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Financial Fragility and the Structure of Financial Markets

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Financial Fragility and the Structure of Financial Markets

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SUMMARY: This paper investigates the role of financial structure on the financial fragility of the economy. It argues that while structure is independent of the degree of what Minsky calls financial fragility, it will have an impact on the rate of contagion by which financial fragility produces general economic instability. This is independent of the traditional view of instability as being caused by financial intermediation creating a mismatch of maturities of financial institutions' asset and liabilities, but is linked to the quality of the assets against which banks lend when there is a rapid increase in resources intermediated by banks. It concludes by arguing that the present system has become more prone to financial crises because of an increase in the speed of contagion due to a change in the financial structure.

JEL Classification: G1, N22

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Instability of the Economy and Fragility of the Financial Structure¹

Against the backdrop of the approaching sixtieth anniversary of the New Deal financial legislation and the inauguration of a new administration facing the task of re-regulation of the financial system, it seems appropriate to reflect on the relationship between financial structure and financial instability. The New Deal regulations were introduced in the aftermath of conditions of extreme financial fragility and one of their express aims was to eliminate the potential for financial institutions to produce instability in the economy. The regulations seem to have been successful, at least until the late 1970's, in preventing another great depression, or to paraphrase, "It" has not (yet) happened again.

Since Minsky developed his now famous "financial instability hypothesis" during the "golden years" of the operation of this New Deal legislation, it must be presumed that he believed that "financial fragility" was not only possible, but also present, during those years of economic stability. This also implies that in Minsky's view the New Deal legislation did little to eliminate the potential for financial fragility. As no substantial breakdown occurred in the period, we might conjecture that while financial structure is independent of financial fragility, it may play a role in the rate of propagation of fragility, or in preventing the transformation of fragility into the "It" of the major instability of the Great Depression.

Minsky's (cf. the Introduction to Minsky, 1982) suggestion that the transformation of financial fragility into a more generalised "breakdown" has been prevented by the existence of "Big Government" acting as spender of last (and sometimes first) resort and a "Big Bank" acting as the "lender of last resort" also seems to preclude the importance of the financial structure of the system in the passage from fragility to breakdown; although it leaves open the possibility of an influence for financial structure on the speed of contagion in the system.

In broaching the question of the impact of financial structure and regulation on the degree of financial instability in Minsky's work, it is important to recognise a basic point of difference from the traditional approach to financial instability. Minsky refers to "instability" as the destabilising impact of financial conditions on the behaviour of the economy as a whole, rather than to the "instability" of the financial institutions in the economy. I shall thus

¹ Professor of Political Economy, University of Bologna, Italy. This paper was presented at the Association for Social Economics Session: "The Current Financial Crisis and Hyman Minsky's Financial Instability Hypothesis" of the Allied Social Science Associations Meetings held in Anaheim, Calif., January 7, 1993, 8.30 am. Financial Support from an Italian Ministry for Universities and Scientific Research group (40%) grant: "Non-competitive market forms and economic dynamics" is gratefully acknowledged.

propose to define changes in the proportions of "hedge" "speculative" and "Ponzi" financial relations (cf. Minsky 1986, Appendix A) in the financing of production as producing changes in the "fragility" of the financial system. It is this definition of "fragility" which replaces the traditional conception of financial "instability".

Financial Instability and Financial Fragility

The traditional conception of instability in financial markets stems from the view that financial institutions act as agents which intermediate between savers willing to lend funds and final borrowers seeking to invest funds. This intermediation function not only requires a matching of borrowers and lenders, but also more importantly concerns the transformation of the maturity of financial assets from short term to long term with lenders preferring short-term liquid assets and borrowers long-term more or less permanent fixed interest liabilities. The greater the mismatch between the maturity of the short-term assets issued to savers and the long-term liabilities purchased from investors the greater the risk that short-term interest rates will rise relative to long-term rates, producing negative net worth and insolvency, or a flight of funds called disintermediation as the short term bid rates lag behind the market. When the volatility of short-term interest rates is modest, the adjustment can be made by cutting back on new lending, reducing net margins and drawing down secondary reserves; this was the method of monetary control in the post-war period. When the movement in short-term rates is substantial, loans must be called and forced sales of assets may take place leading to downward pressure on prices.

Such instability can be reduced in a number of ways. One is to limit maturity mismatching by institutions. This would require a range of different institutions operating in markets for assets of different maturities limited to issuing liabilities of the same maturity, which would imply regulation via the imposition of financial market segmentation. Alternatively, one could have an infinite number of institutions, each operating with an imperceptibly small mismatch, which could be covered by a buffer of liquid reserves. Finally, long-term assets could have interest rates indexed to short-term liabilities; this would eliminate the interest rate risk of maturity mismatching by financial intermediaries, but shifts it onto the borrower who is forced to forego the presumed preference for fixed interest liabilities. Credit risk here replaces maturity or interest rate risk.

In addition to maturity transformation, financial intermediaries are also characterised as producing liquidity through the issue of short-term liabilities against long-term assets. In this process the bank makes an illiquid asset held in the private sector more liquid, while the bank becomes less liquid. The willingness of bankers to create liquidity by lending against

a private sector asset (or against the expected income from a private sector asset) depends on the "liquidity preference" of the bank.

Maturity mismatching and liquidity creation are usually linked together. This is the case for banks which lend against real assets by creating demand deposits. On the other hand, in an inter-temporal general equilibrium world the two aspects are separated, for long-term capital assets are just as liquid as any other financial assets; maturity transformation does not then create additional liquidity. Different financial structures might then be thought to create different relationships between maturity transformation and liquidity creation.

In Minsky's development of the idea, financial fragility represents something more than either the mere possibility, or even the persistence, of financial instability due to maturity mismatching in financial institutions. Rather, fragility is inherent in the **successful** operation of the capitalistic economic system, and results from changes in the liquidity preferences of bankers and businessmen as represented by changes in the margins of safety required on liquidity creation produced by maturity transformation. Thus, fragility could result even in a perfectly stable financial system as defined under the traditional terminology, because of changes in the extent of the creation of liquidity for a given degree of mismatching. In this case, a fall in liquidity preference could take place, the maturity mismatching would remain constant, as bankers become willing to lend against more risky assets. Then different financial structures may not prevent fragility, but they might have different fragility behaviours, similar say to fractal coefficients, concerning the speed with which fragility is transmitted within the system.

Fragility in Stable Conditions

Minsky's theory takes the US financial system as its reference structure. In particular it is crucially dependant on the negotiations and relationships between bankers and businessmen and their evaluation of future returns and prospects. It presumes a very particular type of banker, the banker of let's say the pre-1970 era, before the breakdown of the Bretton Woods system, and still subject to the full force of the Glass-Steagall restrictions on commercial banking. For the businessman, finance is thus a two-stage affair. Short-term project finance comes from the bank, and long-term takeout finance comes from floating the completed project in the capital market. This is where the rest of the financial system comes in. Investment bankers underwrite the floatation of the project by a primary distribution of securities in the capital market. There is no legal restriction to prevent them from being direct investors, but they usually only act as brokers between firms and investors. There is thus an implicit financial structure in which firms' short-term financial liabilities are held in bank

portfolios and firms' long-term liabilities are held in household portfolios, along with banks' short-term demand deposit liabilities.

The ability of the banks to lend to business to finance investment depends on there being buyers in the long-term capital market to provide the funds which the firms use to repay the banks' short-term lending to fund investment. The buyers are predominantly households, who thus finance the capital stock holdings of the economy. The financial system thus intermediates between firms and households in a two stage process.

This is rather different from the textbook description which often presents the financial system as the intermediary which makes the requirements of firms for long-term lending to fund fixed capital investment compatible with the desire of households to hold short-term liquid assets. In fact, commercial banks provide sight and other short-term deposits against secured short-term commercial and industrial lending. Investment banks convert short-term borrowing into long-term borrowing by underwriting long-term primary securities distributions. But since they do not normally take position themselves there is no "natural" long-term demand for these securities unless it comes from other banks, firms (as is the case in many systems outside the US), or from institutions such as insurance companies or pension funds receiving non-discretionary savings which they invest on behalf of the general public.

To the extent that households provide the demand for the long-term securities, despite their preference for liquid assets, they do so only because the secondary market for equity provides sufficient liquidity to allow them to sell without an impact on market price. It is thus the liquidity provided by the financial institutions operating the secondary market, not the intermediary function of financial institutions, which provides the maturity transformation by which the public's demand for relatively short-term liquid assets is matched to the firms' requirement for permanent sources of finance: "So long as it is open to the individual to employ his wealth in hoarding or lending *money*, the alternative of purchasing actual capital assets cannot be rendered sufficiently attractive (especially to the man who does not manage the capital assets and knows very little about them), except by organising markets wherein these assets can be easily realised for money" (Keynes, 1936, pp.160-1).

Thus the mismatching of maturities does not appear on the balance sheet of any financial institution, the maturity transformations which occur within the financial system, and the associated position risks, are minimised, and transferred to the investing public. In this view liquidity is not created via balance sheet transformation, but by the creation of sufficient liquidity and depth by brokers matching buy and sell orders in the market with the

help of "assigned dealers" (specialists) such as those operating on the New York and American Stock exchanges.

There are thus two different methods of liquidity creation. One is "internal" to a financial institution, and results from maturity transformation by banks acting as "dealers" willing to buy and sell loans and deposits at bid-ask differentials. The other is "external" to the financial institutions and occurs in free markets in which brokers seek to match households' requests for liquidity, taking a fee or commission from buyer or seller or both. The extreme case of external liquidity is the mythical Walrasian auction market which costlessly matches buyers and sellers for all future states and dates.

Financial Systems and Financial Fragility

The US system is often contrasted with European financial systems by noting that the US system is "market based" as opposed to "bank based". This is usually meant to convey the fact that long-term financing takes place through primary distribution of securities in the capital market, rather than through banks. The US system is thus said to be becoming more "disintermediated" or more "market based" as the commercial banks' basic clients for commercial and industrial lending in the corporate sector have increased their use of the commercial paper markets to raise short-term finance, thus eliminating the banks from the first stage of the two-stage process of financing investment suggested above.

However, this would be to miss the point of the US system, by ignoring the fact that in the US system it is the liquidity of the secondary securities market which makes maturity transformation via the banking system unnecessary because it allows households to hold long-term securities directly. This reduces the amount of potential maturity mismatching and thus risk on the balance sheets of financial institutions. It seems much more revealing to say that the US system differs from the European system in that in the former, more interest rate and position risks are incurred directly by the investing public, while in Europe they are carried directly on the balance sheets of banks. The same is true of European secondary markets which tend to be dominated by banks or by dealers, rather than brokers. Dealers will also tend to carry interest rate and price risk of their positions of their balance sheets.

This way of characterising the differences in the system also allows us to pierce what might be called the "veil of market deregulation" which masks the fact that as a result of leveling of the playing field more and more interest rate, credit, and position risk is being carried on the balance sheets of banks and other financial institutions.

In the US financial system before the 1920's corporate borrowing in the capital market was not extensive. Most corporations were still held by inside groups of owner-managers

who implicitly provided the long-term funds for investment through retained earnings or increasing their own equity positions, rather than through either bank lending or through the market. Chandler (1990, Chapter 3) suggests that it was only in the post WWI crisis and the 1930's depression, when retained earnings proved to be insufficient, that the large firms depended on either banks or capital markets for anything but working capital, foreign exchange and securities transfer services. Thus, long-term borrowing and long-term lending was directly linked, outside of the financial system and independently of financial markets, but within the class of owners of industry (often with the help of the intermediation of investment banker "brokers" such as J.P. Morgan). This corresponds very closely to Kalecki's idea of the capitalist class financing their own expenditures on consumption and new investment from their own profits, without the need of the financial system to intermediate (cf. Kregel, 1989).

It was the growth of firms to large size which brought change in this structure. On the one hand, firms expanded beyond the abilities of their owners to manage them, but they also outlived their owners. Marshallian heirs, unwilling to continue in their grandfathers' footsteps became politicians and artists and sought to convert their holdings to shorter, more liquid assets by selling their interest to the general public. Antitrust legislation also had an important impact in producing a shareholding public by forcing the breakup of large trusts and causing their shares to be distributed in the hands of many holders. It is difficult to argue that instability in this system was the result of maturity mismatches and position risks due to the fact that banks were unrestricted in the types of assets which they could hold in their investment portfolios.

If instability does not come from maturity mismatching, from banks lending long and borrowing short, where does it come from? In a system such as that which prevailed before WWI, in which capital assets are closely held by the capitalist class, a reduction in the rate of economic expansion and the subsequent fall in prices, brings instant ruin to both financial and industrial capitalists as their wealth is decimated. This constraint on their spending brings investment and employment to a halt. Note that in this respect a wide dispersion of ownership of capital assets in the hands of the general public, with professional managers making decisions on behalf of the industrial firms, means that a fall off in the rate of expansion and a fall in asset prices will be more widely diffused throughout the population and not have as direct an impact on those in charge of the employment and output decisions. But, even in such a system, it is still the case that long-term assets are held directly by the public without the intermediation of the banking system so that maturity mismatching cannot

be the basic cause of breakdown.

The Linkage Between Financial Fragility and Economic Instability

The simplest answer that may be given is by reference to the historical record of the 1920s which suggests that it is the deterioration of the "quality" of the assets held by financial institutions. Part of the problem of quality, especially in the latter part of the 1920's, was linked simply to fraud and misrepresentation. A more important part is linked to excessively rapid expansion of bank resources in the 1920's due to international factors.

Anderson (1979, Chapters 17-19) reports massive gold inflows to the US in the early 1920s to which were added three massive purchases of government securities by the Federal Reserve in 1922, 1924 and finally in 1927 to support the UK return to gold. While bank credit expanded by \$11.5 billion between 1922 and mid 1927, commercial and industrial loans were declining after 1924. Between 1921 and 1927 the total of outstanding commercial loans and installment credits by member banks declined slightly. The expansion in credit, which was not needed to finance industrial needs, went instead into financing real estate lending, which increased by over \$2 billion in the period, and for loans against securities and direct investments in securities which increased by about \$4 billion over the period. There was also a substantial increase in consumer installment lending. All this sounds very similar to the 1980's doesn't it?

This shift in the composition of bank assets meant that the amount of commercial paper eligible for discount at the Fed declined substantially. Recall that the Fed had been set up for the purpose of making the currency flexible and this was to be achieved by discounting against business lending. More importantly, it meant that when the loans to real estate and financial market investors got into difficulty, they could not be used for discount at the Federal Reserve; as it was then set up there was no lender of last resort safety net for this type of lending activity. This is why the most important Glass-Steagall legislation is that of February 27, 1932 which extended the range of assets eligible for discount to include government securities, opening the way to open market policy (cf. Kregel, 1992).

As readers of Frederick Lewis Allen's *Only Yesterday* (chapter XI) will recall, the 1920's got off to a roaring start with the Florida real estate boom, followed by a crash which initiated the string of bank failures which was further exacerbated by the stock market crash and culminated in the string of bank holidays in February and March of 1933. In a 1931 study of Florida state banks' balance sheets for the period 1922-28, Dolbeare and Barnd (1931) found that the major difference between the balance sheets of failed and successful banks was "the larger and more rapid increase of the resources of the failed banks" which "created

problems of wisely investing the added funds.... It was necessary to reach a conclusion as to how long these funds would be left in the bank, and then it had to be decided in what type of assets the funds should be invested. ... If the return of these funds should be demanded unexpectedly at a later date, and the funds had not been invested properly so they could be recalled at once, the banks would be in serious difficulties. ... The rapidity of the inflow of new funds, ... made it necessary for the failed banks to decide their policy quickly, and probably led to a hasty analysis of the new loans and securities in which the funds were invested. ... it is not strange that mistakes were made, since there is nothing to show that the officers of the failed banks possessed superior wisdom. ... The large and rapid reduction of their resources in the post-boom periods was the immediate cause of the failed banks closing their doors." (p. 14).

The study shows that the ratio of loans and discounts to deposits for the failed banks increased from 76% to 81% between 1922 and 1927 while it fell from 71% to 61% for the successful banks. Of the loans and discounts, the failed banks increased their lending on real estate more than three-fold during the period, while the successful banks increased such lending by less than 50%. As a percentage of resources, real estate lending grew from 14% to 17% for the failed banks, while it fell from 16% to 12% for the successful banks.

Even more interesting is the finding that the ratio of equity to liabilities for the failed banks was higher than that for the successful banks in the entire period (except for the year 1925). "In other words the owners of the failed banks were furnishing a larger proportion of the funds for which the banks were liable than were the owners of the successful banks" (p. 34). Investors were clearly attracted to the more speculative, faster growing banks, although presumably at that time there were no economic consultants to justify their behaviour.

The study does not give data on the stock price of the failed banks, but it can be assumed that their rapid growth produced better than average increases in prices so that these banks were able to increase their capital by new issues at costs that were lower than the prudent banks. Thus a boom in bank stocks creates cheap funding which is used to finance a boom in real estate. This would be an identical situation what George Soros identifies as the "reflexivity" which existed in the Real Estate Investment Trusts in the 1970s (cf. Soros, 1987, pp. 66 ff.). In such cases neither public scrutiny of bank balance sheets, nor capital ratios would have prevented the propagation of the crisis.

As Allen reports, most of the purchases were financed on a 10% down basis against blueprints of development sites, without legal documentation or inspection, and in the expectation of being sold at higher prices before any additional balance was due. As long as

prices continued to rise, everyone could continue to meet payments; as soon as prices stabilised the bottom fell out of the market, leaving the banks which had financed the purchases holding collateral which was often in the form of a pyramid of successive binders without documentation for plots of Florida swamp.

But, this was only a practice run for the stock market boom of 1927 which got underway just as the Florida real estate boom was collapsing. The mechanism was more or less the same, with margin money replacing the downpayment, and financial assets (also often representing little more than blueprints) replacing plots of land.

In general, it was the rapid increase in bank resources which led to increased laxity in lending criteria as banks competed with each other to find borrowers, producing a decline in asset quality which emerged as soon as there was a fall in the growth rate of resources. This comes very close to Minsky's definition of financial fragility. It is the fall in the rate of expansion of lending which produces the fall in prices and the ensuing debt deflation. It is the change in liquidity preferences of the banks which eventually leads them to stop liquidity creation, rather than the maturity mismatch, which causes fragility.

Eliminating Fragility by Regulatory Reform

From this historical background it would appear that there are two ways in which reform to prevent fragility from producing instability could have been approached. One would have been to try to eliminate the acceleration and deceleration of bank reserves and the creation of liquidity, which means stabilising the expansion of bank reserves. This is the path that was eventually advocated by monetarist economists who wanted to place the Federal Reserve on a monetary expansion rule. It is also considered impossible by most who recognise the endogenous nature of the money supply and the importance of financial innovations; liquidity cannot be controlled. This is also at the basis of Minsky's belief that fragility is inherent or endogenously produced by the successful operation of the system.

This leaves only the possibility of changing the transmission process by which the excessive growth of liquid resources could produce asset quality deterioration by preventing banks from lending against real estate, financial securities and other non-commercial assets and by preventing fraud in the creation and trading of investment assets. This is the path that was chosen in the New Deal Banking and Securities legislation. By segmenting commercial from financial or investment banking, the ability of the commercial banks to seek new areas of lending outside the traditional C&I loan was restricted. Lending to real estate was set off in its own protected Home Loan Bank system, and investment underwriting was reserved to non-deposit-takers. In this way the system also had imposed on it a type of de

facto maturity matching, with institutions segmented by the maturity and risk of the assets in which they dealt.

The securities legislation was meant to prevent fraudulent representation by placing controls on both issuers and purchasers and by regulating the secondary markets in which they were traded. Thus, although legislation could not give bankers "superior wisdom", it could prevent their excessive optimism from finding an outlet in excessively risky, illiquid assets and limit the damage that would be caused. Thus, the structure of the system will not prevent fragility, but it should be able to control the transmission of fragility into instability and crisis. The introduction of New Deal legislation eliminating fraud, and the increasing dispersion of share ownership, were both factors which damped the propagation of financial distress in the post-war period. The more or less steady expansion which occurred was enough to insure the absence of severe crisis.

It is also true that the New Deal legislation introduced strict market segmentation among financial institutions dealing with different types of asset class and thus brought about a de facto reduction of potential maturity mismatching in portfolios. In particular it forbid banks from borrowing short and lending against long-term assets. But, this is perhaps the least important part of the stability of the period, for severe mismatching did not exist in the pre-war period.

Is the Current Financial System More or Less "Fragile"?

It is both interesting and paradoxical that the modern US system, which is now characterised as one in which "markets" dominate over financial institutions is one in which a much larger proportion of capital assets are held on the balance sheets of financial institutions. As suggested above, one might distinguish this difference in terms of the secondary market for securities dominated by "brokers" and the financial institutions being dominated by "dealers". It is easier to see that markets are increasingly dominated by dealers who do hold assets (and mismatches) on their balance sheets.

This is due, on the one hand, to the rise of large institutional investors. More than half of the outstanding equity of US corporations are held by institutions as fiduciaries, rather than by private individuals. Pension funds and insurance companies are particularly important in this respect. However, these are clearly institutions which match long-term demands for assets with the firms' demand for long-term lending. Their growth is largely the result of legislation forcing households to make contractual savings for long-term purposes. Changes in the value of equity thus has a much more diffused impact on the system and does not necessarily have an impact on management decisions as it did when the inside

owners were also the managers. But, the rapid growth of funds to be invested has pushed institutions into investments which bear higher degrees of risk, with both insurance companies and pension funds substantial investors in merger and acquisition and speculative real estate ventures.

However, the other side of this coin is that the size of the institutional "buy-side" has meant that the financial intermediaries on the "sell-side" have had to expand beyond being mere brokers. In addition, banks (both commercial and investment) are increasingly acting as principals investing their own capital to produce earnings which have been lost as commercial lending has moved to the commercial paper market and as fixed commissions on underwriting and broking for secondary trading have eroded brokerage revenues. Thus, an increasing proportion of maturity transformation is for the first time occurring on the balance sheets of financial institutions as banks are freed to compete for an increasingly wide range of assets. The first experiment was with the savings and loans, who were allowed to expand the range of their investments and to compete with other institutions in issuing liabilities, with a rapid increase in maturity mismatching and a rapid decline in asset quality. The financial structure thus has an increasing potential for producing severe maturity mismatches which increase potential instability. It also has increased potential for increasing competition for assets when there is an expansion in bank reserves, or when financial innovation makes reserves more powerful (we used to call this an increase in velocity or in the multiplier). This means more rapid asset quality deterioration in an expansion and a system which propagates fragility more rapidly. The financial structure may then be said to be more fragile and more unstable than in the post-war period, placing more responsibility on the central bank to prevent the expansion of liquidity. It also means that a new administration, eager to promote the expansion of employment by means of an expansionary policy should act quickly to prevent the possibility of the kinds of "reflexive" processes which increase the risks of rapid fragility propagation should that expansion prove to be successful. Minsky's hypothesis tells us that the fragility will be the natural result of the success of the expansionary policy, rethinking the way banks and financial markets are regulated will be required to ensure that the fragility does not produce another round of excess and then a collapse which allows "It" to happen again.

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Financial Fragility and the Structure of Financial Markets

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JEL Classification: G1, N22

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Instability of the Economy and Fragility of the Financial Structure¹

Against the backdrop of the approaching sixtieth anniversary of the New Deal financial legislation and the inauguration of a new administration facing the task of re-regulation of the financial system, it seems appropriate to reflect on the relationship between financial structure and financial instability. The New Deal regulations were introduced in the aftermath of conditions of extreme financial fragility and one of their express aims was to eliminate the potential for financial institutions to produce instability in the economy. The regulations seem to have been successful, at least until the late 1970's, in preventing another great depression, or to paraphrase, "It" has not (yet) happened again.

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¹ Professor of Political Economy, University of Bologna, Italy. This paper was presented at the Association for Social Economics Session: "The Current Financial Crisis and Hyman Minsky's Financial Instability Hypothesis" of the Allied Social Science Associations Meetings held in Anaheim, Calif., January 7, 1993, 8.30 am. Financial Support from an Italian Ministry for Universities and Scientific Research group (40%) grant: "Non-competitive market forms and economic dynamics" is gratefully acknowledged.

propose to define changes in the proportions of "hedge" "speculative" and "Ponzi" financial relations (cf. Minsky 1986, Appendix A) in the financing of production as producing changes in the "fragility" of the financial system. It is this definition of "fragility" which replaces the traditional conception of financial "instability".

Financial Instability and Financial Fragility

The traditional conception of instability in financial markets stems from the view that financial institutions act as agents which intermediate between savers willing to lend funds and final borrowers seeking to invest funds. This intermediation function not only requires a matching of borrowers and lenders, but also more importantly concerns the transformation of the maturity of financial assets from short term to long term with lenders preferring short-term liquid assets and borrowers long-term more or less permanent fixed interest liabilities. The greater the mismatch between the maturity of the short-term assets issued to savers and the long-term liabilities purchased from investors the greater the risk that short-term interest rates will rise relative to long-term rates, producing negative net worth and insolvency, or a flight of funds called disintermediation as the short term bid rates lag behind the market. When the volatility of short-term interest rates is modest, the adjustment can be made by cutting back on new lending, reducing net margins and drawing down secondary reserves; this was the method of monetary control in the post-war period. When the movement in short-term rates is substantial, loans must be called and forced sales of assets may take place leading to downward pressure on prices.

Such instability can be reduced in a number of ways. One is to limit maturity mismatching by institutions. This would require a range of different institutions operating in markets for assets of different maturities limited to issuing liabilities of the same maturity, which would imply regulation via the imposition of financial market segmentation. Alternatively, one could have an infinite number of institutions, each operating with an imperceptibly small mismatch, which could be covered by a buffer of liquid reserves. Finally, long-term assets could have interest rates indexed to short-term liabilities; this would eliminate the interest rate risk of maturity mismatching by financial intermediaries, but shifts it onto the borrower who is forced to forego the presumed preference for fixed interest liabilities. Credit risk here replaces maturity or interest rate risk.

In addition to maturity transformation, financial intermediaries are also characterised as producing liquidity through the issue of short-term liabilities against long-term assets. In this process the bank makes an illiquid asset held in the private sector more liquid, while the bank becomes less liquid. The willingness of bankers to create liquidity by lending against

a private sector asset (or against the expected income from a private sector asset) depends on the "liquidity preference" of the bank.

Maturity mismatching and liquidity creation are usually linked together. This is the case for banks which lend against real assets by creating demand deposits. On the other hand, in an inter-temporal general equilibrium world the two aspects are separated, for long-term capital assets are just as liquid as any other financial assets; maturity transformation does not then create additional liquidity. Different financial structures might then be thought to create different relationships between maturity transformation and liquidity creation.

In Minsky's development of the idea, financial fragility represents something more than either the mere possibility, or even the persistence, of financial instability due to maturity mismatching in financial institutions. Rather, fragility is inherent in the **successful** operation of the capitalistic economic system, and results from changes in the liquidity preferences of bankers and businessmen as represented by changes in the margins of safety required on liquidity creation produced by maturity transformation. Thus, fragility could result even in a perfectly stable financial system as defined under the traditional terminology, because of changes in the extent of the creation of liquidity for a given degree of mismatching. In this case, a fall in liquidity preference could take place, the maturity mismatching would remain constant, as bankers become willing to lend against more risky assets. Then different financial structures may not prevent fragility, but they might have different fragility behaviours, similar say to fractal coefficients, concerning the speed with which fragility is transmitted within the system.

Fragility in Stable Conditions

Minsky's theory takes the US financial system as its reference structure. In particular it is crucially dependant on the negotiations and relationships between bankers and businessmen and their evaluation of future returns and prospects. It presumes a very particular type of banker, the banker of let's say the pre-1970 era, before the breakdown of the Bretton Woods system, and still subject to the full force of the Glass-Steagall restrictions on commercial banking. For the businessman, finance is thus a two-stage affair. Short-term project finance comes from the bank, and long-term takeout finance comes from floating the completed project in the capital market. This is where the rest of the financial system comes in. Investment bankers underwrite the floatation of the project by a primary distribution of securities in the capital market. There is no legal restriction to prevent them from being direct investors, but they usually only act as brokers between firms and investors. There is thus an implicit financial structure in which firms' short-term financial liabilities are held in bank

portfolios and firms' long-term liabilities are held in household portfolios, along with banks' short-term demand deposit liabilities.

The ability of the banks to lend to business to finance investment depends on there being buyers in the long-term capital market to provide the funds which the firms use to repay the banks' short-term lending to fund investment. The buyers are predominantly households, who thus finance the capital stock holdings of the economy. The financial system thus intermediates between firms and households in a two stage process.

This is rather different from the textbook description which often presents the financial system as the intermediary which makes the requirements of firms for long-term lending to fund fixed capital investment compatible with the desire of households to hold short-term liquid assets. In fact, commercial banks provide sight and other short-term deposits against secured short-term commercial and industrial lending. Investment banks convert short-term borrowing into long-term borrowing by underwriting long-term primary securities distributions. But since they do not normally take position themselves there is no "natural" long-term demand for these securities unless it comes from other banks, firms (as is the case in many systems outside the US), or from institutions such as insurance companies or pension funds receiving non-discretionary savings which they invest on behalf of the general public.

To the extent that households provide the demand for the long-term securities, despite their preference for liquid assets, they do so only because the secondary market for equity provides sufficient liquidity to allow them to sell without an impact on market price. It is thus the liquidity provided by the financial institutions operating the secondary market, not the intermediary function of financial institutions, which provides the maturity transformation by which the public's demand for relatively short-term liquid assets is matched to the firms' requirement for permanent sources of finance: "So long as it is open to the individual to employ his wealth in hoarding or lending *money*, the alternative of purchasing actual capital assets cannot be rendered sufficiently attractive (especially to the man who does not manage the capital assets and knows very little about them), except by organising markets wherein these assets can be easily realised for money" (Keynes, 1936, pp.160-1).

Thus the mismatching of maturities does not appear on the balance sheet of any financial institution, the maturity transformations which occur within the financial system, and the associated position risks, are minimised, and transferred to the investing public. In this view liquidity is not created via balance sheet transformation, but by the creation of sufficient liquidity and depth by brokers matching buy and sell orders in the market with the

help of "assigned dealers" (specialists) such as those operating on the New York and American Stock exchanges.

There are thus two different methods of liquidity creation. One is "internal" to a financial institution, and results from maturity transformation by banks acting as "dealers" willing to buy and sell loans and deposits at bid-ask differentials. The other is "external" to the financial institutions and occurs in free markets in which brokers seek to match households' requests for liquidity, taking a fee or commission from buyer or seller or both. The extreme case of external liquidity is the mythical Walrasian auction market which costlessly matches buyers and sellers for all future states and dates.

Financial Systems and Financial Fragility

The US system is often contrasted with European financial systems by noting that the US system is "market based" as opposed to "bank based". This is usually meant to convey the fact that long-term financing takes place through primary distribution of securities in the capital market, rather than through banks. The US system is thus said to be becoming more "disintermediated" or more "market based" as the commercial banks' basic clients for commercial and industrial lending in the corporate sector have increased their use of the commercial paper markets to raise short-term finance, thus eliminating the banks from the first stage of the two-stage process of financing investment suggested above.

However, this would be to miss the point of the US system, by ignoring the fact that in the US system it is the liquidity of the secondary securities market which makes maturity transformation via the banking system unnecessary because it allows households to hold long-term securities directly. This reduces the amount of potential maturity mismatching and thus risk on the balance sheets of financial institutions. It seems much more revealing to say that the US system differs from the European system in that in the former, more interest rate and position risks are incurred directly by the investing public, while in Europe they are carried directly on the balance sheets of banks. The same is true of European secondary markets which tend to be dominated by banks or by dealers, rather than brokers. Dealers will also tend to carry interest rate and price risk of their positions of their balance sheets.

This way of characterising the differences in the system also allows us to pierce what might be called the "veil of market deregulation" which masks the fact that as a result of leveling of the playing field more and more interest rate, credit, and position risk is being carried on the balance sheets of banks and other financial institutions.

In the US financial system before the 1920's corporate borrowing in the capital market was not extensive. Most corporations were still held by inside groups of owner-managers

who implicitly provided the long-term funds for investment through retained earnings or increasing their own equity positions, rather than through either bank lending or through the market. Chandler (1990, Chapter 3) suggests that it was only in the post WWI crisis and the 1930's depression, when retained earnings proved to be insufficient, that the large firms depended on either banks or capital markets for anything but working capital, foreign exchange and securities transfer services. Thus, long-term borrowing and long-term lending was directly linked, outside of the financial system and independently of financial markets, but within the class of owners of industry (often with the help of the intermediation of investment banker "brokers" such as J.P. Morgan). This corresponds very closely to Kalecki's idea of the capitalist class financing their own expenditures on consumption and new investment from their own profits, without the need of the financial system to intermediate (cf. Kregel, 1989).

It was the growth of firms to large size which brought change in this structure. On the one hand, firms expanded beyond the abilities of their owners to manage them, but they also outlived their owners. Marshallian heirs, unwilling to continue in their grandfathers' footsteps became politicians and artists and sought to convert their holdings to shorter, more liquid assets by selling their interest to the general public. Antitrust legislation also had an important impact in producing a shareholding public by forcing the breakup of large trusts and causing their shares to be distributed in the hands of many holders. It is difficult to argue that instability in this system was the result of maturity mismatches and position risks due to the fact that banks were unrestricted in the types of assets which they could hold in their investment portfolios.

If instability does not come from maturity mismatching, from banks lending long and borrowing short, where does it come from? In a system such as that which prevailed before WWI, in which capital assets are closely held by the capitalist class, a reduction in the rate of economic expansion and the subsequent fall in prices, brings instant ruin to both financial and industrial capitalists as their wealth is decimated. This constraint on their spending brings investment and employment to a halt. Note that in this respect a wide dispersion of ownership of capital assets in the hands of the general public, with professional managers making decisions on behalf of the industrial firms, means that a fall off in the rate of expansion and a fall in asset prices will be more widely diffused throughout the population and not have as direct an impact on those in charge of the employment and output decisions. But, even in such a system, it is still the case that long-term assets are held directly by the public without the intermediation of the banking system so that maturity mismatching cannot

be the basic cause of breakdown.

The Linkage Between Financial Fragility and Economic Instability

The simplest answer that may be given is by reference to the historical record of the 1920s which suggests that it is the deterioration of the "quality" of the assets held by financial institutions. Part of the problem of quality, especially in the latter part of the 1920's, was linked simply to fraud and misrepresentation. A more important part is linked to excessively rapid expansion of bank resources in the 1920's due to international factors.

Anderson (1979, Chapters 17-19) reports massive gold inflows to the US in the early 1920s to which were added three massive purchases of government securities by the Federal Reserve in 1922, 1924 and finally in 1927 to support the UK return to gold. While bank credit expanded by \$11.5 billion between 1922 and mid 1927, commercial and industrial loans were declining after 1924. Between 1921 and 1927 the total of outstanding commercial loans and installment credits by member banks declined slightly. The expansion in credit, which was not needed to finance industrial needs, went instead into financing real estate lending, which increased by over \$2 billion in the period, and for loans against securities and direct investments in securities which increased by about \$4 billion over the period. There was also a substantial increase in consumer installment lending. All this sounds very similar to the 1980's doesn't it?

This shift in the composition of bank assets meant that the amount of commercial paper eligible for discount at the Fed declined substantially. Recall that the Fed had been set up for the purpose of making the currency flexible and this was to be achieved by discounting against business lending. More importantly, it meant that when the loans to real estate and financial market investors got into difficulty, they could not be used for discount at the Federal Reserve; as it was then set up there was no lender of last resort safety net for this type of lending activity. This is why the most important Glass-Steagall legislation is that of February 27, 1932 which extended the range of assets eligible for discount to include government securities, opening the way to open market policy (cf. Kregel, 1992).

As readers of Frederick Lewis Allen's *Only Yesterday* (chapter XI) will recall, the 1920's got off to a roaring start with the Florida real estate boom, followed by a crash which initiated the string of bank failures which was further exacerbated by the stock market crash and culminated in the string of bank holidays in February and March of 1933. In a 1931 study of Florida state banks' balance sheets for the period 1922-28, Dolbear and Barnd (1931) found that the major difference between the balance sheets of failed and successful banks was "the larger and more rapid increase of the resources of the failed banks" which "created

problems of wisely investing the added funds.... It was necessary to reach a conclusion as to how long these funds would be left in the bank, and then it had to be decided in what type of assets the funds should be invested. ... If the return of these funds should be demanded unexpectedly at a later date, and the funds had not been invested properly so they could be recalled at once, the banks would be in serious difficulties. ... The rapidity of the inflow of new funds, ... made it necessary for the failed banks to decide their policy quickly, and probably led to a hasty analysis of the new loans and securities in which the funds were invested. ... it is not strange that mistakes were made, since there is nothing to show that the officers of the failed banks possessed superior wisdom. ... The large and rapid reduction of their resources in the post-boom periods was the immediate cause of the failed banks closing their doors." (p. 14).

The study shows that the ratio of loans and discounts to deposits for the failed banks increased from 76% to 81% between 1922 and 1927 while it fell from 71% to 61% for the successful banks. Of the loans and discounts, the failed banks increased their lending on real estate more than three-fold during the period, while the successful banks increased such lending by less than 50%. As a percentage of resources, real estate lending grew from 14% to 17% for the failed banks, while it fell from 16% to 12% for the successful banks.

Even more interesting is the finding that the ratio of equity to liabilities for the failed banks was higher than that for the successful banks in the entire period (except for the year 1925). "In other words the owners of the failed banks were furnishing a larger proportion of the funds for which the banks were liable than were the owners of the successful banks" (p. 34). Investors were clearly attracted to the more speculative, faster growing banks, although presumably at that time there were no economic consultants to justify their behaviour.

The study does not give data on the stock price of the failed banks, but it can be assumed that their rapid growth produced better than average increases in prices so that these banks were able to increase their capital by new issues at costs that were lower than the prudent banks. Thus a boom in bank stocks creates cheap funding which is used to finance a boom in real estate. This would be an identical situation what George Soros identifies as the "reflexivity" which existed in the Real Estate Investment Trusts in the 1970s (cf. Soros, 1987, pp. 66 ff.). In such cases neither public scrutiny of bank balance sheets, nor capital ratios would have prevented the propagation of the crisis.

As Allen reports, most of the purchases were financed on a 10% down basis against blueprints of development sites, without legal documentation or inspection, and in the expectation of being sold at higher prices before any additional balance was due. As long as

prices continued to rise, everyone could continue to meet payments; as soon as prices stabilised the bottom fell out of the market, leaving the banks which had financed the purchases holding collateral which was often in the form of a pyramid of successive binders without documentation for plots of Florida swamp.

But, this was only a practice run for the stock market boom of 1927 which got underway just as the Florida real estate boom was collapsing. The mechanism was more or less the same, with margin money replacing the downpayment, and financial assets (also often representing little more than blueprints) replacing plots of land.

In general, it was the rapid increase in bank resources which led to increased laxity in lending criteria as banks competed with each other to find borrowers, producing a decline in asset quality which emerged as soon as there was a fall in the growth rate of resources. This comes very close to Minsky's definition of financial fragility. It is the fall in the rate of expansion of lending which produces the fall in prices and the ensuing debt deflation. It is the change in liquidity preferences of the banks which eventually leads them to stop liquidity creation, rather than the maturity mismatch, which causes fragility.

Eliminating Fragility by Regulatory Reform

From this historical background it would appear that there are two ways in which reform to prevent fragility from producing instability could have been approached. One would have been to try to eliminate the acceleration and deceleration of bank reserves and the creation of liquidity, which means stabilising the expansion of bank reserves. This is the path that was eventually advocated by monetarist economists who wanted to place the Federal Reserve on a monetary expansion rule. It is also considered impossible by most who recognise the endogenous nature of the money supply and the importance of financial innovations; liquidity cannot be controlled. This is also at the basis of Minsky's belief that fragility is inherent or endogenously produced by the successful operation of the system.

This leaves only the possibility of changing the transmission process by which the excessive growth of liquid resources could produce asset quality deterioration by preventing banks from lending against real estate, financial securities and other non-commercial assets and by preventing fraud in the creation and trading of investment assets. This is the path that was chosen in the New Deal Banking and Securities legislation. By segmenting commercial from financial or investment banking, the ability of the commercial banks to seek new areas of lending outside the traditional C&I loan was restricted. Lending to real estate was set off in its own protected Home Loan Bank system, and investment underwriting was reserved to non-deposit-takers. In this way the system also had imposed on it a type of de

facto maturity matching, with institutions segmented by the maturity and risk of the assets in which they dealt.

The securities legislation was meant to prevent fraudulent representation by placing controls on both issuers and purchasers and by regulating the secondary markets in which they were traded. Thus, although legislation could not give bankers "superior wisdom", it could prevent their excessive optimism from finding an outlet in excessively risky, illiquid assets and limit the damage that would be caused. Thus, the structure of the system will not prevent fragility, but it should be able to control the transmission of fragility into instability and crisis. The introduction of New Deal legislation eliminating fraud, and the increasing dispersion of share ownership, were both factors which damped the propagation of financial distress in the post-war period. The more or less steady expansion which occurred was enough to insure the absence of severe crisis.

It is also true that the New Deal legislation introduced strict market segmentation among financial institutions dealing with different types of asset class and thus brought about a de facto reduction of potential maturity mismatching in portfolios. In particular it forbid banks from borrowing short and lending against long-term assets. But, this is perhaps the least important part of the stability of the period, for severe mismatching did not exist in the pre-war period.

Is the Current Financial System More or Less "Fragile"?

It is both interesting and paradoxical that the modern US system, which is now characterised as one in which "markets" dominate over financial institutions is one in which a much larger proportion of capital assets are held on the balance sheets of financial institutions. As suggested above, one might distinguish this difference in terms of the secondary market for securities dominated by "brokers" and the financial institutions being dominated by "dealers". It is easier to see that markets are increasingly dominated by dealers who do hold assets (and mismatches) on their balance sheets.

This is due, on the one hand, to the rise of large institutional investors. More than half of the outstanding equity of US corporations are held by institutions as fiduciaries, rather than by private individuals. Pension funds and insurance companies are particularly important in this respect. However, these are clearly institutions which match long-term demands for assets with the firms' demand for long-term lending. Their growth is largely the result of legislation forcing households to make contractual savings for long-term purposes. Changes in the value of equity thus has a much more diffused impact on the system and does not necessarily have an impact on management decisions as it did when the inside

owners were also the managers. But, the rapid growth of funds to be invested has pushed institutions into investments which bear higher degrees of risk, with both insurance companies and pension funds substantial investors in merger and acquisition and speculative real estate ventures.

However, the other side of this coin is that the size of the institutional "buy-side" has meant that the financial intermediaries on the "sell-side" have had to expand beyond being mere brokers. In addition, banks (both commercial and investment) are increasingly acting as principals investing their own capital to produce earnings which have been lost as commercial lending has moved to the commercial paper market and as fixed commissions on underwriting and broking for secondary trading have eroded brokerage revenues. Thus, an increasing proportion of maturity transformation is for the first time occurring on the balance sheets of financial institutions as banks are freed to compete for an increasingly wide range of assets. The first experiment was with the savings and loans, who were allowed to expand the range of their investments and to compete with other institutions in issuing liabilities, with a rapid increase in maturity mismatching and a rapid decline in asset quality. The financial structure thus has an increasing potential for producing severe maturity mismatches which increase potential instability. It also has increased potential for increasing competition for assets when there is an expansion in bank reserves, or when financial innovation makes reserves more powerful (we used to call this an increase in velocity or in the multiplier). This means more rapid asset quality deterioration in an expansion and a system which propagates fragility more rapidly. The financial structure may then be said to be more fragile and more unstable than in the post-war period, placing more responsibility on the central bank to prevent the expansion of liquidity. It also means that a new administration, eager to promote the expansion of employment by means of an expansionary policy should act quickly to prevent the possibility of the kinds of "reflexive" processes which increase the risks of rapid fragility propagation should that expansion prove to be successful. Minsky's hypothesis tells us that the fragility will be the natural result of the success of the expansionary policy, rethinking the way banks and financial markets are regulated will be required to ensure that the fragility does not produce another round of excess and then a collapse which allows "It" to happen again.