Lecture 6: Risk control in banking

Particularly given the focus placed by the New Basel Accord (Lecture 8) on internal control mechanisms as a form of discipline for banks, as well as the hard lessons that history teaches about the consequences of its failure, it is essential to discuss the overall nature of risk control in banks. This is the subject matter of the current lecture, which focuses successively on day-to-day, longer term and crisis considerations. Note that some of the material also reviews earlier discussion (e.g. on credit risk control)

Opportunities and risks

Further recent financial crises as examples of failure to recognise credit, liquidity, interest rate or market risk

Drexels and junk bonds

Rapid growth of junk bond market in late 1980s
Reliance on one institution as market maker
Possible underpricing of risk (rely on liquidity and diversification for protection)
Liquidity was vulnerable to adverse developments (Campeau,
thrift reform, Drexel)
Issuance collapsed in the wake of this

Risks – credit, market, liquidity and market liquidity risk

Japanese banking crisis

Long term excellent performance of Japanese economy
Strong credit expansion in 1980s, backed by strong household saving directed to banks directly or indirectly
Loans directed largely to real estate, since large companies no longer required bank finance (internal finance and securities markets)
Further impetus from cut in interest rates in wake of Louvre Accord
Banks found it hard to adjust to low growth rates since early 1970s, moral hazard from safety net and herding (management risk reduced if emulate competition)
Tightening of monetary policy in 1989 as asset price inflation spread to real economy, followed by quantitative restrictions on real estate financing

Sharp falls in equity prices and real estate prices
Sharp rise in non performing loans and fall in capital ratios
Authorities took very long time to react – still not fully resolved
Failures also of investment banks and insurance companies
Sluggish economic development in the wake of this
- credit constraints
- fiscal crisis
- persistent high household consumption
- bankrupt firms kept operating

Need for risk management

Credit, liquidity, interest rate or market risk are either inherent in banking or offer attractive profit opportunities

Until 1970s, adequate capital, low volatility, fixed exchange rates, stable interest rates, capital controls, oligopolistic banking markets

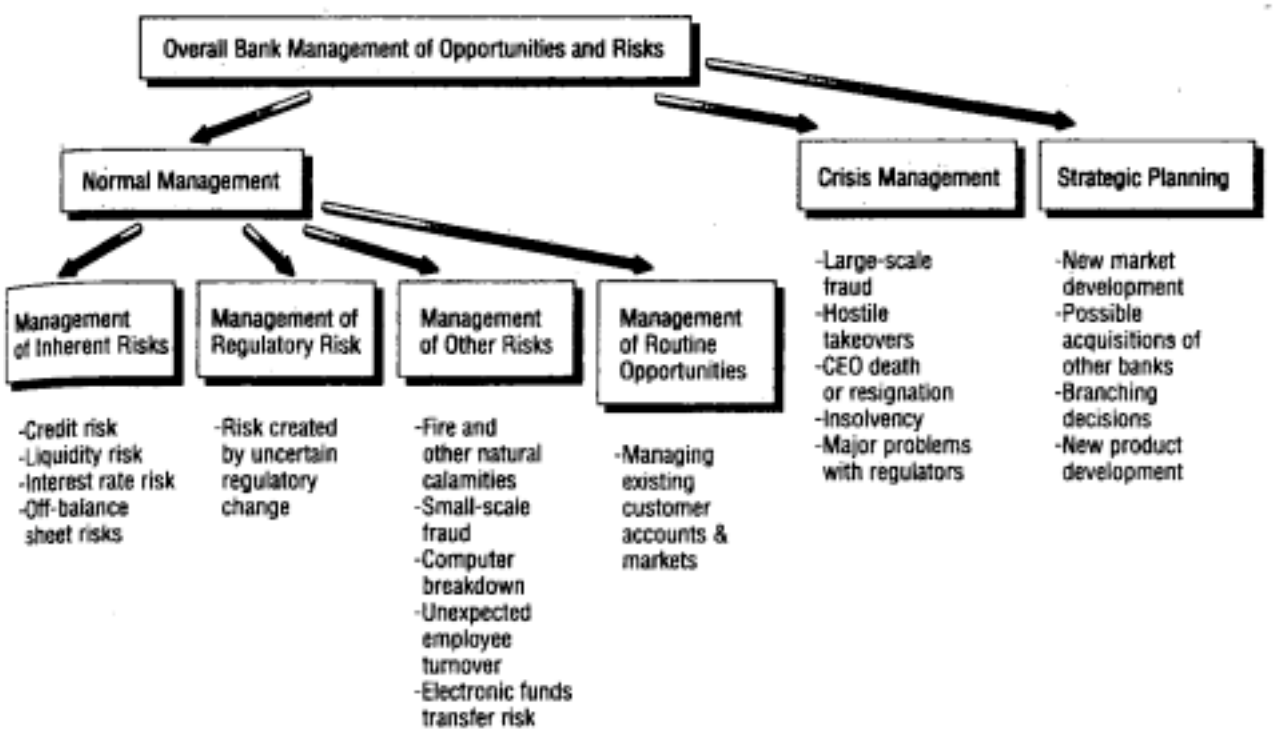
Increased complexity of risks since 1970s due to:

- competition and deregulation
- asset price volatility
- hedging scope
- safety net and moral hazard (lower charter values)
- regulation risks
  - erratic change,
  - general initiatives not suited to individual institutions

- perverse incentives
- limiting innovation

- Business risks increased (fraud, professional liability etc.)

Management of risks and opportunities



Day to day risk management

Managing credit risk

Banks in most countries still get bulk of income from this source

Key aspects from risk control perspective:

underwriting and loan origination – credit analysis and written policy statement (see over)
funding and servicing – documentation must be sound
risk processing - monitoring and diversification (difficulties of specialisation and sequential decisions)
credit culture - avoiding herding and sticking to rules

Contents of a typical policy statement

- The aggregate amount of loans the bank should make.
- The geographical areas from which loan business should be solicited.
- Limits on maximum loan sizes to various types of borrower.
- The bank's diversification objectives.
- The maximum acceptable loan maturities.
- Criteria for collateral requirements.
- Standards of credit analysis and legal documentation.
- The appropriate relationship between credit risk and the price of the loan.
- The lines of authority and responsibility in the management of credit risk, that is, the relationship between the size of the loan and the level at which it can be approved.

Liquidity risk and liability management

Definition of liability management: ensuring maintenance of continuity and cost effectiveness of funding assets. 3 issues:

(1) Diversification to reduce liquidity risk - CDs, eurodollars, repos, securitisation, subordinated debt as well as interbank, time and demand deposits

(2) Liability mix - choice of:
- traditional deposits (“products”) incorporating services and with payoff insensitive to fortunes of intermediary, for small users
- and risk-sensitive investment instruments, for large users
where choice determines degree of monitoring

(3) Maturity structure - duration mismatching affects the degree of interest rate risk, but may also reduce flexibility to react to new information

coping with routine needs and cash crunches
use of models/excess liquidity
costs of accessing discount window

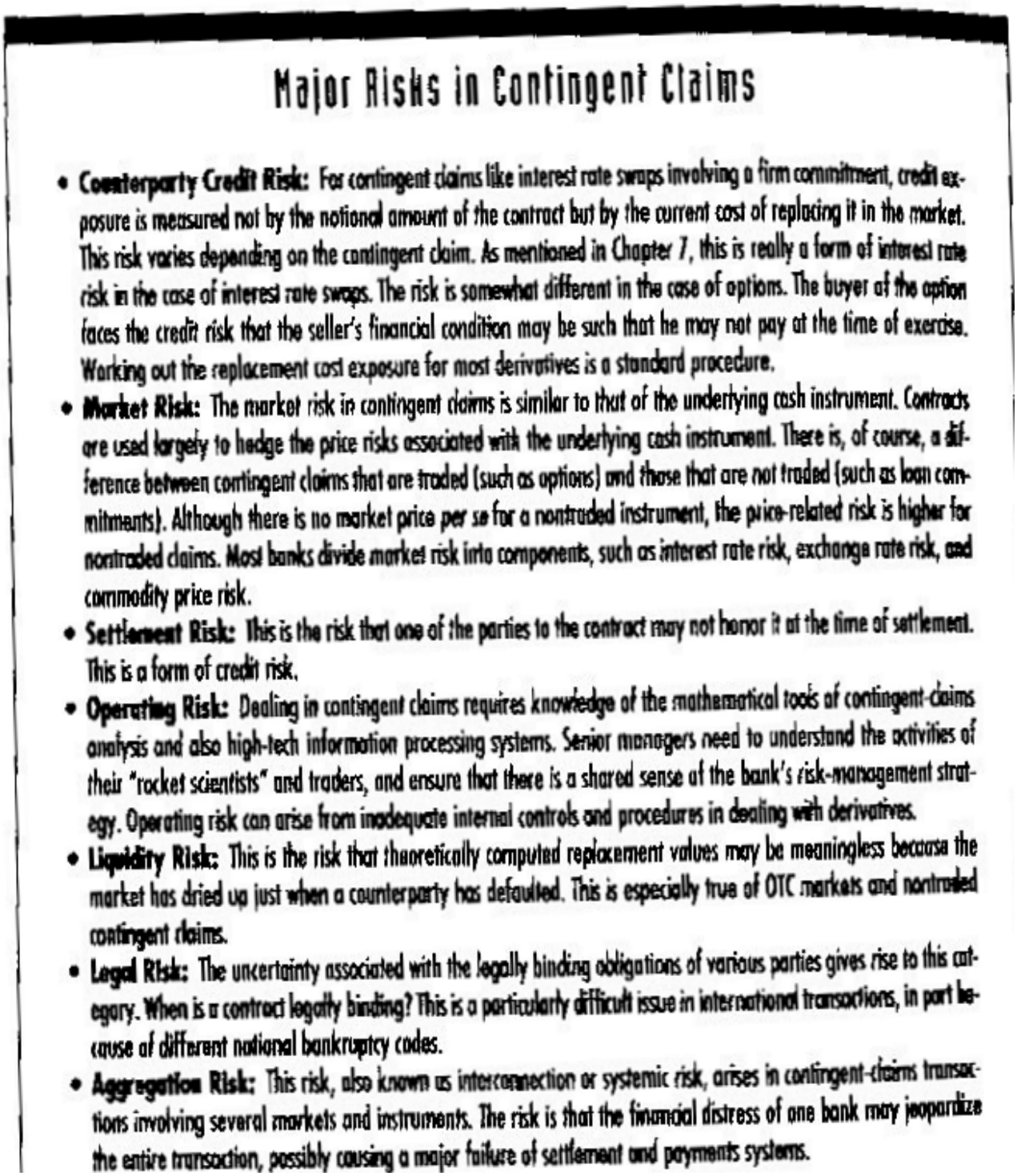
Managing interest rate risk

Balance potential gain against risk of loss
measurement procedures essential
use of interest rate swaps, futures and securitisation

OBS risks

Values of contingent claims (Black Scholes)

Credit risk, interest rate risk, future liabilities (see below)



Major Risks in Contingent Claims

- **Counterparty Credit Risk:** For contingent claims like interest rate swaps involving a firm commitment, credit exposure is measured not by the notional amount of the contract but by the current cost of replacing it in the market. This risk varies depending on the contingent claim. As mentioned in Chapter 7, this is really a form of interest rate risk in the case of interest rate swaps. The risk is somewhat different in the case of options. The buyer of the option faces the credit risk that the seller's financial condition may be such that he may not pay at the time of exercise. Working out the replacement cost exposure for most derivatives is a standard procedure.
- **Market Risk:** The market risk in contingent claims is similar to that of the underlying cash instrument. Contracts are used largely to hedge the price risks associated with the underlying cash instrument. There is, of course, a difference between contingent claims that are traded (such as options) and those that are not traded (such as loan commitments). Although there is no market price per se for a nontraded instrument, the price-related risk is higher for nontraded claims. Most banks divide market risk into components, such as interest rate risk, exchange rate risk, and commodity price risk.
- **Settlement Risk:** This is the risk that one of the parties to the contract may not honor it at the time of settlement. This is a form of credit risk.
- **Operating Risk:** Dealing in contingent claims requires knowledge of the mathematical tools of contingent-claims analysis and also high-tech information processing systems. Senior managers need to understand the activities of their "rocket scientists" and traders, and ensure that there is a shared sense of the bank's risk-management strategy. Operating risk can arise from inadequate internal controls and procedures in dealing with derivatives.
- **Liquidity Risk:** This is the risk that theoretically computed replacement values may be meaningless because the market has dried up just when a counterparty has defaulted. This is especially true of OTC markets and nontraded contingent claims.
- **Legal Risk:** The uncertainty associated with the legally binding obligations of various parties gives rise to this category. When is a contract legally binding? This is a particularly difficult issue in international transactions, in part because of different national bankruptcy codes.
- **Aggregation Risk:** This risk, also known as interconnection or systemic risk, arises in contingent-claims transactions involving several markets and instruments. The risk is that the financial distress of one bank may jeopardize the entire transaction, possibly causing a major failure of settlement and payments systems.

Managing market risk

VAR models

Cover whole institution

Value at risk is the total value of a potential loss in market value that the bank stands to lose from holding a market position

VaR models seek to aggregate risks for the entire institution, comprising trading risks (day to day) and investment risks (longer term)

$VaR_x = V_x * dV/dP * \Delta P_i$

(VaRx is the market value of position x, dV/dP its sensitivity to price moves per $ market value and ΔPi is the adverse price movement over time)

Assumptions are needed on distribution of price changes (e.g. normal), serial correlation, stability of volatility and covariances (usually based on past averages)
Example, JP Morgan – random walk, normal, no serial correlation, standard deviations stable, interrelation of two price movements “joint normal”

For derivatives, market risk calculated with portfolio approach, looking at net position after offsetting exposures. Underlying risk factors (e.g. convexity risk, basis risk, volatility risk) need to be separately considered and aggregated in constructing VaR

Can be extended to credit risk, e.g. by assuming default probability of firms is related to the leverage and volatility of a firm’s equity value

Problems – “fat tails” mean gives little information on unlikely events such as 1987 crash – 20 standard deviations.

Even for “normal” use, assumptions may not be correct and future may not resemble past (e.g. in terms of correlations)

And as in Russia/LTCM, VARs may generate adverse market dynamics

Assume risk exogenous when endogenous to collective behaviour

Stress tests

Essential complement to VaRs which only show losses from normal activity.

Stress tests involve identification of consequences for portfolios of possible "worst cases" (using historical shocks, hypothetical changes or Monte Carlo tests – assessing a number of combinations)

Examples: policy regime shifts, deposit runs, collapses in market liquidity, counterparty failures, unprecedented shifts in interest rates, yield curve, exchange rates, equity or commodity prices

Essential to begin by calibrating exposure to relevant risk, which may be

indirect (via borrowers and other counterparties). E.g. interest rate risk: Use of duration gap analysis for assets, liabilities and thus on equity – possibly also allowing for convexity, or if duration not available simple maturity gap

Issue: should stress tests be standardised across banks with different portfolios?

Inability to do a stress test may show accounting and institutional inadequacies.

Nature and control of regulatory risks

risk of change (cost of adapting, retraining etc.)
link to types of regulation (discretionary and non discretionary regulation)
costs of failing routine CAMEL (capital, assets, management, earnings, liquidity) tests – hence need to monitor own performance to avoid this

Controlling risks in payments and settlements

“Greatest risk”? Given risks of:
counterparty credit (failure of covering funds to arrive),
liquidity (settlement delayed due to temporary unavailability of funds),
systemic failure (contagion) and
operational risks (e.g. computer failure)

need for risk control e.g. via membership standards, caps, collateral, pricing of overdrafts, loss sharing, netting RTGS and DVP

Controlling risk of fraud

Second only to credit risk as a cause of bank failure. Incentives increase when bank in financial distress. Solutions:

- external as well as internal auditing, examinations, legal division checks

Controlling reputation risk

Mis-selling scandals (e.g. pensions) can lead to major losses in customer loyalty as well as fines from regulator. Need for vigilance on the part of management about products and staff incentives in selling them.

Controlling operational risk

Risk of computer failure can be overcome by appropriate backup arrangements, as worked in US on 9-11.

Managing routine opportunities

Easy to neglect existing customers when managing risk and coping with change – but they are assets to bank whose value increases with time

- -strategic pricing
- -nurturing relationships

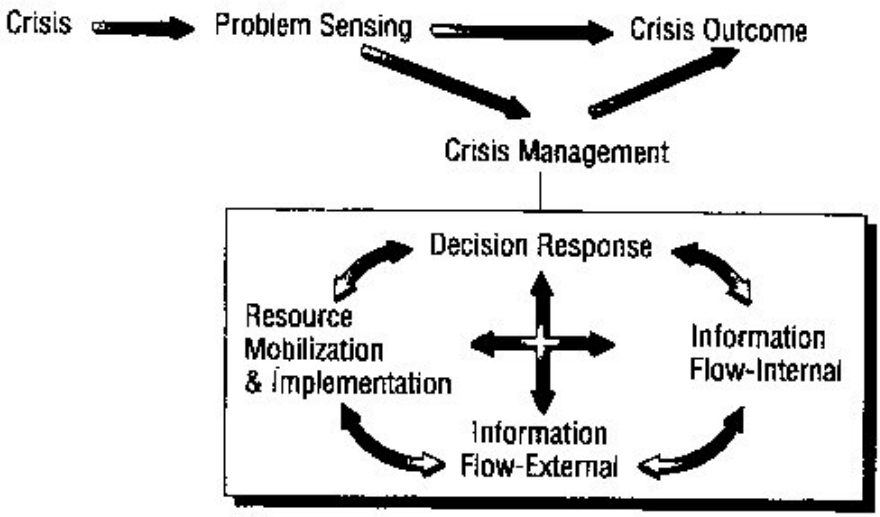
Crisis management

Typical crises – bad loans, fraud, takeovers, executive succession, problems with regulators, reputation

Bank's long term strategic orientation helps positively to cope, while organisation complexity is hindrance

Nonsequential interactive process of crisis management (diagram)

FIGURE 12.8 **The Process of Crisis**



Source: Mitroff, Shrivastava, and Udwadia (1987).

Strategic planning

Successful banks tend to do well in the following areas:

Innovation – to ensure profitability –
need for stream of innovations,
risk management over long term,
human resources, especially managerial talent
marketing, to specific customer base
managing acquisitions (organisational compatibility, management succession),
planning especially of resources
organisational design (mix of central and local)
cost accounting (unbundling services to avoid cross subsidisation)
incentives (quantity of loans or quality?)

A critique - the credit rationing theory of financial crises

In run up to a financial crisis, credit rationing is excessively eased, while during crisis it is overtightened in response

In response to uncertain events (where probabilities hard to assign) subjective views of risk depart from objective in period of calm

Risk management goes awry. No market mechanism ensures risks of crisis (as opposed to cycle) correctly priced; capital ratios decline and interest rat spreads shrink

Causes (i) competition from imprudent creditors (ii) psychologically-induced errors by management (iii) institutional factors (iv) disaster myopia among regulators

Pattern of disaster myopia traceable in many different crises