Financial fragility

Chapter 8
Summary and Conclusion

8.1 Summary

In the introductory chapter 1 we note that recent events of financial disorder (international debt crisis, junk bond crisis, stock market crashes, bank failures) have caused renewed interest in the subject of financial *fragility*. Davis (1992) defines financial fragility as a state of balance sheets offering heightened *vulnerability* to default in a wide variety of circumstances. A fragile financial system is more vulnerable to future outbreaks of financial disorder.

During the 1980s and beginning of the 1990s, among others, the U.S., Norway, Sweden, Finland, Japan, France, Italy, and the United Kingdom were confronted with substantial problems at large banks.

The aim of this thesis is to analyze the recent banking problems from a theoretical (chapter 2), empirical (chapters 3, 4, 5, and 7) and institutional-regulatory (chapter 6) point of view. The empirical chapters 3, 4, and 7 focus on the U.S., while chapter 5 deals with Norway, Sweden, and Finland.

Chapter 2 discusses the various theories of financial fragility and disorder. We first present theories of financial fragility characterized by a full understanding of risk, i.e. uncertainty can be reduced to the 'correct and objective' probability distribution. These theories, being the rational expectations and efficient markets literature and the literature on rational bubbles and runs, contain a postive view on periods of financial disorder. Basically, these periods of financial disruption are not causing serious damage to financial markets and the economy since agents are fully risk aware. In this context such periods are non-events. The chapter continues by discussing other theories of financial fragility, comprised of the literature on unanticipated credit rationing, irrational bubbles and euphoria, and asymmetric information. The common element of these theories is that they all analyze a financial system characterized by an incomplete understanding of risk, thereby leaving room for uncertainty. However, they differ from each other in the way they model uncertainty. The irrational bubbles and euphoria literature is extreme in the sense that uncertainty is completely untractable and invincible. The other theories take positions somewhere in between

the *polar cases of uncertainty and risk.*

The central argument of chapter 2 is that globalization of financial markets, financial innovation and financial deregulation can work out in three ways:

* Imperfectly competitive or oligopolistic financial markets are opened to the forces of national and international competition and are becoming more operationally efficient, thereby generating welfare gains.

* The innovation process may increase debt ratios and volatility in asset prices and as a result financial fragility in the sense of vulnerability of the financial system to future outbreaks of financial disorder. If, however, the risks involved are known and correctly priced by market participants, then these periods of financial disorder are unlucky, but calculated events. Increased financial fragility may lead to more frequent periods of financial disorder without causing serious damage to the functioning of financial markets and the economy.

* If increased financial innovation and financial fragility go together with a lack of understanding of the risks involved, then underpricing and lack of risk awareness by financial agents will aggravate the consequences of a period of financial disorder: not fully calculated events may trigger shifts in confidence, affecting markets more than appears warranted by their significance and leading to a financial crisis.

Taking into account the remarks made above, the financial fragility debate boils down to the debate on risk and uncertainty. Based upon their subjective perception of the applicability of risk, uncertainty, or something in between, academics, regulators, and practitioners will come to different conclusions with respect to the functioning of financial markets and the desirability of regulation.

Chapter 3 deals with extreme value theory and market assessments of the *riskiness* of banks in the U.S. Since the 1970s the U.S. banking system has experienced major changes in terms of new financial products, deregulation, increasing competition, lower margins and changing risk attitudes.

In the literature a consensus exists that distributions of asset returns are fat-tailed. We use a non-parametric tail index estimator based on extreme value theory to shed light on the empirical distributions of stock returns for the twenty largest U.S. bank holding companies between January 1973 and December

1993. Since the tail index is a good indicator of thickness of the tails, it provides an accurate measure of the degree of riskiness of the underlying bank stocks. Based on this criterion, we find that the riskiness of seven of the twenty bank holding companies has increased significantly after the start of deregulation in 1980. Moreover, for fourteen out of twenty bank holding companies we find large increases in the probabilities that the stock prices of these banks experience a one-week return of 20% or 30% (both positive and negative).

The 1980s witnessed the greatest crisis in U.S. commercial banking since the Great Depression. Boyd and Gertler (1994) show that banks with the largest total assets contributed in a significantly disproportionate way to aggregate loan losses. The intuition is that, while deregulation and financial innovation led to increased *overall* competition for the banking industry, the existing regulatory environment tended to subsidize risk taking by *large* banks more than that by small banks (too-big-to-fail policy). The study by Boyd and Gertler corresponds with our empirical findings of increased riskiness of several of the twenty largest U.S. bank holding companies.

In chapter 4, extending the analysis of Wolfson (1990), we present an empirical analysis of indicators of financial fragility in the U.S. banking sector (commercial banks and S&Ls). For the *commercial banking* sector our main conclusion is that the increased variability in the assets of failed banks as a percentage of total bank assets can be explained for a substantial part by the increase of the net bank losses as a percentage of average bank loans. It is this deterioration in the loan performance of the commercial banking sector (third world loans, junk bonds, real estate loans) that led to the largest U.S. bank failures since the banking crisis of 1929-1933. This could suggest that banks' risk awareness and risk pricing were not taking account of the increased riskiness of U.S. commercial banking. Evidence of this increased riskiness was presented in chapter 3.

For the *S&L* sector we can conclude that the main factors accounting for the 'instability' in the S&L sector are the decrease in the S&L interest margin and, in particular, the decrease of the home mortgages share in total financial S&L assets. The last variable indicates riskier investment policies of S&Ls. Starting at the beginning of the 1980s when a lot of S&Ls found themselves locked into negative interest margins (low fixed rates on the assets side and high floating rates on the liabilities side because of a restrictive monetary policy), they decided to take a bet on the deposit insurance system in order to try to save their heads. This was done by investing in riskier products like options, futures and

junk bonds. Deregulation enabled S&Ls to do this. Especially in the second half of the 1980s the effects of the risk taking became visible in the form of S&L insolvencies and failures.

Chapter 5 contains an empirical analysis of the Scandinavian banking crisis at the end of the 1980s and the beginning of the 1990s. In this chapter we present maximum likelihood estimates for pooled banking data of Norway, Sweden and Finland during the period 1980-1992. Our empirical analysis shows strong evidence that *mounting credit losses* played a significant role in the banking crises of Norway, Sweden and Finland. At the same time we observe that the bank failures and insolvencies were not caused by a significant deterioration of net interest margins. A logical interpretation could be that banks have not been able to charge adequate risk premia in order to be compensated for the higher lending risks after deregulation had taken effect. This resulted in built-up capital reserves being too small in order to be able to bear the credit losses and, consequently, in massive bank failures and insolvencies.

The focus of chapter 6 is upon the international dimension to regulation in two areas (banking and securities business) which, while they have common considerations, also raise different issues. The focus is upon two issues in internationally co-operative regulatory strategies: *systemic stability* and *competitive neutrality*. Two central themes emerge. Firstly, while in some areas there is a potential case for international co-ordination to increase the effectiveness of regulation for systemic stability reasons, issues of competitive neutrality might be dominant and, at times, in conflict with the requirements of prudential regulation for systemic stability.

Secondly, specific examples of international co-ordination (the examples chosen are the 1988 Basle Capital Convergence Arrangements with respect to banking and the 1993 European Union's Capital Adequacy Directive with respect to securities business) demonstrate that the approaches adopted may be inefficient in two respects: they do not achieve their systemic stability or competitive neutrality objectives, and the two objectives may be in conflict with the resultant compromise, being sub-optimum for both.

Chapter 7 presents an empirical analysis of the interest rate sensitivity of U.S. bank stock returns. The contribution of this chapter to the literature is twofold.

First, using weekly data for the period 1974-1993 and using the forecast errors of autoregressive integrated moving average (ARIMA) processes in order

to model the unexpected interest rate, we provide empirical evidence on the interest rate sensitivity of the stock returns of the twenty largest U.S. bank holding companies. As in most previous studies, we do not find statistically significant interest rate sensitivity during the 1970s and strong evidence of negative interest rate sensitivity during the 1980s. However, the statistically significant relation disappears completely during the second half of the 1980s. This result is qualitatively independent of using the three-month Treasury bill rate or the rate on ten-year Treasury bonds as input for the ARIMA modelling of the unexpected interest rate variable. Interestingly, our result indicates that, contrary to the existing literature which only covers the period until the mid-1980s, the interest rate sensitivity of bank stock returns varies with the sub-period considered. The only other paper incorporating recent data is Robinson (1995). Robinson employed quarterly data in contrast to the weekly data in our analysis. His results are quite mixed in the sense that the sign of the interest rate sensitivity appears to depend on the choice of the interest rate variable in his time series models.

The second contribution of this chapter is to use *survey data* in order to model the unexpected interest rate variable. This is an alternative approach compared to the existing literature. In this chapter we use weekly survey data on the U.S. federal funds rate for the period April 29, 1980 until December 22, 1993. The survey was conducted by Money Market Services (MMS) International (part of Standard & Poor's) in Belmont, California. The weekly surveys generate a market expectation for the federal funds rate for a certain survey period which is then confronted with the realized value of the federal funds rate during the same survey period. This enables us to calculate an unexpected change in the federal funds rate for the relevant survey period which is then used for estimating the interest rate sensitivity. We find a statistically significant negative interest rate sensitity for the period April 1980 through May 1985. Since then, the statistically significant relation between unexpected federal fund rate changes and bank stock returns has broken down. This result is consistent with our previous findings where we used the forecast errors of ARIMA processes related to the three-month Treasury bill rate and the ten-year Treasury bond rate as a proxy for unanticipated interest rate movements. Also in the latter case we found a breakdown of the interest rate sensitivities during the second half of the 1980s.

In our interpretation we believe that the breakdown of interest rate sensitivity of U.S. bank stock returns should be viewed as a process which developed gradually and became significantly visible during the second half of the 1980s.

The increase of interest rates due to the October 1979 event caused many insolvencies of savings and loan (S&L) associations. These S&Ls found themselves locked into negative interest margins (low fixed rates on the assets side and high floating rates on the liabilities side). The S&L crisis led to an increase of interest rate risk awareness on the part of bankers and regulators. A gradual process of an increasing professionalization of interest rate risk management by banks started. Moreover, hedging of interest rate risk became easier and cheaper because of the explosive growth of derivatives markets trading interest rate futures and options. All this led to a situation in which banks started to control the amount of interest rate risk they were willing to accept and to reduce their sensitivity to *unexpected* interest rate movements.

8.2 Conclusion

Apart from the country-specific conditions, the banking crises studied in this thesis also contain a *structural* component which played an important role in all banking crises. This component relates to the fact that deregulation and increased competition structurally change the market environment in which banks operate. Before deregulation had come into effect, regulation acted as a protection to banks. The key elements to the underlying banking structure were: low degrees of competition, the existence of restrictive practices, cartels and anti-competitive mechanisms, high entry barriers into banking, and limited growth of bank assets and size of balance sheets. Restrictive regulation almost invariably creates economic rents which have the effect of enhancing the value of the banking franchise. It is also the case that non-price competition created a degree of excess capacity that would not be sustainable in a more competitive market environment. Overall, therefore, the impact of the regulatory environment was to create excess capacity, monopolistic profits and economic rents in the banking industry.

The immediate impact of deregulation is likely to be an initial stock adjustment response by banks towards new steady state sustainable balance sheet positions. Financial institutions have a desired portfolio structure for a given set of market and regulatory conditions, and if any of these conditions change, the desired portfolio changes and stock adjustments are made to achieve them. While the new portfolio equilibrium is being achieved through a finite once-for-all stock adjustment, the volume of credit is substantially increased. The IMF (1993a) argues: "The increase in borrowing was broadly based, suggesting that

the debt accumulation reflected a backlog of unsatisfied demand for credit unleashed after financial liberalization". During such a transitional period of adjustment from a credit-constrained to a credit-liberalized market regime economic agents have to learn the new structural equilibrium relations. As long as learning is still taking place expectations errors need not satisfy any of the optimality properties usually assumed in the rational expectations literature (Pesaran 1987). This implies that in such a transitional phase of learning systematic estimations errors by bankers can be made resulting in inadequate risk premia, huge credit losses and substantial bank failures and insolvencies.

The movement from the regulated to the deregulated regime does not necessarily imply that, once the deregulated and new competitive steady-state equilibrium has been reached, the errors will be repeated. What remains to be determined in each of the case study countries is whether the precarious position of banks is transitory in nature (associated with the once-for-all shock of deregulation and increased competition) and whether, once the impact of stock adjustment effects has been unwound, banks will learn from past mistakes. What can safely be concluded from the experience in the countries studied in this thesis, is that big shocks to banking systems (such as sharp changes in regulation) can easily produce severe reactions. However, it cannot be concluded that the aftermath of such shocks indicates the characteristics of the new deregulated environment itself once the adjustment has been made and the lessons learned.

Nevertheless, the deregulated banking environment may have made banking potentially more fragile. The erosion of the economic rents induced by previous regulation is likely to have made banking a more vulnerable industry than in the past.