

Credit Markets, Financial Fragility, and the Real Economy

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I. Introduction

Traditionally in macroeconomic analyses it is mostly assumed that the course of real economic development is accompanied by a smooth working of the financial system. This implies that both the financial structure of firms and households and the operation of financial markets have no influence on the outcome of the real economic process. With regard to the link between the financial system and the macroeconomy Gertler and Hubbard recently point out, "... recent research in macroeconomics – both theoretical and empirical – has resurrected the idea that capital market imperfections may be significant factors in business volatility by making new progress in characterizing the mechanisms."¹ This new literature borrows heavily from the economics of information and incentives to explicitly motivate frictions in capital markets.

In standard classical, Keynesian and monetarist models the importance of the money stock in the interaction processes between the financial and real sector of the economy is emphasized. It is the money stock as a key financial variable which is influencing both the size and the course of economic activity. In this context Blanchard and Fischer remark, "Despite the complexity and sophistication of the financial markets, they are typically represented in macroeconomic models by only two variables: the money stock and the interest rate".² Therefore in the standard models attention is focused on the liability-side of the banks' balance sheets because changes in bank deposits impinge directly and indirectly (through changing interest rates) on aggregate spending. This implies

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¹ *M. Gertler*, Financial structure and aggregate economic activity: an overview, *Journal of Money, Credit and Banking*, August, 1988 and *M. Gertler* and *R. Hubbard*, Financial factors in business fluctuations, in: *Financial Market Volatility*, Federal Reserve Bank of Kansas City, 1988, p. 33.

² *O. Blanchard* and *S. Fischer*, *Lectures on Macroeconomics*, 1989, p. 478.

that the loan or credit-activities (reflected on the asset-side of the balance sheet) connected with the money-creation process are omitted. In their theoretical analyses proponents of this so-called “*money view*” usually make use of the assumption of perfect information and allocative efficiency of fully competitive financial markets. In these circumstances according to Walras’ law mostly the credit or loan market is eliminated.

However in the last decade a new view came about which emphasizes that financial markets and especially the credit-activities of financial intermediaries play a crucial role in the theory of corporate finance as well as in monetary macroeconomics. In this field of research the authors base their view on empirical studies with regard to the impact both of financial variables during the Great Depression in the thirties and the increased fragility of the US-financial institutions in the eighties.³ In this context Blanchard and Fischer point out, “... the interest rate alone does not adequately reflect the links between financial markets and the rest of the economy. Rather, it is argued, the availability of credit and the quality of balance sheets are important determinants of investment.”⁴

This essay deals with a non-technical review of the current issues in the international literature about the impact both of credit markets and financial fragility on the real economy. Special attention will be given to the influence of the working of the credit rationing mechanism and the development of the financial structure of firms and households and the associated financial stability on the ultimate course of the economic process. This view, concentrating on the independent influence of the amount and availability of credit on economic activity, is called the “*credit view*”. Since the early eighties owing to the arise of the economics of information both competing views have led to increased attention given to the supply and especially to the quality of loans as important determinants of national income. Economic theory must also examine how borrowers are able to fulfill their loan-commitments and the economic consequences of systematically induced failures to meet them.⁵

³ B. Bernanke, Nonmonetary effects of the financial crisis in the propagation of the Great Depression, *The American Economic Review*, May 1981 and F. Mishkin, The household balance sheet and the Great Depression, *Journal of Economic History*, December, 1978 and M. Wolfson, The causes of financial instability, *The Post Keynesian Journal of Economics*, Spring 1990.

⁴ O. Blanchard and S. Fischer, op. cit. 1989, p. 478.

⁵ In this context see B. Friedman, Monetary policy with a credit aggregate target, in *Money, monetary policy and financial institutions*, Carnegie-Rochester Conference Series on Public Policy, 1983, and B. Bernanke and A. Blinder, Credit, money and aggregate demand, *The American Economic Review*, Papers and Proceedings, May, 1988.

In section two a short summary will be presented of the traditional views about the interaction between the financial structure of corporations and households and real economic development. Subsequently section three deals with the endogenous cyclical forces that lead to financial instability (Minsky's boom-bust cycle). In section four the modern approach about credit markets and aggregate economic activity will be presented. This analysis is based on the concept of asymmetric information on these markets, with special reference to the impact of credit rationing on macroeconomic performance.⁶ Section five examines the impact of the increased financial fragility in the last decade, characterized by a deterioration of the balance sheets of corporations and depository institutions, on macroeconomic stability.⁷ Finally section six concludes with some summarizing remarks.

II. Traditional Views

The idea about the interrelationship between the financial structure of firms and households and the business cycle dates from the Great Depression in the thirties. That decade was characterized by fails of banks and firms on the one side and by a substantial reduction of economic activity and a concomitant strong increase of unemployment on the other side. This environment gave economists incentives to study the relation mentioned before. In this context Fisher emphasized that the depression was also caused by the poor working of financial markets. He pointed out that the real economic process in the thirties was affected by the increased debt-financing during the upswing of the cycle in the twenties. He puts forward, "... they (debts) were great enough to not only "rock the boat" but to start it capsizing".⁸ In his pathbreaking publication he emphasized that a reduction of the amount of credit

⁶ A. Blinder and J. Stiglitz, Money, credit constraints and economic activity, *The American Economic Review*, May 1983, B. Bernanke and M. Gertler, Financial fragility and economic performance, NBER, Working Paper, 2318, 1987, B. Greenwald, J. Stiglitz and A. Weiss, Informational imperfections in the capital market and macroeconomic fluctuations, *The American Economic Review*, May, 1984, B. Friedman, Implications of increasing corporate indebtedness for monetary policy, Occasional paper 29, Group of Thirty, New York, 1989 and J. Stiglitz, Money, credit and business fluctuations, NBER Working Paper, 2823, January, 1989.

⁷ H. Bockelmann and C. Borio, Financial instability and the real economy, *De Economist*, nr. 4, 1990. See also M. Feldstein, Reducing the risk of economic crisis, NBER Working Paper, 3620, February, 1991.

⁸ I. Fisher, The debt-deflation theory of Great Depressions, *Econometrica*, October, 1933, p. 341. See also M. Gertler, *Journal of Money, Credit and Banking*, August, 1988, op. cit. p. 561.

during the depression is endogenously. Fisher underlines that during the upturn of the business cycle and during the subsequent depression two dominant factors are very crucial, namely excessive debt-financing and deflation respectively. At some time during the cycle firms and households will not be able to fulfill their contractual interest payments and redemptions. Then, according to Fisher, a chain of reactions will emerge featured by a redemption. This will be realized by forced sales of stocks and other assets.⁹ Subsequently the proceeds of these liquidations of assets will be used to redeem bank-loans, generating a reduction of the money stock (M). Owing to the precautionary motive the velocity of circulation of money (V) also reduced. Next, according to the quantity theory, the contraction of the aggregate demand (MV) will start a price-deflation process. In consequence the real debt of firms will increase and their net worth will fall giving rise to bankruptcies. This process will be accompanied with a decline of profits and a concomitant fall of investments and increasing unemployment. Finally the confidence of consumers will also be affected, causing a further reduction of expenditures and a sharpening of the recession. In this context Carter points out, "In a worst case scenario, with no lender of last resort intervention to increase liquidity and restore faith in the ability of financial institutions to honor commitment, bank runs and panic sales of assets bring on full-blown debt deflation".¹⁰

The crux of the financial crisis is the combination of an excessive debt-financing and a deflationary process which intensify mutually. For the price-deflation process causes an increase of the real debts which is strengthening the necessity of debt-redemption and so the deflationary-process endogenously. A sharp deflation transfers wealth from borrowers to creditors which causes a deterioration in business' firms net worth. A similar weakening of the balance sheets of consumers led them to reduce their spending. Fisher calculated that in March 1933 the real debt-burden increased by 40% owing to the strong reduction of prices and the fall of economic activity. He called the described process the *debt-deflation spiral*.

Also the strong fall of the money stock played a crucial role during the depression. At that time Fisher clearly pointed out that the crash on the stock-exchange in 1929 might have been occurred without causing a deep depression. In his opinion the Federal Reserve as lender of last

⁹ I. Fisher, *Econometrica*, October, 1933, op. cit. p. 342.

¹⁰ M. Carter, Financial innovation and financial fragility, *Journal of Economic Issues*, September, 1989, p. 782.

resort should have stopped both the fall of the money stock and the price level by adding liquidity to the financial markets. The reduction of the velocity of money or the increased demand for real balances was encouraged by the loss of confidence of economic agents and the growing bankruptcies in the economy.

In a stimulating asymmetric information analysis of the Great Depression Bernanke puts forward that during the period 1930 - 1933 not only the sharp fall of the money stock but also the increasing cost of credit intermediation and the availability of credit determined the course of the business cycle. In this context he states, "I define the cost of credit intermediation (CCI) as being the cost of channeling funds from the ultimate savers-lenders into the hands of good borrowers. The CCI includes screening, monitoring, and accounting costs, as well as the expected losses inflicted by bad borrowers".¹¹ The great number of defaults of banks and firms gives incentives to the banks to reallocate their loan-portfolios, preferring liquid and high-qualified assets. Moreover the confidence in the banking system was impaired, giving rise to a "run on the banks" by depositors sharpening the financial crisis. This process resulted in a squeezing of credit to households, farmers, and small firms and in a further fall of economic activity. Bernanke points out, "As the real costs of intermediation increased, some borrowers found credit to be expensive and difficult to obtain. The effects of this credit squeeze on aggregate demand helped convert the severe but not unprecedented downturn of 1929 - 1930 into a protracted recession."¹² Also the fact that the spread between interest rates for low versus high-quality borrowers remained so high for so long indicates that asymmetric information problems were severe in this period.

After the second world-war the standard Keynesian analysis did not give attention explicitly to the working of financial markets in explaining the development of economic activity. In this analysis the bond-credit- and stockmarkets are aggregated in such a way that one rate of interest emerges. Investment behaviour of entrepreneurs is determined especially by confidence and shifting moods of optimism or pessimism (animal spirits) and to a lesser degree by financial considerations. The confidence refers on the one side to the expectational view of the investor-borrower with regard to the future returns of the investment project and on the

¹¹ *B. Bernanke*, *The American Economic Review*, June, 1983, op. cit. p. 263.

¹² *B. Bernanke*, *The American Economic Review*, June, 1983, op. cit. p. 257. In this context see also *F. Mishkin*, *Asymmetric information and financial crises: A historical perspective*, NBER Working Paper, no. 3400, p. 24 - 25.

other side to the expectations of the saver-lender with regard to the fulfilment of the loan-contract of the potential borrower. Keynes put forward that a loss of confidence either by the lender or by the borrower could be sufficient to generate a fall in economic activity. Afterwards in the Keynesian IS-LM models the relationship between financial markets and the real economy is accomplished by the rate of interest as the cost-of-capital channel. However, ultimately it is still the money stock as a key financial variable that is emphasized, neglecting the explicit working of credit markets.

In the fifties and sixties in monetary economics attention shifted gradually to the controversy between Keynesians and monetarists (Friedman c.s), focusing on the transmission channels between changes in the money supply and economic activity. Keynesians were emphasizing the multiplier-accelerator mechanism and fiscal policy in explaining the development of national income. Based on the (new) classical theory the monetarists were underlining the relation between the money supply and the course of national income. Friedman and Schwartz put forward that this relation had been very important during the Great Depression. Since the start of the downturn in the business cycle in 1929 until the deep trough in 1933 the money stock as well as economic activity reduced sharply. They stress the importance of banking panics because they view them as a major source of contractions in the money supply. In this context Friedman has pointed out very clearly that just in this period the impact of the money stock on the business cycle has been proved. After all he also neglected the influence of the operation of financial markets during the process of the economic-downturn.¹³ In his further publications he emphasized the meaning of money as a medium of exchange and as an asset, giving particular attention to the special role of banks as money-creating institutions. This implies that the liability-side of the banks were centred and that the asset-side (loans) of banks and other financial intermediaries were kept in the background.

In the postwar period Gurley and Shaw revitalized the research on the interaction between the operation of financial markets and real economic development. These authors were emphasizing the financial-intermediation process in developed and underdeveloped economies, with special reference to the meaning of non-bank financial intermediaries in the savings-investment process for the course of economic activity. According to their view it is not only the money supply created by commercial

¹³ M. Friedman and A. Schwartz, *A Monetary History of the United States, 1867 - 1960*, Princeton, 1963.

banks which is the driving force of aggregate demand in the economy, but also the so-called “near monies” issued by non-bank financial intermediaries.¹⁴ At times of credit squeeze the supply of these interest-bearing liquid assets will be increased by these intermediaries, weakening the effectiveness of monetary policy. (substitution-hypothesis). The activities of the non-bank financial intermediaries influence the liquidity preferences of economic agents, and so lead to a more intensive use being made of the existing money supply. This means increasing the income circulation of money, making it harder for the central bank to regulate expenditures in the economy.¹⁵ Also the well-known Radcliffe-report in 1959 stressed that from a theoretical viewpoint, the money stock is not the only strategic variable in monetary policy but the overall liquidity supply in the economy. This implies that the volume of aggregate demand has become increasingly dependent of factors unrelated to the scope of changes in the money supply. If there is some proportionality between money and liquid assets in the economy, then the money-liquid-assets spending analysis will yield the same ultimate results as the simple money-spending approach underlying the orthodox case. In modern industrialized countries a strong proliferation of financial institutions has come about, especially in the eighties, which has created a substantial amount of interest-bearing liquid assets, blurring the orthodox money-definition and weakening the effectiveness of monetary policy.¹⁶

Gurley and Shaw also emphasized the importance of the total borrowing-capacity of economic agents with regard to macroeconomic expenditures. In other words the availability of credit is a variable which has a dominant impact on aggregate demand and macroeconomic performance. On the other hand the quality of the balance sheets of firms and households, so the financial structure of the economic subjects, determines to what extent this capacity can be used and will also influence the business cycle (Fisher’s debt-deflation approach). In this context the financial intermediaries play a crucial role because their credit-activities (asset-side) determine the availability of credit in the economy. These

¹⁴ *J. Gurley* and *E. Shaw*, *Money in a Theory of Finance*, 1960. See also *J. Gurley* and *E. Shaw*, *Financial Aspects of Economic Development*, *The American Economic Review*, 1955, p. 515 - 538.

¹⁵ *J. Sijben*, *Near-banking and monetary policy*, *Economic Quarterly Review*, Amsterdam-Rotterdam Bank NV, December, 1972, p. 1 - 14.

¹⁶ This view is of current interest owing to the wave of financial innovation processes in the last decade. See in this context, *J. Sijben*, *Financial innovations, monetary policy and financial stability*, *Kredit und Kapital*, March, 1988, p. 45 - 67.

institutions take care of an efficient allocation of savings and investments in the economy through indirect external finance. In this way a greater amount of credit will be available and on more favourable terms than through the rather inefficient direct external finance process by the capital market. Later on the Gurley-Shaw approach about the relevancy of the working of financial markets has been elaborated in the economic literature resulting in the incorporation of financial sectors (portfolio-approach) in macroeconomic models.¹⁷

It strikes that at the end of the fifties Modigliani and Miller in their well-known publication of 1958 just pointed out that under certain, very restrictive, conditions (no taxes and transaction costs, no default-risk and perfect capital markets) capital-decision making is independent of the financial structure of the firm. Since almost no attention was given in this neo-classical frictionless world to possible financial problems with regard to the firm's capital investments, a smooth working of the financial system was assumed (perfect and efficient markets and symmetric information) without any impediment in realizing investment projects. In this context Greenwald and Stiglitz remark, "The classical Modigliani-Miller approach to financial policy concluded that the financial structure of a firm was irrelevant to both its value and its operating decisions, and the neoclassical theory of the firm assumed further that its financial position was irrelevant."¹⁸

This idea resulted in a macroeconomic approach which unambiguously shifted attention again to the money stock as the key financial variable in the real-financial interaction process. This view also supported Friedman's plea to control the money-supply process aiming at a stabilization of economic activity on the one hand and his proposition that the money supply is the driving force behind the development of national income on the other hand. The control of the money supply is also a central issue both in the rational expectations theory in the seventies and in the game-theoretic approach in monetary policy in the eighties (rules versus discretion debate). According to the rational expectations hypothesis only unexpected monetary changes with its concomitant surprise

¹⁷ *J. Tobin*, Money, capital and other stores of value, *The American Economic Review*, Papers and Proceedings, May 1961 and *J. Tobin*, A general equilibrium approach to monetary theory, *Journal of Money, Credit and Banking*, February, 1969. In this context see also *J. Sijben*, Money and Finance: a blurring of disciplines, Tilburg University Press, 1986.

¹⁸ *B. Greenwald* and *J. Stiglitz*, Asymmetric information and the new theory of the firm: financial constraints and risk-behaviour. *The American Economic Review*, May, 1990.

inflation will generate alterations in real economic activity (Lucas-Sargent-Wallace ineffectiveness hypothesis). In the game-theoretic approach the interaction process between the strategic behaviour of the policy-maker and the rational public is emphasized. This implies that a discretionary policy has to be abandoned, because the long-run outcomes in terms of inflation and employment will be less beneficial (Nash-equilibrium) than in the case of a precommitment in monetary policy (rule).¹⁹

III. Minsky's Boom-bust Cycle

The overheated economy of the late 1960s and a significant increase in the use of debt, much of it lent by banks and other depository institutions, the credit crunch of 1966 and the Penn Central bankruptcy in 1970 encouraged some authors to study the stability of the financial system in the industrialized countries. Minsky and Kindleberger picked up Fisher's debt-deflation spiral to revitalize the meaning of the financial structure of firms and households for financial stability and the possible spill-over effects to the real economy. This section deals with a short review of Minsky's financial instability-hypothesis, because his analysis can be used as a connecting-link with the modern theory about the importance of asymmetric information on credit markets both for the financial structure and the real economic process.

Minsky emphasizes that the capitalist system is characterized by a "financial instability bias", manifesting by rapid and accelerating changes in prices of real and financial assets in relation to prices of production.²⁰ The so-called "boom-bust-cycle" in which endogenous cyclical forces may lead to financial instability goes along the following line of reasoning. During the upswing in economic activity firms and households behave in such a way that they don't bother about the development of their financial structure. Owing to a short memory economic agents have less aversion to building-up debts and to an increasing relation between debts and liquid assets. However this behaviour makes the financial system rather vulnerable to possible disturbances in the real

¹⁹ J. *Sijben*, Rational expectations and monetary policy, Sythoff and Noordhoff, Germantown, Maryland, 1980 and J. *Sijben*, Monetary policy in a game-theoretic framework, *Jahrbücher für Nationalökonomie und Statistik*, September, 1992, p. 233 - 253.

²⁰ H. *Minsky*, Capitalist financial processes and the instability of capitalism, *Journal of Economic Issues*, June, 1980. See also E. *Davis*, Instability in the euro-markets and the economic theory of financial crisis, Bank of England, Economics Division, October, 1989.

economy. In this context Minsky distinguishes three kinds of economic agents.²¹ At first the hedge-finance units which are in a financial position characterized by expected profits exceeding the expected obligations connected with debt-financing. In all periods there is an increase of net-wealth. Secondly, the speculative-finance units featured by a financial position by which in the beginning the debt-services exceed the expected returns, but later on the reverse case holds. It is obvious that net-wealth of these agents is very sensitive to interest rate movements. On the other hand owing to the ever-recurring refinancing of the debt the agents are strongly dependent of a smooth working of the financial system. Finally, the speculative or Ponzi-finance units who are confronted with long periods in which the contractual repayments are exceeding cash-flows. They are obliged to increase their outstanding debts continuously until at the end a very substantial income flow can be used to pay off the accumulated debts. Obviously the financial structure of this group of economic agents is especially sensitive to sharp increases of the rate of interest. In this context Carter points out, "In Ponzi financing, income flows are not sufficient even to cover interest on outstanding debt so the refinancing necessarily entails an increase in indebtedness. The proliferation of speculative and Ponzi financing arrangements generates a fragile financial structure in which any sharp rise in interest rates will generate present value reversals, impairing the ability of firms to refinance investment projects in process and their willingness to undertake new investment".²²

The boom-bust cycle with the different stages of financing can be described as follows. At the start of the economic upswing hedge-finance units will dominate, increasing the prices of capital assets and so investment activity. In this context Minsky remarks, "An increase in the demand price for capital assets relative to the supply prices of investment output increases investment, which increases not only profits but also the amount of financing available from banks and financial markets ...".²³ According to Tobin's-q mechanism the price of existing capital goods (equities) will exceed the reproduction costs of new investment goods increasing investment activity. The induced fall of the required rate of return will increase both the investment in reproducible real capital and profits, giving incentives to speculative-finance. Therefore

²¹ H. Minsky, *Stabilizing an Unstable Economy*, 1986. See also M. Carter, *Journal of Economic Issues*, September, 1989, op. cit. p. 781 - 782.

²² M. Carter, *Journal of Economic Issues*, September, 1989, op. cit. p. 782.

²³ H. Minsky, *Stabilizing an Unstable Economy*, 1986, New Haven, op. cit. p. 228.

the ratio of debts to income and liquid assets respectively will rise. This implies that more economic agents will become dependent on an ever-recurring claim on financial markets to finance their assets, weakening their financial structure.

The fragility of the financial system also increases when relative small changes in cash-flows, the discount rate and contractual repayments are influencing negatively the fulfilment of the financial obligations. Minsky argued that in a situation of increasing debt-financing it will be more difficult to meet these debt service requirements if there is a down-turn in the economic cycle with a concomitant reduction of income-flows. Therefore “hedge-finance-units” become “speculative-finance units” and these agents find difficulty in refinancing their debts. Moreover the rate of interest will rise because of a higher demand for credit, increasing the riskiness of credit-extension. Next the rise of the rate of interest will increase the reproduction costs of new capital goods and, according to Tobin’s q-mechanism, will further reduce investment activity. On the other hand the rise of the rate of interest will result in a fall of the price of existing capital goods (equities) or in a higher required rate of return also reducing investment activity. Finally this adjustment process generates the well-known Fisher’ debt-deflation spiral (section 2).

Minsky puts forward that since the sixties during periods of a restrictive monetary policy in the United States the US-economy was brought to the brink of a debt-deflation process. If in these circumstances a financial crisis threatens, the central bank as lender of last resort can help to avoid the debt-deflation spiral. Through a large addition of liquidity to financial markets and the associated fall of interest rates a further fall of the price of equities and so of investment activity can be averted. However he argued that since the sixties, according to the Keynesian receipt, a downturn in economic activity and income-flows has been prevented by a discretionary expansive fiscal policy at the price of higher inflation. (inflationary bias). He expresses this view as follows, “Stagflation is truly a result of big government, but so is the absence of a deep depression in the years since 1966. There is no free lunch: we have eliminated deep depressions but the price has been first chronic and now accelerating inflation”.²⁴ The intervention of the central bank will reduce the fear of a further fall of profits and prevents the loss of confidence with economic agents. Then Minsky concludes, “Both the Great Depression and the great inflation and intermittent stagnation of

²⁴ H. Minsky, *Journal of Economic Issues*, June, 1980, op. cit. p. 519.

1966 - 1979 are symptoms of the underlying instability of capitalism. A great stagflation is the outcome when government is big and the central bank intervenes force-fully".²⁵

Monetary authorities can control this process of endogenous financial instability of the capitalist system as described above by supervising the money-supply process of the commercial banks. Moreover they also need to superintend the capital adequacy ratio of these banks during the up-swing in the cycle to guard against insolvency. In this way the confidence of a smooth working of financial markets can be maintained even if a negative shock might occur. However firms always can step aside and will try to obtain credit from other financial intermediaries which are not supervised by the central bank. Besides in a strong financially integrated world, high qualified corporations can always tap foreign financial markets to finance their investment projects. In this way the process of weakening the financial structure of the firms can proceed impairing the stability of the financial system. There is also the problem of moral hazard. The success of the safety-net of the central bank may be encouraging financial institutions to accept more risky-projects because they feel that public policy is oriented toward preventing significant adverse consequences. From a monetary policy perspective the increased indebtedness of US-corporations during the last decade can increase the risk that sluggish growth could lead to recession, generating widespread and potentially cumulative debt defaults. In this context Friedman points out, "Instead this experience suggests that if enlarged business indebtedness raises the likely costs of economic downturn and the risks associated with them, and hence makes policymakers less likely to accept such periods of economic weakness, it therefore also imparts an inflationary bias ..., this bias is likely to meet less resistance than would have been the case some years ago".²⁶ This approach corresponds with Minsky's view described above that if the financial system has become too fragile to withstand any but the shortest recession, it is unlikely to be able to support a genuine attack on inflation.

Summarizing it may be concluded that since Fisher's publication in 1933 many economists have given attention to the importance both of the operation of financial markets and financial stability for the course of real economic activity. However the interaction process between the real

²⁵ *H. Minsky*, *Journal of Economic Issues*, June, 1980, op. cit. p. 520. See also *M. Wolfson*, *The Post Keynesian Journal of Economics*, Spring, 1990, p. 333 - 355.

²⁶ *B. Friedman*, *Occasional Paper 29*, Group of Thirty, New York, 1989, op. cit. p. 33.

and the financial side of the economy still remained to be determined by the development of the money stock and the rate of interest as the key financial variables.

In the next two sections a non-technical overview will be presented of the modern approaches about the working of the credit market and its importance for financial stability and macroeconomic performance. These sections deal with the role of the economics of information with regard to imperfections on the credit market, the credit-rationing mechanism, the quality of the banks' balance sheets, the associated financial structure of firms and the possible spill-over effects to the real economy. In an economic downturn defaults in the non-financial sector of the economy can deteriorate confidence and the creditworthiness of the banking system which finally may result in bankruptcies. In these circumstances banks will be reluctant to increase their loan-portfolio. Then according to the credit view aggregate demand will be reduced further weakening real economic activity. This phenomenon known as a credit crunch is sometimes called a capital crunch.²⁷ In this context Bockelmann and Borio point out, "When the solvency of intermediaries is affected, the consequences for real activity are potentially more damaging, especially when banks are involved, ... this crisis forces a reduction of bank-credit. Since most small and medium size firms do not have access to alternative sources of finance the "credit crunch" can reduce spending".²⁸

IV. Asymmetric Information and Credit Markets

1. *The Lemon's Principle*

In a pathbreaking publication Akerlof introduced the issue of the importance of agent's uncertainty with regard to the quality of goods for the working of the market mechanism. He puts forward that buyers are using some market variable to judge the quality of the goods they intend to buy in the future. At the same time sellers have an incentive to offer lower qualified goods because the proceeds of the higher qualified goods will mainly accrue to the whole group of sellers and not to the individual seller. For there doesn't exist a classification of qualities of goods traded

²⁷ R. Syron, Are we experiencing a Credit Crunch?, New England Economic Review, Federal Reserve Bank of Boston, July - August, 1991.

²⁸ H. Bockelmann and C. Borio, De Economist, 1990, op. cit. p. 443. See also B. Bernanke and C. Lown, The Credit Crunch, Brookings Papers on Economic Activity, nr. 2, 1991.

and one uniform price will be effected on the market. Therefore there exists a tendency to reduce both the average quality of the goods supplied and the size of the market. He illustrates this idea with the help of used-cars. He points out that asymmetric information exists between buyers and sellers on the market for cars in such a way that the seller has more information about the quality of the cars than the buyer. In this context Akerlof remarks, "But good cars and bad cars must still sell at the same price since it is impossible for a buyer to tell the difference between a good and a bad car".²⁹ It is obvious that the used-car has not the same value as a new car. Otherwise it would be beneficial to sell a bad car (lemon) at the price of a new car and afterwards to buy a new car with a higher chance of a high quality. According to Akerlof this means, "Thus the owner of a good machine must be locked in. Not only is it true that he cannot receive the true value of his car, but he cannot even obtain the expected value of a new car".³⁰ Owing to the uniform price for all qualities the owners of used-cars have the incentive only to supply the bad cars (lemons) on the market (adverse selection). Under certain circumstances even it seems possible that the market of used-cars ceases to exist. In this way there is some analogy with the well-known Gresham's law "bad money drives out good money". Owners of good cars don't like to pay for the bad-ones and will prefer not to sell. In this context Akerlof remarks, The "bad" cars tend to drive out the "good", and further, "bad cars drive out the good because they sell at the same price as good cars. But the bad cars sell at the same price as good cars, since it is impossible for a buyer to tell the difference between a good and a bad car; only the seller knows"³¹ From the foregoing it appears that the lemon's principle implies that prices not only perform the traditional allocation function in the market process but also render an information content with regard to the quality of the goods traded on the market.

Akerlof's message is emphasizing that because of asymmetric information between buyer and seller on the market the supplier of the low qualified goods receives a lemons premium at the cost of those who supply high qualified goods at the same price. Next Akerlof points out that ultimately because of the working of the lemons principle and the operation of the associated market processes the market concerned ceases to exist. He expresses this sequential process as follows, "For it is quite

²⁹ G. Akerlof, The market for "lemons": quality uncertainty and the market mechanism, *The Quarterly Journal of Economics*, August, 1970, p. 189.

³⁰ G. Akerlof, *The Quarterly Journal of Economics*, August, 1970, op. cit. p. 489.

³¹ G. Akerlof, *The Quarterly Journal of Economics*, August, 1970, op. cit. p. 490.

possible to have the bad driving out the not-so-bad driving out the medium driving out the not-so-good driving out the good in such a sequence of events that no market exists at all.”³²

2. Credit Rationing

Recently in economic literature the lemon's principle and the associated asymmetric information has been applied to the operation of financial markets, especially to explain the phenomenon of credit rationing and the importance of the financial structure of economic agents for real economic development. The asymmetric information approach provides an important transmission mechanism for how disturbances on credit markets affect aggregate economic activity. This approach assumes that the borrower is better informed about the credit-risk than the lender, the financial institution concerned. Because of the fact that a priori the identity of the pool of heterogeneous borrowers can not be determined the market rate of interest, so the price of credit, incorporates a lemon's-premium. This implies that in these circumstances borrowers with a low risk will subsidize the high-risk borrowers. However based on the principle of adverse selection they will not be prepared to pay this relative high price, change their behaviour and will leave the bank.

The last few years in international literature about the economics of information or the new microeconomics much attention has been given to the issue of asymmetric information and the connected strategical market behaviour of economic agents. This new approach tries to explain the existence of disequilibrium prices and has been applied to the price-setting processes on the labour market (efficiency wages, insider-outsider problem) and the market for goods. However recently this new view has also been applied to the operation of the credit market, emphasizing the issues of *adverse selection* and *moral hazard* resulting in quantity adjustments on this market. The reasoning goes as follows. Because of asymmetric information the lender will be confronted with a heterogeneous group of borrowers which a priori he cannot divide in several risk-classes. This means that the pool of potential borrowers is completely different manifesting itself in a different chance of repayment of the loan. Analogous to Akerlof's lemon's problem a higher rate of interest (price of credit), applying to all borrowers, gives an incentive to the high-qualified borrower to leave the market while the low-qualified ones will remain. In this way the average degree of risk-aversion in the

³² G. Akerlof, *The Quarterly Journal of Economics*, August, 1970, op. cit. p. 490.

remaining pool of potential borrowers will be lowered. Next to this so-called adverse selection effect a higher rate of interest will stimulate individual borrowers to undertake more risky investment projects, with a higher default-risk but with higher returns if these projects appear to be successful. This incentive effect is called moral hazard.

This market behaviour will result in a fall of the average quality of the borrowers, so possibly deteriorating the quality of the assets of the banking system. The high-qualified borrowers will look for alternative sources of finance like direct external financing on the capital market (see section 2). This reaction is called disintermediation or securitisation, characterized by a replacement of the traditional bank loans by marketable securities. In this context Oort points out, "This process of disintermediation may leave the banks with only the weaker credits on their balance sheets, thus increasing their vulnerability".³³ It may be concluded that in an asymmetric information framework on the loan market a rise of the rate of interest may have the following results. On the one hand a positive impact on the returns of the bank and on the other hand a negative influence through a deterioration of the quality of the banks' assets. If the last adverse selection effect dominates it will not be beneficial for the lender to increase further the loan-rate although an excess demand for loans may still exist. In these circumstances the rate of interest has lost its traditional market clearing function and a new allocation mechanism has to be introduced.

The possible negative results according to the operation of the lemon's principle will disappear when the lender will be able to eliminate the underlying asymmetric information by establishing the real identity and the quality of the borrower. In this context Stiglitz and Weiss remark, "It is difficult to identify "good borrowers" and to do so requires the bank to use a variety of screening devices".³⁴ The bank can offer different loan-contracts to the heterogeneous pool of borrowers (combinations of amount of credit, rate of interest, collateral etc.). In this way a sorting-out mechanism will be introduced to find out the differences of wants between high and low-qualified borrowers aiming at a tailor-made loan-contract. Another way to eliminate the asymmetric informa-

³³ C. Oort, The impact of the quality of debt for the vulnerability of the international banking system, in J. Sijben ed. Financing the world economy in the nineties, Kluwer Academic Publishers, 1988, p. 82 - 83.

³⁴ J. Stiglitz and A. Weiss, Credit rationing in markets with imperfect information, The American Economic Review, June, 1981, p. 393. See also J. Stiglitz and A. Weiss, Banks as social accountants and screening devices for the allocation of credit, NBER Working Paper, 2710, October 1988.

tion refers to trace the creditworthiness of the potential borrower by a screening-process.

Greenwald and Stiglitz have stressed that the lemon's principle can lead to a reduction or sometimes even a disappearance of some markets. Practically this can mean that no or too less share-capital will be available (equity-rationing) or that the banking system shifts to credit rationing.³⁵ In these circumstances the potential borrower is committed to internal finance. Greenwald and Stiglitz point out, "... the free access to all forms of financing envisaged by Modigliani-Miller may not exist. In loan markets, there may be credit rationing. In these cases financial structure and position matter and affect firm behaviour".³⁶ It is obvious that in these circumstances a credit crunch can arise with spill-over effects to the real economy resulting in a contraction of economic activity.

The phenomenon of credit rationing is characterized by an excess demand for loans which, given the vector of the different terms of credit, is not satisfied by the bank. It refers to a disequilibrium situation because neither an increase of the rate of interest nor a strengthening of non-interest terms can eliminate this excess demand. *Disequilibrium credit rationing* arises when there are temporary obstacles to the immediate adjustment of loan rates to clear the credit market because of government intervention in financial markets (interest rate or loan ceilings). Hodgeman has tried to explain this phenomenon by relating it to the risk of default of payment. Based on the assumption that both lender and borrower have the same information with regard to the risk of default, the risk will be reflected in the rate of interest.³⁷ Next Freimer and Gordon have attempted to find out why under certain circumstances banks like to give priority to quantity-adjustments through credit rationing above price-adjustments through an increase of the loan rate. They conclude that the rational lender will equal the repayment of the loan to the best possible outcome of an investment project. Actually this means that a cut-off condition exists in such a way that an increase of the loan

³⁵ J. Stiglitz, Markets, market failures and development, The American Economic Review, Papers and Proceedings, May, 1989, and S. Myers and N. Majluf, Corporate financing and investment decisions when firms have information that investors do not have, Journal of Financial Economics, June 1984. See also D. Jaffee and J. Stiglitz, Credit Rationing, in Handbook of Monetary Economics, volume 2, eds. B. Friedman and F. Hahn, North-Holland, 1990.

³⁶ B. Greenwald and J. Stiglitz, Asymmetric information and the new theory of the firm: financial constraints and risk behaviour, The American Economic Review, May, 1990, op. cit. p. 160.

³⁷ D. Hodgeman, Credit risk and credit rationing, The Quarterly Journal of Economics, May, 1960.

rate will give no further contribution to the improvement of the lender's position. It also implies that different expectations of lenders and borrowers with regard to the risk of default and bankruptcy may give rise to a divergent behaviour of agents on the loan market.³⁸

As was described before the modern literature on game-theory and asymmetric information has introduced the issues of adverse selection and moral hazard which can explain the non-conventional operation of the credit market and the associated credit rationing. These phenomena will arise when the loan rate influences borrower's behaviour (moral hazard) or determines the riskiness of the potential borrowers (adverse selection). It is obvious that the lender-borrower relation built-up in the past (reputation) will also play a role in the decision process with regard to credit rationing. When the borrower has built-up a high credit-reputation, reducing the asymmetric information, then a kind of implicit contract will emerge. This view refers to Okun's distinction between auction and customers markets.³⁹ This implies that the lender will ration a borrower that has a good reputation with regard to his contractual obligations less easily than an unknown and more risky borrower. Therefore the credibility of the financial contract between lender and borrower is very important.

After the traditional temporary disequilibrium-rationing-analysis Stiglitz and Weiss also attempted to give a theoretical underpinning of the more permanent *equilibrium credit-rationing*. They emphasize the importance of asymmetric, not verifiable, information between lender and borrower with regard to the possible outcomes of the investment project. The bank is interested in the interest rate and the quality of the loan. However, as the authors remark, "The interest rate a bank charges may itself affect the riskiness of the pool of loans by either: (1) sorting potential borrowers (the adverse selection effect) or (2) affecting the actions of borrowers (the incentive effect)".⁴⁰ Both the sorting-out effect of the rate of interest with regard to the creditworthiness of potential borrowers and the incentive or moral hazard effect of the rate of interest with regard to the borrowers' behaviour are based on Akerlof's lemon's principle. The sorting-out mechanism through the rate of interest initially results from the bank's distrust of the creditworthiness of the poten-

³⁸ M. Freimer and M. Gordon, Why banks ration credit? The Quarterly Journal of Economics, August, 1965.

³⁹ A. Okun, Inflation; its mechanics and welfare costs, Brookings Papers on Economic Activity, nr. 2, 1975.

⁴⁰ J. Stiglitz and A. Weiss, The American Economic Review, June, 1981, op. cit. p. 393.

tial identical borrowers. However the bank tries to separate beforehand the 'good' and the 'bad' borrowers and this screening-process can be accomplished by making use of the rate of interest. Stiglitz and Weiss assume that on the average the individual borrower who is prepared to pay a higher loan rate can be identified as a more risky-borrower and vice versa. This willingness results from the fact that they assess a low chance of repayment of the loan. This means that a rise of the rate of interest will increase the average riskiness of the loans and the chances of bankruptcy, deteriorating the bank's profitability. It also implies that the rate of interest incorporates information about the quality of the loan. Moreover a rise of the rate of interest will stimulate potential borrowers to offer the higher yielding, but more-risky investment projects (moral hazard effect).

Based on asymmetric information and the concomitant monitoring costs the bank will try to make a contract in such a way that on the one side the potential borrowers can be identified with regard to their credit-worthiness and that on the other side there will be no incentive to change their behaviour that may be unprofitable for the bank. In this context Stiglitz and Weiss speak about the bank-optimal rate (r^*) which is the equilibrium rate of interest maximizing the bank's returns although an excess demand for loans still exists. The bank will not be prepared to make a loan to a potential borrower who is willing whether to pay a higher rate than this optimal rate or to give more collateral. For otherwise losses to the lender exceed gains due to higher interest income. In these circumstances there are no market forces that will equilibrate the market like in a Walrasian world with perfect information. Therefore a quantity-adjustment process emerges resulting in a rationing of credit. With regard to the optimal interest rate Stiglitz and Weiss remark, "In the bank's judgement, such a loan is likely to be a worse risk than the average loan at interest rate r^* , and the expected return to a loan at an interest rate above r^* is actually lower than the expected return to the loans the bank is presently making"⁴¹ (see appendix).

The analysis of Stiglitz and Weiss has given a new impetus to the traditional credit-availability doctrine. It explains the phenomenon of equilibrium-rationing characterized by an excess demand for loans and a backward bending supply curve. The rate of interest determines directly the quality of the bank's loan-portfolio giving an incentive to the bank to ration credit. With regard to the market-mechanism the authors point

⁴¹ J. Stiglitz and A. Weiss, *The American Economic Review*, June, 1981, op. cit. p. 394.

out, “The law of Supply and Demand is not in fact a law” and further; “It is rather a result generated by the underlying assumptions, that prices have neither sorting nor incentive effects. The usual result of economic theorizing: that prices clear markets, is model specific and is not a general property of markets-unemployment and credit rationing are not phantasms”⁴² Stiglitz puts forward that already Adam Smith described the sorting-out mechanism with regard to the creditworthiness of the borrowers, generated by a rise of the rate of interest, as follows “... the greater part of the money which was to be lent, would let to prodigals and profectors. Sober people, who will give for the use of money no more than a part of what they are likely to make by the use of it, would not venture into the competition”⁴³

3. Collateral

Apart from directly monitoring or controlling the projects of borrowers to screen-in low risk borrowers, which may be very costly, other methods of reducing moral hazard and adverse selection effects are available to lenders. Recently Bester has shown that in an equilibrium with sufficient competition between the banks no credit rationing will exist. The quality of the different borrowers can be established by using both the collateral requirements and the rate of interest as screening-devices. He assumes that in making the loan-contract banks make a decision simultaneously about the level of the interest rate and the required collateral.⁴⁴ In this way it is possible to offer different contracts which can perform the function of a self-selection mechanism to adequately screen-out high risk borrowers. He shows that borrowers with a low default-risk will sooner accept a strengthening of collateral requirements with a concomitant reduction of the rate of interest than a borrower with a higher risk of default. In this way the overall level of risk in the remaining pool of borrowers will be lowered. Therefore in the equilibrium situation no credit rationing will exist. His reasoning goes as follows. If a high-risk borrower can not receive the preferred loan he has to com-

⁴² J. Stiglitz and A. Weiss, *The American Economic Review*, June, 1981, op. cit. p. 394.

⁴³ J. Stiglitz, *The American Economic Review*, Papers and Proceedings, May, 1989, op. cit. p. 31.

⁴⁴ H. Bester, *Screening versus rationing in credit markets with imperfect information*, *The American Economic Review*, September, 1985. In this context see also H. Milde and J. Riley, *Signalling in credit markets*, *The Quarterly Journal of Economics*, 1988. These authors put forward that the loan size can also be used in a similar way to collateral to screen-out high-risk borrowers.

pete with the low risk borrowers confronted with beneficial contracts. This implies that in an equilibrium with credit rationing a group of bad and less-bad risks always exists. However Bester remarks, "... pooling of different risks at one contract is not viable against competition wherever self-selection mechanisms are available".⁴⁵ He characterizes an equilibrium as a separation of borrowers with different risks (separating equilibrium). High-risk borrowers will accept a contract with a higher rate of interest and less collateral than the low-risk ones. In the equilibrium situation it holds that the amount of collateral is negatively correlated to the degree of risk of the borrower's investment project. This means that the collateral requirements in the various contracts give the bank the desired information about the risk of default of the potential borrowers. (signalling-effect) In this context Bester points out, "... low-risk entrepreneurs have been assumed to be able to raise a sufficient amount of collateral to distinguish themselves of high risk ones".⁴⁶ Offering different contracts, determined by various combinations of interest rate and collateral requirements, operates as a screening-mechanism separating 'bad' and 'good' borrowers. Under these circumstances there is no need to make an appeal to the working of the adverse-selection effect according to the Stiglitz-Weiss analysis.

Bester's analysis has some analogy with the game-theoretical issues of reputation and credibility of central banks with regard to monetary policy. To stick to the preannounced anti-inflation policy, in case of need accepting a recession, may be sufficient to convince the public that the central bank actually is a 'hard' policy-maker. Then this signal prevents a monitoring-process by the public to identify the central bank with regard to the priority of price stability ('hard') or employment ('weak').⁴⁷

In economic literature it is put forward that a change of the non-interest terms of credit gives a possibility to compensate the size of credit rationing. For strengthening the collateral requirements may reduce the excess demand for credit and so the amount of credit rationing. However more restrictive non-interest terms may also be a kind of credit rationing, owing to the fact that these stronger requirements will be used to reduce the availability of funds. Irrespective of the view one is defending, it can be stated that a change of the non-interest terms of credit

⁴⁵ H. Bester, *The American Economic Review*, September, 1985, op. cit. p. 850.

⁴⁶ H. Bester, *The American Economic Review*, September, 1985, op. cit. p. 854. See in this context also Ch. Goodhart, *Money, information and uncertainty*, Chapter 7, 1989, p. 168 - 176.

⁴⁷ J. Sijben, *Jahrbücher für Nationalökonomie und Statistik*, September, 1992.

and the associated credit rationing will operate as a transmission channel in monetary policy, without changing the rate of interest. In this context Stiglitz and Weiss remark, "Note that in a rationing equilibrium to the extent that monetary policy succeeds in shifting the supply of funds, it will affect the level of investment, not through the interest rate mechanism, but rather through the availability of credit".⁴⁸ The spill-over effect of the credit market to the goods market and aggregate demand is the crux of the credit rationing mechanism. However, as was already mentioned in section 3, in a strong financially integrated world, high qualified borrowers can always raise funds on foreign financial markets weakening the effectiveness of domestic monetary policy.

4. *Financial Structure*

In the context of credit rationing by banks the last few years much attention has also been given to the important role of the financial structure of economic agents for macroeconomic performance. Recently Bernanke and Gertler have studied the endogenous interaction between the financial structure of firms and real economic activity with asymmetric information on credit markets. They emphasize that owing to the lemon's principle the induced increase of the cost of capital will weaken the efficiency of the investment process. The authors put forward that the equilibrium level of investments is positively related to the financial structure of the firm, defined as net worth in relation to the debt-service. Moreover according to the Stiglitz-Weiss analysis, the position of the firm's balance sheet is also relevant with regard to a likely credit rationing.

Bernanke and Gertler develop a model in which endogenous pro-cyclical movements in the firm's net worth are strengthening fluctuations in production and investment activity.⁴⁹ They show how these fluctuations with the connected development of cash-flows are positively related to changes in the borrower's balance sheet-structure or his collateralizable

⁴⁸ *J. Stiglitz* and *A. Weiss*, *The American Economic Review*, June, 1981, op. cit. p. 409.

⁴⁹ *B. Bernanke* and *M. Gertler*, *Financial fragility and economic performance*, *The Quarterly Journal of Economics*, February 1990 and *B. Bernanke* and *M. Gertler*, *Agency costs, net worth and business fluctuations*, *The American Economic Review*, 1989, p. 14 - 31. See also *J. Bisignano*, *Structures of financial intermediation, corporate finance and central banking*, BIS, Basle, December, 1990 and *B. Bernanke* en *J. Campbell*, "Is there a corporate debt crisis?" *Brookings Papers on Economic Activity*, 1988, 1, p. 83 - 125.

net worth. Therefore the wedge between the cost of capital in case of external and internal finance is negatively correlated with the business cycle, giving rise to volatility in investments. Higher cash-flows during the upswing will give more room for internal finance and so relatively lower costs of capital (no lemon's-premium) and vice versa. During booms it becomes easier to borrow, agency costs of finance are relatively low and the rise in internal net worth reduces the premium attached to external finance. Conversely, in recessions the premium rises and it becomes more difficult to obtain finance. With regard to the testable implications of their model Gertler and Hubbard point out, "In contrast to the frictionless neoclassical model, the framework here predicts that, *ceteris paribus*, investment will vary across firms positively with differences in firm's internal net worth. Furthermore, this variation is likely to be more pronounced in recessions than in booms".⁵⁰ Shortly, an income-accelerator effect exists owing to the fact that increasing cash-flows and an associated improvement of the financial structure of the firm is weakening the terms of credit. This view also supports Fisher's debt-deflation spiral in section 2. For a deterioration of the firm's balance sheet because of an unexpected fall of the price level will reduce its borrowing-capacity. Assuming that these firms belong to the group with qualified investment projects, the redistribution of wealth owing to the price deflation-process will result in a reduction of investments and a contraction of economic activity.

Bernanke and Gertler emphasizing this cyclical interaction process also make mention of a possible investment crisis. This view links-up with the approach of Gurley and Shaw that the borrowing-capacity will also determine the aggregate demand in the economy. Moreover in the downturn of the cycle new borrowers will be faced with more restrictive terms of credit than those firms with a high reputation on credit markets. For these high-rating firms have build-up credibility and reputation with regard to the performance of the loan contract, reducing the information problem. In this way these firms can benefit from economies of scale with regard to information-gathering by the lender. Analogous to the operation of the signalling-effect in game-theory lenders also can threaten to refuse future loans to stimulate borrowers to improve their financial behaviour (reduction of the moral hazard-effect). In this way lenders can contribute to increasing financial stability. For the information that owing to a potential loss of credibility with regard to the per-

⁵⁰ M. Gertler and R. Hubbard, Federal Reserve Bank of Kansas City, 1988, op. cit. p. 58.

formance of the loan contract and a possible cutting-off lending in the future may work as a deterrent-strategy.

However some authors with contrasting viewpoints have argued that the increasing reliance on debt by US-corporations in the 1980s has not yet exposed the economy to any significant risk of financial fragility. In this context Jensen emphasizes that debt reduces a company's "free cash-flow", defined as the excess of its cash flow over the amount of funds that can be invested profitably within the firm. The availability of free cash-flows may encourage managers to use these funds for inefficient expansion rather than for increasing payments to share holders. Managers know that they will have to meet debt-service payments come what may, so they will be disciplined giving them incentives to improve efficiency. He also puts forward that the value created for investors in leveraged buy-outs (LBO's) and other exchanges of debt for equities in the last decade is a reflection of prospective gains in operating efficiency. In the case of leveraged buy-outs these gains are due to the replacement of the conventional large and often diversified corporate structure with the superior organizational form of management represented by the "LBO association." He underlines that a higher debt level increases managers' incentive to improve future corporate performance and will signal this improvement to the financial market. In this context he states, "Debt creation enables managers to bond their promise to pay out future cash-flows ... the exchange of debt for stocks helps managers overcome the normal organizational resistance to retrenchment that the pay out of free cash flow often requires. The threat of failure to make debt-service payments serves as a strong motivating force to make such organizations more efficient".⁵¹ Financing through debt creation enables firms to credibly commit to pay-out future cash flows. Debt also reduces agency costs by diminishing the cash flow over which the firm can exercise discretion. On the other hand the highly levered capital structure itself will also reduce creditors' incentive to force liquidation of the firm in the event that the expected efficiency gains and higher earnings do not materialize. This implies that even if the firm fails cannot meet the increased debt service payments the outcome is unlikely to be a traditional default and bankruptcy with its contractionary effects for the real economy and the associated negative feed-back effects to the financial system. Some other authors with contrasting views emphasize that the

⁵¹ *M. Jensen*, Takeovers: their causes and consequences, *Journal of Economic Issues*, Winter, 1988, p. 29 - 30. See also *M. Jensen*, Agency costs of free cash flow, corporate finance and takeovers, *The American Economic Review*, May, 1986, p. 323 - 325.

increasing indebtedness of both firms and household borrowers in the eighties has represented no more than a continuation of trends that already prevailed in the postwar period. Moreover most of the corporations which borrowed heavily during the last decade were industries that are relatively insensitive to the business cycle.

V. Financial Fragility

The arise of bad-loans in the banking system and its attendant increase in outstanding debt of firms and households, coinciding in time with a cyclical downturn, has increased financial fragility. Basically this development has been caused both by the rapid process of liberalisation of financial markets in the eighties and the associated erosion of the relative stable postwar financial structure with the connected problems of banks in the United States, Great Britain and recently also in Japan (commercial real-estate crisis). In the United States failures of commercial banks and thrift institutions have reached levels not seen since the Great Depression. Many of the conditions and the events of the eighties have contributed to the fear of an impending major economic crisis. In this context Wolfson points out, "... the observed financial instability in the latter postwar period is a result of the interaction of two developments, one cyclical and the other secular".⁵² The cyclical forces leading to financial instability were described in section 3, based on Minsky's boom-bust cycle. But also secular and more longer-term developments such as a new regulatory structure for financial institutions that encouraged excessive risk-taking have played a role as well. Guttentag and Herring remark that conservative attitudes toward debt creation and risk gradually began to change in the postwar period as memories of the Great Depression faded and time went by without any great shocks to the financial system.⁵³

In the new competitive deregulated financial environment of the eighties and especially during the business-cycle expansion since 1982, US-banks have changed their behaviour with regard to loans and investments substantially. For the maintenance of the Glass-Steagall Act

⁵² *M. Wolfson*, *The Post Keynesian Journal of Economics*, Spring, 1990, op. cit. p. 334. In this context see also *F. Mishkin*, *Financial innovation and current trends in U.S. Financial Markets*, NBER, Working Paper, no. 3323, April 1990 and *B. Friedman*, *Views on the likelihood of financial crisis*, Working Paper NBER, no. 3407, August, 1990.

⁵³ *J. Guttentag* and *R. Herring*, *Credit rationing and Financial Disorder*, *Journal of Finance*, December, 1984.

(separation of commercial and investment banking) and the Mc Fadden Act (no interstate banking), dating from the thirties, made it impossible for the commercial banks to diversify their risks and to shift their activities geographically respectively. This implies that in this new competitive financial environment US-banks were stimulated to accept more risky but higher yielding investment projects to improve their declined profitability and capital basis (financing leveraged buy-outs, speculative real-estate projects and unsound loans). More opportunities for private debt creation developed, and the relative importance of government securities in bank portfolios began to decline. In the corporate sector debt increased in relation to equity, the debt-maturity shortened and liquidity declined deteriorating the financial strength of the balance sheets. Moreover the process of financial liberalisation has greatly expanded alternatives to banks as sources of credit. Finance companies and other nonbank institutions now compete with banks to meet firm's financing needs, and commercial paper allows many firms to raise funds directly from capital markets rather than through banks (securitisation).

During the recent economic downturn these financial developments have resulted both in increasing financial fragility and in enlarging bankruptcies. It can be stated that with high debt levels of many companies and households a cyclical downturn like in the early nineties could reveal a degree of fragility in both the real and the financial sectors that has remained effectively hidden by the long cyclical upswing in the eighties. This view links-up with Fisher's debt-deflation spiral and Minsky's financial instability-hypothesis with regard to the debt-accumulation during the boom of the business cycle. An excessive borrowing becomes dangerous when at the peak of the cycle the interest rate rises and economic activity starts to fall. Then the higher leverage-ratio of the firms may increase the risk of default, sharpening the consequences of a recession with feed-back effects to the financial sector. In these circumstances the overall stability of the economic and financial system is at issue. In this context Wolfson puts forward, "Thus the financial crisis is best understood as an endogenous reaction to the increasing fragility that develops over the course of the business cycle expansion".⁵⁴ In his empirical pioneering study about the influence of financial structure of the US-non financial corporate sector on the real economy during the 1946 - 1987 period he assumes that the most important influence in both the

⁵⁴ M. Wolfson, *The Post Keynesian Journal of Economics*, Spring 1990, op. cit. p. 337. See also J. Faust, Will higher corporate debt worsen future recession? Review Federal Reserve Bank of Kansas City, March - April, 1990.

cyclical and secular analysis was the increase in financial fragility. The financial fragility of the non financial corporate sector, expressed by difficulty in meeting debt repayment commitments, played a major role and was transmitted to the banking system by means of increased defaults on bank loans. As financial fragility variables he took the ratio of corporate net interest payments to gross capital income on the one hand and the ratio of net loan losses to average loans outstanding in the banking sector on the other hand. The higher these ratios the more fragile is the condition of the corporate sector and the banking system respectively and vice versa. It appears that financial fragility exhibits a strong cyclical pattern, rising in recessions, overlaid on a secularly rising trend, which has steepened significantly since the mid-seventies.⁵⁵ In this context Driscoll concludes, "Even if high levels of private sector debt do increase the fragility of the financial system and this is reflected in greater instability in financial markets, it is not clear that this has made the real sector of OECD economies more unstable in the 1980s or that the real sector will be more prone to instability and recession in the future (p. 22).

US-monetary authorities are worried about the increased financial vulnerability of the firms because it is weakening the implementation and effectiveness of monetary policy. Friedman argues that in the last few years the weakening of corporations' balance sheets has increased in such a way that the Federal Reserve is not able through monetary tightening to eliminate a possible rekindling of inflation. For in these circumstances there is a fear for either causing a recession or sharpening an already set going fall in economic activity.⁵⁶ The increased likelihood of debtor distress during a recession could reduce the central bank's tolerance for allowing a business downturn, thus becoming less aggressive in pursuing anti-inflation policies. Moreover increased debt could also intensify the effect of a recession. US-monetary policy became relatively tight near the peak of the expansion at the end of the eighties, followed in the early nineties by monetary expansion to bottom-out the lasting

⁵⁵ *M. Wolfson*, *The Post Keynesian Journal of Economics*, Spring, 1990, op. cit. p. 347 - 348. See also *M. Driscoll*, *Deregulation, credit rationing, financial fragility and economic performance*, OECD, Working Papers, February, 1990, p. 21 - 22. Davis has examined the relationship between private sector debt/income ratios and loan default risk in major OECD countries. See *E. Davis*, *Rising sectoral debt/income ratios; A cause for concern*, BIS Economic Papers, no. 20, 1987.

⁵⁶ *B. Friedman*, *Occasional Paper 29*, Group of Thirty, New York, 1989. See also *H. Kaufman*, *Debt and financial stability: an overview*, in *Debt, Financial Stability and Public Policy*, Federal Reserve Bank of Kansas City, August, 1986.

recession. Therefore authorities were faced by a reputation trade-off: either maintaining their credibility with regard to price stability or accepting a recession with the fear of an associated increase of financial instability because of excessive debt-financing in the eighties.

Without doubt the availability of a lender of last resort to avoid a possible financial crisis and to calm market fears by supplying liquidity to the market (like the Fed in 1987), may give rise to moral hazard manifesting by banks' acceptance of higher-risk investment projects. The banks will be encouraged to take more risk because they feel that policy makers are oriented toward preventing significant adverse consequences. This behaviour will also be stimulated by the so-called "too-big-to-fail-doctrine" that appears to guide government policy. In this way the Federal Reserve tries to prevent a possible disturbance of the payments system with negative spill-over effects to other banks and the real economy. For widespread failures of the interconnected depository institutions are likely to threaten directly the entire financial system. On the other hand both the insured and the uninsured depositors will not be encouraged to monitor the credit activities of the banks accepting the higher risks. In these circumstances a small crisis, resulting in the default of some banks may have positive signalling-effects. However Kindleberger has shown that financial crises without a lender of last resort have been followed by greater depressions than in cases of a crisis with the intervention of the central bank to supply markets with liquidity.⁵⁷ In any case a safety-net will be necessary to preclude the development of a debt-deflation induced recession envisaged by Fisher during the Great Depression. In this context the forced Penn Central bankruptcy in 1970, the problems with Drexel-Burnham and Lambert and the collapse of the Junk-bonds market (1989) are very illustrative. The last event was caused by the fact that investors became aware of the genuine risks on this market changing their behaviour dramatically. Federal regulators also were sensibly unwilling to add further moral hazard, signalling market participants that the junk bond market might deteriorate financial stability.

The last few years banks in the United States and also in Japan and Great-Britain were very active in improving their balance sheet positions by cost reductions, shortening their balance sheets by securitisation of assets and by strengthening their capital basis. This behaviour also results in reluctance with regard to extending new loans and in sharpen-

⁵⁷ C. Kindleberger, *Manias, Panics and Crashes: A history of financial crises*, New York, 1978.

ing the terms of credit because the banks were experiencing increasing severe losses on the outstanding loans. However the slowing of bank credit expansion is also determined by a more cautious attitude towards borrowing, as firms and households have reacted to the elevated levels of debt accumulated during the eighties. It is quite obvious that this credit or capital crunch coinciding in time with a slowdown in economic activity will not foster real and financial stability. It provokes fears that a credit crunch would be an additional drag on a slowing economy sharpening the recession.⁵⁸

VI. Concluding Remarks

This essay deals with an overview of the theoretical developments about the interactions between financial markets and especially the credit market on the one hand and the course of economic activity on the other hand. Moreover attention is also directed both to the importance of the financial structure of corporations and households and the associated weakening of the balance sheets of financial institutions for economic and financial stability. In the last decade the economic process has been driven very strongly by the drastical changes on financial markets (capital, interest and exchange rate movements). The deregulation and especially the internationalisation of financial markets has created quite a new, highly competitive, financial environment. Therefore analysing issues both in the field of corporate finance and monetary economics starts from the central angle of reflection, the operation of the global financial markets.

It may be concluded that until recently the interaction between the operation of credit markets and macroeconomic performance has not been moved to centre-stage in economic literature. It was Fisher during the Great Depression and authors like Gurley, Shaw, Tobin and Minsky in the postwar period who analysed the meaning of non-bank financial intermediaries, the importance of credit-availability and the consequences of excessive debt-financing for the course of the real economic process. However in macroeconomic models only the development of two key financial variables, namely the money stock and the rate of interest, were still emphasized neglecting the operation of financial markets.

⁵⁸ P. O'Brien and F. Browne, A "credit crunch"? The recent slowdown in bank lending and its implications for monetary policy, OECD, Working Papers, no. 107, 1992 and A. Wojnilower, The central role of credit crunches in recent financial history, Brookings Papers on Economic Activity, 2, 1980.

During the seventies this one-sided approach changed gradually. Based on the economics of information and the new microeconomics in the eighties the importance of the quality of bank loans and the creditworthiness of borrowers became very crucial in analyses to explain phenomena like credit rationing and the increased financial fragility. In this context the agency and adverse selection problems provide additional mechanisms for effects from this fragility on macroeconomic performance.

The modern approach about the interaction between the operation of financial markets and the real economy (Bernanke, Gertler, Stiglitz, Weiss, Greenwald etc.) underlines the role of the credit market for the course of economic activity. Based on asymmetric information and the associated agency problems these authors point out that financial markets are not transmitting mechanically savings to investments. Owing to the existence of asymmetric information between the lender and the borrower quite new problems have been come about. The information problems find expression by the working of adverse selection and moral hazard, resulting in credit rationing and weakening the interest rate as a transmission channel in monetary policy. This means that investment activity may change substantially without alterations in the rate of interest. Other financial variables like the borrowers' reputation or credit-rating and the financial structure of the firm will determine investment behaviour and the business cycle. According to Akerlof's lemon principle, under certain circumstances the operation of financial markets may be deteriorated generating credit rationing and even equity-rationing. It is obvious that in these cases, opposite to the Modigliani-Miller theorem, the financial structure really will influence the entrepreneur's investment decisions. In this context Greenwald and Stiglitz remark, "Not only is the informal notion of the importance of the strength of a firm's financial position validated in these imperfect information models, but they also provide a mechanism for the propagation of macroeconomic disturbances and the persistence of their effects."⁵⁹

The issues of adverse selection and moral hazard also play a role with regard to central bank supervision to protect the depositors who entrust their money to the banks. The insurance of bank deposits aims at a curtailment of a possible panic with depositors which may result in a severe

⁵⁹ B. Greenwald and Stiglitz, *The American Economic review*, May, 1990, op. cit. p. 163. See also J. Stiglitz and B. Greenwald, *Information, Finance and Markets: the architecture of allocative mechanisms*, NBER, Working Paper no. 3652, March, 1991.

classical bank-run.⁶⁰ However the moral hazard-effect and the associated agency problem comes about when the existence of deposit-insurance may stimulate banks to increase their risk-taking. The banking and thrift industries know that in case of non-performing loans the deposit-insurance corporation will always be available as a 'safety-net', giving them incentives to change their behaviour in taking risks. On the other hand this 'safety-net' or helping hand will guard against a rapid bank-run in case of a shock confidence of market participants. Moreover no depositor needs worry about the banks' lending policies. In this context also the adverse selection-effect is at work, encouraging bad borrowers to offer more risky investment projects.

During the last decade both effects connected with deposit-insurance have contributed to a smooth involvement of US-banks in risky activities, weakening the structure of their balance-sheets. In this way the stability of the American financial system has been reduced. Moreover the financial fragility further increased owing to the fact that the insurance-corporations themselves were faced with a lack of resources. Therefore the US-financial system has to be submitted to the market-discipline. Recently Greenspan in an address to the Congress has pointed out very clearly, "With depositors exercising insufficient discipline through the cost of deposits, the incentive of some banks' owners to control risk-taking has been dulled. Profits associated with risk-taking accrue to owners, while losses in excess of bank capital that would otherwise fall on depositors are absorbed by the FDIC"⁶¹ The Fed-chairman advocates a differentiation of insurance-premiums both to influence banks' behaviour with regard to risk-taking activities and to avoid the associated moral hazard problem. In this context he remarks, "A promising approach that seeks to simulate market discipline with minimal stability implications is the application of risk-based deposit insurance premiums. The idea is to make the price of insurance a function of the bank's risk, reducing the subsidy to risk-taking and spreading the cost of insurance more fairly across depository institutions".⁶² This idea could be implemented for example by limiting the amount of deposit insurance (now \$ 100 000) or by linking the premium to the potential credit-risk. It is also possible to make a distinction between insured and uninsured

⁶⁰ In this context mention can be made of the Federal Deposit Insurance Corporation (F.D.I.C.) and the Federal Savings and Loan Insurance Corporations (F.S.L.I.C.) in the United States.

⁶¹ A. Greenspan, Statements to the Congress, Federal Reserve Bulletin, September, 1990, p. 731.

⁶² A. Greenspan, Federal Reserve Bulletin, September 1990, op. cit. p. 733.

deposits with a risk-adjusted deposit-rate. Then the depositor can choose where to place his deposit and the deposit-rate will reflect the risk he is willing to take. In this way the central bank may be able to realize a balance between stability and efficiency of the financial system and to contribute to a strengthening of the solidity and credibility of the system as a prerequisite for stability in the real economy.

Some years ago the Bank for International Settlements (BIS) took the initiative to stimulate central banks to consult and cooperate internationally also aiming at a sharpening of the control of banking institutions to safeguard the stability of the financial system.⁶³ In 1988 The Committee on Banking Regulations and Supervisory Practices (Cooke Committee) has designed internationally comparable risk-based capital-adequacy ratios (8%) for the banks to be introduced in 1993. In the near future it will appear whether the supervisors will succeed in controlling the consequences of the revolution on financial markets in the eighties by a coordinated design of a new adequate framework of supervision aimed at a stronger banking industry in an era of more freedom. In this context of the overall tendency to make greater room for market discipline alongside official prudential supervision the BIS concludes. "Above all, reducing incentives to excessive risk-taking will depend on the credibility of the authorities' commitment to limiting intervention to the necessary minimum in the event of turmoil. In much the same way as the monetary authorities' anti-inflation commitment, it needs to be demonstrated in consistent action."⁶⁴ The robustness of the financial system can be maintained by stable government policies and an institutional environment that encourages sufficient diversification of risks, reducing the risk of future economic and financial crises.

Appendix

Equilibrium Credit Rationing

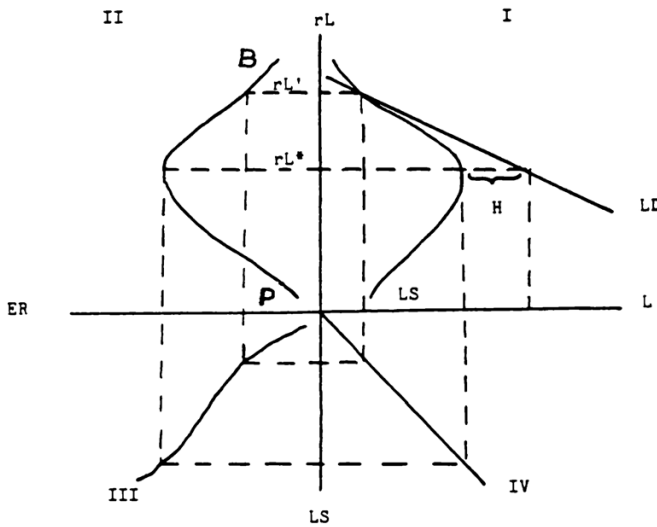
The diagram below shows how credit rationing can be consistent in theory with a market equilibrium because of market imperfections. As described in section 4 the quality uncertainty of loans arising from asymmetry in information between lenders and borrowers gives rise to two

⁶³ See in this context A. Lamfalussy, *The restructuring of the financial industry: a central banking perspective*, SUERF Papers on Monetary policy and financial systems, no. 12, Tilburg, 1992.

⁶⁴ BIS-Annual Report, 1991, p. 212.

problems, namely moral hazard (adverse incentives) and adverse selection.⁶⁵

Essentially there are four quadrants to this diagram showing a theoretical set of relationships between the loan rate (r_L), charged to the lenders, and the expected return to an individual bank (ER) on the one hand and the demand for and supply of loans (L_D , L_S respectively) on the other hand.



The demand for loans, which is negatively related to the loan rate, is depicted in quadrant I. Quadrant II shows the relationship between the loan rate and the expected return on loans or the profitability of bank lending (PB), implied by the Stiglitz-Weiss asymmetric information analysis. As the loan rate increases the line PB initially rises showing that the expected return to the bank increases. After the loan rate (r_L^*) is reached, however, the PB-line begins to fall back again. This is because a further rise in the loan tends to crowd out some risk averse “good” borrowers (adverse selection) and to encourage other borrowers to undertake high yielding but risky investments (moral hazard). So although each loan that is repaid earns the bank a higher return, the number of bad loans rises sharply. As a result, the expected return to the bank actually falls as the loan rate rises after the level (r_L^*).

⁶⁵ See *M. Driscoll*, OECD, Working Papers, February, 1990, op. cit. p. 34.

Quadrant III describes the normal positive relationship between the expected return on loans and the supply of loans (L_s). The 45-degree line in quadrant IV allows to derive the backward bending loan supply schedule to be constructed in quadrant I. The diagram shows that for the loan rate (r_L^*) and the associated expected return to the bank (ER), there is a credit rationing equilibrium with an excess demand for loans (H). As can be seen the Walrasian equilibrium ($L_S = L_D$) is at a loan rate (r_L'). But this is not an equilibrium for banks would be operating below peak expected returns and could maximise profits by cutting the loan rate back to (r_L^*). As long as $H > 0$, the volume of loans will be determined by the lender and the borrowers will be rationed.

Zusammenfassung

Die Kreditmärkte, die Fragilität des Finanzsystems und das gesamtwirtschaftliche Ergebnis

Ziel dieses Beitrags ist es, die derzeit in der modernen Literatur auftauchenden Fragen bezüglich der Auswirkungen von Kreditmarkt Vorgängen sowie der Fragilität des Finanzsystems auf das gesamtwirtschaftliche Ergebnis einer Überprüfung zu unterziehen. Diese neue Literatur stellt stark auf Wirtschaftlichkeitsaspekte von Informationen und auf Anreize für explizit motivierte Friktionen auf den Kapitalmärkten ab. Wenn man mit den traditionellen Ansichten über die Wechselbeziehungen zwischen der Finanzstruktur von Unternehmen und der privaten Haushalte mit dem Konjunkturzyklus beginnt (Schuldendeflationierungsspirale nach Fisher und finanzielle Instabilitäts-Hypothese nach Minsky), schenkt man den asymmetrischen Informationen besondere Aufmerksamkeit, die wegen der nicht vorhandenen Perfektion der Kreditmärkte bestehen. Wegen eben dieser Existenz asymmetrischer Informationen auf diesen Märkten und der damit verbundenen Probleme geben Fragen bezüglich ungünstiger Auswahl und moralischer Bedenklichkeit Anlaß zu Phänomenen der Gleichgewichtskreditrationierung und wertpapiermäßigen Unterlegung von Verbindlichkeiten (Greenwald-Stiglitz und Bernanke-Gertler), wodurch der Zinssatz als Transmissionsriemen der Geldpolitik geschwächt wird. Schließlich werden die von einer qualitativen Verschlechterung der Bilanzen des Nichtbankensektors und von einlagennehmenden Instituten auf das gesamtwirtschaftliche Ergebnis und die Stabilität gekennzeichneten Auswirkungen der höheren Fragilität des Finanzsystems in den 80er Jahren untersucht. Es schließen sich einige Anmerkungen zur Aufgabe der Zentralbanken hinsichtlich der Wahrung der Stabilität und der Integrität des gesamten Finanzsystems an.

Summary

Credit Markets, Financial Fragility, and the Real Economy

The purpose of this paper is to give a review of the current issues in modern literature about the impact both of credit markets and financial fragility on macroeconomic performance. This new literature borrows heavily from the economics of information and incentives to explicitly motivate frictions in capital markets. Starting with the traditional views about the interrelationship between the financial structure of corporations and households and the business-cycle (Fisher's debt-deflation spiral and Minsky's financial instability-hypothesis), special attention is given to the asymmetric information-approach with regard to imperfections on credit markets. Owing to the existence of asymmetric information on these markets and the associated agency problems, the issues of adverse selection and moral hazard give rise to the phenomena of equilibrium-credit rationing and securitisation, (Greenwald-Stiglitz and Bernanke-Gertler) weakening the rate of interest as a transmission channel in monetary policy. Finally the impact of the increased financial fragility in the eighties, characterized by a deterioration of the quality of the balance sheets of the non-financial sector and depository institutions, on macroeconomic performance and stability is analyzed. Some remarks are made on the task of central banks to safeguard the stability and soundness of the whole financial system.

Résumé

Marchés du Cr dit, Fragilit  Financiere et l'Economie R elle

Le but de cet article est de pr senter un examen critique des analyses faites dans la litt rature moderne de l'impact des march s financiers ainsi que de la fragilit  financiere sur les r sultats macro conomiques. La nouvelle litt rature emprunte fortement aux  conomies de l'information et des stimulants pour expliquer les tensions sur les march s des capitaux. En prenant comme point de d part les vues traditionnelles sur l'interd pendance entre la structure financiere des entreprises et des m nages et le cycle des affaires (la spirale d flation dette de Fisher et l'hypoth se de l'instabilit  financiere de Minsky), on accorde une attention particuli re   l'approche assym trique de l'information concernant les imperfections des march s financiers. Par suite de l'existence d'informations assym triques sur ces march s et des probl mes d riv s des agents, les r sultats de la s lection d favorable et du risque moral font surgir les ph nom nes du rationnement du cr dit d' quilibre et de titrisation (Greenwald-Stiglitz et Bernanke-Gertler), affaiblissant le taux d'int r t comme canal de transmission dans la politique mon taire. Finalement, l'auteur de cet article analyse l'impact de la fragilit  financiere accrue dans les ann es 80, caract ris e par une d t rioration de la qualit  des bilans du secteur non financier et des institutions de d p ts sur les r sultats et la stabilit  macro conomiques. Quelques remarques sont faites sur la t che des banques centrales en vue de sauvegarder la stabilit  et la solidit  de tout le syst me financier.