necessarily occur after credit standards are reduced and after at least some premiums have been received.

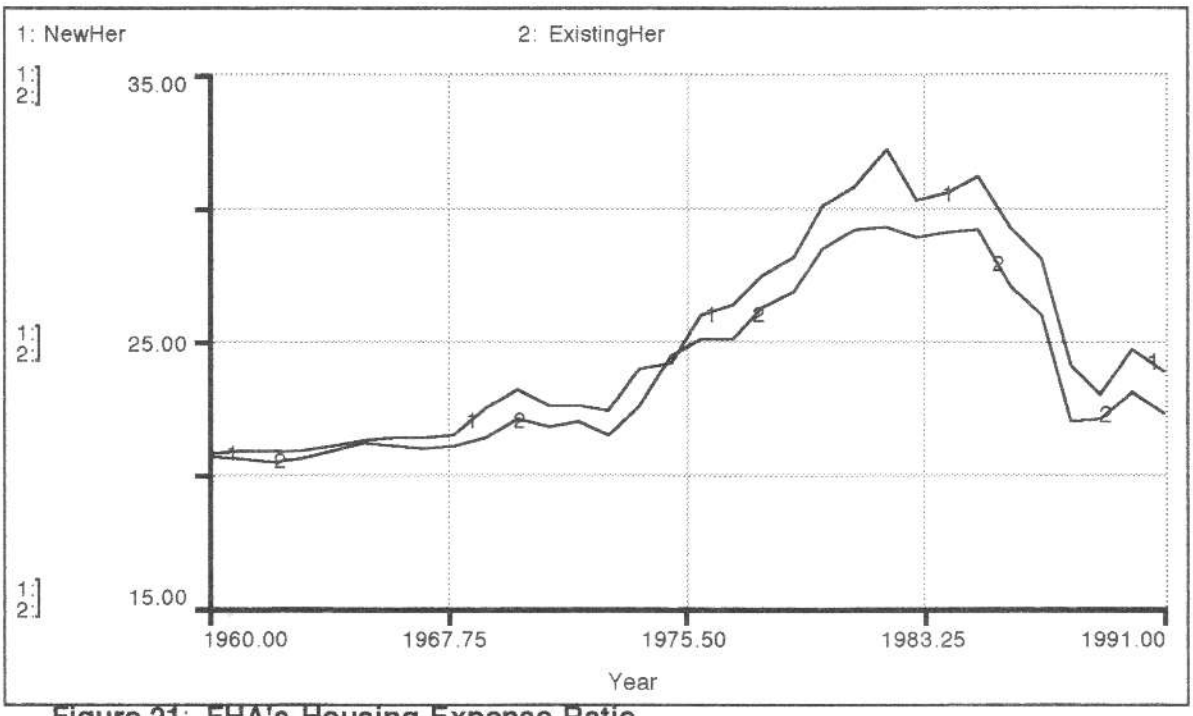

Figure 21: FHA's Housing Expense Ratio

Source: Compiled by GAO from annual issues of *Characteristics of FHA Single-Family Mortgages: Selected Sections of National Housing Act,* U. S. Department of Housing and Urban Development, 1978 - 1991, and *Series Data Handbook, A supplement to FHA Trends Covering Home Mortgage Characteristics,* Department of Housing and Urban Development, 10/12/78, for data from 1960 through 1977. Definition of the Housing Expense Ratio was revised in 1977 and 1988 by HUD. From 1960 through 1978: "Monthly housing expense to total effective income"; from 1978 through 1988: "Total housing expense to total effective income"; From 1988 through 1991: "Total mortgage payment to total effective income". Data plot by LeapTec.

Figure 22 below shows the FHA fund equity since 1987.[37] Two of the funds have been insolvent, and the accountant's report for 1990 indicates that the equity of the third (the MMIF) "may not be sufficient to cover losses resulting from adverse economic conditions" (Price Waterhouse, "Report of Independent Accountants", in Federal Housing Administration 1990 Annual Report. p.39)

The data in Figure 21 and 22 are consistent with the mechanism described here.

[37]Information on FHA insurance fund accrual-basis equity is unavailable prior to 1987. Prior to 1987, the insurance fund accounting did not include foreclosure and default loss reserve accruals. See Interview Notes dated March 5, 1993 with C. Austin Fitts and Interview Notes dated May 26, 1993 with an audit partner of an independent accounting firm, LeapTec Report 2.4.

The problem is that the negative, balancing loops operate with a delay which is not present in the self-reinforcing, positive loop. The self-reinforcing process is one in which a decrease in standards increases FLIP-insured lending, thereby increasing premium income and the FLIP's reserve fund. With income and reserve fund up, the FLIP is ready to reduce standards again. This process operates faster than the controlling process where lower standards and increased lending cause insured defaults to rise, which reduces the reserve fund and generates pressure to raise credit standards. As a consequence, standards can fall while income rises. When growth slows the FLIP is in trouble, and it will come under pressure to raise its credit standards.

5.3. Augmenting the Design

In brief, the problem is that revenues are physically received before defaults begin to occur. Solutions here involve accounting practices designed either to accelerate the recognition of defaults or to delay the recognition of income. Accounting for new federal insurance programs should comply with generally accepted accounting principles (GAAP).[39] One of the foundation principles of accounting is that revenues should be matched with the activities that earn the revenues. Clearly, up front premiums should be booked into an unearned income account which is only gradually recognized as income. Less obviously, a portion of early revenues should also be booked as unearned income and recognized slowly. The argument here is the observation that loans do not typically default early-on. Consequently, the FLIP is not actually protecting the lender against very much risk during the early period, and hence the premiums must compensate the insurer for bearing risk later on. These practices will delay premium income so that it better matches defaults.

Further, GAAP requires an estimate be made of future losses on currently insured loans. Without this estimate, information on defaults will be delayed by the full time until defaults are actually realized. This feature of GAAP accelerates the recognition of losses due to defaults.

The application of accounting procedures described above will help. But, the estimates of future losses and the estimates of how long to wait before recognizing income must themselves be based on experience with defaults. It takes time to gain experience. And hence, even with the application of GAAP there may be a delay during which a FLIP may mistakenly believe itself to be more profitable than it really is. As a consequence, the timing of successive changes to credit standards should be a matter of concern. In particular, sufficient time should be allowed for evaluating the results of a credit change on defaults before making a further change in the same direction. How much time will depend on the asset being financed and the term of the loan, but it could be several years or more.

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[39]Until recently FHA was not required to use GAAP accounting. (See Interview Notes, LeapTec Report 2.4, dated March 5, 1993 with C. Austin Fitts and Interview Notes dated May 26, 1993 with an audit partner of an independent accounting firm.)

6. Lenders' Control and Federal Loan Insurance Program Boundary Expansion

6.1. Design Issue[40]

In this section we examine a design problem related to the interaction of federal insurance programs and primary lenders. Ordinarily, primary lenders can control the amount of their lending via credit standards (see Section 2, above). If lenders wish to lend more, they can relax standards; and, if they wish to lend less, they can tighten. However, if the lender is attempting to control lending in an area where a FLIP exists, and if the lender can only affect conventional standards, his actions may not affect the volume of lending as much as the fraction of lending that is insured.

For example, if the lending volume is higher than anticipated (perhaps because the FLIP is seeking to expand its boundaries), lenders may strengthen their standards. However, the principal effect may only be to require previously well-qualified borrowers to get insurance. A number of consequences may follow. First, the new borrowers will be at the better end of the FLIP's risk scale, and they may find themselves subsidizing borrowers at the worse end. This subsidization may or may not be considered desirable,[41] but it is a side-effect of other decisions and, as such, it is unlikely to have been subjected to serious policy consideration -- and that is surely undesirable.

Further, the newly insured borrowers will be able to take advantage of the FLIP's looser standards and in particular an elevated LTV ratio. A higher LTV ratio means that the borrower will be borrowing more for any given transaction. Consequently, tightening standards on conventional loans may increase overall lending, rather than curtail it. The end result will be a self-reinforcing pressure toward a widening gap between conventional standards and insured standards coupled with increasing insured lending.

This process also operates in reverse. If originators seek to expand their lending portfolios (e.g., because of excess liquidity (See Section 1.) or inadequate profits (See Section 2.)), they may try to become more attractive by loosening standards. But loosening standards may have less of an impact on their portfolios than on the fraction of loans that are insured. That is, if lenders can only affect their own standards, they may end up simply permitting borrowers who previously needed insurance to go without. The consequence will be continuing deterioration in originators' standards (See Figure 5 for an example.) and a declining fraction of loans insured by the FLIP.

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[40] For a more complete and rigorous discussion and supporting evidence, see the Analytical Report "Expanding the Boundaries of Federal Loan insurance Programs" in LeapTec Report 2.4

[41] Note, however, that these new borrowers are not the wealthiest portion of the population. The wealthiest individuals will still qualify for conventional financing.

To see the kind of decline that is possible, the figure below shows the fraction of home mortgage loan originations insured by the FHA and VA. This fraction declined from 35% in 1970 to 10% by 1991.

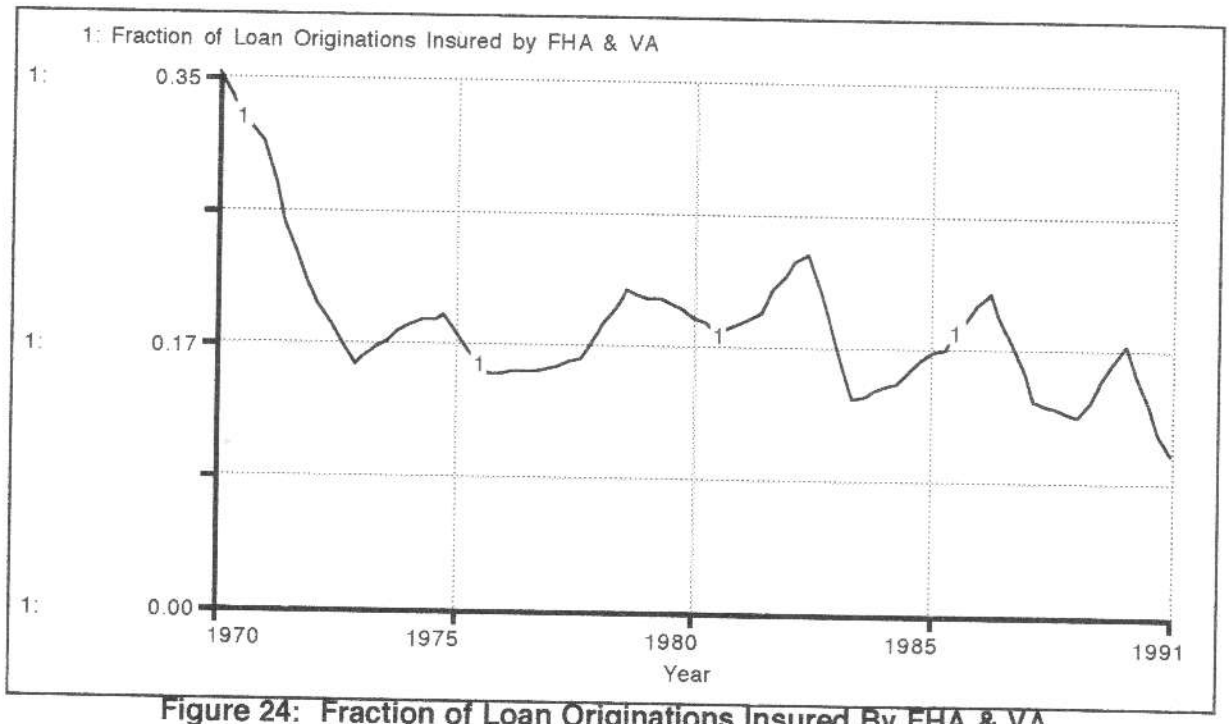

Figure 24: Fraction of Loan Originations Insured By FHA & VA

Source: Revised annual data from Survey of Mortgage Lending Activity, Financial Services Division, HUD. Data for 1990 & 1991 is preliminary and subject to revision. Data plot by LeapTec.

A further adverse consequence of the mechanism operating in this direction is the converse of that mentioned earlier in this section: The FLIP will experience reduced insuring at the better end of their risk scale. As a consequence, their insuring will increasingly be concentrated among the riskiest possible borrowers.

6.2. Design Weakness: A Causal Loop Explanation

These ideas are illustrated in the following diagram which shows that the attempt to control lending adequacy creates an intended negative loop and an unintended positive loop. The negative loop controls lending adequacy by adjusting standards. The positive loop weakens or even reverses the negative loop.

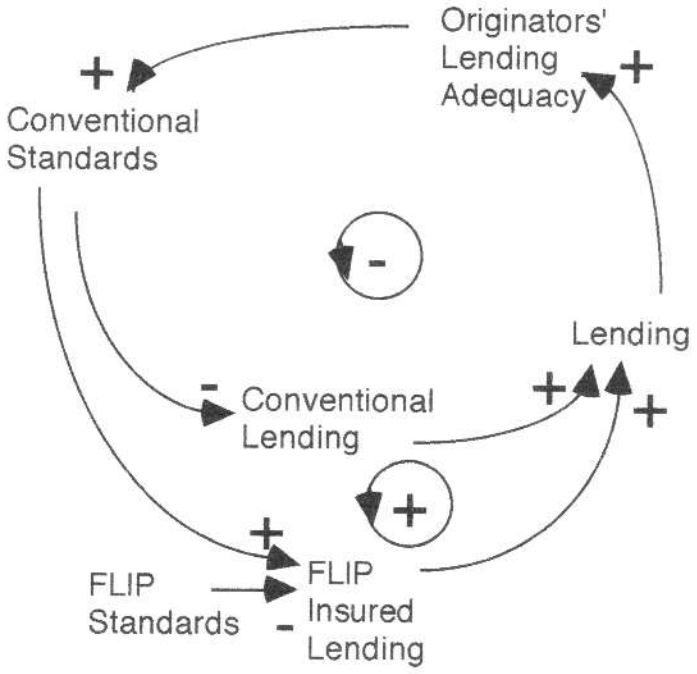

Figure 25: Lenders' control of lending is undermined by a positive loop

6.3. Augmenting the Design

The problem here is that conventional standards can move in one direction while FLIP credit standards remain unchanged or even move in the other direction. A possible design augmentation would be to set a range for FLIP standards in terms of conventional standards. For example, a FLIP might be required to keep its loan-to-value ratio within 5 points of the prevailing standard on conventional loans. That way, if conventional standards tighten (i.e., the loan-to-value ratio for conventional loans decreases), the FLIP would be required to tighten as well. Lenders would regain control of their lending. The

design addition creates another negative loop in the system as shown below. The additional negative loop adds additional control to lenders.

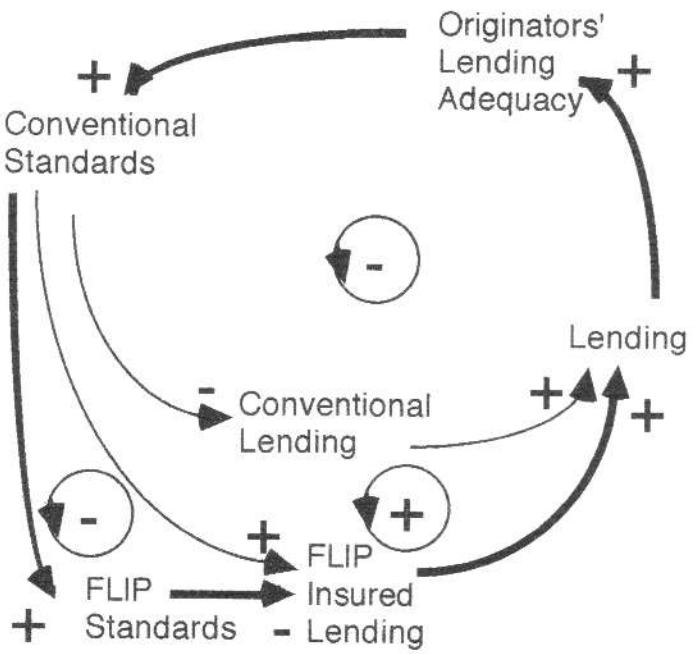

Figure 26: Tying FLIP standards to conventional standards

The weakness is that the FLIP will lose a measure of control over its insuring.

7. Summary & Conclusion

This report has examined the design of future financial guarantee programs. We have summarized a number of potential design weaknesses, and considered how to counteract them. The weaknesses do not stem from any failure of either law or regulation, but rather from the basic goals and structure of the programs themselves. Accordingly, we have paid particular attention to design changes that do not eliminate the problematic feature, but which rather can counteract it.

The design issues were originally analyzed in prior LeapTec Analytical Reports. The following table provides a list of the design issues, the section number in which it appears in this report, and the LeapTec Report number in which the relevant LeapTec Analytical Report appears.[42]

Sect.	Design Issue	LEAPTEC Report
1	Credit Expansion from establishing GBEs	1.4a
2	Profits/Lending/Defaults Spiral	2.1 & 2.3
3	GBE Competition	2.3
4	Extrapolative Expectations	2.2
5	FLIP Boundary Expansion	2.4
6	Lenders' Control and FLIP Expansion	2.4

Figure 27: Summary of Design Issues

The following table summarizes the design additions that we considered in this paper. Rows are labeled by design addition and columns by design issue. An entry at an intersection of row and column indicates that the corresponding design addition affects the corresponding design issue. The entries show the section number in this report in which the design addition is discussed.

We have grouped the design additions into four categories, indicated by a symbol (**, *, **L**, or –). Design additions marked with a minus (–) may be counterproductive in some cases, and should be implemented with great care, if at all. An **L** indicates a lowering-the-mast policy. A single or double asterisk (* or **) indicates the design addition is likely to be effective in most cases. The double asterisk (**) augmentations are more precise, easier to implement, or involve fewer undesirable restrictions on financial institutions.

[42]Report 1.4(a) is the Analytical Report for the LeapTec Report 1.4.

Design Augmentation \ Design Issue	Credit Expansion from Establishing GBEs	Defaults/Lending/Profits Spiral	GBE Competition	Extrapolative Expectations	FLIP Boundary Expansion	Lenders Control and FLIP Experience
** Reserve requirements for GBEs	1.3.3					
** Capital requirements for financial institutions		2.3.4	3.3	4.3.1		
** GAAP accounting for FLIPs					5.3	
* Automatic reserve draining as GBEs purchase loans	1.3.2					
* Tie financial institutions' credit standards to prices of underlying asset				4.3.3		
* Give to or require from financial institutions information on price movements and effects of price movements on profits				4.3.2		
* FLIPs to allow time between change in credit standard and further change in the same direction					5.3	
* Set a range for FLIP standards in terms of conventional standards.						6.3
L Limit the guarantees with size of financial institution		2.3.1	2.3.1	2.3.1	2.3.1	
L Control loan fraction sold by originators	1.3.1					
L Only one GBE per market served			3.3			
L Maximum GBE market share			3.3			
– Tie financial institutions' credit standards to profits		2.3.2				
– Tie charges for financial guarantees to portfolio risk of financial institutions		2.3.3				

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Figure 28: Summary of Design Augmentations

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