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**BANK CAPITAL: DEFINITION, ADEQUACY  
AND ISSUE ANNOUNCEMENT EFFECTS**

**VOLUME 1**

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## DECLARATION

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## ABSTRACT

This dissertation focuses primarily on potential explanations for bank common stock abnormal returns, and their patterns, coincident with the announcement of bank capital issues. Potential influences considered include increased regulatory pressure, conflicting regulatory and market views of bank capital adequacy and the relative predictability of security type. Where possible, the dissertation is set in both UK and US contexts.

The dissertation has four principal research components;

(1) a review of historical and contemporary bank capital regulation in the UK and US. Historical analysis indicates that the definition of capital, as determined by its functional properties, is dynamic and qualifies the consistency of its measurement over time. The regulatory control of absolute levels of capital is seen to have influence on bank structural development, costs and risk. The regulatory control of relative bank capital (ie in terms of balance sheet structure) is found to have a long and controversial history in the US and is effective progenitor of the current methodology of bank capital measurement and assessment, such as the Basle Agreement, and contains a number of potentially costly deficiencies.

(2) an examination of bank capital issue announcement effects in the UK. Following similar work in the US (eg Keeley 1989) negative abnormal return effects are found associated with the announcements of UK ordinary share issues. Also, evidence hints that an imposed increase in regulatory capital pressure (viz the introduction of a minimum capital ratio regime) causes a reduction in issue announcement effects for ordinary share issues.

(3) assessment of the capital adequacy of UK and US banks from a market perspective and in terms of a number definitions of capital; namely equity, regulatory primary capital (US), and the 1992 Basle Agreement capital. Conflict between market and regulatory views of capital adequacy are observed in certain years for primary capital. In terms of the capital structure relevance hypothesis, this suggests particular costs which may influence issue announcement effects.

(4) modelling the predictability of UK bank capital issue security type (viz ordinary share and debt) and assessing the hypothesis that it is inversely related to the announcement abnormal returns.

## CHAPTER I

### INTRODUCTION

#### 1.1 DISSSERTATION OVERVIEW

This dissertation is concerned with the analysis of bank capital in terms of several themes which, in varying forms and degrees, are interdependent and complementary to each other.

##### Bank Capital Regulation:

Bank capital regulation commonly is justified in terms of the prevention of bank system failure. But questions emerge as to its efficacy and cost. The dissertation considers bank capital regulation in historical and contemporary terms and identifies both its absolute and relative control forms.

##### Capital Market Environment:

In terms of capital market environment, the dissertation considers three dimensions of market quality; perfection, efficiency and freedom.

TABLE 1.1  
CAPITAL MARKET QUALITIES

PERFECTION	EFFICIENCY	FREEDOM
-----	-----	-----
PERFECT	COMPLETE*	FREE
IMPERFECTIONS	RATIONAL EXPECTATIONS	↓ ← (REGULATION)
- Taxation		FAILURE
- Bankruptcy Costs		- Free Rider
- Agency Costs		- Information Asymmetry
- Information Asymmetry	INFORMATION	- Externalities
- Regulation	ARBITRAGE	

\* Apart from full insurance efficiency in the Arrow-Debreu sense, Tobin (1984) also identifies a functional efficiency - the service the financial industries provide for the economy as a whole.

---

#### Empirical Evidence:

Empirical analysis focuses on the reaction of a bank's common stock (ordinary share) price to the public announcement of an impending capital issue. Other assessments include a market view of the adequacy of bank capital, and the predictability of the security type of bank capital issues.

Questions:

Following a sketch of relevant theory in Section 1.2, four basic question areas are identified in Section 1.3. The dissertation accommodates an international dimension, being set primarily in the UK and US contexts.

## 1.2 THEORY

The dissertation draws upon a body of corporate finance (or financial economics) knowledge which has developed markedly with the post 1950 formulation of several major theories concerning portfolio efficiency, equilibrium asset pricing, corporate capital structure, agency theory, and rational expectations; Jensen & Smith (1984).

Jensen (1983) observes that the vast economic literature on the theory of the firm is not a positive theory of the firm but rather a theory of markets in which the firm, like a black box, acts in a value or profit-maximising way. Nevertheless, the insight these theories have allowed into corporate finance behaviour is relevant to organisation theory which, Jensen anticipates, is likely to enjoy major development.

### 1.2.1 Corporate Finance Theory

It is convenient to identify three strands of corporate finance theory; these are identified for ease of exposition and are interconnected to varying degrees.

a. Firstly, the normative portfolio selection theory of Markowitz (1952, 1959), which defined mean-variance efficient asset portfolios for risk averse investors, provided the basis for the development of a positive theory of the determination of equilibrium asset prices, namely the capital asset pricing model (CAPM) (1). Also, mean-variance models are used in banking models (2).

b. Secondly, observations (dating from at least the turn of the century) of a pervasive randomness, or unbiased fair game nature, in consecutive price movements of assets attracted renewed attention in the post 1950 era. This precipitated an explanatory theory based on the idea of market efficiency Samuelson (1965) and was later adapted for empirical testing Fama (1970, 1976). While this theory has found support at least in terms of historic price, and publicly available information sets, it has suffered criticism. In essence, the efficient market hypothesis comprises two elements, the rational expectations hypothesis and efficient arbitrage hypothesis; eg Tobin 1984, Begg (1982 p206).

The rational expectations hypothesis developed by Muth (1961) has an independent literature, and postulates the equivalence of individuals' subjective expectations of a random economic variable to their mathematical conditional expectations. Major implications of this hypothesis flow from the properties of the conditional expectations of forecast error (namely zero and orthogonal). This hypothesis, coupled with an assumed

information asymmetry, provided new insight into macroeconomics and the problems of the business cycle. The efficient market hypothesis may be viewed as a particular application of the rational expectations hypothesis.

c. Thirdly, subsequent to the capital structure irrelevance hypothesis of Modigliani & Miller (1958) which obtains in perfect and complete capital markets (3), the introduction of market imperfections has provided hypotheses of capital structure optimality and thus relevance. Imperfections considered include taxation, financial distress/bankruptcy costs, and agency costs.

Also, by assuming information asymmetry between management and the market, hypotheses have emerged which envisage management arbitraging the information via various signals including capital structure decisions. This latter genre of signalling hypotheses may be viewed as a hybrid of capital structure and information (strand b) theory.

Despite development in corporate finance, major questions still surround the choice of security type in finance raising capital issues. Myers (1984 p575) comments, ...

'We do not know how firms choose the debt, equity or hybrid securities they issue. We have only recently discovered that capital structure changes convey information to investors. There has been little if any research testing whether the relationship between financial leverage and investors' required return is as the pure MM (Modigliani & Miller) theory predicts. In general, we have inadequate understanding

of corporate financing behaviour, and of how that behaviour affects security returns.'

### 1.2.2 Banking Firm Capital Structure

Models of the banking firm are prefaced by the question of why banks exist (4) and those focusing on capital structure are normally distinguished by the element of exploitable financial market imperfection and some degree of regulatory constraint. Reviews of banking firm models have been undertaken by Baltensperger (1980) and Santomero (1984); Adekanye (1992) provides a recent survey.

While knowledge about corporate financing behaviour has advanced post the MM foundation by the ordered recognition of (perfect) market imperfections the advancement of capital structure theory in the particular case of the banking firm is by contrast neglected and fragmentary. Pringle (1974) noted,...

'There has been little theoretical or analytical research on the bank capital decision, and there exists no theory of bank capital based on optimizing behaviour on the part of the individual bank. Models of bank decision-making that are based on optimizing behaviour have been concerned primarily with other questions and have not treated capital as a managerial

decision variable. The role of capital in bank financial management remains vaguely defined and, in the opinion of some writers, relatively unimportant.'

The 1980s saw little to alter Pringle's prognosis. As Santomero (1984 p595) observes in his review of modelling the banking firm "...In all, this literature on optimal bank capital is a bit vague and very model specific"; he notes that the literature has used techniques including bankruptcy factors and models from corporate financial theory. He comments, ...

'The capital decision of the financial firm is more complicated than it may first appear. This is true because the optimal choice of scale and leverage is determined by the assumed financial environment and the raison d'etre of the firm ... Accordingly, to derive an optimal capital structure, one must determine, first, the role played by the financial institution and, second, the extent to which one wishes to deviate from the perfect market paradigm.'

Apart from focusing on the relaxation of perfect financial market conditions, much of the body of bank capital structure model literature tends to acknowledge, to some extent, the regulatory constraint. The micro, or prudential, regulation of banks, of which capital regulation is part, may have direct macroeconomic implications, namely for money aggregates and policy (5).

## 1.3 QUESTION AREAS

### 1.3.1 Bank Capital Regulation

The idea of a "free" market, and the role of regulation generally, have received increased critical assessment in recent decades. In a "free" market context, regulation may be justified to prevent market failure stemming from sources such as information asymmetry and the free rider problem.

In the particular context of banking, the topic of "free" banking is under renewed scrutiny; Goodhart (1985). The "free" banking evidence appears controversial in part due to matters of definition; also it tends to focus on monetary rather than capital regulation. Benston (1991) reaches the challenging conclusion that regulation tends to disrupt financial stability.

The role of capital in the banking firm has received much increased attention from prudential regulation authorities around the world in the past couple of decades (6). Steps have been taken, eg via the Basle Committee, to improve and converge bank capital definition and standards in order to better control risks and reduce "unfair" competition based on diverse national capital standards. The accounting profession also is seeking a degree of international harmonisation in standards.

The regulation of US and UK bank capital in the form of absolute control has a history stemming from the roots (7) of modern commercial banking. Underpinned by absolute capital regulation, relative (in terms of balance sheet structure)

bank capital regulation has a long history in the US but has suffered criticism as a failure risk control instrument during the economic exigencies of the 1920s and 1930s.

Modern relative bank capital regulation, as epitomised by the 1988 Basle Agreement, may be seen as having evolved from intuitive and ad hoc rules of thumb to a more scientific, formal and unified basis. This type of regulation uses a function based definition of bank capital, which emphasises its risk bearing capacity, against which risks may be matched, monitored and controlled. The Basle Agreement acknowledges certain of its shortcomings; eg risk accommodation is limited largely to credit risk.

Other criticisms include the Basle regime's methodology; eg the setting of a minimum capital standard (following the precedence of the 1981 US and 1987 joint US-UK regimes) and the inherent arbitrariness in selecting a particular level.

Also the integration of the Basle Agreement with management and market disciplines is unclear. Disquietingly, survey evidence suggests the Basle Agreement regulatory standards will influence bank management attitude towards capital allocation management despite the fact that it is deficient as a management tool; Coopers & Lybrand (1988). Also, the market's view of capital standards is ignored by the Agreement.

Guided by the underlying questions of the effectiveness and cost of bank capital regulation in general, question areas specifically considered include:-

- i. What is bank capital?
- ii. What justification exists for bank capital regulation?

- iii. How has the regulatory definition of bank capital evolved and what forms has it taken?
- iv. How has capital regulation development influenced
  - bank market structure
  - capital market efficiency
  - risk
  - management and costs?
- v. Do historic bank capital series require qualification in terms of changing risk bearing attributes?
- vi. Have periods of "free" banking, vis a vis capital regulation, existed and if so, have they exerted a discernible influence on bank risk?
- vii. Critically assess contemporary bank capital regulation methodology with particular reference to the Basle Agreement.

The question of cost of conflict between capital regulation and the market discipline is raised in Section 1.3.3.

### 1.3.2 Bank Capital Issue Announcement Effects

#### Development of Study Genre:

Capital event empirical studies focus on capital market pricing phenomena (abnormal returns) defined at a time and/or over a period relative to the event. These studies may be categorised according to various characteristics such as corporate type (industrial, utility, bank) and the event nature; major event categories include "pure" leverage change (security exchange, and no change in the funding level), and

capital issue for cash. Defining the public announcement of the intended capital transaction as an event itself provides a further study category.

In general chronological terms, early capital event studies emphasised testing of the EMH using monthly data surrounding the transaction, eg stock splits analysed in terms of monthly data around the split date; FFJR (1969). Consideration of the announcement date and the immediacy of price reaction developed later.

"Pure" leverage studies developed as a major category from around 1980, eg Masulis (1980a), and as noted by Kolodny & Suhler (1985), were followed by capital issue announcement studies in the industrial and utility sectors. More recently, capital issue announcement studies have been extended to the banking sector - at least in the US.

Overall, "pure" leverage change announcement studies in the non-finance sector provide conflicting evidence on the validity of tax shield, bankruptcy cost and wealth transfer hypotheses but tend to support agency cost and signalling hypotheses.

#### Capital Issue Announcement Studies:

##### a. Non-Finance Firms

As noted by Smith (1986), the studies of common stock abnormal returns associated with capital issue announcements are on average negative with a magnitude patterned according to

security type and the nature of the firm (industrial or utility) (8).

The occurrence of a common stock abnormal return coincident with the announcements represents an anomaly in terms of the semi-strong form of the EMH.

Evidence for the capital structure irrelevance and relevance hypotheses appears mixed and in aggregate conflicting. For instance, the overall negativity of announcements effects challenges the validity of both the capital structure relevance (imperfect) market hypotheses and the capital structure irrelevance (perfect) market hypothesis: eg Smith (1986).

Nevertheless, the pattern of abnormal return negativity associated with security type appears relatively well accommodated by hypotheses built on assumptions of information asymmetry in conjunction with capital financing decisions - the so called signalling hypotheses in which management has an incentive to arbitrage their information advantage via financing policy; Myers & Majluf (1984) who assume asymmetry of information provide an explanation for both negativity, and abnormal return patterns for common stock and debt. But their model does not explain the announcement effects of other security type issues and, by incorporating optimal managerial incentive contracts in the model, Dybvig & Zender (1988) reassert conditions of capital structure irrelevancy.

b. Bank Firms

Empirical studies of bank common stock abnormal returns coincident with bank capital issue announcements are relatively small in number and recent, compared with similar studies in the industrial and utility sectors. Key papers include Wansley & Dhillon (1989), Wall & Peterson, P. (1988), Isberg & Brown (1987), Polonchek, Slovin & Sushka (1989) and Keeley (1989).

The pattern of announcement effects is similar to that of industrial and utility firms but, like utilities, the absolute magnitude of the abnormal returns are lower than those for industrials (9).

The banking studies tend to focus on regulation based explanations for observed issue announcement effects. Some evidence emerges to support the hypothesis that increased regulatory pressure, namely imposing a monitored minimum capital standard, reduces information asymmetry and the signal content of the issue announcement.

By simultaneously viewing increased regulatory environment pressure and bank regulation capital status (ie capital adequate or inadequate), Keeley (1989) finds contrary evidence which suggests the non-exclusive validity of information asymmetry (signalling) and capital structure relevance hypotheses; the latter concerns a hypothesised reduction in the value of deposit insurance.

Noting a lacuna in similar analysis of bank capital issue announcement effects in the UK context, this dissertation asks,

- i. Do UK banks exhibit ordinary share pricing phenomena (abnormal returns) coincident with ordinary share and debt capital issue announcements?
- ii. Are announcement effects, if any, influenced by changes in regulatory rigour including,
  - the 1979-80 change; ie from informal to formal (ie with statutory backing) power of the prudential regulating authority, and/or the promulgation of regulatory capital measurement methodology?
  - the 1987 regulatory imposition of a minimum capital standard, in relative (ie balance sheet structure) terms?

#### 1.3.3 The Adequacy of Banks' Capital from the Market's View

This question area focuses on the assessment of banks' capital adequacy from a market perspective. Also, assuming the relevance of capital structure, it is hypothesised that conflict or agreement between the market and the regulatory (ie based on a minimum capital standard) views of capital adequacy may further explain issue announcement effects.

The market view is assessed using an equity valuation model developed by Shome et al (1987); assessment is made by reference to the parameter of an independent financial risk variable which is defined in terms of capital structure. The adequacy of different capital definitions is facilitated; ie by defining capital as equity capital, primary capital, or Basle Agreement capital.

Specific questions include,

- i. What is the market's assessment of bank capital adequacy in both the UK and US?
- ii. What is the market's adequacy assessment of capital for
  - banks which are capital adequate in regulatory terms, and
  - banks which are capital inadequate in regulatory terms?
- iii. Does a conflict exist between the regulatory and market views of the adequacy of bank capital observed in  
ii. ?

Question ii. is applied to US banks and to capital defined as regulatory primary capital, and Basle Agreement capital.

#### 1.3.4 Security Type Issued Predictability

Finally, noting that observations suggest a pattern of issue announcement effects based on the security type to be issued, the dissertation focusses on the hypothesis that the pattern reflects the predictability of the security type to be issued.

More particularly it is hypothesised that an inverse relationship exists between the absolute magnitude of bank capital issue announcement abnormal returns and the predictability of the security type of the issue. The testing of this hypothesis in the industrial sector has provided at best, weak evidence; Schadler (1987) (10).

Assuming the existence of information asymmetry, an element of pre-announcement repricing may have occurred from information

available in the public domain such as accounting and market variables. To some extent, investors may have predicted the announcement which consequently may contain little or no information. Otherwise, if the announcement is contrary to prior information and investors rational expectations the information content, and price reaction may be large.

While there appears to be no extant study on bank capital security type predictability, over the past couple of decades a number of studies have pursued this objective in the non-finance sector. Based on probit, logit and multivariate discriminant analysis models, they estimate the predictability of security type to be issued, given the need for external finance. Notable studies include Baxter & Cragg (1970), Martin & Scott (1974), Taub (1975), Taggart (1977), Marsh (1982), and Schadler (1987).

In effect, the studies identify predictor variables which stand as suitable proxies for publicly available information. Major predictor variables utilised in Marsh (1982) and Schadler (1987) include proxies for a target capital structure, deviations from it, and market conditions. The proxy variables include factors such as current capital structure, firm size, and bankruptcy risk.

Although predictability models have been developed in the banking sector over past decades to indicate early warning and failure, eg Sinkey (1979), Sinkey et al (1987), there appear to be no extant issue security type predictability studies. Potential predictor variables for bank security type studies may be derived from adaptations of industrial study predictor variables. Also bank failure prediction models may provide suitable risk variables.

#### 1.4 SCOPE AND QUALIFICATIONS

This dissertation is set in the UK and US contexts and is directed towards a critical assessment of bank capital regulation, and extending analysis of bank capital issue announcement effects.

The costs of bank capital regulation are assessed qualitatively and in terms of issue announcement effects, including the influence of changes in regulatory regime and its conflict with market discipline. Bank capital issue announcement effect analysis is extended by both the above factors and an assessment of the security type predictability hypothesis.

Although the cost of potential conflict between bank capital regulation and management discipline are not directly considered in this dissertation, the assessment of market-regulation conflict may provide information useful to management. Also, evidence of costs of regulation policy may be useful to regulators in policy development and implementation.

Apart from the dissertation text and footnotes, annexes are used to house expanded reference to theory and literature; this includes a number of key papers and books presented in abridged and paraphrased form.

Data availability and validity form a particular constraint in this dissertation. The empirical analyses are applied to large banks in the UK and US. This represents 6 banks in the UK. US bank observations were obtained from two sources. The one, IBCA, provides a bank specific balance sheet and income

statement account format over 1983-87 for 103 banks; the other, Datastream provides market data but only very limited account data. Consequently the basic 103 US bank observations were reduced due to a lack of complete account and market data, and/or incompatible account data (compatibility of equity accounts was used as the matching criterion).

UK capital issue announcement dates were confirmed from two sources, newspaper ('Financial Times' and 'The Times') indices and Extel News Cards. Sources for US capital issue details, used by US researchers, proved unobtainable here; some details were available from 'Moodys Bank and Finance Manual' but issue announcement confirmation in the 'Wall St Journal Index' effectively reduced US capital issue announcement observations to a handful of common stock issues and a desired distinction of preference stock type (non-redeemable from redeemable) proved difficult on a consistent basis.

## 1.5 DISSSERTATION STRUCTURE

Following this introductory chapter, Chapter 2 examines relevant corporate finance theory. This includes the rational expectations and efficient market hypotheses, corporate capital structure theory and its coincidence with assumed information asymmetry in the form of signalling hypotheses.

Chapters 3 and 4 focus on the constraint of bank capital regulation. Chapter 3 considers bank capital regulation within the argument for "free" banking and provides a critical

assessment of the development of both absolute and relative capital regulatory controls. Chapter 4 extends the critical assessment to contemporary bank capital definition and regulation, and reviews market based methodologies of bank capital adequacy assessment.

Chapter 5 reviews US empirical studies of bank capital issue announcements effects. The original empirical analysis of the dissertation is contained in the following three chapters. Chapter 6 assesses UK bank capital issue announcement effects and the influence of regulatory changes. Chapter 7 focuses on market assessments of the adequacy of banks generally, as well as banks grouped adequate or inadequate by regulatory capital criteria.

Chapter 8 assesses the predictability of capital issue security type from public information and the possibility of its inverse relationship with issue announcement effects. Finally, Chapter 9 draws conclusions from the results and provides recommendations for further research.

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## FOOTNOTES

(1). The CAPM is normally attributed to Treynor (1961) and Sharpe (1963, 1964) with further major development accorded to Lintner (1965), and Mossin (1966); some of the basic assumptions upon which the basic CAPM rests have been relaxed, eg Lintner (1969) introduced heterogeneous expectations, and Black (1972) was able to dispense with the need for a no-risk asset. Its use in empirical tests of capital market efficiency has been qualified, eg Roll (1977).

The CAPM may be viewed as a special case of the more general equilibrium asset arbitrage pricing theory (APT) which allows numerous factors to explain the equilibrium return on a risky asset. APT, developed by Ross (1976a), views the return on any risky asset as a linear combination of various common factors that affect asset returns.

(2). Mean-variance portfolio models also are applied to the balance sheet in models of bank capital structure; eg Pringle (1974), Kahane (1977), Koehn (1979), Koehn & Santomero (1980), Keeley & Furlong (1990). Earlier models, adapting to the intermediary balance sheet, include Parkin (1970), Pyle (1971), Hart & Jaffee (1974). Pyle (1971), by considering the dependence between the securities bought and sold by financial intermediaries, shows that asset (liability) portfolios cannot in general be chosen independently of the parameters of the liability (asset) yields. The major result of the paper is contained in the specification of the yield relationships which are conducive to financial intermediation.

Because of assumed imperfection in the financial market, namely a differential between borrowing and lending rates, adaptation of the mean-variance model is required in application to the financial intermediary. Hart & Jaffee (1974) derive the separation theorem without assuming that the intermediary can borrow or lend at the same risk-free rate.

(3). "A perfect capital market should be defined as one in which the MM theory holds" ; an off-the-cuff comment attributed to Ezra Solomon: Brealey & Myers (1988 p397). Also, the MM theory, set in perfect capital market conditions, has been shown to hold in a state-preference framework of complete capital markets; eg Hirschleifer (1966, 1970).

(4). Santomero (1984) comments that there at least three approaches to the question of why internal financial institutions exist in the financial markets; the role of asset transformer (ie diversification potential and asset evaluation), the nature of the liabilities issued and their central function in a monetary economy, and that the two-sided nature of the financial firms is critical in explanation of their behaviour.

(5). For instance, the inter-relationship between bank and bank system failure risks, eg Revell (1975), Mason (1979), Gilbert & Wood (1986); system failure carries the implication of sharp money supply contraction. Prudential and monetary regulation policy may also be in conflict, eg tight monetary control policy versus more liberal prudential control policy; Federal Reserve Bulletin (1984 July).

(6). A degree of universality may be ascribed to the role of bank capital. Wilcox (1979) for instance, comments that, ...

'Though differences in emphasis may exist, the basic role of capital in banking does not vary from country to country ... it is fundamental that all banks need capital to cover and extend fixed assets and business investments, to enable trading to continue and increase, to maintain the confidence of depositors and ensure viability in the face of loss arising from inevitable business and political fluctuations and uncertainty, particularly in an inflationary climate.'

(7). This is a matter of definition choice; in this dissertation the 1600s and specific national experiences. Banking has a much earlier history. In a Persian context, Olmstead (1948 p83) notes that,

'Private banking as a commercial proposition first made its appearance in Babylonia in the reign of Kandalanu (648-626). At the very beginning we find members of two great banking families of Babylon, that of Egibi and of the less important Iranu.'

'Preceding times had witnessed no such large-scale use of credit. The loan business was in the hands of the one great economic unit - the temple - and loans were made principally to temple dependents. Assyrian landlords, however, had made regular advances of grain to their peasants.'

Also in the much earlier Mesopotamian context of the transition from copper to bronze age, Childe (1954 p118) notes the development of a money economy during the urban revolution, which was characterised by standardisations, generalisations and quantizations.

(8). Smith (1986) suggests four generalisations about abnormal returns (ARs); also see his table in Annex 2.4D.

- i. The average ARs are non-positive.
- ii. ARs associated with announcements of common stock sales are negative and larger in absolute value than those observed with preferred stock or debt.
- iii. ARs associated with announcements of convertible securities are negative and larger in absolute value than those for corresponding non-convertible securities.
- iv. ARs associated with sales of securities by industrials are negative and larger in absolute value than those for utilities.

(9). The lesser magnitudes of issue announcement effects for both banks and utilities, vis a vis industrials, is attributed to their relatively strong regulatory environments. The mitigation of announcement effects for utilities is believed attributable to the reduction of information asymmetry, and greater predictability of issue announcement, facilitated by the regulatory environment; eg Smith (1986).

Keeley (1989) notes negative announcement effects for bank common stock issues which appear smaller than those found for industrials but larger than those found for utilities; generally he notes negative announcement effects for issues of

common stock and securities with risk characteristics similar to common stock such as mandatory convertible debt, although he found a positive announcement effect associated with perpetual preferred stock.

(10). Smith (1986 p7) hypothesises that the patterns of abnormal returns reflect the predictability of the issue announcement, ...

'Because stock price changes reflect only the unanticipated component of the announcement, the magnitude of the stock price change at the announcement will vary inversely with the degree of predictability of the announcement if other effects are held constant.'

He believes that, ...

'In general a new debt issue is likely to be more predictable than a new equity issue because principal repayments are more predictable than earnings.'

Also, in recognition of the significant differences between the price reactions of industrials and utilities to new equity sales he notes the latter's more extensive use of external capital markets which, if associated with a greater predictability of security issuance, should result in utilities experiencing a smaller price reaction to announcements of new security sales.

Smith also observes that while hypotheses about the predictability of announcements help explain the observed

differences in announcement returns of common stock versus debt issues and utilities' versus industrials' offerings, they do not appear to explain differences in announcement returns between common and preferred stock or between convertible and non-convertible issues.

Schadler (1987) tested the hypothesis that abnormal returns are inversely related to the predictability of the security issue type (common stock, convertible debt and straight debt) within the context of the industrial sector, but found at best weak evidence of a systematic relationship.

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## CHAPTER 2

### REVIEW OF THEORY

#### 2.1 INTRODUCTION

This chapter examines major theories, and their assumption fields, relevant to empirical observation of common stock abnormal returns coincident with the announcement of capital issues. Major theories include the rational expectations (and more specifically efficient market) hypothesis, capital structure theory and signalling hypotheses.

##### 2.1.1 Capital Market Perfection

The seminal capital structure irrelevance theory of MM (1958) is cast in terms of assumptions necessary for perfect capital market conditions (1), while capital structure relevancy hypotheses are based on relaxation of one or more of the assumptions. Banking firm models of capital structure generally involve an exploitable capital market imperfection and, to varying degrees, the constraint of regulation which is considered in Chapters 3 & 4.

Imperfections recognised in the area of capital structure relevance theory include taxation and bankruptcy costs, as well as agency costs. Also, the relaxation of the perfect information assumption has generated hypotheses incorporating information asymmetry and its arbitrage in both the capital structure and rational expectations-efficient capital market

theory areas.

In the capital structure area, information asymmetry, namely management's superior information about investment prospects and firm value, coupled with an appropriate arbitrage incentive provides the rationale for signalling hypotheses. These include hypotheses utilising capital issue decisions, and choice of security type issued, as signals; eg Myers & Majluf (1984), Myers (1984).

#### 2.1.2 Capital Market Efficiency

The notion of capital market efficiency may be housed in conditions less restrictive than those required for a perfect capital market (2). A comprehensive taxonomy of capital market efficiency is provided by Tobin (1984) who discerns four distinct meanings. Such efficiency may be defined in an information-arbitrage sense in which it is impossible on average to gain in trading on the basis of publicly available information. Also the market may be efficient in a deeper fundamental-valuation sense if an asset's price is determined by rational expectations of its future payments entitlement; these two meanings are particularly relevant to the idea of capital market efficiency used in this dissertation.

The other meanings of efficiency relate to the completeness of financial markets in terms of the provision of insurance services in the Arrow-Debreu context and, fourthly, Tobin identifies functional efficiency which concerns the service provided by the finance industry to the economy as a whole (3).

### The Rational Expectations Hypothesis (REH):

The rational expectations hypothesis (REH) developed by Muth (1961) asserts, in essence, that economic agents do not on average make systematic errors in predicting an economic variable, and that any forecast error should be uncorrelated with information. The REH facilitated revolutionary insights into the business cycle area following papers in the early 1970's, eg Lucas (1972) Sargent (1973). The REH, coupled with an assumed information asymmetry concerning the distinction between real and inflationary price changes, enabled the re-assertion of classical equilibrium doctrine that markets clear; Lucas & Sargent (1979).

The rational expectations hypothesis (REH) and the efficient market hypothesis (EMH) are nominally distinct due to separate developments, and literatures. Nevertheless during the 1970's the latter was perceived to be a special case of the former (4).

The REH, or "Muthian Rationality", marked a radical change from previous treatment of expectations as being exogenous or formed adaptively in dynamic models (5). Muth departed from the conventional view that theories based on rational behaviour were inadequate to explain observed behaviour; he reasoned that existing economic models did not assume enough rational behaviour. Muth's hypothesis, in essence, postulates the equivalence of two distinct concepts; economic individuals' subjective, psychological expectations of economic variables are equivalent to the mathematical conditional expectation of those variables (6).

Major implications of this hypothesis flow from the properties attached to information conditional expectations of an

economic random variable. More particularly, the conditional expectation, which is effectively the forecast of a random variable, is subject to a forecast error which possesses two key properties, namely that the conditional expectation of the forecast error is zero, and orthogonal (7).

Thus the REH acknowledges individual economic agents and their separate subjective expectations which on the average, and in terms of a given information set, adhere to the stochastic behaviour of the system determining the variable under consideration. In other words, on average, individuals do not make systematic mistakes in forecasting the future; their expectations of economic random variables are correct on average.

Expectations will diverge from actual values only because of some unquantifiable uncertainty in the system. If there were no unquantifiable uncertainty, expectations of variables would coincide with the actual values - there would be perfect foresight.

The REH does not require individuals to have identical expectations although the individuals' expectations should be distributed around the true expected value of the variable to be forecasted; the average of individual forecasts would be the expected value of the true variable although individuals could certainly differ in their beliefs.

By abandoning the idea of identical individuals, the REH may be viewed from an arbitrage perspective, but it is not synonymous with arbitrage. If economic profit may be gained from gathering and analysing information to predict the future, some individuals may be expected to follow this strategy. Ordinarily in markets, not all individuals have to respond to price signals in order maintain a vibrant price

system, some individuals may be passive. If enough arbitrage activity takes place, the market may behave as if it is rational, even though many individuals are passive (8).

Criticisms, tests and (macroeconomic) applications of the REH are considered in Annex 2.1A.

The Efficient Market Hypothesis (EMH):

Generally, the function of the capital market is to transfer funds between borrowers (producers) and lenders (savers) efficiently. The efficiency of the capital market may be viewed in terms of allocational and operational efficiency (9).

Putting efficiency in the context of the functional rationale for the stock market, Koh (1989) notes, ...

" The primary function of a stock market is to allocate ownership of the economy's capital stock. If stock prices provide accurate signals for resource allocation, firms are able to make correct production-investment decisions, and investors are able to choose the most suitable stock for investment. These choices are only possible if the market is efficient, that is, if stock prices fully reflect all available information."

Efficiency in the EMH sense is explained in terms of information, eg as typified by Lorie et al (1985 p77), ...

"An efficient market is one in which a large number of buyers and sellers react through a sensitive and efficient mechanism to cause market prices to reflect fully and virtually instantaneously what is knowable about the prospects for the companies whose securities are being traded."

The basic hypothesis of market efficiency is that financial markets use the true information conditional probability distribution in the determination of prices. Also, as noted by Tobin (1984), in a shallower sense the EMH jointly incorporates a hypothesis about market behaviour, namely rapid information arbitrage and requires the nomination of an equilibrium pricing model for empirical testing. While market efficiency can be regarded as implying rational expectations, rational expectations does not imply market efficiency. Market efficiency is a joint hypothesis about expectations and the market behaviour of participants. Minford & Peel (1983 p122).

The EMH emerged as an explanatory response to an acceleration in the accumulation of empirical evidence of a seemingly all pervasive independence, or randomness, in sequential stock market price movement (10). Subsequently the EMH came to be recognised as a particular application of the REH.

The first rigorous specification of an efficient market is generally attributed to Samuelson (1965) who proved that random price movement is to be expected in ideal market conditions. Samuelson's proof (see Annex 2.2A) is cast in terms of the futures prices for commodities and rests on a fundamental property of conditional expectations; essentially, today's forecast already embodies the best guess as to what

tomorrow's forecast will be, so expected profits cannot be made on the change in price; Samuelson (1973) also derived the martingale property of stock prices;(See Annex 2.2B).

As noted by Lorie et al (1985 p63), ...

'If a market has zero transaction costs, if all available information is costless to all interested parties, and if all participants and potential participants in the market have the same time horizons and homogeneous expectations with regard to prices, the market will assuredly be efficient and, as Samuelson has proved, prices in such a market will fluctuate randomly.'

A model of informational efficiency, allowing less stringent conditions than those of the ideal market and in a form suitable for empirical testing was developed by Fama (1970, 1976) and is still adopted by most empirical researchers; Koh (1989). Fama's empirical form perceives a three tiered information set; the assertion of the hypothesis, that security prices are freely flexible and reflect all available information, is qualified in terms of a particular information tier.

A fundamental criticism of the EMH is based on the fact that its traditional empirical testing is a joint test with the specified model of equilibrium returns. This problem is compounded when the capital asset pricing model (CAPM) is specified as the equilibrium returns model - such a test is effectively a joint test of the validity of the CAPM, ie a

joint test of the mean-variance efficiency of the market portfolio (see Roll 1977). Other criticisms stem from the microeconomics of information as explored by Grossman & Stiglitz (1976, 1980); Stiglitz (1984) notes that information first achieved prominence in economic analysis in the late 1970's.

More recent major criticisms focus on the need for stochastic system stability, stemming from volatility tests initiated by Shiller (1981a), and evidence of mean-reversion, eg, Poterba & Summers (1988). Overall, Samuelson (1989) is inclined to accept the evidence of financial market efficiency at the micro level but, acknowledging the evidence of Shiller et al, doubts efficiency at the macro level. Samuelson (1989) also draws two conclusions from the mean-reversion evidence. Firstly, if the evidence is truly significant, modification to certain dogmas of rational behaviour is required. Secondly, such evidence provides a basis for supporting conventional wisdom on long-run equity investing - which Samuelson previously had been unable to accept; see Annex 2.2C.

The formal derivation of the EMH and its major criticisms are considered in detail in Annex 2.1.

### 2.1.3 Capital Issue Announcements

Capital issue announcement abnormal returns suggest an anomaly in terms of the efficient market hypothesis, and the Modigliani & Miller (1958) capital structure irrelevance hypothesis.

The acknowledgement of taxation (corporate), bankruptcy and financial distress costs suggest the existence, and therefore relevance, of an optimal capital structure. But these so called "static" hypotheses (Myers 1984) ignore the explicit role of capital issues in terms of issue decision and security type. The recognition of agency costs, a further source of "relevance" hypotheses, does better acknowledge the role of capital issues, in terms of relative costs of security type, in the context of achieving optimal capital structure (eg Jensen & Meckling 1976). The role of capital issues is more formally and comprehensively recognised under the relaxation of information symmetry and the suggestion that management policy decisions regarding items such as capital structure change may be a means of communicating, or signalling, information to the market; more particularly these hypotheses consider the choice of security type issued (eg Myers & Majluf 1984, Myers 1984).

## 2.2 CORPORATE CAPITAL STRUCTURE THEORY

### 2.2.1 The Capital Structure Irrelevance Hypothesis:

A fundamental reference point in the theory of corporate capital structure is the seminal work of Modigliani and Miller (1958) who concluded, in their famous 'proposition I' that under the conditions of a perfect market, capital structure is irrelevant to firm value (11).

Previously advocated capital structure theories, eg Durand (1952), generally envisage an optimal (minimum weighted average cost of capital) debt-equity ratio. In comparison with the MM model these demonstrate a return on equity which rises (with increasing leverage) initially slower, then faster, than the MM model. Brealey & Myers (1988 p393) suggest these traditional views may be supported by two arguments. Firstly, investors react not to 'moderate' but to 'excessive' debt and, secondly, while MM's proposition may be acceptable in perfect markets - in the actual imperfect markets levered firms may borrow at a cheaper rate than individual investors and thus provide a valuable service which allows the shares to trade at a premium to their theoretical value.

MM's (1958) study influenced profoundly subsequent capital structure theory (12). As well as representing the first formal research on the relevance of capital structure to firm value, the model's rigorous perfect market conditions, necessary for its result, have provided a benchmark from which subsequent analysis has been able to examine the ordered impact of market imperfections. These include the introduction of taxation (both corporate and personal), costs of financial distress and bankruptcy, agency costs, and information asymmetry with associated signalling hypotheses.

## 2.2.2 The Capital Structure Relevance Hypotheses

### a. Taxation

The tax shield hypothesis was initiated by Modigliani & Miller (1963) who acknowledged corporate taxation and the deductibility of (debt) interest payments; this results in a tax shield asset which implies that firms have an incentive to use debt for 100% of their financing structure. This extreme conclusion is at variance with empirical observation, but may be better accommodated by including factors which offset the present value of the tax shield. Such offsetting factors have been derived from a closer examination of the taxation system to include personal taxation (Miller 1977), and consideration of costs that arise as borrowing increases (eg financial distress and bankruptcy).

Miller (1977) challenged the MM (1963) hypothesis, and re-asserted the MM (1958) claim of no optimal leverage for the individual firm, with the use of more realistic assumptions, viz the combined effect of corporate and personal taxes and the variety of investor tax brackets. In his model these factors influence the aggregate corporate sector leverage but leave the individual firm value independent of its own particular capital structure.

A middle ground view, between the extremes of MM (1963) and Miller (1977), may be considered by relaxing the assumption that the corporate tax shield on debt is constant (13). DeAngelo & Masulis (1980) extend Miller's work by analysing the effect of tax shields other than those based on interest payments on debt (eg non-cash charges such as depreciation and investment tax credits). Given that depreciation etc. serve as

tax shield substitutes for interest expense, the DeAngelo & Masulis model predicts that firms will select a level of debt that is negatively related to the level of available tax shield substitutes. DeAngelo & Masulis also demonstrate that the use of more debt increases the probability of zero or negative earnings, and thereby causes a decline in the expected value of the interest tax shield. They also show that if there are positive bankruptcy costs (see next section) there will be an optimum tradeoff between the marginal expected benefit of interest tax shields and the marginal expected cost of bankruptcy.

b. Financial Distress and Bankruptcy Costs

Myers (1984) notes the bankruptcy and agency cost dimensions of financial distress, ...

'Costs of financial distress include the legal and administrative costs of bankruptcy, as well as the subtler agency, moral hazard, monitoring and contracting costs which can erode firm value even if formal default is avoided.'

Schadler (1987) notes that Baxter (1967) first formally considered that the probability of bankruptcy and associated costs may be an important variable in the capital structure decision. If a firm increases its debt to a level considered excessive by the market, stock prices will fall from the increased probability of experiencing a state of nature where bankruptcy occurs. Also, bankruptcy costs are incorporated in the state-preference models of Kraus & Litzenberger (1973), and the mean-variance framework of Kim (1978). Both models

express the role of bankruptcy costs in the capital structure decision.

While bankruptcy costs are acknowledged by a number of theorists as an important variable in capital structure determination, the question whether the magnitude of the costs is large enough to drive an equilibrium condition remains unresolved.

Bankruptcy costs are both direct and indirect. The former are thought to be minor and the latter significant but difficult to assess. Warner (1977b) considered direct costs of bankruptcy (eg lawyers and accountants and other professionals' fees, management time administering bankruptcy) of railroad bankruptcies, and found them to be trivial. Also, he noted they decreased (as a percentage of value) as a function of the size of the bankrupt firm. Copeland & Weston (1988) comment that Warner's evidence suggests that the direct costs of bankruptcy may not be sufficiently large to be an important determinant of optimal leverage.

Indirect costs, such as opportunity costs, are difficult to calculate. Altman (1984) assesses average indirect bankruptcy costs. Copeland & Weston (1988) comment that in the light of Altman's evidence, total bankruptcy costs (both direct and indirect) appear sufficiently large to give credibility to a theory of optimal capital structure based on the trade-off between gains from leverage induced tax shields and expected bankruptcy costs.

The value of assets passing from through a bankruptcy, or reorganisation, may diminish depending on the type of the asset. As noted by Brealey & Myers (1988 p431) intangible assets linked to health of the firm as a going concern (eg

technology, human capital and brand image) may be severely reduced in value. Long & Malitz (1985) provide empirical evidence that confirms that firms holding largely intangible assets borrow less.

Brealey & Myers (1988) point out that a firm which gets into difficulty will not necessarily go bankrupt - it may be able to postpone or avoid bankruptcy. In these circumstances stockholders and bondholders who ordinarily are united in a desire to see the firm recover, may nevertheless be in conflict on individual interests (see Agency Costs). They comment that, ...

'In times of financial distress the security holders are like many political parties - united on generalities but threatened by squabbling on any specific issue.'

Writing from an agency cost perspective, Barnea et al (1985) note that bankruptcy problems are identical to other agency problems with respect to cost incidence. They comment that under default, if the transfer of ownership from stockholders to bondholders is costless, then the mere possibility of bankruptcy should have no impact on the capital structure decision. But given the impossibility of writing contracts which unambiguously establish the rights of claim holders under all contingencies, dispute may be fostered, and may be resolved in the formal process of bankruptcy.

Also, Barnea et al stress the difference between the costs of formal bankruptcy proceedings and the costs of liquidation. Bankruptcy and liquidation are best considered distinct and independent events; neither event is necessarily sufficient to

trigger the other (14). They note that the expected value of bankruptcy costs, if any, can be said to be borne by the equityholders if debt is sold to rational investors.

### c. Agency Costs

Debt was commonly used before the introduction of tax subsidies on interest payments. This suggests that a theory of optimal capital structure based on bankruptcy costs in the presence of tax subsidies fails to capture what must be some important determinants of the corporate capital structure. If an optimal capital structure exists, it may be caused by other factors; (Copeland & Weston p509).

A view of the firm as set of contracts among factors of production, with each factor motivated by its self interest is developed by Fama (1980b) who stresses the distinction between ownership of capital and ownership of the firm (ie a distinction between risk bearing and management). He notes that each factor of production is owned by somebody and, ...

The firm is just the set of contracts covering the way inputs are joined to create outputs and the way receipts from output are shared among inputs. In this "nexus of contracts" perspective, ownership of the firm is an irrelevant concept. Dispelling the tenacious notion that a firm is owned by its security holders is important because it is a first step towards understanding control over a firm's decisions is not necessarily the province of security holders. The second

step is setting aside the equally tenacious role in the firm usually attributed to the entrepreneur.'

As noted by Barnea et al (1985) agency problems emerge in an environment with frictions and market imperfections. While such problems may be reduced by the efficient operation of markets, and unresolved agency problems may be further reduced by complex financial contracting (which aligns the diverse and conflicting interests of parties), ultimately residual agency problems manifest themselves in terms of reduction in the value of financial securities. This gives rise to costs countervailing against the benefits of external financing - a trade-off leading to optimal corporate finance characterised by a complex financial structure and maturity arrangements.

In general terms, the costs of an organisation include those of maintaining contracts between its key contributors. Such costs are referred to generically as the 'agency costs' of the organisation and include costs of structuring, monitoring and bonding a set of contracts between contributors with conflicting interests. Also they include 'residual loss' - the value of output lost because the costs of full enforcement of contracts exceed the benefits. A fundamental assumption of this approach is that all contributors to the organisation behave rationally, and as if they expect other contributors to behave rationally; Strong & Walker (1987 p194).

Studies of agency problems and their associated costs appear to have developed in a piecemeal manner; nevertheless Barnea et al (1985) provide a comprehensive, structured taxonomy, see Annex 2.4.

Barnea et al note that the delegation of authority may give rise to conflicts between agents and principals, and that problems emerge when conflicts of interest between agents and principals, or among the principals themselves, affect the operation of the business enterprise. They distinguish between an economic theory of agency (ETA) and a financial theory of agency (FTA). The ETA focuses on the relationship between a single principal (who provides capital and consequently holds a claim on end-of-period firm value) and an agent (the manager whose efforts are needed to produce the value). The FTA focuses on relationships between different groups of securityholders in the context of the optimal financing of the firm.

#### External Equity:

Jensen & Meckling (1976) demonstrate what they term, the 'agency costs of outside equity' by considering a firm owned by a single individual, the owner-manager (O-M), who will enjoy subsidised perks (eg executive jet, holidays) consumption if a portion of equity is sold to external investors; the greater the proportion of external shareholders the greater the subsidy. Consequently a conflict of interest arises which will generate agency costs. Monitoring costs will be incurred by new shareholders to ensure the original O-M acts in their interests (15). Watts & Zimmerman (1979) note that agency costs of external equity may be reduced if management and shareholders agree to an independent audit.

#### Debt:

Strong & Walker (1987 p199) comment that literature on the agency cost of debt focuses on relaxation of the perfect market assumption of given, independent investment policies. This fosters conflicts of interest between shareholders and debt holders if the firm is unable to precommit itself to a value-maximising investment policy at the time of debt issue. Shareholders may be able to increase their own wealth by either increasing the risk profile of the firm's asset structure, Galai & Masulis (1976) use the option pricing model to demonstrate the bondholder wealth expropriation hypothesis, or rejecting projects with a positive net present value if the benefit from accepting the project accrues to the bondholders without also increasing shareholder wealth, Myers (1977), Brealey & Myers (1988 p429). To guard against this behaviour bondholders may insist on various types of protective covenants and monitoring devices to protect their wealth from shareholder raids on it. The costs of writing and enforcing such covenants may be significant and debt holders must charge higher *ex ante* yields to compensate for possible expropriations by shareholders. Moreover, these costs may increase with the percentage of finance supplied by bondholders.

Jensen and Meckling (1976) indicate an optimum capital structure based on agency costs alone. Given that agency costs increase with higher proportions of debt, and similarly with higher proportions of equity, they suggest there is an optimum combination of outside debt and equity that will minimise total agency costs. Copeland and Weston (1988, p 511) point out that if the agency costs of external equity are low, as may be expected in a widely held firm, then the optimal capital structure can result from a trade off between the tax shelter benefit of debt and its agency cost.

**Other Factors:**

Agency costs may also be associated with factors other than the acquisition of debt and equity capital. Titman (1984) suggests agency costs are important for contracts, both implied or explicit, between a firm and its customers and its employees.

**Contractual Mitigation of Costs:**

Contractual methodology, such as secured or collateralised debt and leasing, may mitigate agency costs (16).

## 2.3 ASYMMETRIC INFORMATION AND SIGNALLING HYPOTHESES

The relaxation of the MM (1958) assumption of symmetric information may, as demonstrated by Akerlof (1970), cause the market to break down if potential (lemon) buyers cannot verify the quality of the product they are offered. Consequently asymmetric information, and certain other, conditions provide the basis for hypotheses which directly accommodate management's financial policy decisions (eg capital issue behaviour) to signal information to the market; eg Ross (1977), Myers & Majluf (1984), Myers (1984) (17). Nevertheless, by introducing optimally constructed management contracts, Dybvig & Zender (1988) have reasserted the Modigliani Miller irrelevance propositions.

Ross (1977) considers 'financial incentive signalling' in which a manager's employment contract causes him to convey information about the firm's prospects through capital structure choice. Ross assumes management knows more about the firm's future returns than do investors, but the schedule of incentives and remuneration for management is known to all participants. Management's choice of capital structure is a means of signalling their inside information to outsiders. Ross's signalling equilibrium concept is of an equilibrium function relating the inferred market value of the firm to management's choice of capital structure from which the market inference is drawn.

Leland & Pyle (1977) focus on the entrepreneur seeking additional equity financing for a single venture, and who is better informed about the expected value of a project than outside potential investors. The fraction of equity the

entrepreneur retains in the project is the means by which he, or she, can signal project quality to potential investors. The greater the personal stake the entrepreneur is willing to take in the venture, the more investors are willing to pay for their share of it.

Miller & Rock (1985) consider dividend policy under asymmetric information. If investment and external financing are held fixed, the cash dividend reveals the firm's operating cash flow: a larger-than-expected dividend reveals larger-than-expected cash flow and the stock price increases and similarly, a lower-than-expected dividend is bad news for investors. Consequently, by extension, the Miller & Rock model predicts that announcements of new security issues will, on average, depress the stock price (as does Myers & Majluf, 1984) but does not specifically consider security type choice, nor their differential effect on stock prices (as does Myers & Majluf).

During the 1980's hypotheses emerged which directly accommodate management's capital issue and security selection behaviour; eg Myers & Majluf (1984) and Myers (1984). In a model combining financing and investment decisions, Myers & Majluf (1984) assume management is advantaged in asymmetric information about the value of the firm, and its shares, ie about the value of assets in place and potential new investment opportunities. Also, it is assumed that management acts in the interest of existing shareholders who are passive; ie will not rebalance their portfolios in response to what they learn from firms actions (18).

Faced with an investment opportunity, management weighs up the value which may be given up to new shareholder if shares are undervalued, against the net present value (NPV) of the

investment. Consequently management may not issue shares even if it means passing up good investment opportunities. Aware of their firm value information disadvantage, investors will reason that a decision not to issue shares represents 'good' news while a decision to issue is 'bad' news, or at least less good.

But the decision not to issue, and not to invest, misallocates real capital investment, and reduces the value of the firm. Myers & Majluf reason that management would try to rearrange its capital structure to avoid being caught in this 'financing trap', and this explains some financing choices.

The model concludes that, under asymmetric information, if stock is issued to finance investment, the stock price will fall; but this is in the interests of old shareholders. If the firm issues safe (default-risk-free) debt to finance investment, stock prices will not fall. Also, it is generally better to issue safe securities than risky ones; if possible firms should raise equity from retained earnings, but if recourse to external capital is necessary the bond markets should be used in preference to the equity market (19).

Myers (1984) expounds a descriptive 'Pecking Order' hypothesis which acknowledges Myers & Majluf (1984) which gives similar predictions. The hypothesis contends that firms prefer internal to external finance, and, if external finance is sought, prefer debt to equity (20). He allows that his model is 'too extreme' and in need of refinement before capturing actual behaviour; nevertheless, he argues that it shows how models based on asymmetric information can predict these two central ideas of the pecking order hypothesis. Baskin (1989) notes that the accumulated evidence in favour of the pecking order hypothesis is substantial.

Myers outlines a pecking order 'story' which makes four points; almost verbatim, it says;

- 1). firms prefer internal finance;
- 2). they adapt target dividend ratios to investment opportunities while trying to avoid sudden changes in dividends;
- 3). sticky dividend policies, plus unpredictable fluctuations in profitability and investment opportunities, mean that internally generated cash flow is sometimes more than capital expenditure and sometimes less. If more, the firm pays off debt or invests in marketable securities; if less, the firm first draws down its cash balance and sells its marketable securities;
- 4). if external finance is required, the firm issues safest securities first; ie. start with debt, then possibly hybrids then equity as a last resort. Consequently, there is no well defined target debt/equity ratio because there are two types of equity, internal and external, one at the top of the pecking order and one at the bottom. Each firm's observed debt ratio reflects its cumulative requirement for external finance.

Myers acknowledges the potential for an explanation via issue costs; ie internal finance avoids issue costs and, that if external finance were needed, debt avoids the still higher issue costs of equity; but he reasons that ..

'issue costs in themselves do not seem large enough to override the costs and benefits of leverage emphasised in the static trade-off story'.

In terms of the cost of external finance, Myers notes that while traditionally considered in terms of administrative and issuing costs (and underpricing for new issues), the introduction of asymmetric information allows the possibility that the firm may incur the cost of deciding not to issue and pass up a positive NPV investment opportunity; this latter cost may be avoided if the firm can retain enough internally generated cash to cover positive NPV opportunities.

Concerning the advantage of debt over equity issues, Myers argues that the way to reduce the amount by which a security issue is over or under valued is to issue the safest possible securities; ie those whose value changes least when managements inside information is revealed to the public. Myers says the decision rule seems to be, issue debt when investors undervalue the firm, and equity or some other risky security when they overvalue it.

Nevertheless, investors know the firm will issue equity only when it is overpriced, and debt otherwise. Consequently, the investor would refuse to buy equity unless the firm had already exhausted its 'debt capacity' - ie had issued so much debt already that it would face substantial additional costs in issuing more. Under these circumstances, investors would effectively force the firm to follow a pecking order.

Dybvig & Zender (1988) assume an optimal managerial contract (in substitution for the sub-optimal contract commonly assumed by asymmetric models), and thereby demonstrate that the MM irrelevancy proposition still holds in many reasonable models with incomplete information. Dybvig & Zender note that in moral hazard situations (such as the shareholder-manager relationship with asymmetric information) the incentive contract is of primary importance; but many models focus on

the moral hazard and ignore the matter of the optimality of the contract.

Dybvig & Zender focus their criticism on Myers & Majluf as a chief representative of the asymmetric information, sub-optimal contracting model genre. Dybvig & Zender note that the rejection of profitable projects is the inefficiency in the Myers & Majluf model; ie the manager refrains from making new investment because of his (or her) incentive to protect original investors from an underpricing loss on the issue of new shares.

Although Myers & Majluf consider a choice of managerial contracts, and select one in which the manager cares about the degree of dilution and not just about the profitability of investments (see Footnote 18), they do not consider an optimal managers' incentive contract as do Dybvig & Zender (21).

Dybvig & Zender demonstrate the separation of incentives and financing, ie 'the "real" set of feasible contracts to the manager does not depend on financing'. Also, they show that evidence of stock price reaction to debt and equity issues is consistent with their model; they illustrate by example that in very good states, the existing project generates sufficient funds for any new project, and therefore the requirement for new financing is bad news. They comment that, ...

' ... even if empirical evidence agrees more or less with Myers & Majluf, this is not convincing proof that their story is correct; the same empirical evidence is consistent with optimal investment in a world consistent with the Modigliani & Miller irrelevancy propositions.'

Dybvig & Zender also challenge the value to investors of signalled "superior" information from the firm, and thus the motivation of many of the signalling models (22).

## 2.4 CAPITAL ISSUE ANNOUNCEMENT EFFECTS

### 2.4.1 Introduction

As noted in Chapter 1, the focus of empirical capital related event studies in the industrial and utility firm sectors has shifted from the transaction to its announcement and, in the past decade, from "pure" leverage change announcements to seasoned capital issue announcements. In another dimension too, the initial emphasis on semi-strong market efficiency evidence yielded to interest in capital structure change (with 'pure' leverage) and more recently signalling hypotheses; major studies from these genres are detailed in Annex 2.4.

In overall terms, studies of non-financial firm seasoned capital issue announcement effects show common stock abnormal returns (ARs) which are on average negative and in absolute magnitude terms are best explained in terms of the security type issued, and the status (industrial or utility) of the issuing firm. These patterns are noted by Smith (1986); see Chapter 1 (Footnote 8) and in tabular form in Annex 2.4D.

Attempts to explain the negative abnormal return in terms of transaction costs have shown them to be significant yet inadequate. Kolodny & Suhler (1985) calculate that transaction costs account for around 23% of the negative return; Asquith & Mullins (1986a) calculate that the negative price reaction on issue announcement represents around 31% of the planned issue proceeds for industrials (12% for utilities) which appears too large to be explained by transaction costs.

#### 2.4.2 Capital Structure Hypotheses

The general non-positivism of the AR results confounds the prediction of both the capital structure irrelevance and relevance hypotheses. Maximising behaviour by firms suggests that in voluntary transactions such as capital issues, the firm should structure the transaction to yield the highest possible value for the firm. Thus a movement along a leverage-value function should result in no AR associated with the issue announcement (irrelevance hypothesis), or non-negative ARs (relevance hypothesis).

This challenge to the validity of the capital structure hypotheses may be mitigated if the issue announcement is coincident with a shift in the leverage-value function. Smith (1986) notes the theoretic difficulty of distinguishing between a movement along, and a shift in, a given leverage-value function, and consequently the difficulty of testing the hypotheses. Smith concludes that studies of financing decisions provide relatively weak tests of optimal capital structure theories.

#### 2.4.3 Information Based Hypotheses

The role of non-positivism appears to be much better accommodated within the context of the information based hypotheses.

Firstly, non-zero abnormal returns on security issue announcements represent an anomaly in terms of information efficiency; ie semi-strong market efficiency as formulated by

Fama (1976).

If information asymmetry exists between management and investors then negativity may be explained in terms of management's relative advantage in specific valuation information, Myers & Majluf (1984) and Miller & Rock (1985), and capital issues signal bad news.

Non-zero abnormal returns may also be viewed in terms of a more general asymmetry, the inability of investors to anticipate management's issue announcement, although this in itself says nothing about the pervasive negativity.

#### 2.4.4 Relativity According to Security Type Issued

Relativity of abnormal return, based on issue type, is accommodated to some extent by Myers and Majluf (1984) in terms of equity and (default-risk-free) debt. Miller & Rock (1985) do not distinguish between security issue type. The relative degree of investor anticipation provides a further explanation.

Signalling Hypotheses:

Smith (1986) comments that the Myers & Majluf (1984) hypothesis, provides a potential explanation for the relativity of abnormal return based on security type issued. While the evidence across equity and debt securities is consistent with this information asymmetry hypothesis, some data within the debt class is apparently inconsistent. Both Eckbo (1986) and Mikkelsen & Partch (1986) disaggregate their bond data by rating class, but do not find higher rated, less

risky (and less sensitive) bonds to be associated with smaller ARs. Moreover, Eckbo also finds more negative ARs to mortgage bonds than non-mortgage bonds. Stultz & Johnson (1985) argue that secured debt should be less sensitive to firm value than non-secured debt.

#### Degree of Predictability:

In the information asymmetry sense, as abnormal returns reflect only the unanticipated component of the announcement, the magnitude of the stock price change at the announcement will vary inversely with the announcement's predictability. Smith (1986) suggests that debt issues are relatively more predictable than equity issues, and that utility issues are more predictable than industrial issues.

Concerning the relative predictability of issue type Smith (1986) argues that, in terms of maintaining a target capital structure and unchanged cash flow, the more predictable the debt principal repayments the more predictable are the debt issues.

Similarly, earning predictability, and thus internally generated equity, determines the predictability of new equity issues. And given that in general, principal repayments are more predictable than earnings, a new debt issue is more predictable than a new equity issue.

Smith also supports the predictability of debt issues on the basis of relative cost structures of public versus private debt issues. The larger fixed component and more pronounced economies of scale of publicly issued debt, versus bank debt causes a firm to use the bank credit until an efficient public issue size is reached, whereupon the bank debt is retired and

the public debt issued. Investors' observation of bank borrowing and the pattern of public debt issuance should facilitate an enhanced predictability, and a smaller price reaction to debt issue announcements. Marsh (1982) provides evidence on the use of short term debt to predict public debt issues.

#### 2.4.5 Relativity According to Organisation Type

##### Signalling Hypotheses:

Management of utilities generally petition their respective regulatory authorities for permission for new security sales. Smith (1986) notes this petitioning process could reduce the price reaction of utilities announcements relative to industrials for any of three reasons; it may reduce the information asymmetry between managers and outsiders, it could limit managers' discretion as to what security to sell, and it could reduce managers' ability to time security offerings to take advantage of any differential information.

##### Degree of Predictability:

In terms of the significant difference between the price reactions of industrials and utilities to new equity sales, Smith explains this in terms of a relatively higher frequency of use by utilities of the external capital markets which is associated with a greater predictability of security issuance, and consequently a relatively smaller stock price reaction to

announcements of new security issues.

Smith's hypotheses about the relative predictability of security issue type provides an explanation for the observed differences in announcement returns of common stock versus debt issues, but not for those between other issues, such as common and preferred, or convertible and non-convertible.

#### 2.4.6 Other Hypotheses

Security issues may involve important changes in ownership, and or control in the firm, which may be reflected in the observed price reaction to their announcement. In surveying a number of papers, Smith (1986) notes that evidence suggest that organisational restructuring on average benefits stockholders. Also, announcements of transactions that increase ownership concentration raise share prices, while those that reduce concentration lower share prices.

In respect of organisational restructuring, Schipper & Smith (1986) note that in contrast to the negative abnormal returns for common stock sales, a company selling stock in a previously wholly owned subsidiary, an 'equity carve-out', experiences significant positive returns around the announcement. Such 'carve-outs' are normally associated with the adoption of management incentive compensation plans based on the subsidiary's stock. Smith (1986) notes that the result is also consistent with the information asymmetry hypothesis; if management believes the subsidiary is undervalued, by segregating the

subsidiary's cash flow and selling separate equity claims, the firm can capture that gain.

Concerning ownership structure changes, Masulis & Korwar (1986) consider a number of equity sales in which firm management organises the primary issue to be accompanied by a registered secondary issue; this results in a negative AR higher (-4.5%) than that recorded for average industrial equity offerings (-3.1%).

#### 2.4.7 Summary of Industrial-Utility Evidence

In overall terms, non-zero abnormal returns on security issue announcements represent an anomaly in terms of both capital structure theory and the Fama (1976) formulation of semi-strong market efficiency.

Individual studies tend to endorse informational signalling and agency cost hypotheses while the explanatory power of tax benefits, wealth transfers and bankruptcy costs appears diminished by mixed, contradictory evidence.

The negativity of the abnormal returns is accommodated by hypotheses of information asymmetry between management and investors. Evidence of relativity of abnormal return based on issue security type supports Myers and Majluf (1984) in terms of equity and debt; but relativity based on intra-debt relative riskiness lacks empirical support. Smith (1986) argues for equity and debt relativity on the basis of issue predictability but this does not consider other observed differences, such as that between common and preferred stock or convertible and non-convertible.

## 2.5 SUMMARY

In perfect market conditions, Modigliani & Miller (1958) hypothesised the irrelevance of capital structure to the cost of capital.

Capital market efficiency, which may hold in conditions less than perfect, has been defined in terms of the coupled hypotheses of investors' rational expectations and rapid arbitrage. Evidence of market efficiency in terms of historic and public information sets generally has been confirmed in developed stock markets such as the UK and US. Nevertheless criticisms, particularly of the methodology (namely of the CAPM equilibrium pricing model) and contrary evidence (particularly from volatility tests) have tended to diminish the quality of the market efficiency hypothesis and evidence. The weight of evidence appears to support the market's micro efficiency, but not as yet macro efficiency.

The introductions of specific imperfections including taxation, bankruptcy costs, and agency costs into the MM framework has allowed hypotheses of minimum capital cost and thereby capital structure relevance.

The introduction of the imperfection of information asymmetry, coupled with a managerial incentive to signal this information through financing policy has been hypothesised to result in negative market reaction to announcements of external financing issues, particularly of equity; Myers & Majluf (1984). Nevertheless, by introducing optimal managerial incentive contracts, Dybvig & Zender (1988) have reasserted the Modigliani & Miller (1958) capital structure irrelevancy proposition even with asymmetric information.

As noted by Weston (1989),..

'Departures from the MM propositions are driven by imperfections, not by errors in the logical structure of their model. Some models depart from MM because of different assumptions. These models can be reconstructed to be consistent with MM and with the data. Future progress will come from relating the competing models to cumulating empirical evidence.'

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## FOOTNOTES

(1). More precisely, the MM theory has been cast in terms of a perfect and complete capital market. Copeland & Weston (1988 p331) succinctly define perfect capital market conditions, under which both product and securities markets will be both allocationally and operationally efficient, as, ...

- 'a. Markets are frictionless, ie there are no transaction costs or taxes, all assets are perfectly divisible and marketable, and there are no constraining regulations.
- b. There is perfect competition in product and securities markets. In product markets this means that all producers supply goods and services at minimum average cost, and in securities markets it means all participants are price takers.
- c. Markets are informationally efficient; ie, information is costless, and is received simultaneously by all individuals.
- d. All individuals are rational expected utility maximisers.'

(2) Capital market efficiency is a necessary, but in itself insufficient, condition for a perfect capital market, and may coexist with imperfections such as frictions (eg transaction costs and taxes) and imperfections in the product market (eg monopoly competition): Minford & Peel (1983 p120), Copeland & Weston (1988 p331).

(3). The problem of an inadequate risk-shifting market are considered by Arrow (1963); see Annex 2.3B. The formulation of a complete financial market, in which economic agents may insure themselves in all future contingencies (ie full insurance efficiency), draws upon state-preference theory, and the concept of a pure security first specified by Arrow (1964) and Debreu (1959) - and sometimes called an Arrow-Debreu security. The complete market allows the creation of a complete set of pure securities from which any security may be formed; pure securities and complete markets are defined in Annex 2.3C.

The fourth specification of capital market efficiency identified by Tobin (1984), functional efficiency, relates to the economic functions of the financial industries. Tobin notes that such industries do not provide services directly useful to producers or consumers (although some individuals enjoy gambling and prefer the security market to casinos). Resources allocated to financial services are usually justified on other grounds including, for instance, the pooling of risks and their allocation to those most able and willing to bear them (a generalised insurance function in the Arrow-Debreu sense). Tobin also identifies other grounds such as the facilitation of transactions by providing mechanisms and networks of payments, and the mobilisation of savings for investment in physical and human capital - and the allocation of savings to their more socially productive uses. (See Footnote 9 for the distinction between operational and allocational efficiency).

(4). Begg (1982, p207) notes that in the late 1960's and early 1970's macroeconomists were irrational in modelling

expectations by failing to take account of all available information (namely the development of the EMH - a special application of the REH) on how this task may be approached.

(5). Previously, expectations had been accommodated as exogenous in the short run in the 'General Theory' of Keynes (1936) and the later development of the adaptive expectations hypothesis, Cagan (1956) and Nerlove (1958), postulated that individuals use information on past forecasting errors to revise current expectations.

But, while adaptive expectations allows the modelling of unobservable expectations purely in terms of past observations on the relevant variable  $x$ , without the need to specify the process by which the initial level of expectations is determined, there are criticisms from a RE perspective. More particularly,

adaptive expectations considers only past values about the variable about which the expectations are to be formed and ignores the effect of other variables. Also, mechanistic backward looking extrapolative rules allow the possibility of systematic forecasting errors for many periods in succession. The sub-optimal use of available information is hard to reconcile with the idea of optimisation which is the foundation of most microeconomic analysis: Begg (1982 p26).

(6). Muth (1961) in using the certainty equivalence proposition assumed for simplicity that rational economic agents need only focus on the mean, or expected value, of future variables.

The more general statement of the REH, namely the equivalence of the subjective probability distributions of economic actors to the objective probability distributions in the system, has

been illustrated in later work; eg Lucas (1978a) shows a model in which people's entire subjective probability distribution would coincide with the true objective probability distribution governing the system.

(7). The formulation of conditional expectations and properties of the forecast error are noted, eg, by Sheffrin (1983 p7).

Generally, an economic actor makes probability assessments based on the information available at the time; conditional expectation may be defined in terms of the conditional probability density for a random variable  $X_t$ , given the information available at time  $t-1$ .

$$\text{Conditional Expectation} = E[X_t | I_{t-1}] = \int_a^b X_t f[X_t | I_{t-1}] dX_t$$

The conditional expectation of a random variable is just the expected value of the variable formed by using the conditional density.

Conditional expectations may be viewed as forecasts of random variables, in order to understand major properties. The forecast error, associated with any forecast is defined as

$$\text{forecast error} = \epsilon_t = X_t - E[X_t | I_{t-1}]$$

and has two important properties; namely that the conditional expectation of the forecast error is (a) zero, and (b) uncorrelated with any information available to the economic actors (orthogonality). More particularly, these properties follow from noting that

(a). At time  $t-1$ , the conditional expectation (or the forecast) is known so that its conditional expectation is just the forecast itself. Thus the conditional expectation of the forecast error is

$$E[\epsilon_t | I_{t-1}] = E[X_t | I_{t-1}] - E[X_t | I_{t-1}] = 0$$

(b). The orthogonality property; forecast errors should also be uncorrelated with any information that is available to economic actors. Otherwise it would be possible to improve the forecast by incorporating this correlation into the forecast. In other words, any subsequent forecast errors should be inherently unpredictable and hence unrelated to any information available at the time the forecast is formulated

$$E[\epsilon_t \cdot I_{t-1} | I_{t-1}] = 0$$

Muth's rational expectations hypothesis equates, in essence, two distinct concepts; the subjective, psychological expectations of economic variables are postulated to be the mathematical conditional expectation of those variables.

Symbolically, with  $X_t^\epsilon$  as the subjective, psychological expectation for a variable  $X_t$ , Muth's hypothesis asserts that

subjective expectations = conditional expectations

$$_{t-1}X_t^\epsilon = E[X_t | I_{t-1}]$$

In other words, there is a connection between the beliefs of the individual economic actors and the actual stochastic behaviour of the system.

(8). Sheffrin (1983 p10) notes that when arbitrage is relatively costless (as in financial markets) the REH may be especially applicable (although the REH is not synonymous with arbitrage and may prevail even when arbitrage activities are costly). Also, he notes that survey evidence measuring average, rather than marginal, beliefs or behaviour may provide a misleading perspective on the applicability of the REH.

(9). Copeland & Weston (1988, p331), Minford & Peel (1983, p119) distinguish between allocational and operational efficiency. Allocational efficiency obtains when prices equate the marginal rates of return (adjusted for risk) for all borrowers and lenders with scarce savings optimally allocated to productive investments in a way that benefits everyone. Operational efficiency concerns the cost of transferring funds.

The distinction of informational efficiency, the extent to which prices reflect information, from the direct welfare orientation of allocative, or Pareto, efficiency of market regimes is noted by Strong & Walker (1987 p121) who comment that, ...

"...at the current stage of theoretical research into these concepts, the precise relationship between the two is not clear".

(10). The early development of the EMH is noted by Lorie et al (1985). The roots of the market price 'random walk'

doctrine are often traced back to the Frenchman L. Bachelier (1900) who studied commodity prices and concluded they followed a 'random walk' (though not using that term) and that commodity speculation in France was a 'fair-game'. The term 'random walk' was coined in an exchange of correspondence in "Nature" magazine in 1905. Subsequently, isolated papers from Working (1934) Cowles & Jones (1937) and Kendall (1953) characterised a long gestation period before the papers of Roberts (1959), who observed the similar patterns of random number generation and stock market price changes, and Osborne (1959), who noted the similarity of stock price movements to "Brownian motion", appeared to herald the notable development of full academic interest; eg Moore (1962), Fama (1965) and Granger & Morgenstern (1963).

(11). Barnea et al (1985) noting the intuition behind the MM theorem, comment that arbitrage opportunities exist when the law of one price is violated - an arbitrageur purchases an item in one market and immediately sells it in another market for a higher price. Given the assumed perfect market conditions, two firms which are identical in terms of the assets they hold should conform to the law of one price, and sell at the same price despite differences in the liabilities issued to finance the assets; the "moral" of this arbitrage argument is that capital structure per se has no inherent advantages or disadvantages in altering the real aspects of the firm.

MM's proposition II, follows directly as a corollary; viz the required rate of return on equity increases linearly with financial leverage (and maintains the existing price per share). In other words in the MM world, the price per share

and the value of the firm are unaffected by altering financial leverage.

By introducing the state-preference framework, it has been shown that sufficient conditions for the MM independence thesis are complete and perfect capital markets; eg Hirshleifer (1966), Robichek & Myers (1966).

Kraus & Litzenberger (1973) summarise this point, noting that individuals may create primitive securities in complete markets; ie if the number of distinct complex securities (eg common stocks and bonds) issued by firms equals the number of states of nature; see Annex 2.3C. They comment, ...

'Since in a perfect market the firm is a price taker, the market price of these primitive securities are unaffected by the firm's financing mix. Therefore, given the firm's capital budgeting decisions which determine the firm's returns in each state, the firm's market value is independent of its capital structure.'

also,

'... the proof of the MM independence thesis in a state-preference framework does not depend upon the assumption that the firm will earn its debt obligation with certainty. The firm may not earn the "promised" return on its bonds in some states of the world and would be bankrupt. In these states the firm's bonds are claims on the residual value of the firm.'

Although the firm's financing mix determines the states in which the firm is insolvent, the value of the firm is not affected since bankruptcy penalties do not exist in a perfect market.'

(12). Recent criticisms include Gordon (1989) who comments that,..

'It seems to me that there is something fundamentally wrong with a theory that reduces our great financial and non-financial corporations to legal fictions at best, and at worst to barriers for the realization of perfect capital markets... for a theory of corporate finance to explain and advance practice and guide public policy it must go beyond reducing these great institutions to legal fictions.'

More accommodatingly, Weston (1989) notes that,..

'MM ushered in the modern theory of finance. Their irrelevance propositions have stimulated a stream of important theoretical and empirical literature. As a result we have <sup>come</sup> ~~to~~ understand better the forces that influence financing decisions and the methods of returning cash to suppliers of funds ..... Departures from the MM propositions are driven by imperfections, not by errors in the logical structure of their model. Some models depart from MM because of different

assumptions. These models can be reconstructed to be consistent with MM and with the data.'

(13). Brealey & Myers (1988 p418-419) comment that the difference between MM (1963) and Miller (1977) centres on additional taxes paid by debt versus equity holders.

'MM implicitly assume that personal taxes are the same on debt and equity ... (and) ... the corporate tax shield always exceeds the extra taxes paid by the marginal lender, and companies should borrow to the hilt ... (while) ... Miller assumes that investors are subject to different tax rates. Therefore, as the total amount of corporate debt increases, investors with higher tax rates must be bribed to hold debt. ... The equilibrium amount of debt in Miller's model is reached when the corporate tax benefit to the borrower equals the personal tax cost to the marginal lender. As long as companies pay the same rate of tax it is immaterial which firms supply this debt.'

Brealey & Myers note that for a compromise theory to work, it seems necessary to reconsider the assumption that the corporate tax shield on debt is a constant (34%) regardless of the amount borrowed. (ie how else can the additional tax paid by lenders ever reach 34 cents per dollar when the marginal tax rate for the wealthiest investor is 28%). See also Myers (1984).

In practice, the possibility of a loss (and the inability to carry it back against past taxes) involves the carrying forward of the tax shield with the hope of using it later; but the firm loses the time value of money. Thus, ...

'If there is a chance that firms will make a loss, the expected corporate tax shield is less than 34%. The more firms borrow, the higher the probability of loss and therefore the lower the expected tax shield.'

(14). Barnea et al (1985 p37) note that bankruptcy costs include a legal process which may consume a portion of the remaining assets, and potential disruptions to the normal activities of the firm which may cause a deterioration in long standing customer and supplier relationships.

In contrast, the firm liquidates only if the market value of the firm as a going concern falls below its dismantled value under liquidation. It is inappropriate, they add, to attribute the costs associated with the distress sale of assets to the event of bankruptcy, because while the proportion of debt in the capital structure affects the probability of bankruptcy, it does not affect the probability of liquidation. Liquidation is a mere capital budgeting decision; there is no necessary link between the decision to liquidate and the ability to pay off debt claims. A firm on the brink of bankruptcy should be liquidated only if the value of its assets as a going concern, net of reorganisation costs, is below the dismantled value under liquidation. On the same basis, a nonbankrupt firm that fits this same test must be liquidated.

(15). Strong & Walker (1987 p195) note that the perk subsidy will lead to excessive expenditure on perks by the O-M. But, under the rationality assumption, the losses from excessive perk consumption is anticipated at the time of external share issue by the external investors and discounted from the amount they are willing to pay. This implies the firm's decline in value from excessive perk consumption will be borne by the O-M. In this case the gross agency cost is the difference between the value of the firm if the O-M could costlessly pre-commit to an agreed level of perk expenditure and the value without precommitment. The net agency cost is the gross agency cost less the O-M's willingness to pay for the extra perk consumption with an external shareholding and the O-M, who bears this cost, will act to minimize them as necessary.

(16). A number of studies are noted by Copeland and Weston (1988). Scott (1976) shows that the optimal leverage may be related to the collateral value of the tangible assets held by the firm. In bankruptcy, the bondholders' loss is limited by the salvage value of the firms assets. The bondholders' monitoring costs may be reduced by simply requiring the loan be tied to the salvage value of specific assets. Leasing represents a further avenue for reducing monitoring costs; leased assets are fully secured as they remain the property of the lessor and can be repossessed in the event of default; Copeland & Weston (1988 p511). Stultz and Johnson (1985) demonstrate that secured debt may increase firm value as it makes it more advantageous for shareholders to undertake positive NPV projects. Copeland & Weston (1988 p512) comment that this suggests secured debt will generally be preferred to unsecured debt, a result consistent with Myers & Majluf (1984) - see next section. Stultz & Johnson also note secured debt decreases monitoring costs, ie collateral can't be paid out as dividends nor exchanged for another (riskier) asset, and

secured creditors are less likely to require restrictive covenants.

(17). From the agency perspective, Barnea et al (1985 p38) comment that the resolution of asymmetry through signalling represents a unique agency problem which, unlike others, cannot be resolved costlessly through arbitrage in the financial markets; and ...

'Consequently, this problem may be more significant than the others in terms of inducing yield differentials between securities and optimal capital structure'.

(18). Myers & Majluf note three possibilities for management's behaviour under asymmetric information none of which can be theoretically justified over the other two, but each one of which yields substantially different empirical predictions. In lieu of a supporting theory of managerial behaviour, they use the assumptions' positive empirical implications as criteria for assumption selection. The assumption selected explains why, on average, stock prices fall on the announcement of a new issue, and debt issues have less price impact than stock issues.

The other assumptions considered include; (a) management acts in the interests of all shareholders, and ignores any conflict of interest between old and new shareholders, and (b) management acts in the old shareholders' interests, but assumes they rationally rebalance their portfolios as they learn from the firm's actions.

(19). Krasker (1986) models the relationship between the stock price and the issue size by modifying the assumption that the firm has a single all-or-nothing investment opportunity whose cash requirements are fixed and known by all investors in the Myers & Majluf model. Krasker allows the firm to choose not merely whether to issue stock, but also how much stock to issue.

His model shows that the stock price following the announcement of a stock issue should be inversely related to the issue size. Also, Krasker finds the rate of decrease in the stock price as the issue size increases can be so rapid that the product of the two (ie the total proceeds of the issue) is bounded; and ...

'Under these conditions - called 'equity rationing' - there is an upper limit to the amount of money that the firm can raise by stock issue, irrespective of how many shares management issues. Intuiting suggests that equity rationing is most likely to occur when the firm's investment prospects are poor, but paradoxically the opposite is true.'

(20). Myers acknowledges the hypothesis has earlier roots. He notes that Donaldson (1961) observed, in a sample of large firms, that management favoured internal funds to external funds and that when funds in excess of internal generation were unavoidably needed, dividend cuts were generally unthinkable to most management except as a defensive measure in a period of extreme financial distress; and if external finance were needed, managers rarely thought of issuing stock.

Financing according to a pecking order schedule was previously assumed to run contrary to shareholder interests, but this is challenged by current asymmetric information hypotheses. Myers notes that in the 1960's, a firm's reliance on internal finance was generally viewed by 'managerial capitalism' writers as an outcome of the separation of ownership and control; managers avoided external finance as it subjected them to the discipline of the capital market, Berle (1954), Berle & Means (1932). Also, Myers comments that Donaldson (1969), who was not concerned primarily about managerial capitalism, observed that the financing decisions of the firms he studied were not directed toward maximising shareholder wealth, and that explanations of financing decisions would have to start by recognising the 'managerial view' of corporate finance.

(21). The Dybvig & Zender model is initiated by the entrepreneur choosing a managerial compensation scheme and resultant optimal decision rule, and rational equilibrium price functions, to maximise the proceeds from the initial public offering.

A possible interpretation of the contract is that the manager is paid a constant plus a term proportional to the portfolio of the initial stock plus a pro rata purchase and participation in new issues. Consequently, they note , ...

'if the price is out of line, the effect of mispricing on existing shares is completely offset by the effect of mispricing on the pro rata purchase of new shares. For example, if the manager knows

that the profitability of assets in place is very large, the prospective capital loss on the existing shares (the dilution effect) is exactly offset by the windfall gain on the implicit purchase of new shares. The net effect is to make the manager indifferent about the price at which the share issue is made, which leads to optimal investment. The share price is correct on average, but does not fully reflect the manager's information in each state of nature.'

(22). Dybvig & Zender believe it reasonable to view signalled information as entirely firm-specific idiosyncratic information.

Also, they note that Ross (1985) has shown the timing of release of idiosyncratic information is a matter of indifference to investors in the firm as information is diversifiable. They comment, ...

'Rational investors will therefore not pay more for a firm with earlier information release, and therefore entrepreneurs have an incentive to set up a firm in a way that maximises productive efficiency, without regard to the information release.'

## CHAPTER 3

### BANK CAPITAL DEFINITION: HISTORICAL DEVELOPMENTS

#### 3.1 INTRODUCTION

The definition of bank capital is a complex problem. In large part this is due to its intrinsically dynamic and plural nature; ie reflecting an active and reactive evolution through social and economic change, and significance to groups of individuals each with a distinct viewpoint. The nomination of a particular group viewpoint (1) is necessary in specifying a definition of bank capital and its adequacy; in the regulatory context, the notion of bank capital's adequacy suggests a functional capacity matched against a functional requirement.

This chapter critically examines the historical development of bank capital regulatory constraints and their influence on factors including bank market structure and risk. In one sense, this represents a component of the general "free" banking argument. The exercise is essentially descriptive, in part due to the fragmentary, largely qualitative, nature of historical evidence; and the difficulty of isolating the influence of bank capital regulation from other facets of the regulatory regime. Also, consideration of bank risk focuses on its elemental forms, such as bank failure; the refined view of a structure of bank risks is considered in Chapter 4.

In another sense Chapters 3 and 4 also analyse, at least implicitly, four other inter-related dimensions of bank capital definition. One examines capital "matter", acknowledging factors such as the composition, structure and measurement of bank capital. A second, national approach, is being mitigated by moves to international convergence of capital definition and measurement. A third dimension concerns the theme of long term financial innovation; this is manifest in the primary development of bank capital's characteristics under the aegis of equity capital and the secondary spread, particularly in recent decades, of capital characteristics to non-equity instruments, the so-called "hybrid" instruments. Finally, the dimension of time recognises the dynamics underlying definition development and plots its evolutionary path.

Preliminary to the historical analysis, general facets of bank capital definition are considered in Section 2, and Section 3 places bank capital prudential regulation in overall context. Section 4 examines the evolution of the absolute bank equity capital regulatory constraint. Section 5 analyses the evolution of bank capital in terms of balance sheet structure, and its long established formal regulation in the USA.

### 3.2 GENERAL DEFINITIONS OF "BANK" AND "CAPITAL"

While the term "bank capital" enjoys wide currency its definition requires particular qualification, even in the general linguistic sense. Separate consideration of the terms "bank" and "capital" emphasises the potential definition diversity and the lack of any absolute, universal definition.

The classification of a corporation as a bank is essentially a statutory or bureaucratic judgmental process and represents an important instrument of regulatory control of finance markets and participating institutions. Generally, the choice and specification of discriminator variables are designed to imbue the title "bank" with a positive or substantive connotation denied "lesser" finance sector corporations. The carrying of the title "bank" is significant yet inherently arbitrary (2). Also the qualities associated with the term "bank" accentuate the free rider problem in banking (3).

It is possible to distinguish at least three distinct genres of corporate capital. In the context of the overall balance sheet the term "capital" may be used to represent,

- a). A sub-set of assets defined by fixed and long term maturity, and more specifically termed "real" or "physical" capital (4).
- b). At the short end of the balance sheet and within a set maturity limit, an excess of assets over liabilities is termed "working capital" (5).
- c). A sub-set of the liability side. Among the more narrow uses in this context is "equity (or owners') capital"; wider uses include other liability side items possessing one or more

characteristics in common with, or similar to, those of equity; eg permanent or long term maturity (6). At the extreme, the total mix of liabilities, that is equity and debt, is referred to as capital by economists examining the financing structure (eg Modigliani & Miller 1958). This third genre, the liability side approach, is specified in this dissertation.

### 3.3 BANK CAPITAL PRUDENTIAL REGULATION IN CONTEXT

#### 3.3.1 General Regulation

##### Regulation and the Free Market:

The desirability of regulation is commonly considered in the context of the argument for a free market. As noted by Schotter (1990), the free market argument (as distinct from the moral and political elements of the 'conservative argument') possesses a number of intellectual roots and has been justified by Hayek (1948) who views the market as the most efficient mechanism capable of processing the huge amounts of disparate information necessary to coordinate the plans of individual economic agents. Nevertheless, the very individual rationality which allows the market to work may destroy the optimality of its results due to information asymmetry, externalities, and the free rider problem (7).

Regulation may be justified in terms of a remedial activity to reduce costs associated with some market failure; nevertheless criticisms may arise (8). Gardener (1986) observes that fundamental questions requiring analysis include, is regulation necessary (does the market resource allocation achieve maximum social welfare) and, if so, there stands the operational question of determining the best method of regulation.

Government regulation policy is often aimed at correcting 'market failures' such as natural monopoly, incomplete information and restricted market entry. The policies comprise rules which restrict or direct action by the market participants. In practice regulation and the market process

interact and often cannot be disassociated and assessed independently.

### Theories of Regulation:

It may be argued that the perfect market regulates; firms that are inefficient may ultimately fail. Otherwise, in an economic context, regulation appears to lack a universal, or widely accepted definition. Extant definitions tend to be varied and purpose specific, depending on the context of the analysis. Regulation has diverse forms, most obvious is the intervention of the government, or some authoritative body, employing a legislative framework. Also, cartels and agreements may serve as a form of self-regulation. Regulation may be categorised in terms of the power of the regulator as well as the degree of formality employed (9).

(See Annex 3 i)

Stigler (1971) provides a theory of regulation based on trade between industry and government; this involves analysis of contrasts between the processes of the market and politics. Stigler acknowledges two major alternative views of industry regulation. The one sees regulation as being instituted primarily for the protection and benefit of the public or some subclass (eg the cost of petroleum quotas are the cost of defense, a social goal), while the other considers the political process as an imponderable which defies rational explanation, ...

'a constantly and unpredictably shifting mixture of forces of the most diverse nature, comprehending acts of great moral virtue (the emancipation of slaves) and of the most vulgar venality (the congressman

feathering his own nest)'.

Stigler observes that the central task of the theory of economic regulation is the explanation of ...

'who will receive the benefits or burdens of regulation, what form regulation will take, and the effects of regulation upon the allocation of resources'.

His theory is advanced by assuming political systems are both devised and employed rationally (ie appropriate instruments for the fulfillment of desires of members of society - but not necessarily a concept of the public interest).

Stigler notes that regulation may be either sought by an industry or thrust upon it although, as a rule, it is acquired by the industry and designed and operated primarily for its benefit; regulations with an onerous net effect on an industry are the exception but may be explained similarly.

In posing the question 'why does an industry solicit the coercive powers of the state rather than its cash?', Stigler notes that an industry may seek to increase its profitability through various avenues facilitated by the power of the state, but subject to certain characteristics of the political process.

In considering the costs of obtaining the legislation, Stigler notes that the nature of the political process in a democracy must be examined to explain why many industries are able to employ political machinery to their own ends. Like the market process, the political process involves information costs (10). The industry seeking regulation pays with resources and votes. Stigler also notes that the financing of industry-wide

activities such as the pursuit of legislation raises the usual problem of the free-rider.

Nevertheless, as noted by Gardener (1986 p31), ...

'Many contemporary theories of regulation are specific to particular countries and systems. Because regulation is fundamentally a politically induced process, the ability to generalise any theory of regulation across country boundaries is often inappropriate and misleading. Values, institutions and political and social cultures differ greatly between countries. Even within a single country and for similar reasons, generalizing a theory to different stages of its development may be just as difficult.'

Kane (1977) argues that the introduction of political power into economic affairs 'initiates a dialectical process of adjustments and counteradjustments'. He sees a market process of 'reflex action' to rechannel regulatory power, as regulatees ...

'short-circuit regulator intentions both by finding and exploiting loopholes and by the simple expedient of disobeying the law. Avoidance and evasion absorb resources (especially lawyers and administrators) from other uses, raising the costs of performing the previously

unregulated activities. All this frustrates the coalition sponsoring the regulation and puts pressure on bureaucrats and legislators to seek new administrative remedies. The dialectical conflict can resolve itself in numerous ways, but seldom before the nation experiences a wasteful cycle of political/economic reaction.'

#### Environmental Development:

Regulation has developed, observes Gardener (1986 p25), 'as a significant growth industry' over the past couple of decades. He notes that this has been accompanied by a growing feeling that there is too much government regulation, particularly in view of mainly USA evidence that many regulatory schemes fail the cost benefit test, and may exacerbate rather than solve a problem.

Gardener also notes that prior to 1960, government regulation generally was believed somehow costless but this has yielded to a view that all types of regulation have some effect on costs. These costs include, the provision of data and information to regulators, and the maintenance of internal information systems by those regulated to ensure that regulations are being met. Also, potential costs include, reduced competition, the wastes of non-price competition, and some regulation may have hidden costs like reducing the flexibility and reactive capabilities of the regulated institutions to change and opportunities. Other regulation problems include a possible effect on management style; eg managements may become more orientated towards satisfying the

regulators than meeting their proper business demands and objectives. Institutions subject to regulation may innovate to avoid the burdens imposed by regulations.

### 3.3.2 The Definition of Free Banking

Debate about market freedom has emerged in recent years in the context of the banking industry. In a general sense freedom is taken to mean the absence of market constraint of a regulatory nature. Nevertheless, in terms of historical argument, the debate is clouded by an element of confusion centred on the definition of free banking. There appear to be two main points of confusion.

#### Historical Precedent - Degree of Constraint:

A major point of confusion centres on the degree of regulation, or more specifically its absence, necessary to define free-banking. The definition of free-banking eras in both the US and Scotland appears controversial.

In the US context "free-banking" is commonly used to refer the state banking period between the lapse of the charter of the Second Bank of the United States and the initiation of the National Banking System; ie the 1837-1863 period. Nevertheless the application of the title "free-banking" has been described as a misnomer (11).

Scotland provides a relatively pristine example. As noted by White (1984 p23), Scotland experienced free-banking during the 18th and early 19th centuries, during which it had

'... no monetary policy, no central bank,  
and virtually no political regulation of  
the banking industry.'

More recently, White (1991) has acknowledged criticisms of the traditional view that the pre 1844 Scottish system warranted the label "free banking" (12); he concludes (p59) that, ...

'At least from 1810 to 1844, then, the traditional free-banking model is valid for understanding the Scottish banking system. Correspondingly, the Scottish experience provides useful - and favourable - evidence on the performance of a competitive banking system without a central bank.'

#### Central Banking Function Argument:

Goodhart (1985) distinguishes between the macro (monetary) and micro (or prudential regulation housing capital regulation) constraints imposed by central banks. He notes the free banking argument is recurrent, at least in the context of criticism of the macro function. Goodhart observes that the debate arose in the previous century and, that form of the debate, has re-emerged in terms of rules versus discretionary monetary management (13). Goodhart assesses that historical studies of free banking experiences generally suggest that it was 'not so bad after all', at least in the context of a monetary system without a central bank. See Annex 3.2.

Nevertheless, because discretionary monetary management appears to assume the existence of a central bank this debate has become confused with that concerning the need for a central bank for the micro management (ie regulation and supervision) function.

### Bank Capital Regulation:

A further problem emerges in the identification of the influence of a particular regulatory constraint, capital regulation for the purposes of this dissertation, from that of other constraints. In a broad sense this requires distinction between macro and micro regulation (as noted by Goodhart above) and, at a more refined level distinction between the micro regulations (ie the identification of capital regulation effects vis a vis, say, those of deposit insurance).

### 3.3.3 Bank Regulation Rationale and Structure

The relatively heavy regulation of the banking industry, noted by Dale (1984a, p53), occurs due to factors such as the role of bank deposits as money (controlled via monetary regulation) and the central role of banks in the payment mechanism, and the politically sensitive allocation of financial resources within the economy. Also, as major repositories of public savings, banks attract consumer protection regulation.

Prudential regulation may be characterised as a fairly uncommon type, found in areas where the cost of system failure is high both in social and political terms; eg the nuclear industry. The prudential regulation of banks seeks financial system stability, a macro objective, through micro policy aimed at the individual banks. More particularly, prudential regulation of banks is justified fundamentally in terms of the market mechanisms inability to recognise or accommodate the cost of bank system failure, the seeds of which are carried in individual bank failure; ie contagion risk.

As noted by Grady & Weale (1986 p35)...

'It has gradually been recognised that, while competition and the operation of a free market generally may be desirable objectives, banking is somehow or other different.... It is believed that the social costs of failure outweigh any advantages that untrammelled competition might bring.'

Bank prudential regulation, while legitimised in terms of the solvency of the banking sector, focuses on the containment of insolvency risk for the individual bank. The rationale for prudential regulation integrates to some extent with that for both monetary and consumer protection. The potential for multiple bank failure carries with it the spectre of an abrupt contraction of the money supply, and severe dislocation of the real economy, as evidenced in the 1930's depression. Also, the risk of loss of depositor confidence is a key factor in the bank insolvency process. See, eg Dale (1984a p53-55), Revell (1975), Gilbert & Wood (1986).

An argument supporting the role of the central bank in its micro function is provided by Goodhart (1985). He contends that the problem of information asymmetry and the consequent free rider problem, provides a rationale for the existence of an institution such as a central bank providing micro (or prudential regulation). He observes that history demonstrates that such an institution tends to emerge "naturally". Nevertheless, the desirability of such an institution is qualified by necessary constitutional/behavioural qualities (14).

More recently, Goodhart (1991) reasserts the need for a central bank. He notes that the standard argument for a central bank is open to criticism; ie the banks' asset portfolios simply could be restricted to control their vulnerability. Goodhart (1991) supports central bank existence from another tack - based on the inevitable need to support "true" banking institutions holding risky asset portfolios incapable of being objectively valued in conditions of asymmetric and limited information (15).

The assumption that bank regulation is primarily justified in terms of enhanced financial stability is challenged by Benston (1991). He notes that bank regulation predates concern for financial stability by 'hundreds of years'; and observes that, in the US context, 'regulation has tended to exacerbate rather than promote stability'. Benston argues that the fundamental reason for bank regulation is government taxation of seigniorage; this was traditionally achieved through restriction on entry into banking, but is now controlled through non-interest-bearing reserves (16).

Dale (1984a) categorises prudential regulation in two broad areas, preventive regulation and protective regulation. Capital regulation is included in the former as well as other elements including anti-competitive, liquidity, interest rate risk, loan limits, permissible business activities, and bank examinations; the latter comprises deposit insurance and lender of last resort support. See Annex 3.3.

A further distinction may be drawn between regulation and supervision; the former entails the imposition of rules and restrictions while the latter concerns the monitoring of the banking and financial system to ensure that the rules are complied with; eg Mullineaux (1987)

Dale (1984a p56; see Annex 3.3) notes three inter-related rationales for preventive regulation; ie based on the connection between market discipline, regulation, and moral hazard. More particularly regulation may be viewed as, ...

i). a surrogate for market forces; ie 'compensating for the lack of information available to depositors by seeking to lay down the kind of conditions that depositors would themselves wish to make were they in a position to do so',

ii). to counter the moral hazard problem; ie to rule out the additional risk-taking that may be encouraged by the protective regulation (ie liquidity and other support) extended to banks and depositors.

iii). 'to take account of the social costs of bank failure by placing a ceiling on risk-taking lower than that which would prevail in a free market environment where depositors are fully informed about, and therefore able to control, the levels of risk incurred.'

#### Problem of Policy Conflict:

Problems of conflict between prudential regulation and other regulatory areas may emerge in the application of policy (see next section for intra prudential regulation conflict). This is well evidenced in terms of conflict with monetary regulation. Operational conflict arises when pursuit of the one regulatory objective is being emphasised more than the other; for instance, prudentially controlled lending standards may be criticised as too conservative, or too loose, depending on whether the monetary policy being pursued is respectively expansive or restrictive. Conversely, when prudential regulation is of the moment, monetary regulation may be criticised. A strong example of this type of conflict was provided during and after the Great Depression when both areas of regulation were of the moment and conservative lending standards conflicted with expansionary fiscal and monetary objectives (Federal Reserve Bulletin July 1984 p550).

Another dimension of this problem arises in the argument whether responsibility for monetary and prudential regulation

should be housed in a single authority. The advantages of housing both responsibilities in the central bank has been supported by Volcker (1984) (17), although this view may lack neutrality given his position as Chairman of the Federal Reserve Board which houses both functions. The unanswered question appears to be, does the joint housing in a single authority of both the micro and macro function require modification to the conditions called for by the above Goodhart (1985) critique (18)? Also, how should commercial, and political, independence be defined?

#### Regulatory Bodies:

In the UK the Bank of England is the sole bank regulator. The USA bank regulation process is complex and based on a dual structure which divides regulatory responsibility between federal and state authorities, and bears three co-existing federal agencies.

The USA federal agencies comprise, the Office of the Comptroller of the Currency (OCC), the Federal Reserve Board (FRB), and the Federal Deposit Insurance Corporation (FDIC). The primary (or chartering) regulatory agency establishes capital requirements for the banks it regulates. In terms of supervisory authority, the OCC supervises banks with national charters, the FRB and the states supervise state chartered Federal Reserve member banks, and the FDIC and the states supervise state chartered, insured, non-member banks, and finally the states alone supervise state chartered, non-member, uninsured banks. Also, the Federal Reserve is a primary regulatory authority over bank holding companies. The emergence of these bodies is noted in Section 3.4.

### 3.3.4 Prudential Regulation of Bank Capital

#### Definition of Adequate Capital:

Prudential regulation of bank capital is concerned with the maintenance of a level of "adequate" capital. Maisel (1981 p20) defines capital as "adequate" when, ...

'... it reduces the chances of future insolvency of an institution to some predetermined minimum level or, alternatively, when the premium paid by a bank to an insurer is "fair"; that is, when it fully covers the risks borne by the insurer.'

Confusingly, in a linguistic sense, the term "Capital Adequacy" has evolved to describe the functions involved in the prudential regulation, including supervision, of bank capital; eg the regulatory definition, measurement, assessment, monitoring and control of bank capital. Often, particularly in the US context, "Capital Adequacy" is used implicitly to refer to capital ratios in a regulatory context, as in the USA. Dale (1984a, p57) notes that, ...

'Capital adequacy, which is usually assessed in terms of the ratio of capital to assets, is the most important measure of a bank's soundness'.

### Rationale for Capital Regulation:

The inter-related rationales for bank preventive regulation, noted above by Dale (Section 3.3.3) are emphasised in Maisel's (1981) definition of adequate capital.

Dale (1984a p57) identifies a number of reasons why regulators cannot safely allow the level of bank capital to be determined by the market alone. Primarily, the market fails to account for the social cost of bank failure in an unregulated environment. Other reasons stem from the imposition of protective regulation (ie depositor insurance, lender of last resort) which removes market discipline and drives down capital ratios. Protective regulation generally induces both depositors and investors to forgo their own independent risk analysis and rely on regulatory protection. Dale notes that banks also may feel protected if their capital ratios are uniformly low on the basis that the regulators would be obliged to support the whole system.

The socially optimum level of capital is modeled by Santomero & Watson (1977). The model presents two off-setting elements; viz the costs associated with bank failures that result from the industry being insufficiently capitalised, and the costs that enforced over-capitalisation impose on both the bank and society as a whole.

Deposit protection, commonly provided in many countries on a flat rate basis, represents a substitute for capital; ie banks are able to lower their capital ratios without depositors requiring an additional risk premium (19).

The efficacy of capital regulation in terms of actually influencing capital levels and, in view of its interrelationship with other form of regulation, influencing particular bank risks is considered in Chapter 4.

### 3.4 THE EVOLUTION OF ABSOLUTE BANK EQUITY CAPITAL REGULATION

#### 3.4.1 Introduction

This section (3.4) considers the UK in terms of England and Wales, and Scotland in its separate free-banking period to 1844; the US analysis involves both state and national/federal legislation. The direct regulatory constraint of absolute bank equity, or ownership, capital in the early centuries of modern USA and UK banking development appears to have been used as a fundamental control of bank size, risk and market structure. Less direct, yet nonetheless significant, constraints upon equity capital (via growth and profitability limitations) include certain geographic and activity (namely note-issuing in early banking) regulations; these are acknowledged but not emphasised in the analysis.

It seems reasonable to view capital in the origins of UK and US banking as being in the form of simple proprietorship capital. In the UK context, early banking practice was based on the provision of safekeeping facilities for specie and other financial assets by respected merchants (20). The confidence of the depositor was based upon the merchant's wealth, or capital, and character. In the early colonial period of the US, domestic banking was chiefly characterised by merchant credit for a widely dispersed, generally sparse population with a barter trade; the first commercial banks were chartered in the 1780's (21).

### 3.4.2 United Kingdom

Early formal bank capital regulation was a matter for direct government legislation. The role of the Bank of England as formal prudential regulator of bank capital is recent, and considered in Chapter 4.

#### a. Scottish Development

The Bank of Scotland was chartered in Edinburgh by an act of Scottish Parliament in 1695, one year after the creation of the Bank of England, and towards the end of a period of political transition identified by the joining of the crowns of Scotland and England in 1603 and the union of the parliaments in 1707.

The bank was founded as a purely commercial venture and, despite an official sounding name, was unique among European banks of the period in being not a state institution: the government neither did business with it (the Act creating the bank prohibited it from lending to the government) nor regulated it. The bank possessed a legal persona and enjoyed limited liability. It was the first joint-stock bank in Scotland and its charter provided it with a legal monopoly on public (but not private) banking for 21 years. The bank made no effort to renew its monopoly rights when they expired 21 years later in 1716 'Apparently thinking one bank was the most the country could accommodate', White (1984 p24-25); also Gaskin (1965 p 14), Checkland (1975 p23-25).

Unlike England, where the Bank of England's joint-stock monopoly continued for over a century, Gaskin (1965) notes that in post 1716 Scotland, ...

' ... there was no legal barrier to the setting up of other joint stock companies for carrying on the trade of banking. In addition, under Scots law there was, even at that time, a generally available form of legal incorporation in the contract of "copartnery". Thus although over much of the eighteenth century Scotland banking was a small-scale, local affair, as in England, two other powerful joint-stock banks were established, the Royal Bank of Scotland in 1727 and the British Linen Bank in 1746, and their presence prevented the reproduction of the English pattern of one large bank dominating all the others.'

Noteworthily, these three chartered public banks were granted limited liability, but all those which followed were not. Immediate rivalry between the Royal Bank of Scotland, also chartered in Edinburgh, and the Bank of Scotland led to 'duelling', based on acquisition and presentation of large number of the rivals notes for exchange into coin. White notes that this period of intense competition between the two banks led to a number of innovations (22). During the 1730's and 40's a number of non-issuing private bank houses appeared in Edinburgh. White (1984 p27) notes that these were small partnerships dealing primarily in bills of exchange and commercial loans, many holding cash credit accounts at the chartered banks. Other entrants included the Banking Company of Aberdeen (a short lived joint-stock venture formed in 1747 but retired in 1753 after note reflux pressure). Also the British Linen Company (renamed the British Linen Bank, noted

above) ultimately enjoyed the world's first success with branch banking (initially agents appointed in various cities to discount bills and circulate the bank's notes). Later entrants included further small private bankers in the late 1750's, and several provincial banking companies in the early 1760's.

Legislation in 1765 prohibited in Scotland the issue of notes bearing the option clause, and notes of denomination smaller than one pound (23); also, all notes were to be redeemable into gold. White (1984 p30) comments that this raised a barrier to entry against small-scale banks of issue in Scotland, but the right of note issue remained universal.

Entry into Scottish banking continued during the 1760's. White (1984) observes that the number of Scottish banks, both issuing and non-issuing, rose from 5 in 1740 to 14 in 1750, 23 in 1760, 32 in 1769; the Ayr Bank crash in 1772 brought down 8 small private bankers in Edinburgh and the Scottish banks numbered 20 in 1773.

Gaskin (1965) notes the early consolidation of the Scottish banking system in the first half of the nineteenth century arose from a new group of joint-stock banks emerging to join the three ancient institutions and, 'to supplant the remnants of private banking, and to establish branch systems.' More particularly the 1810-1830 period is noted as 'the zenith of the Scotch banking system' by Checkland (1975). The 1810 formation of the Commercial Bank of Scotland, followed by the National Bank of Scotland in 1825 represented a new scale of joint stock bank characterised by a new quantum of capitalisation and stockholder numbers, and able to challenge the two public banks (or three after the British Linen Bank succeeded in obtaining a new charter in 1813); also 1810

marked the beginnings of a savings bank movement. Checkland (1975 p283).

By 1810, Scottish banking was divided among three Edinburgh based chartered ("public") banks with branches in a few large towns; 9 private (non-issuing) bankers - 8 in Edinburgh and one in Glasgow - and 22 provincial banking companies; White (1984 p33).

Nevertheless Checkland (1975 p283) notes that 'Though a number of the provincial banking companies were joint stock concerns rather than small-scale partnerships, none had been large enough to challenge the two public banks. Most were governed by terminable agreements, often ending after 21 years.' Also functional differences existed between the banks (24).

The entry of the Commercial Bank of Scotland in 1810 founded on more liberal principles (25) and the joint stock of over 650 shareholders, spelled the end of the small private bankers and ushered in an era of extensive branch banking; White (1984 p33) observes that the Commercial Bank made a public announcement that no private banker would sit on its board and, by 1819 it had opened 14 branches compared with 17 for the British Linen Bank, 14 for the Bank of Scotland, and the Royal Bank's single branch office in Glasgow. Growth in the following decades, to the eve of 1845 saw 19 banks of issue in Scotland with 363 branches.

White (1984 p34) observes that in its "heyday" the Scottish banking system was cited as an example by free banking advocates elsewhere; the system had evolved a number of features, ...

'There were many competing banks; most of them were well capitalised by a large

number of shareholders; none was disproportionately large; all but a few were extensively branched. Each bank issued notes for £1 and above; most banks' notes passed easily throughout the greater part of the country. All the banks of issue participated in an effective note-exchange system. All offered a narrow spread between deposit and discount (loan) rates of interest.'

White (1984 p36) deriving figures from Checkland (1975) notes that 109 distinct bank firms had entered the system and by 1845 20 banks remained, 19 of them banks of issue (nine of the 19 had entered since 1830). Of the others, 36 had failed or been wound-up, 12 disappeared for reasons unrecorded, 11 retired voluntarily or ended without apparent failure, and 30 merged with other banks.

Freedom of entry in to the Scottish banking system was terminated by the Act of 1844 and the subsequent Scottish Bank Act of 1845 which allowed Scottish banks a degree of advantage over English note issuing banks (26); nevertheless, since 1845 the number of Scottish banks declined steadily, largely through merger. Effectively the Acts provided for the eventual extinction of the right of note issue, except by the Bank of England, in England and Wales; while in Scotland (and Ireland) an indefinite continuance of the bank's own note issues was allowed but no new note-issuing bank was allowed to be formed. Gaskin (1965) notes that

' ... this distinctive treatment was born partly of deference to the national sentiments of these countries but mainly

in recognition of the firmness with which the Scots in particular were attached to the use of small-value notes. In the 1840's powerful political forces could be fielded in Scotland against any attempt to abolish the one pound notes while almost equally strong prejudices against them existed in England. Peel met this by dividing the currency realm and in so doing incidentally provided a legal reinforcement of the separate identity of Scottish banking. Before 1900, at a time when Scottish banks were among the giants of the British banking world and could easily have spread southwards, the separate note issues effectively kept them within Scotland since they exposed them to political attack from the less favourably treated English banks.'

## b. Development in England and Wales

It is convenient to consider the development of UK (namely England and Wales) absolute bank equity capital regulation as punctuated by two major legislative impacts, namely the right to joint-stock capital bank formation and the adoption of limited liability, thus broadly defining three periods.

### Private Bank Capital:

Until the Banking Act of 1826, which breached the Bank of England's 132 year old joint stock bank monopoly status in England and Wales, other banks were constrained in capital by limitation on the number of capital contributors; ie private capital of sole proprietorship or (limited number of member) partnerships. Consequently this period was characterised by the development of the Bank of England's size and influence in contrast to the rest of the banking sector - a set of necessarily small banks of limited development potential.

The Bank of England was formed in 1694 by an Act of Parliament. Effectively this represented a deal in which London merchants and financiers provided the Crown with a loan and the Bank was granted a monopoly as the first and only joint stock bank in England and Wales. This monopoly right was extended and reinforced; Kindleberger (1984 p75) notes that,

'As the end of each (charter) period approached, it was necessary to renew the charter, usually at the price of lending the government more money on a permanent basis and at an interest rate below the

market, although a new charter also gave the opportunity for adding to the Bank's powers and prerogatives.'

This status was reinforced by the Bank Charter Act of 1708 which set the number of partners in any other bank at a maximum of 6 persons (27). Also, the Bank Act of 1742 more clearly expressed the privilege of the Bank's exclusive joint stock status (28).

While the London goldsmith-bankers (who numbered 44 in 1677) were not directly affected by the creation of the monopoly, the note issue circulation of London private bankers was driven out by the notes of the Bank; nevertheless the loss of this source of revenue encouraged a wider use of cheques and, for their own convenience, the London private bankers formed the London Clearing House around 1770. Also, the private bankers came to treat the Bank as a customer rather than a competitor; using it to deposit spare balances which they regarded as ultimate reserves and, when in need of assistance they applied to the Bank for accommodation over a period of particular difficulty. Crick & Wadsworth (1936 p11)

Provincial industrialisation initiated in the latter half of the 1700's, coupled with the monopoly based complacent indifference of the Bank to opening branches, brought the advent of country banking; based on the limited financial and personal resources of separate localities and typically operated in conjunction with trade interests by persons relatively amateur in finance. The number of county bankers is estimated at 12 in 1750, 230 in 1797, and 721 in 1810; Crick & Wadsworth (1936 p13).

Apart from the capital constraint other key risks of the banking system are noted by Crick & Wadsworth (1936 p13-14). Particularly for the country banks, the mixing of banking with other trades involved 'divided interest and unsound methods', and in terms of asset diversification risk 'the fortune of many a country bank was bound up in the success or failure of one or two large firms' (29), but for all banks 'primitive means of communication and inadequate cash reserve arrangements added to the vulnerability ... which was intensified by lack of contact between them'. Also bank note issue was unregulated, although after 1808 it was necessary to obtain a licence (this merely involved an annual fee of £30 and a stamp duty on notes). Accounts were not published, and even the best of banks were subject to the risk of suspicion; bank "runs" were a common occurrence and, ...

'at the best of times failures were distressingly numerous, and in periods of strain the country banks collapsed in such numbers as to entail grave disorder and to undermine confidence over and over again'.

Particular capital related risks include the constraint on partner numbers and the ability of the depositors and noteholders to assess the capital position of the bank. The constraint of partner numbers may not have been significant for some firms; in 1822, of 552 note issuing banks, 375 had three partners or less, and only 26 had the maximum number (30). With no account publication and unlimited liability, the assessment of a bank's capital involved the assessment of partners' total wealth (albeit qualified by a doubtlessly less informed assessment of their liabilities) and probity. Webber (1989) notes that such factors tended to keep country banks

localised as the names of partners, and their financial standing, would be best known in their own neighbourhood.

A period of numerous failures around the time of Waterloo (1815) was followed by an extreme crisis in 1825 which brought down 93 banks. This gave rise to public demands for change and governments began to favour the introduction of open joint stock banking, particularly in the light of its development in Scotland and Ireland. The Scottish banking system based on a smaller number of joint stock banks was perceived as having weathered the crisis quite well: Webber (1989). Nevertheless, Kindleberger (1984 p83) notes that, ...

'The failure of 73 out of 770 banks in England in 1825 was not a very different ratio than 3 out of 36 in Scotland (as of 1830), but the large absolute number made a lasting impression, as did the intensity of the panic.'

#### Joint Stock Bank Capital:

The right to joint stock banking in England and Wales was introduced in stages. The Act of 1826 enabled the formation of banking co-partnerships with any number of shareholders and the right of note issue but only outside a 65 mile radius centred on London and with certain restriction on business with London (31). The Act contained no provision as to share denominations or amounts to be paid up on shares; Crick & Wadsworth (1936 p16).

Nevertheless, the Act also specifically confirmed that the Bank was entitled to open branches anywhere in England & Wales, which right it claimed with offices in a number of provincial centres (32). Initially this acted as a competitive deterrent, but once it was demonstrated that such new joint stock banks could compete, formations increased reaching nearly 50 (with around 10,000 proprietors) by 1833 and over 100 by 1836. Following successful establishments in the provinces, a further re-interpretation of the Bank of England's Charter in 1833 enabled joint stock banks to be established in London provided they did not issue notes; 5 such banks were established there by 1844 despite constitutional and operational difficulties which they nevertheless withstood, assisted in part by the innovation of printing and circulating annual statements of account (33). Country joint stock banks developed rapidly, helped by the development of trade and industry, and the relative weakness of private banks; between 1825-26 and 1841-42, the number of private banks fell from 554 to 311 while the number of country joint stock banks rose to 118; Crick & Wadsworth (1936 p21).

In 1836, the number of country joint stock banks doubled within a 12 month period and several of these hastily developed ventures failed. A Committee of 1936, enquiring into the operation of the 1826 Act observed, as noted by Crick & Wadsworth (1936 p21), ...

' ... too frequently wide and misleading difference existed between share denomination and the amount subscribed; paid-in capital was sometimes inadequate, and additional resources were sometimes obtained by dangerous extension of re-discounting; deeds of settlement often

were loosely drawn, allowing directors and management excessive power.'

Although no substantial changes resulted from the Committee's observations, in 1844 two Acts were introduced that severely impacted on banking operations. The one, the Bank Charter Act of 1844 established the dominance and control of the legal tender note issue of Bank of England; it also had the effect of hindering certain banking amalgamations (34). The other, an Act specifically designed to regulate joint stock banks (35), took the form of a Code which provided extremely onerous conditions for the establishment and conduct of new joint stock banks while leaving extant ones untouched.

As noted by Crick & Wadsworth (1936 p25) the Act prevented the establishment of any joint stock bank without obtaining a charter, with a maximum term of 20 years, through the burdensome process of obtaining Letters Patent. Also, absolute capital standards were imposed with a minimum nominal capital of £100,000; no share was to be of lower denomination than £100, and no company could begin business until all shares had been subscribed and at least one half of their nominal capital paid up. Also, the deed of partnership was required in a form approved by the Privy Council and, among other clauses, should disallow the company to purchase or lend upon the security of its own shares. The Code also required a statement of assets and liabilities to be published monthly and the annual accounts to be examined by auditors elected by the shareholders.

The stringency of the 1844 Code in conjunction with the provisions of the 1844 Charter Act, brought the establishment of new joint stock banks to a standstill (36). Dissatisfaction with the restrictive Code grew and it was repealed by the Act

of 1857 which introduced more reasonable provisions. During the interval between the 1844 Acts and 1857, Crick & Wadsworth (1936 p27) observe that private banks authorised to issue notes dropped from 208 to 157 (half the drop due to failures, the remainder due to amalgamations); similarly, a population of 72 joint stock banks at the beginning of the period fell to 63 (failure accounting for 6, and amalgamation for three).

The 1857 Act included provisions requiring, the retention of a minimum denomination of shares at £100, and registration under the Act for all banks established since 1844, as well as all new banks; the right of note issue was not reintroduced. The Act also increased the maximum number of persons in a banking partnership (as opposed to a company) from 6 to 10.

Significantly too, the Act expressly excluded banking companies from the principle of limited liability of shareholders which had just been accepted and embodied in general law; it was reasoned that depositors were offered greater security by the knowledge that the shareholders were fully liable for losses, and bankers themselves were in agreement with this. Otherwise the Act made joint stock banks subject, in almost all respects (excepting limited liability in particular), to general company law. Webber (1989); Crick & Wadsworth (1936 p28).

Generally, the establishment of joint stock banks, or banking co-partnerships, from 1826 had significant ramifications for capital growth, capital dispersion and management. While capital was still likely to be contributed from a bank's particular operational locale, the potential existed for expanding the capital base by attracting new investors without this requiring changes in management as was the case with a private bank where normally the introduction of an additional partner had to be a very carefully made choice from within the

family of original owners, or their close business associates. By dispersing the investment in a bank through shares, a greater number of investors were able to provide capital and especially before the introduction of limited liability, a far greater and more dispersed source of wealth was callable in the event of liquidation. Joint stock banks could provide a greater diversification of risk and the capacity to expand in support of advancing trade and industry. Webber (1989).

#### Limited Liability:

Although the principle of limited liability for bank capital was introduced in 1858 and widened in application in later years, its adoption by banks was generally restrained until the City of Glasgow Bank failure of 1878 and subsequent legislation of 1879.

In 1858 a short bill was introduced enabling new banks to be formed with limited liability except in respect of note issue, and existing banks were allowed to take advantage of the Act. A particular feature of the legislation was the requirement that banks availing themselves of the Act must publish a statement of assets and liabilities twice yearly and exhibit it in every branch of the bank. Previously the publication of balance sheets was a rarity except among the London joint stock banks; few of the principal country joint stock banks printed anything more than an annual statement of capital and of the allocation of profits; none of the private banks issued any figures except those concerning note issue. Crick & Wadsworth (1936 p30-31).

The 1857 and 1858 legislation facilitated far easier new bank formations and, existing banking co-partnerships to reform

with a far less cumbersome constitutions with the option of limited or unlimited liability. Nevertheless existing banks were reluctant to avail themselves of the legislation; reasons included fear that much goodwill rested on the unlimited liability of the partners, the potential for a competitive disadvantage if other banks maintained unlimited liability, and a probable reluctance to publish balance sheets. New bank formations were less hindered by such factors although the maintenance of the £100 minimum share denomination proved an obstacle; this was removed by the 1862 Companies Act which consolidated and greatly simplified the laws affecting companies generally, including banks. Subsequently, the early 1860's saw the spread of limited liability banking with the conversion of form among existing banks, particularly from private banks into limited joint stock banks; private bank numbers were also diminished by absorption into joint stock banks. Nevertheless many of the larger, older joint stock banks were reluctant to adopt limited liability (37), although some abandoned their old co-partnership constitutions and registered as unlimited liability companies - which also reduced the liability of a shareholder from three years after transfer to one year. Crick & Wadsworth (1936 p31-33).

Attitudes against adoption of limited liability strongly changed with the disastrous failure, involving fraud, of the unlimited liability City of Glasgow Bank in 1878 which demonstrated dramatically that even the bankrupting of scores of shareholders was not adequate protection for depositors (38).

Consequently a capital flight from bank shares caused a fall in market price, Crick & Wadsworth (1936 p33); More particularly support for unlimited liability did not disappear immediately, increasing numbers of banks wished to convert to

limited liability and the prices of unlimited stock fell;  
Webber (1989)

The reluctance of the older and larger joint stock banks to accept limited liability was seen as a problem for the restoration of confidence. A compromise solution was devised by the Act of 1879 which established a new legislative principle of "reserved liability". This provided for the division of the unpaid portion of limited liability bank shares into two parts; the one callable at directors' discretion, and the other only in the event of the winding up. The intention was to create a new kind of liability on shares, "reserved liability" represented part of the difference between the nominal and the actual paid-up amount of a share, being available only in the case of a company being wound-up; the Act allowed a company with fully paid up share capital to create a reserved liability by increasing the nominal amount of capital, others could provide a portion of uncalled capital as reserved liability. The Act also provided for the election of auditors by members, and the audit of accounts (39); Anderson & Cottrell (1974 p312-316).

The principle of reserved liability was widely accepted, the London joint stock banks changed to the limited liability form with registered reserved liability in 1882. One result of the change was to bring into general practice the publication of bank balance sheets at least once a year. Crick & Wadsworth (1936 p33-34).

By 1882, out of 114 joint stock banks in England and Wales, 44 banks had been formed with, or converted to, reserved liability, 53 held limited liability but were not availed of reserved liability and 17 remained with unlimited liability. By 1885 of 99 joint stock banks, 68 held reserved liability,

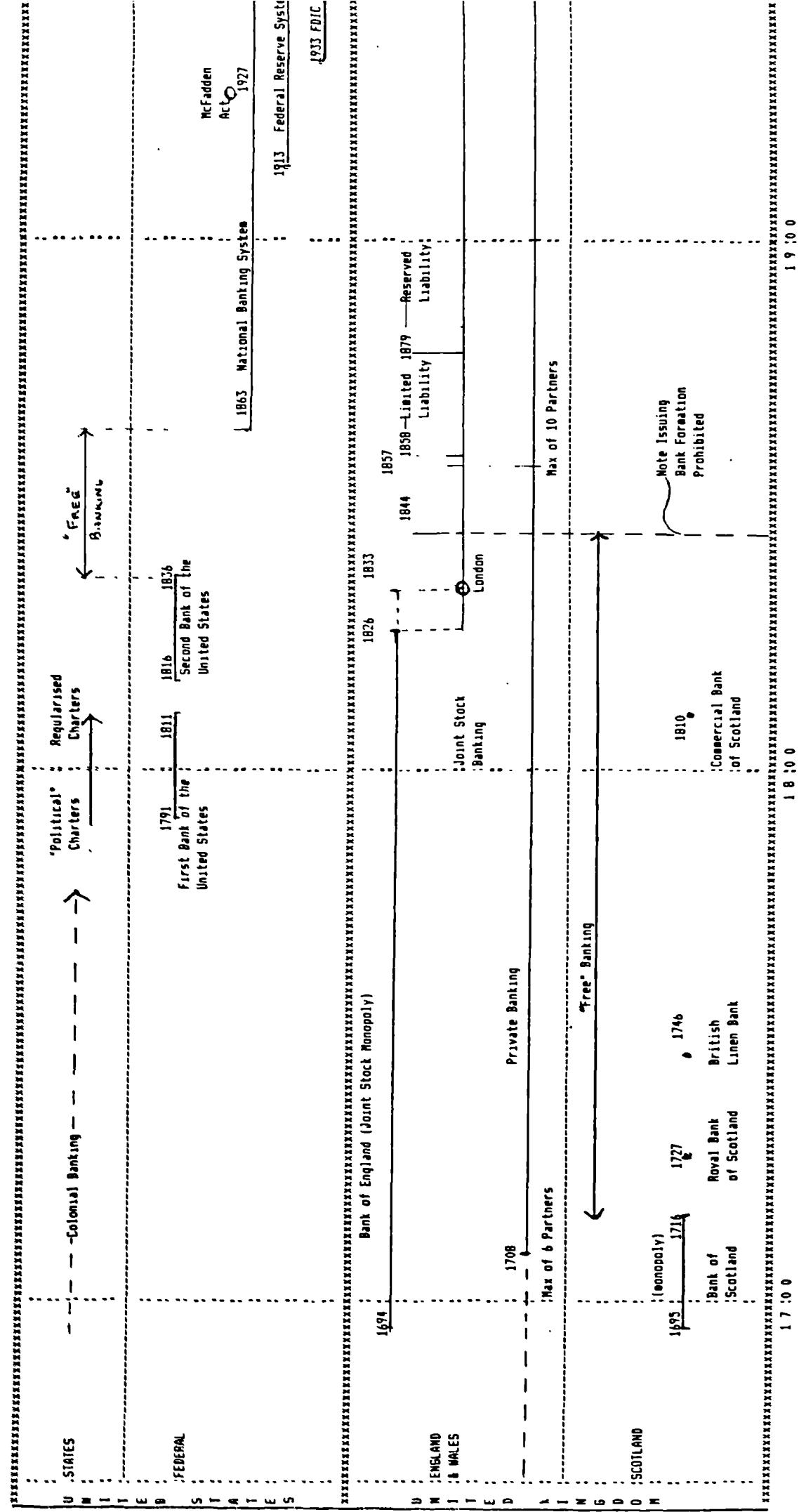
29 held limited liability only; Webber (1989). Crick & Wadsworth (1936 p35) comment that by 1884 the number of private banks had fallen considerably since 1844 while the joint stock banks had increased in market dominance in terms of resources and branches, although their numbers had not increased greatly.

The practice of issuing high denomination shares with only part of the nominal capital paid-up, as prevailed in the early days of joint stock banking, gave way to a greater democratisation or wider market appeal, with a trend towards issuing smaller denomination shares and the introduction of fully paid-up shares (40).

Diagram 3 1

MAJOR HISTORICAL BANK CAPITAL REGULATION

- A Diachronic Chronology of the UK and US -



### 3.4.3 United States

The early colonial role of capital in providing depositor confidence (41) appears to have gained official recognition and, post revolution, developed along with the evolution of banking institutions and practice, to be represented by a formally required minimum capital stock which also served to support and control both liabilities (mainly bank note) and loan growths.

#### a. Early State Banking

##### Initial Stages:

After the revolution, the need for additional credit facilities saw the chartering of early state banks with specified capital stock, eg the Bank of Pennsylvania in 1780. Apart from individual state banking legislation, Congress used bank capital as a measure to limit non-deposit liabilities (viz notes outstanding) in the chartering of the First Bank of the United States (1791-1811) followed by the Second Bank of the United States (1816-1836). These banks represented the first elements of national central banking, in terms of monetary control (42).

The charter of the First Bank of the United States provided for a maximum capital stock of \$10m; and the public subscription was payable in specie (at least a quarter) and Federal government bonds. The bank's non-deposit liabilities (viz issued note) were limited to capital stock plus deposits. The Second Bank of the United States was chartered with a capital of \$35m with the provision that non-deposit debts (viz notes) could not exceed the amount of capital stock. During

1791-1811 the number of state chartered banks rose from 6 to 88 while the average capital stock fell from \$2.125m to less than \$0.5m. Following the lapse of the First Bank's charter, and until the establishment of the Second Bank (ie the 1811-1816 period) state bank numbers jumped 158 to 246 banks and total capital stock of all state banks increased by around 110%, and note circulation more than tripled. Staats (1965 p39-42).

The early period of state bank chartering is characterised as a political process. The individual charters generally involved a minimum capitalisation but these were not standardised but resulted from the political bargaining process. Capital was used as a control measure for note issue (43). Staats (1965 p44) comments, ...

'There appears to have been wide latitude in provisions stipulating the amount of initial capital stock payment and the manner of paying the balance of stock subscriptions.'

Also, Howe (1915 p96) noted that in the early stages, ...

'Bank charters were considered as one of the spoils of partisan politics and were often granted by the party in power to politicians as a reward for party activity.'

A number of states had standardised capital requirements by 1836. Staats (1965) notes standardisation of minimum capital stock requirements with a minimum paid-in capital stock; New York required all the minimum to be paid in before

commencement of operations, while 50% was required by Alabama, Massachusetts, Rhode Island and Vermont. Previously, Massachusetts passed a law in 1822 requiring a surplus accumulation for new banks with less than 100% paid in capital; such banks were prevented from paying dividends, which were maintained in a surplus account until the specified capital stock had been paid. Staats also confirms that most states controlled liabilities in terms of paid in capital; namely, ...

'The maximum legal ratios of liabilities to capital stock were usually three, four, or five to one, however, much of the legislation was not clear as to which types of liabilities were subject to the limitation. Some states included only note liabilities while others also included deposit liabilities. In addition, by 1836 restrictions on bank loans in terms of a ratio of loans to paid-in capital stock were frequently established in the state legislature.'

#### "Free" Banking Period:

After the lapse of the Second Bank in 1836, the regulation of banks was again entirely in the hands of the states. Rockoff (1991) notes the emergence of "free" banking; ...

'ideas on banking were numerous and vigorously pressed, and the states adopted a wide range of regulatory systems. Some followed the lead established in the

Independent Treasury and tried to prohibit all banks, or all new banks, and force people to deal in specie. But increasingly the most popular form of legislation was the so-called free-banking law. This legislation, first adopted in Michigan and New York in the late 1830's and then by large numbers of states in the 1850's, had two main provisions.

1. Entry into banking was open to all as long as certain minimum requirements with respect to capital and other matters were complied with. Under the old system of chartered banking (still the dominant mode in many states), each bank required a separate charter from the state legislature.

2. Bank Notes intended to circulate from hand to hand as money had to redeemable in specie and backed by government bonds (typically issued by the state where the bank was located). These bonds were deposited with a state official who was empowered to sell the bonds and redeem all the notes of a bank if one note was protested for non-payment.'

Cooper & Fraser (1986) note that by 1860 18 of the 32 states had passed free banking statutes; see footnote (11). State insurance plans for banknotes and deposits emerged during this period; in some states these were operated by the state governments while, in the others, mutual agreements among the

participating banks were used.

Staats (1965) observes that the number of banks climbed from 506 to 901 during 1834 to 1840 while average capital stock remained almost unchanged at over \$395,000. By 1843 the number of banks had dropped 23% following recessionary influences started with a panic in 1837. By 1863 there existed 1,532 banks with a total capitalisation of \$412.2m.

In terms of minimum capital stock, Staats (1965) notes that by 1863, thirteen states had adopted minimum initial capital requirements for banks with levels ranging from \$25,000 to \$100,000. Also several states placed maximum limits on the amount of capital stock for a single bank.

Also, concerning initial paid-in capital, prior to 1863, the laws of those states which regulated capital stock contained varied provisions concerning capital payment. Before operations could commence, some states stipulated that all a bank's legal capital had to be paid in, other required less. Staats (1965 p49) notes that prior to enactment of general banking legislation, incorporators were required to pay in as little as 10% of stated capital before beginning business.

The forms of capital payment also varied. While some states required a capital contribution in specie, others allowed a portion in the form of real estate mortgages or personal property. Provisions allowing property as payment were abused with the use of inflated valuations, and finally the practice was eliminated.

An attempt to increase effective bank capital through the assessment of additional liability to shareholders was first made in 1808 in Pennsylvania. Although it proved

impracticable, the notion that stockholders should personally assume banks liabilities remained and was incorporated into the statutes of several states prior to 1863. Legislation developed included shareholders being liable for the par value of stock held, and the concept of 'double liability' made stockholders personally liable up to an amount equal to the par value of the stock owned.

b. The National Banking System:

The post 1836 federal central banking lacuna was broken by the National Banking Act of 1863 and succeeding legislation from which emerged the national banking system. Cooper & Fraser (1986 p48) comment, ...

'The pressure of financing the civil war proved to be more effective than concerns about the safety and soundness of the banking system in prompting Congress to act.'

The Act initiated the formal federal regulation of banks, establishing the office of the Comptroller of the Currency to administer law, and supervise and examine national banks which could be chartered, subject to requirements, including the holding of a reserve part of which had to be held in Treasury bonds. Cooper & Fraser (1986) also note that, ...

'While (national) bank chartering requirements were liberal (though stricter than the state free-banking laws) and no specific authority to regulate bank entry was included in the act, the Comptroller soon began the exercise of discretion in approving or rejecting applications for national bank charters. Further, the act placed restrictions on the types and amounts of loans national banks could make and established a system of reserve requirements.

Despite the stricter chartering conditions, taxation was used to induce banks to join the national system (44). Cooper & Fraser (1986 p49) comment that the national system provided a uniform currency and a more stable banking system, but lacked a mechanism to provide an elastic money supply to meet the variable needs of industry and commerce. Consequently, ...

This, coupled with problems posed by interbank holdings of the required reserves in 'pyramid' fashion' was blamed for a number of financial panics in the late 1800's and again in 1907, and led to the founding of the Federal Reserve System (the Fed) which had as a primary goal, the provision of an elastic currency to end the periodic bank liquidity crises.

#### Minimum Capital Stock:

The national banking period initiated in 1863 included provision among federally chartered banks for a minimum capital stock dependent on the population of the bank's domicile city. (National Currency Act 1863: Section 6, and National Bank Act 1964: Section 7). The minimum capital stock was later extended by the McFadden Act of 1927 to apply to bank branches.

#### Initial Paid-In Capital:

The National Currency Act of 1863 required at least 30% of capital stock paid before the commencement of business with the balance to be paid by instalment, each of 10% of the legal

capital stock and timed in a sequence of no more than two month periods from the commencement of business.

This requirement was generally less stringent than that prevailing among the states. Nevertheless, the federal requirement was hardened by the National Bank Act of 1864 which changed the minimum initial capital payment to 50%, and required the 10% installments of the balance on a monthly basis.

**Surplus Accumulation:**

Surplus accumulation requirements were rare before the Civil War. Apart from the 1822 Massachusetts requirement (previously mentioned) Virginia later required banks to accumulate and maintain a surplus of at least 5% of capital before dividends could be paid. Staats (1965 p50) notes that 'the accumulation of a large surplus was not generally encouraged and surplus requirements were not widely imposed because of the fear of possible concentration of financial power'. Also, Dewey (1911 cited in Staats 1965) reports that in 1846 the Connecticut Banking Commission stated, ...

'... banks should not be allowed to accumulate a large surplus, as it would tempt those who knew the true condition of the bank to take advantage of the purchase of stocks of those who were less well informed.'

Staats concludes that ...

'Apparently, fears of excessive financial power out-weighed the desire to provide

more protection for depositors and noteholders; consequently, surplus was not an important element of stockholders equity prior to 1863.'

The National Bank Act 1864 required national banks to carry 10% of its net profits of the preceding half-year to its surplus fund until the same shall amount to 20% of its capital stock.

Following the lead of the national bank legislation a number of states required the establishment of surplus accounts equal to 20% or more of capital stock and most of these required 10% of annual profits to be accumulated in surplus until the minimum level had been attained. Some 19 of the states adopted provisions identical to those of the federal laws while other adopted more stringent requirements.

#### Double Liability:

The National Currency Act of 1863 continued the convention established in the chartering of the Second Bank of the United States, that the par value of each bank stock should be set at \$100. A similar provision was included in the Banking Act of 1864.

Par value was significant as each of the major national banking laws made shareholders liable up to the amount of par value of stock owned for debts of the bank. In effect, a shareholder was personally liable for twice the par value of his shares because, after initially investing in shares at par value, he could be assessed for a like amount to help satisfy the banks debts.

c. The Federal Reserve System:

By 1913, all but a handful of states had established minimum capital stock requirements and although there was little uniformity in the minimum requirements among states, the provisions in most states were less stringent than those in federal law.

Also, in terms of initial paid-in capital, by 1913 most states regulated the payment of legal capital although the requirements varied among states. Some required all capital to be paid prior to opening, while other required half and lesser amounts: some stipulated an absolute amount of capital. The time allowed for the payment of the balance of the capital stock also varied widely from 90 days to 2.5 years.

The Federal Reserve System was founded in 1913 to achieve the macroeconomic objective of monetary stability. Its initial effect on bank regulation was minor, enlarging only in later years. Cooper & Fraser (p49) note that, ...

'..... some observers view the failure of the Federal Reserve Act to include provisions for strengthening the state banking system to be the major weakness of the 1912 legislation.'(45).

Apart from the establishment of the dual state and federal banking systems further major US legislation tended to consolidate more power in the federal banking authorities particularly after the exigencies of the 1920's and early 1930's; the powers included greater control over bank structure (including absolute and relative capital controls) and operation,

These developments are sketched in Annex 3.4; particular elements include, ...

i). the McFadden Act of 1927, which allowed national banks to establish branches where permitted by state law; the Act also eliminated the requirement that national bank stock have a par value of \$100 per share, ie national banks were permitted to issue stock at par values less than \$100.

ii). the Banking Act of 1933 (Glass-Steagall) separated commercial and investment banking, increased the regulatory power of the Federal Reserve Board, and created the Federal Deposit Insurance Corporation (FDIC). This was closely followed by,

iii). the Banking Act of 1935, which extended the independence and power of the Federal Reserve Board. Apart from increased monetary management power, the Fed was given power of discretion in the granting of national bank charters. Federal influence over state bank charters also emerged from the FDIC via its discretion over the provision of deposit insurance cover.

The Banking Act of 1935 revised provisions regarding surplus accumulation which had been in effect since 1864 and required a surplus equal to at least 20% of capital stock to be paid in prior to the commencement of business by national banks. This contrasted with the 1864 legislation which, while requiring ultimately a 20% surplus, permitted the accumulation of surplus out of earnings.

The Banking Act of 1935 also required each national bank to increase its surplus account by 10% of semi-annual profits until the account equalled the par value of capital stock. The

effect of the 1935 revision was to increase the total amount of owners' equity in banking institutions because, in the light of the banking experiences of the 1920's and early 1930's, it was deemed imperative that owners supply additional protection against insolvency and loss to depositors and other creditors.

Also, the concept of 'double liability' which was found in state banking legislation prior to 1863, remained generally in force in federal and state statutes until 1937. It became apparent after the banking difficulties in the early 1930's that the legal provisions making bank stockholders personally liable for bank debts were hampering efforts to secure additional capital to strengthen the banking system. Therefore included in Title III of the Banking Act of 1935 means whereby a national bank could terminate on or after July 1 1937, the double liability of its shareholders by publishing notice thereof in a newspaper one time at least 6 months prior to termination. Following the change in federal banking laws, most of the states which had double liability requirements also eliminated these provisions from their respective legislation.

iv). the Bank Holding Company Act of 1956, designed to halt interstate banking expansion.

### 3.4.4 Major Themes of Capital Regulation

The foregoing suggests a number of major themes in the development of absolute equity capital regulation in both the UK and the US; key features of bank capital regulation development concern, ...

#### (i). Bank Market Structure:

The use of capital regulation as a control of bank market structure was manifest in minimum and maximum capital constraints imposed via specific capital amounts or a maximum number of capital contributing persons in a single bank entity; and the ultimate liability of the individual capital contributor.

A polar difference in the application of capital based monopoly policy in England (an effective monopoly of capital growth bestowed on the Bank of England) and the US (with anti-monopoly capital constraints), also contrasts with the lack of capital control in a free banking Scotland.

The English monopoly system which limited banks, other than the Bank of England, to a maximum number of partners until 1826, contrasts with a fairly consistent focus on a minimum equity capital standards developed in the individual states of the USA and later federal legislation (although the fear of monopolising banks was accommodated largely by non-capital means such as geographic-branching and activity controls as well as some maximum capital controls).

A further contrast is provided by the lack of any particular capital constraint during the free banking era of Scotland (46); although the three old chartered banks alone enjoyed

limited liability until its wider availability. This is somewhat different to the capital constraint in the so called "free banking" states of the US - in the decades prior to the Civil War; these states regularised their individual bank chartering procedures thus replacing the case by case random specifications which tended to flow from a political process.

(ii). Capital Market Efficiency:

A number of developments led to greater capital market efficiency; such as improved information, and liquidity factors based on the democratisation of shares (eg the reduction of minimum par values and the facilitation of easy ownership transfer).

Improvement in the information structure; includes the mitigation of factors such as limited localised knowledge, and the development of accounting standards and presentations, and auditing. In a broad sense information structure improvement came from technological (transport and communication technology) as well as direct legislative measures. And, in the case of the early London joint stock bankers, was voluntarily improved in a relatively harsh competitive climate.

Another important feature concerns the role of capital regulation and risk; this includes a number of elements.

(iii). Shift from Uncertainty to Risk:

The transition from unlimited to limited liability of shareholders, albeit initially in cumbersome measures such as

"double liability" and "reserved liability" allowed a greater degree of quantifiable risk to emerge from the haze of uncertainty; the distinction between uncertainty and risk is considered in Chapter 4. The development of disclosure and auditing requirements also would have assisted this trend.

(iv). Failure Risk:

The regulatory control of bank capital maximum levels, for whatever avowed purpose, also appears to have been associated with widespread bank failure risk - eg the evidence, albeit nominal and contestable, of pre 1826 English banking versus the Scottish experience.

(v). Capital Costs

Particularly in the English bank context, the pre 1826 suppression of capital size ensured a large number of owner-managed banks; the later emergence of widespread joint stock banks allowed the development of a specialised or professional management; it is tempting to view this as facilitating a general improvement in bank management skills, and economies of scale (47). Also, it represents the introduction of new agency (monitoring) costs.

### 3.5 THE EVOLUTION OF RELATIVE BANK CAPITAL REGULATION

#### 3.5.1 Introduction

This section considers the development of bank equity capital regulation in its relative, or balance sheet, structure context.

##### a. General Regulatory Philosophies

In keeping with the relatively technocratic approach it historically demonstrated towards absolute equity capital regulation, the US similarly applied formal regulation of bank capital as an interactive balance sheet structure control from the early state period; as noted previously in Section 3.4.3a.

In contrast, the formal use of capital linked balance sheet structure control for regulatory purposes is relatively novel in the UK (48); a formal process has been developed only within the past couple of decades - see Chapter 4. Previously, the Bank of England performed a less precisely defined role of informal prudential regulator via its control over banking 'club' membership; ie the exercise of discretionary, indirect power over bank behaviour (49).

The regulation of equity capital, itself absolutely regulated, in terms of the bank balance sheet structure represents the progenitor of modern adequacy of bank capital regulation. Put in more prudentially aligned terminology, this represented an early formal manifestation of the matching of a functional capacity based definition of bank capital against functional requirements demanded of the various banking risks - see Chapter 4.

### b. The Secular Downtrend In Capital Structure

The phenomenon of a secular downtrend in bank capital as a proportional component of bank balance sheets is documented in both the US and the UK. The reasons for the decline are unclear.

Nevertheless, a number of possible contributory factors present themselves. Bank regulation not specifically directed at capital structure may have been influential; ie the development of capital substitutable bank prudential protective regulation, such as lender of last resort facilities and deposit insurance - whether formally or implicitly, may have provided some impetus to the downtrend. The long term development of opportunities for risk diversification also may also have encouraged the downtrend. Also, fundamental changes in factors influencing capital structure, as per theory noted in Chapter 2, may have contributed to a change in optimal capital structure (50).

The development of absolute bank equity capital constraint regulation represents a fundamental qualification to observations, in industrial countries such as the UK and USA, of a secular downtrend in bank equity capital in terms of balance sheet structure. In other words, on a secular nominal basis, bank equity capital may not represent a consistent measure. For instance in terms of risk bearing capacity capital may need to be qualified by properties of unlimited liability or more obscure factors such as double liability.

Nevertheless these qualifications have tended to stabilise this century. Another major qualification is the fact that the banking environment and risks have changed dramatically over time. The further qualification of accounting standards, including the use of hidden or secret reserves, is considered in Chapter 4.

### 3.5.2 Capital Structure Development

#### a. USA

In the USA, which has a long established tradition of using relative equity capital for regulatory control of balance sheet size and structure. Lindow (1963), cited in Vojta (1973a p8), notes that, ...

'Bank capital ratios have been declining since the early 1800's. Throughout most of the 19th century, banks were heavily capitalised. In the early 1800's capital funds to total assets were in the 70% range, but moved to about 20% by 1900. The rapid expansion of bank assets during World War I and the economic expansion of the 1920's brought the ratio to just under 13%. From the Depression years to 1945 the ratio moved to 6%. In the post-war period the ratio adjusted to just under 10% through the 50's before reverting to the present 6-10% range. The ratio of capital to deposits showed a parallel trend, running somewhat above the ratio of capital to total assets. In the 1870's the ratio was as high as 80%. By 1920, the ratio had dipped just under the 20% level. From a low of 6% in 1945, the ratio rose before adjusting to the present 6-10% range. The ratio of capital to risk assets was nearly 60% in the late 1870's, 25% by 1900, 15-18% in the 1920's and in the post

war period reached the present 8-12% range. .... The historical experience in this country is that a normative standard of bank capital in relation to assets or deposits has not been maintained.'

A graph of the secular, decline of capital bank balance sheet structure is illustrated in Graph 3.1. Post World War 2 developments are also illustrated by Maisel (1981), in Table 3.1.

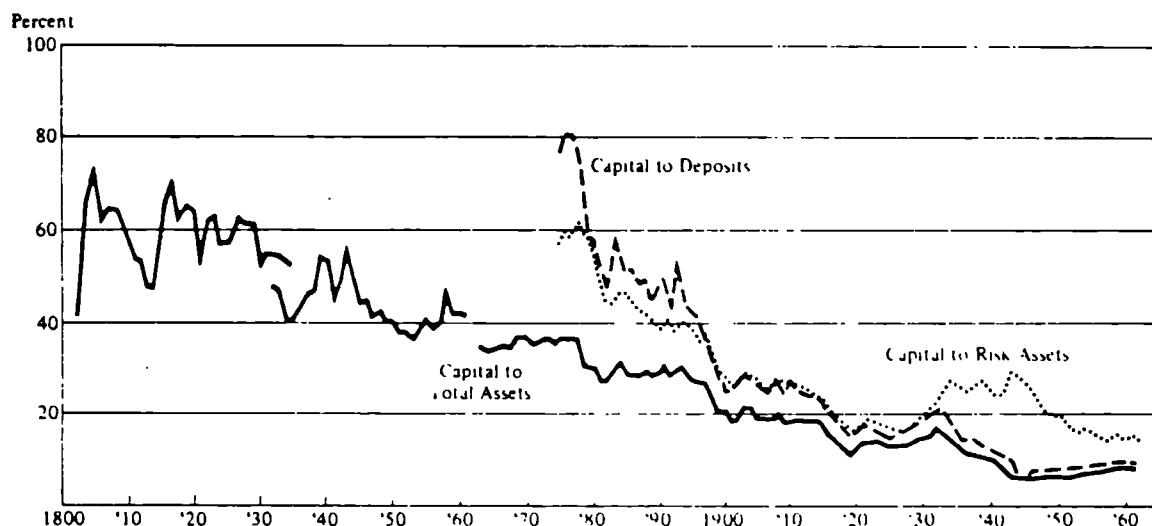
In a wider context, Robinson & Pettway (1967) also cited in Vojta, note that, ...

'the decline in capital ratios in the USA has had a parallel in almost every foreign country ... (and) ... Generally, banks in the Netherlands, West Germany, Switzerland, Belgium and the Scandinavian countries have been roughly comparable to equivalent US banks in size of capital accounts, whereas banks in the United Kingdom, France and Italy tended to maintain much lower ratios ... (and) ... Major Japanese banks also maintain lower levels of capital than do US banks.'

GRAPH 3.1

THE SECULAR DECLINE IN US BANK CAPITAL RATIOS

- Bank Capital as a percent of Assets and Deposits -  
1803-1963



Source: taken from Orgler & Wolkowitz (1976);  
primary source, Lindow (1963)

Graph is derived from data for Jun 30:-

1803-1835: for Massachusetts banks; 1876 Report of the  
Comptroller of the Currency (1876 p98).

1834-1862: for all banks in the US; Historical Statistics of  
the US (1949 p263)

1865-1962: for all commercial banks in the US: Annual Reports of  
the Comptroller of the Currency (1865-1874); Journal of  
Political Economy (December 1947 p559); Historical  
Statistics of the US (1957 p631-2); Banking and  
Monetary Statistics, Board of Governors of Federal  
Reserve System (1962 Supplement p28); Federal Reserve  
Bulletin (March 1962 p346).

TABLE 3.1

US Ratio of Bank Equity Capital to Total Book Assets  
 (Expressed as Percentage, and for all Banks in the US)

Year	Ratio
	%
1939	10.33
1949	6.86
1959	7.9
1969	7.45
1979	5.75

Source: Maisel (1981 p108) using figures derived from the Federal Reserve and Comptroller of the Currency illustrates the post-war decline for all banks in the US:

b. UK

The United Kingdom has recorded a secular downtrend in capital ratios in terms of both the private and joint stock banks. Evidence is fragmentary and varies according to source for the early days.

Table 3.2, compiled by Collins (1988) provides a general picture of the downtrend from the mid 1800's to early this century.

Table 3.3 has been compiled from primary data contained in Crick & Wadsworth (1936) presented in Annex 3.6. The compiled Table shows capital ratios for the 1844, 1884, 1904 and 1934 years but lacks figures for the private banks. The ratio figures available for joint stock banks, in Table 3.3, indicate a general decline, which became more marked in the first few decades of this century.

The downtrend in the capital ratios of the joint stock banks is further chronicled by Wilcox (1979). In the two decades prior to World War I, Wilcox notes a greater efficiency in the use of capital during a period of bank amalgamation which caused a general downward trend in the average published ratio of capital to deposits. For joint stock banks the ratio was about 20% in 1880 , dropping to about 13% by 1990 and, influenced also by wartime inflation, was no higher than 6% by 1917 and following increases in proprietorship funds, in 1920 the average published ratio of capital resources to deposits rose from 5.25% to nearly 6.5%. The capital to deposits ratio for the clearing banks stood at 7% by 1931, declining slowly to around 5.75% in 1939, and with wartime inflation, reached 3% in 1945 and finally as low as 2.5% by 1951.

Capital growth via earnings retention proved a problem during the 1950's due to credit controls. Easier credit control and generally improved economic conditions from 1958 allowed a substantial increase in published capital resources throughout the 1960's. The adoption of a fuller disclosure policy by the banks (vis a vis hidden reserves - see Chapter 4) in 1969 saw a jump in published capital ratios. The 1968 average ratio of capital to deposits of all the parent clearing banks was about 6% - in 1969 on the new and consolidated group basis it rose to just over 8.5%.

In terms of the private bank sector, Webber (1989) notes that their balance sheets were published and circulated for the first time in the 1890's and showed a downtrend during the First World War; during the interwar years the private bank sector virtually disappeared. A more detailed exposition of the private and joint stock bank ratio developments, based on Webber (1989) and Wilcox (1979) is provided in Annex 3.5.

TABLE 3.2  
 UK BANK CAPITAL RATIOS  
 Decadal Averages: 1840-1909  
 Source: Collins (1988)

Ratio of Capital Funds\* to Public Liabilities

	%
A: England & Wales**	
1840-49 (8)	35
1850-59 (13)	20
1860-69 (19)	19
1870-79 (20)	20

(\*Sample only; number of banks in parentheses)

B: United Kingdom

1840-49	20
1890-99	15
1900-09	13

C: Scotland

1865-69	18
1870-79	16
1880-89	16
1890-99	15
1900-09	15

\*\* Capital Funds defined as Paid-Up Capital and Reserve Funds

Table derived by Collins from the following sources:

A: London Clearing Bank Archives - see Collins (1984)

B: Calculated from D.K. Sheppard (1971)

C: Calculated from S.G. Checkland (1975)

TABLE 3.3

EQUITY CAPITAL RATIOS\* : BANKS IN ENGLAND AND WALES  
 (1844, 1884, 1904, 1934)  
 - Bank Numbers in Parentheses-

	1844 %	1884 %	1904 %	1934 %
BANK OF ENGLAND	35.8	25.1	18.6	3.2
1. LONDON BANKS				
1.a Private	na (63)	na (35)		
1.b Joint Stock	21.9 (5)	19.1 (21)	15.5 (14)	9.5 (3)
2. LONDON AND PROVINCIAL BANKS				
Joint Stock		11.4 (6)	10.3 (12)	6.1 (11)
3. PROVINCIAL BANKS				
3.a Private:	na (273)	na (172)	na (35)	
Issuing.....	na (208)	na (100)	na (18)	nil
Non-issuing..	na (65)	na (72)	na (17)	
3.b Joint Stock:				
Issuing.....	(100)	(91)	(39)	
Non-issuing..	na (28)	18.8 (46)	15.8 (18)	6.7 (1)

Source: Derived from Crick & Wadsworth (1936)

See Annex 3.6 for their source data and qualifications

\* Equity Capital Ratio = Capital & Reserves / (Capital & Reserves + Note Circulation + Deposits)

a Includes Channel Islands & Isle of Man

### 3.5.3 Development of Relative Bank Capital Regulation

#### a. Origins

In the USA, structural bank capital regulation was apparent from the early state period and was based on the simultaneous developments of absolute equity capital regulation (previously considered) and some notion, however fundamental, of risk analysis.

The precise dating of the origins of capital ratio usage appear to be largely a matter of definition. It may be argued that legislation based on the difference between capital stock and paid in capital stock, eg surplus accumulation legislation, is a form of capital ratio control, albeit within the equity account.

In the wider sense, both the First and the Second Banks of the United States were subjected to non-deposit liability control based on capital stock. Staats (1965 p45) also notes that most states restricted bank liabilities in terms of paid-in capital and used a maximum limit; nevertheless, the legislation often was not clear as to which liabilities were subject to the limitation (51).

During the 1836-63 period, Staats (1965 p52) notes that a number of states supplanted the capital to liabilities legislative control by a reserve requirement, expressed in terms of a ratio of reserves to liabilities, and designed to maintain liquidity in the asset structure.

The National Currency Act of 1863 limited the indebtedness of national banking associations in terms of capital stock. As

noted by Staats (1965 p61), ...

'Except for deposit and note liabilities, bills of exchange or drafts drawn against money on deposit, and liabilities to shareholders, indebtedness was limited to the amount of unimpaired capital stock actually paid in. The National Bank Act (of 1864) included an identical provision and also restricted the amount of national bank notes issued to any national bank to the amount of its paid in capital stock.'

In the post 1863 era, as deposit creation began to supplant note issue, the previous capital based control of note issue was extended to deposits. Staats (1965) notes that by 1910 six states' legislation required that deposit liabilities must not exceed a certain multiple of paid in capital (52), and three states restricted aggregate loans and investments in terms of capital stock (53).

#### b. Wider Development of a Capital to Deposits Ratio

A wider use of a capital to deposit ratio from the early stages of the century parallels the earlier development of the equity-debt ratio used in industrial and commercial enterprises which relates the volume of capital to the volume of debt protected by the capital. As the capital deposit ratio developed as an accepted measure, a rule of thumb emerged, stipulating that capital should equal at least 10% of deposits, as a standard for the adequacy of capital. The

origin of the one-to-ten ratio is unknown but its earliest legal citation is in the 1909 Californian legislation; and, as previously noted, some states stipulated different ratio levels (eg 1 to 15), while others gave no legal backing to a standard; Staats (1965 p80-81)

The capital-deposits ratio never was incorporated into national banking legislation despite repeated recommendations by the Comptroller of the Currency. Nevertheless, Staats (1965 p83) comments that, ...

'The capital-deposits ratio generally, and the 1:10 standard specifically, were used to some extent by the Federal Reserve System, the FDIC, and the Comptroller of the Currency ... (but) ... the period of time this standard of capital adequacy was actually used by these agencies seems to have been rather brief, possibly extending from the bank holiday in 1933 to the mid 1940's.

Revell (1975 p29) comments that, ...

'The first time that a general rule of thumb was adopted was in 1933, when all banks were closed during the "bank holiday" and allowed to reopen only on proof of capital adequacy. From then on a rough ratio of 1:10 net worth to total deposits was accepted.'

### c. Shift Towards a Capital to Assets Ratio

Although evidenced in earlier use among some states (see Section 3.4.3), a capital to assets ratio began to gain favour during the Second World War. Staats (1965 p84) comments that,

...

'The 1 to 10 capital-deposit ratio was criticised after the late 1930's as bank deposits increased sharply and the structure of bank assets changed substantially. With the decreased importance of loans and with increased liquidity resulting from the holding of US government securities, it became apparent that a measure of capital adequacy had to be related to the structure of assets and not only to the volume of debt.'

Revell (1975 p49) notes that the FDIC moved onto a ratio of 1:10 net worth to appraised value of assets in 1939. This change of emphasis was justified, notes Revell, on two grounds, namely ...

'(1) the real risk was asset depreciation and not deposit withdrawal, and

(2) the net worth/deposits ratio failed to distinguish between deposit variability (instability) and deposit velocity (turnover).'

Revell (1975 p29) comments that, ...

'The FDIC ratio was suspended during the war because all new deposits gained went into riskless government bonds. When the FDIC re-imposed its ratio in 1945, bankers drew attention to the fact that their portfolios still contained a large proportion of government bonds, and as a result the ratio was modified to a 1:5 net worth/risk assets (all assets other than cash and government securities).

In the post World War II period, a ratio used by both the FDIC and the Federal Reserve related capital to total assets. Staats (1965 p84) comments, ...

'No generally accepted standard for adequately capitalised banks was developed for this ratio, although the Federal Reserve System authorities suggested that an adequately capitalised bank would have capital equal to at least 7% of total assets, while the FDIC used the national average of the ratio for all banks as the standard.'

Nevertheless, neither the capital to deposit, nor the capital to asset ratios distinguished between the risk of banks asset structures. And as the proportion of loans in bank balance sheets began to revert to normal after 1950, the matter of asset structure risk came to the fore of thinking on capital adequacy measurement.

d. Refinement of the Capital Ratios

A key element involved in this development is the distinction among the degrees of risk involved in several asset categories, and the idea of "free" capital (54).

In its early refinement, the asset category method viewed assets such as cash, bank balances, and US government securities as practically free from risk (particularly during a prevailing Federal Reserve policy of pegging prices). The capital to risk asset ratio focused on the remaining "risk assets". Staats (1965 p86) notes that, ...

'Originally, a capital-to-risk-asset ratio of one-to-five, or 20%, was considered standard for adequately capitalised banks, although the Comptroller of the Currency adopted a one-to-six ratio.

Further development involved refinement of the degrees of risk in the several types of risk assets. The 1952 year appears something of a watershed year in the development of refined capital ratios. As noted by Revell (1975 p30), developments included, ...

(i). Adjusted Deposits to Capital Ratio

The New York State Bankers Association (NYSBA) proposed that the denominator of the capital ratio should be total deposits less riskless assets (ie cash and government securities); this related capital to 'deposits at risk' rather than assets at risk.

Revell (1975 p30) observes that the change in numeric value under this formulation; ie in 1965, on the basis of this

formula, the average insured bank had a ratio of 14.1%; and a ratio of 11.7% on the FDIC formula.

### (ii). Adjusted Assets to Capital Ratio

#### Adjusted Risk Assets:

The idea of "riskless assets" was expanded to include asset categories slightly more risky; eg bonds of federal agencies guaranteed by the US government. Nevertheless this system resulted in the same simplistic dichotomy of risk categories - risk or riskless.

#### Disaster Valuation of Assets:

A 1952 report for the Illinois Bankers Association, by G. Freeman, recommended that each bank should determine its own capital adequacy based on its worst past experience; more specifically it should value each asset type in its portfolio on the basis of its experience in the depression of the 1930's. In other words, the experienced percentage loss for each asset type is applied to the respective types of assets currently held to find the amount of capital required. This approach was criticised as impractical for use by some banks; Staats (1965 p90). Revell (1975 p30) notes that this methodology also recommended an arbitrary, assumed 10% loss on loan portfolios; he also comments that this was the first "disaster valuation" approach to the question of solvency.

### Six Asset Risk Categories:

In 1952 the Federal Reserve Bank of New York (FRBNY) Bank Examinations Department (or more particularly Howard D. Crosse; according to Revell 1975) developed a method of determining minimum capital requirements which while similar to Freeman's method, was standardised and simplified. Bank assets were divided into 6 categories according to the degree of risk with an allocated capital requirement assigned to each category.

The asset categories based on liquidity and credit risk, ranged from the most liquid of bank assets, called "primary reserve assets" such as cash on hand against which no capital is required. Other categories included "secondary reserve assets" requiring a 5% minimal capital; "portfolio assets" with 12%; "substandard assets" 20%; "work-out assets" 50%; and "fixed assets" 100%.

Staats (1965 p94) notes that the aggregate of the capital requirements for each of the 6 asset categories is compared to the bank capital comprising, ... 'book capital plus unused, or excess, valuation reserves less estimated losses and half of doubtful assets.' He adds that this method allowed the determination of any required additional capital and, ...

'received widespread acceptance among commercial bankers and banking supervisory authorities because of the soundness of its approach to the determination of capital adequacy.'

This methodology appears to represent the prime progenitor of modern international prudential capital assessment, albeit

with a number of significant developments; this is discussed in Chapter 4. A fundamental criticism of this methodology is provided by Revell (1975 p30) who observes the arbitrariness of the capital margin set for each risk category. He comments,

...

'we can see just how arbitrary the margins are, although they were supposed to be based on a bank loan officer's approach to comparable situations when lending to customers. (It is worth noting this link between the creditworthiness of a bank and its own procedures for determining the creditworthiness of its customers ...).'

Revell also makes the point that, ...

'The amount of capital determined by the formula is not supposed to be a measure of "adequate" solvency, but a minimum below which net worth is definitely inadequate. Normally banks will have between 115% and 125% of the minimum capital requirement.'

#### e. Agencies' Methodologies

##### Federal Reserve Board:

In 1956, the Board of Governors of the Federal Reserve System introduced its own ratio formulation which, while similar to the earlier FRBNY ratio, also incorporated some refinements.

These included a liquidity factor (ie more liquid banks require less capital) which was weighted by a disaster valuation based on the assumption of a repetition of the experiences of the 1930's. A further refinement involved a sliding scale of requirements based on the size of the bank's portfolio (ie providing for relatively greater amounts of capital for smaller banks).

The Board of Governors revised the ratio formula in 1972. As noted by Revell (1975 p36) changes adopted included an update of the reference disaster valuation period to the 1950-71 period which covered the two credit crunches of 1966 and 1969, and a distinction between credit risk and market risk (55).

Nevertheless, as noted by Moulton (1987), the evolution of the system brought greater complexity and precision, and it became more difficult to administer. Finally, the system was dropped in the mid-1970's because adequate capital levels could not be agreed. She notes that, ...

'For the next few years, regulators persuaded or cajoled banks into increasing capital when needed and, in extreme cases, required a bank to formulate a plan to raise capital.'

#### **The Comptroller of the Currency:**

Since 1962 the Office of the Comptroller of the Currency abandoned arbitrary numerical relationships in favour of a subjective judgement process involving consideration of 8 factors. These include, 1) quality of management; 2) liquidity

of assets; 3) history of earnings and retention thereof; 4) the quality and character of ownership; 5) the burden of meeting occupancy expense; 6) the potential volatility of deposit structures; 7) the quality of operating procedures; 8) the bank's capacity to meet present and future needs of its trade area, considering the competition it faces.

The Comptroller's Handbook required the examiner to make an accurate determination of the capital adequacy for each bank, but in lieu of arbitrary guidelines, the application of the criteria represented a subjective process. Dince & Fortson (1972), Revell (1975).

While the Comptroller's approach became known as "non-ratio", ratios are used as guidelines, particularly in identifying problem banks. Orgler & Wolkowitz (1976) note that until 1971, the Comptroller's Manual disclaimed any reliance on capital ratios in assessing the capital adequacy of national banks.

Nevertheless, while recognising that subjective factors are helpful up to a point, Dince & Fortson (referring to the Office of the Comptroller in 1966) comment that, ...

'Ratios alone are not conclusive but they do have a bearing. The most important ratio used is the is the ratio of bank capital to risk assets; ie all assets less cash and government securities ... (this does not utilize the multigrade risk classification system of the Federal Reserve System...).'

Revell (1975) identifies the use of a rule of thumb element, consisting of the ratio of net worth to gross loans and

discounts. He comments that this is used as the first quick test of capital adequacy and ... 'where gross loans and discounts exceed seven times net worth , the bank is scrutinised more closely.'

More recently, Orgler & Wolkowitz (1976) noted that, ...

'A notably popular measure ... (in problem bank identification) ... is total loans to total capital where total capital includes equity, loss reserves, and long term debt. More recently, the Comptroller has begun to experiment with the ratio of classified assets (as determined by bank examiners) to total capital.'

On the basis of this ratio, a bank is classified as A (ratio below 20%), B (20-40%), C (40-80%), and D (80% plus). Orgler & Wolkowitz (1976 p70-71) note that at the end of 1973, 85.5% of national banks were "A" banks; the ratio is then combined with the deposit size of the bank in order to establish an acceptable loans to capital ratio (eg for banks with deposits under \$100m the acceptable ratio ranges from 8.5% for A banks to 6.5 for D banks). Nevertheless these ratio tests are only guidelines, final evaluation is based on the 8 factors.

Apart from the subjective emphases on management quality, and earnings and retentions, the ratio approach of the Comptroller is also notable for the use of a definition of capital which extends beyond net worth or equity.

Federal Deposit Insurance Corporation (FDIC):

The FDIC has tended to use forms of a capital to assets ratio. These are characterised by use of a wide definition of capital (ie including equity, reserves and long-term debt) adjusted for the quality of assets as determined by bank examiners. Orgler & Wolkowitz (1976 p71) note that the principal ratios calculated by the FDIC for all insured banks are,

- i). adjusted capital to adjusted gross assets; in which total capital is adjusted by deducting 100% of assets classified as "loss" and 50% of assets classified as "doubtful", and
- ii). net capital to adjusted gross assets; in which total capital is adjusted by deducting 100% of all classified assets ('loss', 'doubtful', and 'substandard').

The adjusted gross assets in either ratio is equal to total assets less 100% 'loss' assets and 50% 'doubtful' assets. Orgler & Wolkowitz also note that the FDIC also considers a management rating and an earnings analysis in determining a bank's overall rating.

Acknowledgement of Non-Equity Capital:

As previously indicated, long-term debt became increasingly recognised in capital definition by both the FDIC and the Comptroller.

Orgler & Wolkowitz (1976 p67) observe that since 1962, the Comptroller has allowed banks to issue subordinated debt up to one third of their total capital and allowed this debt to be considered as part of the capital account; this assisted

competition with other financial institutions and foreign banks. They observe (p72) that the Comptroller promoted, ...

'the rapid growth of long-term debt by allowing national banks to use this source and by considering long-term debt as part of total capital.

Nevertheless the Comptroller imposed qualifying restrictions on its use; namely a minimum maturity of 7 years, and a ceiling of one third of total capital. Moreover, to qualify for the one-third ceiling required passing two tests (failure reduced the one-third ceiling) namely,

- i) an earnings coverage test: ie earnings before interest and taxes must be at least three times the total fixed charge on long-term debt, and
- ii). a retained earnings test; ie retained earnings over the previous 5 years must equal or exceed the average pro rata sinking fund necessary to retire the debt in full by its maturity date.

The FDIC traditionally accepted long-term debt. Orgler & Wolkowitz (1976 p67) comment that, ...

'The FDIC has never objected to long-term debt as long as it did not exceed a "reasonable" amount. ... This is a consistent attitude in an agency that emphasises depositor protection in cases of failure. Since long-term debt is subordinated to deposit liabilities, it provides the same protection as equity in the case of bankruptcy.'

The FDIC applied similar constraints, namely the one third ceiling, the minimum maturity of 7 years, and debt issues must have a face value of at least \$500; nevertheless no formal tests were applied which accorded with its relatively liberal attitudes; Orgler & Wolkowitz (1976 p72).

The Federal Reserve Board previously was the most reluctant of the agencies to consider long-term debt as part of capital. This was reasoned on the basis that it is an inadequate substitute for equity in absorbing temporary losses; Orgler & Wolkowitz (1976 p67). Nevertheless, in 1975 it allowed a proportion of long-term debt to be counted as part of total capital, effectively adopting an approach similar to that of the Comptroller; Orgler & Wolkowitz (1976 p72). The allowed proportion was based on several tests, including an earnings test.

Recent developments in the regulatory definition of capital, which focus on the inclusion of non-equity items, are considered in Chapter 4. The recent comment of Benston (1991 p223) nevertheless appears appropriate at this juncture, viz  
...

'For reasons that are unclear to me, the regulatory authorities also have not fully counted subordinated debentures as capital. Subordinated debentures not only would protect the deposit insurance agencies from loss, as would equity capital, but also would be preferable to equity capital, as long as the debentures could not be redeemed by the bank for a period long enough for the authorities to force its reorganization and

recapitalization when it is in danger of becoming insolvent. ... It should be recognized that subordinated debentures simply are explicitly uninsured time-dated deposits. Thus the only cost to a bank of issuing such liabilities is that it is forced to give up some or all of the deposit insurance subsidy it receives from the government in the form of underpriced insurance by having to pay a rate for funds that includes the cost of risk.'

#### Agencies' Philosophies:

Revell (1975 p37) views the multiplicity of prudential regulation supervisory agencies as a major criticism of the US system; he believes it is difficult to justify differences in their basic approaches. He cites Randall's (1965 p127-30) observation of an apparent difference in philosophy between the Comptroller and the Federal Reserve System, and notes that around 1965 a number of banks whose capital ratios were declining changed from state to federal charter in order to come under the more lenient supervision of the Comptroller (who placed a lesser emphasis on solvency ratios than the Federal Reserve System).

Orgler & Wolkowitz (1976) comment that it is difficult to conclusively compare agency orientation although some inferences may be drawn. They note that because the

Comptroller's experience is based on supervising the more stable banks, it is generally considered the least conservative; and while the FDIC and the Federal Reserve Board (FRB) have been 'generally more conservative than the Comptroller in attitudes towards bank capital, in recent years they have become more liberal'.

Also, they note (p73) that regulatory practices are not tied to actual legal statutes but depend on the agencies achieving their goals through persuasion; ie no regulatory agency has direct legal authority but can apply indirect pressure via for instance frequent examination, and denial<sup>or</sup> branch and acquisition applications.

### 3.6 SUMMARY

#### Capital Regulation in Context:

While the "free" market argument justifies regulation in terms of preventing potential market failure, theories of regulation are diverse and suggest rationales such as trade between industry and government, Stigler (1971); and a dialectical process of adjustments and counteradjustments, Kane (1977).

In the banking sector Benston (1991) challenges the financial stability rationale for bank regulation; he views it essentially as taxation by government authorities of seigniorage, and argues in a wide sense that "regulation has tended to exacerbate rather than promote stability".

More particularly, bank prudential regulation is fundamentally justified by the market's inability to account for the cost of a contagious systemic failure. Although its roots may be found in early bank regulation, the formal principle of prudential regulation appears to have been firmly established in the US after the experiences of the 1920s and 1930's.

It is difficult to isolate and assess the influence of prudential regulation policy from that of monetary regulation policy; and similarly bank capital regulation from other forms of prudential regulation. Ironically, capital regulation appears to be best justified as a means of controlling the risk-taking behaviour, and costs, encouraged by another form of prudential regulation - deposit insurance.

Benston (1991 p226-7) attributes much of the US commercial bank failure of the 1920s and 1930s to regulation which

constrained geographic and activity diversification (56). He comments (p227) that, ...

'Given the existence of governmentally-provided deposit insurance (de facto or de jure), capital requirements are necessary. Other regulations of banks portfolios and activities have been detrimental to the goal of enhancing financial stability.'

#### Absolute Bank Capital Regulation:

The analysis shows the key influence of capital regulation policy in shaping bank market structure, risk definition, capital costs, capital market efficiency and, more controversially, bank failure.

Contrasts between the regulatory developments of the three geo-political areas also illuminate the influences of different capital regulation policy. The contrasts between monopoly policy, and more particularly the role of capital regulation in that policy, are strong. The selective use of minimum, and maximum, capital levels represented a distinctive and key regulatory constraint. A unified ceiling (maximum capital) policy applied in England and Wales contrasts with a focus on minimum capital, which evolved from raw political bargaining, in the states of the US.

In terms of defined "free" banking periods, Scotland was generally characterised by the lack of capital regulatory constraint (notwithstanding an uneven distribution of limited liability status). It is difficult to draw a strong conclusion

about the influence of capital regulation in the failure risk experience of Scotland in contrast to that of England and Wales. In the pre Civil War States of America "free" banking was characterised by a regularised chartering procedure rather than the absence of capital regulation.

#### Relative Bank Capital Regulation:

The secular decline in capital ratios appears to be a universal phenomenon. But the preceding analysis indicates that equity capital has not been consistent in terms of its qualities in the UK and US. Consequently, such time series need to be qualified. For instance, the risk bearing capacity of capital has evolved with absolute capital regulation.

Bank capital regulation in relative, or balance sheet structure, terms is long established in the US and has evolved to accommodate a wider-than-equity capital definition. Also the risk against which capital is matched moved from a focus on liabilities to assets. Emphasis and development in capital and risk definition has differed among the individual US regulatory authorities according to their particular philosophies. Relative capital regulation became the main instrument of bank capital prudential regulation.

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## FOOTNOTES

(1). Apart from the variety of identifiable group viewpoints, such as those of bank regulators and accountants, there may exist intra-group viewpoints; eg the diverse views of the USA bank regulatory agencies (see Chapter 3.5). This is also evidenced in the accounting profession which encountered particular problems in defining capital in recent years when the problem of measuring capital in inflationary conditions was of the moment; eg Harvey & Keer (1983 p13) comment,

' ... Much of the debate was about maintaining 'capital' or the substance of the business but accountants have rarely agreed on what they mean by these terms. Having considered such definitions as the equity interest, capital employed, and so on, the conclusion is finally reached that the definition of this phrase still has to be agreed amongst accountants.'

Similarly, among the legal profession, corporate capital may be defined by reference to both statute and common law, and is subject to current interpretation. In the UK, emphasis is on the definition of authorised and issued share capital and the nature of ordinary and preference shares; Jones & Bellringer (1984).

(2). The significance of the title "bank" and the element of arbitrariness underlying its bureaucratic determination were demonstrated over recent years in the UK. The title "bank" was emphasised by the Banking Act 1979 which imposed the added

qualification of 'licenced depositor taker' (second tier bank) on a number of erstwhile banks. The Banking Act 1987 did away with the two tier categorisation and provided that there should be only one category of authorised institution and that "bank" could be used only by authorised institutions which met the specified prudential requirements set out in the Act.

The inherent arbitrariness of this bureaucratic process was noted in 'Banking World' (April 1988, p71);

' ... authorised institutions of the 1987 Act include firms which are not banks and have never desired to use the name. They include also firms which are generally regarded as doing banking business, but have not described themselves as banks.'

Unlike many countries in which banks are licensed or chartered (as in the USA) therefore restricting and controlling the operation of whatever is defined as 'banking business', the UK previously had no such direct banking law. Writing before the 1979 Act, Revell (1975 p46-45) noted that many laws impinged on bodies carrying on banking business and there existed several lists of bodies regarded as banks for the purposes of different Acts of Parliament. The process of recognition of a bank was a progressive one, each stage conferring certain privileges and certain obligations. The price of full banking status as a 'listed bank', as opposed to a 'statistical bank', was full adherence to various regulations and the close supervision of business by the Bank of England. Official recognition was a powerful factor in inspiring public confidence. When recognized, banks were under severe official lending constraints. At the end of the 1960's new banks had the incentive to obtain only the bare minimum of official

recognition if they could avoid the obligations imposed on full status banks - this was the origin of the "fringe" banks.

(3). Goodhart (1985) notes that information asymmetry about differential risk taking allows banks with a greater propensity to take risk to benefit from the more conservative banks; he comments that ....

'"reputation", "name", "trust" is more important in financial intermediation than elsewhere: accordingly the free-rider problem is also felt more acutely'.

The free rider problem is discussed in Chapter 3.3.

(4). Real capital, sometimes confusingly referred to as "capital", is used to describe corporate fixed or long-term assets such as land, buildings and plant. These items are characterised by long maturity. This definition of capital tends to acknowledge real capital in the classical economics sense.

(5). A definition of working capital is typified by Greener (1971), ...

'A vague term for that part of the capital of the company which is continually circulating ..(and).. is calculated by deducting current liabilities from current assets.'

(6). The range of corporate capital definitions used in the general context of the liability side of the balance sheet are

exampled by Hanson (1974), ...

'The capital of a company is the money that has to be raised to purchase the real capital required for starting up the business ... (and) ... the capital of a business is taken to be its net worth, that is, the value of its assets less the amount owing to creditors.'

and Pearce (1981), ...

'Companies can have a variety of types of capital. The principal distribution is between share capital and loan or debenture capital.'

These definitions exemplify the looseness and multiplicity of meanings generally accorded to corporate capital. They identify singly or in combination, a number of liability side items including share capital, shareholders' funds (net worth), and debenture/loan stock as representing capital. These items have in common a perpetual or (initial) long-term maturity.

(7). When information asymmetry emerges - markets can break down and create a need for intervention; eg Akerlof (1970). Also, individual rationality coupled with externalities may ruin the optimality of market outcomes. A further qualification arises from the distinction of private from public goods; the benefits of Adam Smith's 'invisible hand' apply to private goods. But in public goods markets the

problem, as noted by Schotter (1990 p59), is the lack of incentives for rational individuals ...

' ... to reveal their true willingness to pay for the goods that exist in markets for private goods, because rational people know that they can not be excluded from using a public good provided by the other agents in society and are tempted to get a free ride' ;

(8). Gardener (1986 p30) notes both the public interest (or consumer protection) and producer protection (or capture) hypotheses. He observes that the public interest hypothesis emphasises consumer interest and holds that regulation is supplied in response to public demand for relief from some market failure such as inefficient or inequitable market practice. Criticisms of this hypothesis's explanatory power include the fact that regulation may sometimes be undertaken to fulfil objectives which lie outside the strict public interest, and the lack of a clear mechanism by which the alleged and defined public interest is translated into the required legislative action.

Gardener notes that the producer protection hypothesis explains regulation in terms of demand by groups attempting to promote their own private interests. The integrity of this hypothesis is weakened by the existence of several versions, some of them conflicting. The hypothesis generally indicates a gain to producers through regulation but fails to acknowledge that consumer groups often benefit as well.

(9). Gardener (1986 p29) comments that, ...

'The economics literature does not contain a universal and widely accepted definition of regulation. At one extreme is the strict definition of regulation, like governing in accordance with the law. At an operational level, regulation refers to control over what individual economic units may do and sometimes how they can perform these activities. ... Sometimes a superficial and circular approach is adopted - regulation is what regulators do. But regulation is not just what regulators do; it is how they do it. Regulation, for instance, may be tight or lax; it may be paternalistic or dictatorial; and regulation may be limited or all embracing. In this setting regulation may be characterised more efficiently by its effect on the economic efficiency of the units or market under regulation.'

(10). Costs of information appear to be accommodated in Stigler's assessment of the political process. Characteristics of the political process (see Annex 3.1) may be moderated, in part, by having numerous levels of government (the individual has more incentive to acquire information about local issues than whole state systems). Also, Stigler notes that, ....

'The voter's expected expenditure to be informed about the individual policy proposals, and express his preference (by individual and group representation as well as by voting) are determined by expected costs and returns, just as they are in the private market place. The costs of comprehensive information are higher in the political arena because information must be sought on many issues of little or no direct concern to the individual, and accordingly he will know little about most matters before the legislature. The expression of preferences in voting will be less precise than the expressions of preferences in the marketplace because many uninformed people will be voting and affecting the decision.'

Stigler describes the channels of political decision-making as gross or filtered or noisy, ...

If everyone has a negligible preference for policy A over B, the preference will not be discovered or acted upon. If voter group X wants a policy that injures non-X by a small amount, it will not pay non-X to discover this and act against the policy. The system is calculated to implement all strongly felt preferences of majorities and many strongly felt preferences of minorities but to disregard the lesser preferences of majorities and

minorities.

Nevertheless, this condition may be reduced by, ...

'any reduction in the costs to the citizen of acquiring information and expressing desires and by any increase in the probability that his vote will influence policy'.

(11). For instance, Cooper & Fraser (1986 p46) note that, ...

'In 1837, Michigan enacted a ~~fee~~ bank chartering law. New York and Georgia followed with similar legislation the following year. By 1860, 18 of the then 32 states in the United States had passed free banking statutes. While there were variations among the states, these laws essentially allowed banks to be chartered by any parties providing a prescribed amount of capital and securing notes of the new banks with a specified amount of bonds. The bonds were deposited with an agent of the states who would sell the bonds to satisfy calls for note redemption should the bank fail to do so.'

Nevertheless as cited by White (1984, p139):

'Vera Smith (1936, p44-6) briefly discusses why "free banking" was a misnomer as applied to state banking laws

passed between 1837 and the Civil War. Those laws made banking "free" only in the sense that legal barriers to entry were regularised. Smith (p149) rightly notes that "the American system was characterised by certain features which render it quite inappropriate as an example of the working of free banking in the more general sense," the more general sense being absence of any special banking regulation.'

(12). White (1991 p37-38) notes that economic historians such as Checkland (1968) and Munn (1985) are

'... sceptical of any simple picture of complex historical experience, (and) have pointed to features of the Scottish case seemingly at odds with the free-banking model. They have offered alternative interpretations, according to which the two most important Scottish banks, or the Bank of England, played certain controlling roles.

He also notes that monetary economists, eg Cowen & Kroszner (1989) and Rothbard (1988) in defending visions of the laissez-faire payments systems (viz the legal restrictions theory of money and the one-hundred-percent gold standard respectively), that do not coincide with the Scottish model, have accordingly argued that it was not laissez-faire.

Relying on Checkland (1975) and Munn (1981) for historical facts which the pattern of traditional free banking fits best, White (1991 p58-59) argues that, ...

'The traditional contrast between the freer Scottish system and the more restricted English system is warranted. The privileges of the chartered Scottish banks may have generated some small rents worth protecting, but they did not impede competition in intermediation or in the provision of inside money. The chartered banks may have played a special leadership role before 1810, but did not control, direct or cartelize the Scottish banking industry. The Bank of England was not a lender of last resort to the Scottish system before 1844. Nor was it a central bank in the sense of providing a reserve base of high-powered money for the Scottish banks except during the Restriction period. The Scottish banks used the London financial market to meet occasional liquidity needs, but this did not imply reliance on the good graces of the Bank of England.'

(13). Goodhart (1985) notes that the debate about the desirability of free banking, ie the desirability of having a central bank, previously flourished in the early and mid 19th century. Such debate centred on the question of whether market discipline imposed by a well functioning clearing house would suffice to keep the banking system in order.

Goodhart comments that after falling dormant, the subject has been revived by questions about the desirability of discretionary monetary policy by a central bank (eg Friedman 1959 and Hayek 1978); and the structural necessity of, and functions of, a central bank. This latter question arises from general reconsideration of the need for government intervention and regulation of the market; and accords with the current focus of economic analysis, vis a vis rational expectations advocates, on the influence of different institutions and policy regimes (particularly those of the government) on the market.

(14). Drawing on the historical patterns of central bank development, Goodhart (1985) observes that a central bank micro function is a naturally occurring phenomena. He is opposed to free banking, in the context of the absence of a central bank micro function, on the basis that it depends on the existence of perfect costless information, or at least on the availability of much greater information than is available; ie he acknowledges the problem of information cost and the resultant free-rider problem.

Nevertheless he qualifies his support for a micro regulator by prescribing its behavioural critique; viz it should be both non-profit-maximising and non-commercial in order to avoid the potential cost of conflicts of interest. See Appendix 3.2.

Also in the context of self regulation, or 'the club approach', which provides a solution to the free-rider problem, Goodhart (1985 p75-81) similarly notes the need for the commercial neutrality of club officialdom in order to avoid conflicts of interest (eg officials drawn from the membership may promote undue restraint on competition such as

harsher barriers to entry).

(15). Goodhart (1991 p18) notes that the standard argument in support of a central bank is based on, ...

'the view that the combination within banks of portfolio management together with the provision of payment services makes them uniquely vulnerable to contagious crises involving adverse social externalities.'

Goodhart believes this argument may be criticised on the grounds that, ...

'the permissible asset portfolio of commercial banks could be restricted into a form which limited such vulnerability.'

Goodhart's new tack is based on the view that financial intermediaries risk is based on the unique nature of bank assets - ie mostly non-marketable, and not suitable for objective market valuation in conditions of information asymmetry and limited information. And even if the payments system were hived off to safe financial intermediaries (ie those limited to holding safe asset portfolios), ...

'we would still need a central bank to support the residual, risky, "true", banking institutions, which were undertaking the necessary function of making loans to borrowers who could not

otherwise sell their own equity and debt in extant financial markets.'

(16). Seigniorage, or seignorage, is defined by Cooper & Fraser (1986 p33) as the difference between the cost of producing money and its value as a means of exchange.

Benston (1991) comments, ...

'Because, governments tended to debase the money they produced to maximize seigniorage in the short run, bank-produced money often came to dominate state-produced money. Those in power could increase the tax they could impose on bank money (for example, via low- or no-interest-rate loans to the state and to powerful persons) by limiting entry into banking, thereby maximising banks' profits and the amount that could be taxed. Hence, bank regulation was almost exclusively limited to restrictions on entry. In the United States, taxation often took the form of sale of bank charters (via contributions to legislators) and requiring banks to back their notes with government securities. At present, non-interest-bearing required reserves now serve the purpose. If this still is a reason for regulating banks, the tax would be enhanced by reducing restrictions on entry and assets, as this would increase the public demand for

reservable bank money.'

Benston also suggests that an important reason for regulation is the redistribution of wealth to those with political power.

(17). Arguing, in a USA context, that the responsibility for both areas of regulation should be vested in the one authority, the Federal Reserve Chairman Volcker (FR Bulletin p550, July 1984) notes that.....

'... fully one-half (of the OECD countries), including the United Kingdom, Italy and the Netherlands, place both the monetary policy and the main supervisory functions directly in the central bank. In several major countries including France, Germany and Japan, supervisory responsibilities are shared in varying degrees between the central bank and either a banking commission or the ministry of finance. In one country, Canada, the formal responsibility lies basically with the finance ministry. The remaining countries have separate (and typically very small) banking commissions: those commissions usually have formal links with the central bank, and may rely on it for operational surveillance as well as for policy input.'

Highlighting perceived advantages in the central bank having dual regulatory responsibilities, Volcker also noted that...

'The nature of the Federal Reserve's responsibilities for the overall financial health of the economy forces it to weigh tradeoffs among various goals.

Specifically, conflicts between measures taken to achieve objectives of monetary policy and measures taken to achieve those of supervision and regulation have to be reconciled; more positively, those policies need to be pursued in a mutually reinforcing manner. Indeed, both regulatory and monetary policy will be improved if each can take advantage of information obtained in the execution of the other. ... On the other hand, the public interest will not necessarily be served by the single-minded pursuit of different - and possibly competing - policy objectives.'

' ... But experience here and abroad suggests that a strong central bank, by the very nature of its broad responsibilities and its relative independence, is in a unique strategic position to take a balanced and long view ...'

(18). Goodhart (1985 p8) notes the practical concern of this matter and notes opinions both for (eg Revell 1975, Benston 1983) and against (Kareken 1981, Kane 1984) having several agencies. While favouring a single agency himself, he acknowledges that the matter has had surprisingly little academic and analytic attention.

(19). Dale (1984a p57) cites Peltzman (1970), who comments that,

'Deposit insurance fees do not vary with a bank's capital structure, and the insurance enables highly leveraged banks to avoid having to pay more for deposits. Thus, the bank's private cost of a highly leveraged capital structure is below the social costs. The difference is paid for by the (insurance agency) in the form of a greater risk exposure'.

(20). In England, Crick & Wordsworth (1936 pl1) observe that,

'By the beginning of the nineteenth century there were banking firms in England which could claim a history extending over two hundred years, and the oldest of them all were the London private bankers. Some of these originating in families already specialised in finance, were firmly established long before the first provincial bankers made their appearance, and pre-dated even the Bank of England (1694) by nearly a hundred years. As early as the second half of the 17th century the business of a number of scriveners and goldsmiths ranged over current and deposit accounts, advances and the discount of bills of exchange and government orders, and included dealing in

bullion and foreign moneys. The goldsmiths were quick to adopt credit instruments, and introduced into England the cheque and the bank promissory note. An early list of such goldsmith-bankers records that there were forty-four in London in 1677.'

(21). Rose (1987 p81) comments that during the colonial period there were few domestic banks, in the current sense, and (according to Krooss & Blyn 1971) none appeared before 1750. Also, ...

'British banks discounted most of the commercial notes arising from trade with the colonies and held the deposits of the large trading companies and wealthy colonial landholders. In the domestic economy trade was generally carried on by barter and, therefore, bypassed local banks. Moreover the colonial population was small and widely dispersed, nine out of every ten persons working on farms. Lending was large confined to sales on account with merchants extending credit to their customers on a short-term basis.'

The further development of the institutional structure is sketched by Cooper & Fraser (1986, p45) who note that, ...

'The first real commercial banks were founded in the 1780's. Their "chartering" required special acts of the state legislature, a requirement that held until the until the "free banking" charter laws

of various states in 1837 and 1838. Even so, there were more than 300 commercial banks by 1830.'.

(22). White (1984 p25) notes that in 1728, when bettered in duelling with the Royal Bank (which enjoyed the advantage of sums of cash deposited with it by government agencies), the Bank of Scotland was faced with illiquidity (but not insolvency) and was obliged to suspend payments, call in its loans and make a 10% call upon its shareholders, and close its doors for some weeks. White (1984) notes that Bank of Scotland announced compensatory interest payments on its notes for the period of suspension, a policy it had previously employed during two run crisis periods.

Also, he notes that the presentation of one bank's notes for payment by agents of the other provided the genesis of what was to become a system of note exchange, a central clearinghouse for cheques. Other innovations from this strongly competitive period include the cash credit account, a form of overdraft account by the Royal Bank in 1728, and the soliciting of deposit accounts by offering interest by the Bank of Scotland in the same year.

Ultimately the intensity of the rivalry was moderated and the two banks reached an agreement to accept and regularly exchange one another's notes as part of an accommodation reached in 1751. This followed the widening of competition; each bank had sponsored the formation a banking partnership in Glasgow and were jointly surprised when these banks started issuing their own notes. The Glasgow banks were the Glasgow

Ship Bank supported by the Bank of Scotland in 1749, and the Glasgow Arms Bank supported by the Royal Bank in 1750.

(23). White (1984 p28) notes that the Act chartering the Bank of Scotland had provided for 'summary diligence' on its notes; ie the noteholder's right to immediate payment on Bank of Scotland notes. In 1730 the Bank of Scotland began printing an 'option clause' into the obligation printed on its notes; the bank's pound note promised the bearer "one pound sterling on demand, or in the option of the Directors one pound and sixpence sterling at the end of six months after the day of demand".

A petition for summary diligence against the Banking Company of Aberdeen (1747-1753) by a noteholder was refused on the grounds that remedy was enforceable on bills but not on promissory notes such as bank notes; ie the right of summary diligence on Bank of Scotland notes was not extended to other bank notes. Nevertheless, White observes that the notes of the banks continued to circulate despite legal uncertainty until the 1765 Act settled the matter by outlawing the option clause, and making summary diligence enforceable.

Pressures for legislation arose in part from the issuing of small notes (ie for fractions of £1) apparently in response to a denominational disequilibrium caused by external coin drain. Some public agitation emerged against small notes issued with an option clause; eg optional notes for sums of 5s. and 1s. issued by numerous small traders.

(24). White (1984 p33) note that functional differences existed among the banks, ...

'the chartered bankers served as bankers to many of the private banks, whereas the latter specialised in servicing certain sorts of borrowers not served by the former. The private bankers also served as Edinburgh agents of the provincial banking companies. The private bankers in Edinburgh did not issue notes, whereas provincial bankers typically were banks of issue.'

Also, close arrangements existed between the Edinburgh private and chartered banks as evidence by the private bankers often exercising considerable control as directors of the Royal Bank and the Bank of Scotland; White notes a vertical division of labour arising from the comparative advantage of the smaller private bankers in dealing with commercial borrowers, and the economies of scale available in issuing business.

(25). White (1984 p33) also cites Anderson's (1910 p3-5) observation of a perceived aloofness of the chartered banks from the working public which gave rise to demand for a bank of more liberal principles and explains the Commercial's profession to be the bank of the citizens.

(26). The 1844 Act closed entry into the note issuing industry throughout the UK. The 1845 Scottish Bank Act allowed an existing Scottish issue bank to exceed its authorised circulation (based on a previous circulation average) by meeting a 100 per cent marginal specie reserve requirement; thus Scottish banks could exceed authorised circulation like the Bank of England (which had an authorised circulation set at £14m); thus in this respect Scottish banks

were advantaged over English provincial banks which simply had an authorised circulation based on a previous average; White (1984 p76).

(27). Crick & Wadsworth (1936 pl1) cite the relevant extract from the Act as, ...

' ... during the continuance of the ... Bank of England it shall not be lawful for any body politic or corporate whatsoever erected or to be erected ... or for any other persons whatsoever united or to be united in covenants or partnerships exceeding the number of six persons ... to borrow owe or take up any sum or sums of money on their bills or notes payable at demand or at any less time than six months from the borrowing thereof.'

(28). The suppression of any right of banks in general to joint stock formation was further strengthened by the Bubble Act of 1720, which was aimed at preventing the free creation of large stocks of freely transferable shares. Kindleberger (1984 p76) notes that the Act

' ... halted formation of unincorporated joint-stock companies and was a device to serve the South Sea Company by halting diversion of cash subscriptions to rival promotions, not an attack on it, (and) constituted a barrier to company formation for a 100 years.'

(29). Crick & Wadsworth (1936 p15) note that, contact developed between the county and London banks during this period. Country banks often held very small cash reserves, and held accounts with London private banks, known as a "London agent", who performed various services (eg foreign business) and became a form of final reserve providing an avenue for surplus fund investment and, in stringent times, providing accommodation usually through rediscount of bills. Nevertheless contact between the provinces and London was still perfunctory at best, and some of the small country banks had no London accounts at all.

(30). This is derived from Webber (1989), with reference to Pressnell (1956 p229-234). Also, he notes that the potential for organic capital growth was constrained; more particularly, in the late 1700's, many banks were formed as adjuncts to existing trade business and with the objective of providing a source of funding. The potential for additions to bank capital from banking profits was apparently rare; the maintenance of a reserve fund among private bankers does not appear to have become a normal practice until around the 1820's and later - an alternative being larger cash reserves and an account with the Bank of England.

Generally the increase of bank capital beyond initial investment does not appear to have been common until the 1840's and later;

i.e from profits retained to build up the business; by new entrants bringing additional capital - although this was usually only to replace an outgoing partner unless the number of partners was being extended to the maximum limit; or by calling upon existing partners for further capital although this was highly unusual.

An emphasis on the adequacy of capital and reserves in the early 19th century in respect of country banks, is noted by Pressnell (1956 p234), but qualified by the crude nature of contemporaneous banking theory. Pressnell comments that insistence on a large minimum capital, without reform in other directions, might have resulted in but a slight increase in security at the expense of an over-capitalised banking system. The reaction of country banks to public discussion about the levels of their capital in the second quarter of the 19th century remains obscure.

(31). More particularly such banks were to be established only outside a 65 mile radius of London; they were not allowed to open offices in this defined London area; nor able to draw bills on their London agents payable on demand or for less than £50 in amount. Also, while shareholders were to remain jointly liable for debts of the co-partnership, proceeding were to be taken by, or made against, two or more members appointed as "public officers", and judgement against such officers were to operate against all partners; Crick & Wadsworth (1936 p16)

(32). The defined London exclusion zone more than covered the area in which The Bank of England's notes circulated (as well as those of around 100 private note-issuing banking firms); also the Bank had always conducted a purely London business with no direct interest in the provinces. Post the 1826 Act the Bank opened branches in Gloucester, Manchester, Swansea in 1826; Birmingham, Liverpool, Bristol, Leeds, Exeter (later removed to Plymouth) in 1827; Newcastle in 1828; Hull and Norwich in 1829; and Plymouth and Portsmouth in 1834. Crick & Wadsworth (1936 p17).

(33). Unlike the country joint stock banks, London joint stock banks were established as common law co-partnerships without the right to act through "public officers"; legal actions required the quotation of all shareholders the number of which might run into hundreds. Consequently any action could be void for any slight inaccuracy on the list; banks having even one shareholder in common could not take action against themselves (under common law no man could sue himself). Apart from constitutional problems, animosity from the Bank of England and discrimination in favour of private bankers (vis a vis ability to accept bills at less than 6 months after date). Crick & Wadsworth (1936 p19-20).

(34). As noted by Crick & Wadsworth (1936 p24-25), the Act prevented the development of note issuing activity by any bank not currently engaged in it, and prevented any note issuing bank from circulating more notes than it had outstanding prior to the Act. Also, ...

' ... it was permissible for two private banks of issue to amalgamate and retain the aggregate of their issue, provided the membership of the new partnership did not exceed 6 in number - but if an issuing joint stock bank absorbed a private bank of issue, or if two joint stock banks of issue amalgamated, then the new note issue was not to be the sum of the existing note circulation, but only the amounts permitted to the absorbing bank. (Also) ... if any joint stock bank of issue amalgamated with a bank, whether joint stock bank or private, having an office

within the 65 mile radius, or itself opened a branch there, the right of issue was forfeited. (And) if any issuing bank closed its doors its right of issue lapsed.'

(35). The 1844 Act was influenced by a Select Committee on Joint Stock Companies of the same year which concluded that unsound companies were comprised of three types: those founded on unsound principles; those ill-constituted so that failures were incident to management; and those of speculative origin. The Committee recommended that various information about the companies should be published in order to counter the last two reasons for failure, namely the names of directors, shareholders, and the amount of capital subscribed or to be subscribed; Webber (1989).

(36). During the life of the code, which ended in 1857, no more than 10 bank establishments were attempted; and only three established in the post 1844 decade. While some of the code's provisions were desirable and had been the practice of London joint stock banks, those covering the formation and regulating the deeds of settlement, and the minimum share values, restricted the possibility of formation to all but the most ambitious of promoters and prosperous towns. The restraints were even more of a penalty due to competition from existing joint stock banks not subject to such controls. On the other hand, existing companies enjoyed a period of freedom from competition in which they could consolidate their position. By allowing existing institutions the possibility of growth free from new competitors it may well have added to security in banking; Webber (1989). Crick & Wadsworth (1936 p27)

(37). The 1860's were also characterised by trade expansion, speculation and, with excessive company formation, many business failures. Declining public confidence in private banks was further shaken with the spectacular 1866 Overend-Gurney crisis (a discount house which had changed to limited liability a few months before failing with liabilities of more than £10m). Also, the form of the shares of new limited liability banks provided opportunity for speculation; some were subject to operations involving rumour coupled with bear speculation - legislation in 1867 (Leeman's Act) brought this practice to an end by requiring contracts of share purchase or sale to quote the distinguishing numbers. Crick & Wadsworth (1936 p32-33).

(38). Details of the case are noted in Anderson & Cottrell (1974 p308) citing the Bankers' Magazine XXXVIII (1878 917-21). Anderson & Cottrell (1974 p249) note that, ...

' ... belief in unlimited liability was overthrown in 1878 by the failure of the City of Glasgow Bank, an unlimited concern. Its shareholders were twice asked for capital to meet the bank's debts; the first call was for £500 per £100 stock held and it fell on 1,800 separate individuals, resulting in the bankruptcy of a third of the proprietors. A second call of £2,250 per £100 held was made and was met by 269 shareholders.'

Webber (1989) citing Gregory (1929 p.x) notes that the total holding of shares by the public was £840,000 and the holders of £750,000 of this were absolutely ruined.

(39). Collins (1988 p100) comments that the 1879 Companies Act,

'... especially eased the transition to limited liability status by permitting bank proprietors to acquire a special form of "reserved" liability. Under this act unlimited liability was retained for note issues, but for other liabilities and debts the amount that shareholders could be called upon to contribute in normal circumstances was restricted to a fixed sum - the liability was no longer unlimited. However, in the event of liquidation shareholders would be responsible for paying up to an extra, specified amount in order to cover the company's debts. This extra amount represented the new "reserved" liability, a reservoir of capital resources not available under normal commercial conditions, but resources which could be drawn upon only in the last resort. Thus, a compromise had been devised between those who argued that full limited liability (where shareholders were only liable to the book value of their shares) might deter the public from placing deposits with a bank; and those who stressed that the unlimited nature of a proprietors liability under old legislation was restricting the pool of

potential investors.'

Also, in the Scottish context, as noted by Checkland (1975 p478)

'The Company Acts had made limited liability available to business enterprise generally. The banks in Scotland, and the larger ones in England, had made no move to adopt it, preferring that the obligation should continue to rest on shareholders: they felt that such a step would reduce public confidence in them, and so harm their business. Even after the debacle of 1878, the Scottish banks were still reluctant to limit liability to subscribed shares. In a sense they were right, for limited liability meant that the public would bear any losses beyond the capital. The Scottish situation was complicated by the fact that the three oldest banks had always enjoyed limited liability, being creations of the state. The outcome was a compromise. The government passed the Companies Act 1879. ... The Act introduced the principle of "reserve liability". Under it, banks could acquire subscriptions for additional reserve capital which would not be called, except in the case of illiquidity or failure.'

(40). These democratisation developments are shown by example in Crick & Wadsworth (1936 p344-345). The trend to wider share ownership and limited liability is exemplified by the experience of the Midland; this name was adopted in 1923 following the period of bank consolidations reflected in previous longer names - from Birmingham and London pre 1891, to London and Midland, to London Joint City and Midland in 1918.

Its early capital comprised 2,000 shares of £50 on which £25 was called up. Over the years the uncalled capital was paid-up out of profits and further shares issued; by 1874 capital comprised 6,000 £50 shares fully paid. In 1881 with a change to limited liability a large amount of uncalled capital was reintroduced; issued capital then comprised 24,000 shares of £60 on which £12.10s was paid-up, £12.10s was callable at any time, and the remaining £35 available only in the event of liquidation.

Largely as a result of amalgamations the number of shares had grown rapidly, reaching 2.869m in 1918. This, coupled with an environment in which stability of earnings had brought the shares' investment quality close to "gilt-edged" class, led the bank to appeal to a wider, more marketable, share ownership by creating a new class of capital - fully paid shares; this was designed to appeal to small investors who were reluctant to hold the old shares due to the risk, however slight, of heavy calls. Consequently, nearly 2m fully paid £2.10s shares were issued - some for cash and the majority in acquiring the capital of two Scottish affiliations. In a further step to democratisation, another new class of shares was created in 1925 and 2.25m £1 fully paid shares were issued for cash over following years.

Contemporaneous with Crick & Wadsworth (1936) the paid-up capital of £14.5m was divided almost equally between partly

and fully paid shares, while the £1 fully paid were rather more numerous than those of £2.10s.

The increase in number of shareholders reflects both growth and democratisation. Immediately prior to its 1879 change to limited liability status the paid-up capital of £300,000 was held by 290 shareholders - an average of just over £1,000 each. In 1934 the paid up capital of £14.25m was held by 72,900 shareholders, averaging about £200 each (Crick and Wadsworth 1936 p345). More recently, in 1990, the Midland Bank plc share capital comprised 784m £1 shares held by 109,236 shareholders, of whom 102,498 were individuals holding 94% of the shares.

(41). Among the early organisations formed to issue paper currency, Staats (1965 p38) notes the role of capital appears to have been secondary to that of assets. He comments, ...

'Apparently, the amount of notes an organisation was able to issue depended upon the assets held and not upon the size of the owners' equity'.

(42). Staats (1965 p39) notes that in 1781 Congress chartered the Bank of North America, 'the first bank in the modern sense - with a proposed capital of \$10m. However the bank began operations with capital stock of \$324,000 of which \$254,000 was owned by the continental government'

Cooper & Fraser (1986 p45) note that the First and Second banks moderated the issue of state bank notes by periodically presenting the notes for payment in specie; nevertheless,

pressure from banks and those who feared the national bank's concentration of financial power contributed to the non-renewal of each bank's original fixed term charter. A detailed account of their histories is provided by Timberlake (1978).

(43). Howe (1915 p96) provides a sketch of early state banking,

'In some instances the state held a portion of the capital stock. The State of South Carolina owned all of the capital stock of the Bank of the State of South Carolina and its officers and directors were elected by the Legislature.

The banks received deposits, discounted merchant's notes, and loaned money to land owners on mortgage security and dealt in domestic and foreign exchange. They had the right to issue circulating notes to the amount of two or three times their capital stock. Their bills were redeemable on demand in coin - that is, gold or silver, whichever was most convenient. A reserve of about 33 1/3 per cent was maintained by the better class of banks, but others kept but 10 per cent or even less.

There was no adequate supervision and the laws enacted for their control were loosely enforced. Some of the charters were secured by unscrupulous men who ignored or evaded the laws and who issued

bank notes without the capital stock being paid in full, and in the case of some banks no capital at all was provided.'

(44). Cooper & Fraser (1986 p 48-49) note that federal legislation also "encouraged" state banks to convert to national charter, with the introduction of a tax on state bank notes. While initially effective (a balance of 1,600 national banks versus under 400 state banks by 1866) the tax became increasingly irrelevant (in accord with a growing preference for check, ie cheque, accounts rather than bank notes) and 1,500 state banks existed by 1888, thus securing a dual system of both national and state banks. They comment that, ...

A significant measure of noteholder protection was a provided by the requirement that the national bank deposit with the comptroller an amount of government bonds equal to the amount of 'national bank notes' (printed in uniform fashion by the Treasury) received by the banks for issue. If a national bank failed to redeem its notes, its bonds could be sold to pay the noteholders.'

(45). Cooper & Fraser (1986) note that as a "sop" to states rights, membership in the Federal Reserve System was mandatory for national banks but voluntary for state banks and created '... a number of problems, some of which persist to the present day'. An immediate effect was the encouragement of banks to seek state bank chartering to avoid the costs of membership of the Federal Reserve System; also this created a

system of non-uniform reserve requirements (state banks were subject to state rather than federal reserve requirements) which persisted until the DIDMCA of 1980.

(46). Potential confusion between the status of partnerships and joint stock banks, and chartered and unchartered banks, in English and Scottish contexts, is considered by a number of authors. Crick & Wadsworth (1936 p10) note that at the time of the establishment of the Bank of England (1694) which gained the sole right to joint stock organisation in England and Wales by a special charter from the Crown, ...

'There was ... no true joint stock organisation in the modern sense of a body operating under a special branch of the law. When it was desired to pool capital from numerous subscribers in a common venture the only means of doing so with safety and convenience was to obtain a special charter from the Crown. In industry and trade the usual commercial unit was an individual or a small partnership, with members more often than not drawn from one family. Gradually, however, as undertakings grew larger and called for more extensive capital funds, partnerships tended to increase the number of their members, embodying the terms of their association in a deed of co-partnership, issuing share capital, and becoming "common law companies". Large firms of this description were sometimes called "joint stocks", but they possessed

no corporate entities, and their members were individually liable for all debt of the firm. Nevertheless, such associations, though prohibited for more than a century by the Bubble Act of 1719, in fact continued to increase in strength and numbers, forming the direct predecessors of the modern trading company. In English banking both these roads to development were closed, ...'

In the context of Scotland, around 1810, White (1984 p33) notes that

'Checkland (1975) reserves the term "joint-stock bank" for enterprises to be founded later, and Munn (1981) follows this usage in his history of the provincial banking companies. ... The law made no distinction among provincial, joint-stock, and private banks, as the rule of unlimited liability made all nonchartered banks effectively partnerships. The important distinction came along financial lines: The private banks and provincial banking companies were based on their partners' contributions, with shares generally not freely transferable, whereas joint-stock banks raised capital by issuing a limited number of transferable shares.'

(47). In a general context, the significance of the introduction of limited liability has been linked to economies of scale by Hicks (1983), who comments that, ...

'In so far as one associates economic progress with economies of scale....it must be regarded as a major achievement of limited liability that it has made much of our economic progress possible.'

Nevertheless, at least in contemporary bank regulation terms, Benston (1991 p228) notes that, ...

'Enhancement of productive efficiency is mentioned as another reason for regulation. If there were significant economies of scale, these might be achieved by restricting the number of banks that could operate. However, empirical studies do not find such economies, except perhaps among the giant banks. Furthermore, banking is a worldwide market, in which entry by giant banks into national markets cannot be restrained successfully.'

(48). The origins of UK ratio control are suggested by Crick & Wadsworth (1936 p39). They note that the Baring crisis of 1890 provoked widespread debate about banking reserves and, prior to the First World War, led to regular monthly publications of statements of account showing cash to deposit liabilities by several large joint stock banks, ...

'Thus the proportion between cash and deposit liabilities was brought into prominence and the banks began to become effectively "ratio conscious ... (and later) ... the cash ratios of the commercial banks came to provide the principal medium for the smooth operation of central bank policy".

Prior to the recent capital ratio developments (considered in Chapter 4), Revell (1975 p46) notes, ...

'The only publicised ratios for banks in Britain have been cash ratios, liquidity ratios and reserve asset ratios. These have three features: (1) they are intended mainly for monetary policy purposes; (2) when imposed, they were based on existing practices of the banks; (3) until 1971, they applied only to the London clearing banks, and in a less rigorous form to the Scottish clearing banks.

(49). Gardener (1981 p28) notes that, ...

'The UK system of bank regulation generally has often been described as one of "suasion", or moral persuasion. This system has relied on the idea of gentlemen's agreements, together with a respect for the advice and suggestions of the Bank of England that apparently

transcended the need for explicit and detailed rules and laws.'

Nevertheless, formality is distinct from power of enforcement. The more formal US regulators also had to use "persuasion". Orgler & Wolkowitz (1976 p73) note that, ...

'None of the (US) regulatory agencies have direct legal authority to enforce practices concerning capital. Requests for additional capital are supported by persuasion rather than the threat of legal sanctions. Of course, the regulators can be very persuasive by denying branch and acquisition applications or by frequently examining an offending bank. In the extreme case, when a bank's solvency is jeopardised by lack of capital, regulators can invoke cease and desist orders, but they rarely do.'

(50). The specific question of why capital ratios experienced a secular decline is outside the focus of the dissertation. Nevertheless potential, influencing factors include the development of taxation, or more particularly the tax deductability of interest payments, which may have rendered a qualified advantage to debt vis a vis equity financing. A further question concerns the influence of the introduction of a professional bank management which may have influenced agency costs.

(51). See the quote from Staats (1965 p45) in Chapter 3.4.3a.

(52). Staats (1965 p61-2) observed that, in 1909, legislation in California required that paid-in capital must always equal at least 10% of deposit liabilities; similarly, Kansas required that deposits must not be accepted to exceed, continuously for 6 months, ten times paid-up capital stock and surplus; Oklahoma required that deposits (excluding inter-bank deposits) must not be accepted to exceed ten times paid-up capital stock and surplus; Rhode Island limited deposits to 10 times capital stock; and South Dakota limited deposits to 15 times legal capital. Also Texas imposed a more complex legislative restriction on deposits in terms of capital and surplus; this involved more stringent limitations on smaller banks in recognition of their greater susceptibility to insolvency.

(53). Staats (1965 p63-64) notes that, in order to limit the quantity of higher-risk bank assets, Massachusetts limited loans to twice capital stock, while Nevada and Nebraska restricted loans plus investments to 8 times capital stock; Nebraska also limited real estate assets to 50% of capital stock.

(54). Early manifestations, noted by Staats (1965 p96) were the concept of "fluctuating" assets, and net "free" capital.

In early 1940 Skinner advocated a ratio of capital to "fluctuating assets", defined as loans and investments.

Also, Wooster (1943) introduced the concept of "net free capital" derived from concept of "available" capital proposed in 1940 by the Institute of International Finance at New York

University. "Net free capital" is determined by subtracting fixed investments and substandard loans and investments from total capital funds. Staats notes that Wooster suggested a ratio of net free capital to risk assets, while the Institute of International Finance proposed a ratio of available capital to total earnings assets.

(55). The early 1952 FRBNY ratio, and the Federal Reserve Board's 1956 and 1972 ratio formulations, as demonstrated by the "Analyzing of Bank Capital" or "ABC" forms, are shown in Revell (1975).

The asset risk category nomenclatures in the 1952 FRBNY ratio cited in Staats (1965) appear to be derived from Crosse, H.D. (1962). Revell (1975) citing the methodology actually published by the FRBNY uses a slightly different nomenclature for some categories; these are similarly ranked as riskless assets, minimum risk assets, normal risk assets (ie the ordinary portfolio of the bank), sub-standard assets, workout assets, and fixed assets.

Also, the revised 1972 ABC form methodology is neatly summarised by Orgler & Wolkowitz (1976), ...

'This (ABC) formula is part of the screening process used by the Federal Reserve in detecting those banks that require close analysis of the adequacy of their capital. In principle, subjective weights are assigned to balance sheet items to determine the amount of necessary capital. On the liability side, weights represent credit and market risks. The sum

of the liability weights multiplied by the weights outstanding less liquidity provided by assets yields the required amount of capital for liquidity purposes. The amount of capital required to cover asset risks is obtained by adding the products of the amount outstanding of each asset multiplied by its credit and market risk factors. This is supplemented by capital required for other purposes such as the activities of the trust department. The total requirements are compared to adjusted capital (total capital less classified assets) to determine if the amount of capital as bank has is adequate.'

As a forerunner of current capital requirements for off-balance sheet items (see Chapter 4) Moulton (1987) notes that off-balance sheet items were accommodated indirectly via a capital requirement for trust department activities and expressed as a certain percentage of trust earnings. She notes, ...

'Though trust activities are not the sort of off-balance sheet exposure that the new guidelines are aimed at, trust department assets are not on the bank's balance sheet. (Trust income is reported on the income statement.) A capital requirement against gross trust earnings reflected the risk that lower earnings might adversely affect the bank's earnings.'

(56). In terms of individual banks in the US context, Benston (1991 p26-27) believes regulation made banks significantly less stable by constraining their ability to diversify; he contends that state and nationwide branching restrictions were responsible for most of the failures of 1920s and 1930s. He also criticises restrictions on asset diversification regulations (eg Glass-Steagall Act separation of commercial and investment banking).

'Opportunities for and incentives of owners and managers toward risk-taking or avoidance have been affected by regulations restricting the assets banks can hold and services they can provide, by deposit insurance, and by capital requirements. Because banks can take almost any desired level of risk, it is unlikely that restraints on their activities will be effective in reducing risk-taking. In fact, evidence supports this conclusion. Deposit insurance on the other hand, gives banks incentives to take risks, which they have done. Capital requirements ... though, are an effective means of restraining risk-taking. Given the expectation that deposit insurance serves to reduce banks' desired levels of capital, imposition of capital requirements is necessary.'

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## CHAPTER 4

### BANK CAPITAL DEFINITION: CONTEMPORARY DEVELOPMENTS

#### 4.1 INTRODUCTION

Over the past two to three decades a number of factors have emerged and contributed to significant changes in the regulation of banks in many industrialised countries. Generally these factors include harsher environmental conditions, improved analytic capabilities and concern about the effectiveness of existing capital regulation. Regulation changes (1) include a move to convergence in supervisory capital standards and an increasingly complex methodology. While the market's failure to account for the cost of systemic failure remains a fundamental argument for regulation, the use of market determined risk premia is being advocated as a supplementary regulatory tool.

The following sections consider contemporary developments concerning bank capital. Section 4.2 considers traditional debate about the use of a capital adequacy notion, and developments in the general banking environment. The fundamental elements of the notion of capital's adequacy are also reviewed; namely, the characteristic and functional based definitions of bank capital and refinements in bank risk

definition and identification.

Contemporary accounting and regulatory views of bank capital definition are considered in Sections 4.3 and 4.4 respectively. The latter focuses on refinements in national (UK and US), and international, regulatory definitions of adequate bank capital.

Complementing the traditional debate about the use of a notion of capital adequacy, Section 4.5 provides a criticism of bank capital regulation and includes both managerial and market views. Apart from considering general evidence about the efficacy of bank capital regulation, the specific methodology of the widely advocated capital to risk-weighted asset ratio, which has particular ramifications for bank management, is also reviewed. Market based risk assessment provides an alternative means of setting capital standards and also allows assessment of past regulatory practice.

## 4.2 RECENT EVOLUTIONARY ENVIRONMENT

### 4.2.1 Past Limitation of the Capital Adequacy Notion

The failure of many US banks in the Great Depression era prompted research on the relationship between relative bank capital and bank failure. Early studies contributed to a traditional view that there was no relationship; Secrist (1938), Crosse (1962), Cotter (1966). (2).

Secrist (1938) found the ratios were lower for non-failures than for failures and commented that,

'The assertion that banks in order to remain solvent must have a ratio of at least 10% (the prevailing regulatory standard of capital to deposits to minimise threat to solvency) is illusory ..... According to this standard, the safer institutions are those first to fail'.

More recently, Vojta (1973a p9) noted that

'The weight of scholarly research is overwhelmingly to the effect that the level of bank capital has not been a material factor in preventing bank insolvency, and that the ratio 'tests' for capital adequacy have not been useful in assessing or predicting the capability of a bank to remain solvent'.

The inability of this research to link capital levels to failure may be mitigated to some extent. The observation that many of the banks which failed during the Depression era had relatively high capital structures finds a possible explanation in the fact that capital ratios may have been boosted by deposit runs prior to insolvency, Gable (1974), Dale (1984a, p57).

Evidence on more recent bank failures also suggests that capital ratios were not a significant factor; Santomero & Vinso (1977), Cates Consulting Analysts (1985) (3). Nevertheless, a number of studies have indicated a significant relationship between a bank's capital ratio and its probability of failure; Bovenzi et al (1983), Avery & Hanweck (1984) and Short et al (1985) all show a statistically significant relationship between a bank's capital ratio and its probability of failure. Also, Korobow & Stuhr (1983) find that regulators' evaluations of banks are significantly influenced by capital ratios.

Ehlen (1983) argues for moderation in the perceived role of capital in bank failure. He notes that...

...'the strength of a financial institution and its first line of defense against adversity is earning power, with the corollary being that capital is of lesser importance'..... and that .....  
'capital plays a critical, although passive, role in maintaining the financial strength and credibility of a financial institution in the market place.'

Representing a more "definition based" approach to the relationship, Dale (1984a) stresses the 'essential link between capital adequacy and bank failures' and comments that those who seek to deny a connection between capital adequacy and bank failures are confused. Dale argues that a bank can only be said to have failed when it has exhausted its capital, and that much of the confusion surrounding this issue turns on the difference between the concept of capital as own funds available to absorb losses and the published measurements of capital which may give an entirely false reading due to asset overvaluation (eg loan losses have not been taken into account).

#### 4.2.2 Bank Capital and the Recent Banking Environment:

A remarkable state of flux has characterised the banking industry worldwide over the past couple of decades, and has focused much attention on the role of capital in bank management and regulation.

It is difficult to comprehensively define the current period of banking industry development. While the manifestations of significant change are apparent at most levels of bank structure and activity, the factors causing change are diverse and inter-related. Without the dominance of a single omnipotent causative factor, or outcome, particularly one of extreme cathartic quality as in 1929 and the 30's, the current period lacks the convenience of a single label. "Revolution" is seemingly apt yet perhaps premature as the period lacks a definitive end; economic historians ultimately may become the label-fixing arbiters referring to outcomes as yet unforeseen (4). Nevertheless in a specific context, such as financial innovation, "revolution" appears a suitable term in the interim; Miller (1986) observes that, ...

'The word revolution is entirely appropriate for describing the changes in financial institutions and instruments that have occurred in the past twenty years. The major impulses to successful financial innovations have come from regulations and taxes.'

The general complexity and enormity of the process of change became increasing evident during the 1980's. As noted by the OECD (1985), ...

'During the past twenty years or so, the business of banking has gone through a period of extremely rapid and accelerating changes under the combined impact of profound modifications in the economic environment, technology, market forces and public policies regarding the regulatory framework. In many instances, the causality of these changes has not been unidirectional and there have been important feed-back effects in the process of change.' (5)

The dimensions of regulatory, market and institutional change, particularly those wrought in the UK, are assessed by Res (1985) who notes a framework of key causative exogenous factors including inflation, information technology, the "Thatcher Effect" (a form of liberalism), the relegation of sterling from a world currency status, international competition (London as a world financial centre), and human behaviour.

Generally, changes in the banking market have originated from different policy approaches to the financial services industry as well as shifts in the bank regulatory framework. Other changes have resulted from the evolution of financial practices, techniques and strategies. Among the major developments noted by the OECD stand customers' new demands for financial services, financial innovations and the "marketisation" of banking and finance. Also the growing interpenetration of the financial services industry and technological advances (6).

Bank capital management and supervision became increasingly significant during the 1980's as bank capital, and profitability, replaced bank balance sheet size as key measures of a bank's success. Generally, this trend reflected a growing deterioration in asset quality and a perceived need to strengthen capital resources.

In the US context, Maisel (1981 p5) observes the problem of determining whether the post war decline in banks' capital ratios is the result of benign market forces reflecting, for instance improved financial techniques, or of weakness in the regulatory system. He comments (p109), ...

'Capital adequacy has become a question of prime concern because some observers, including bankers, fear that the level of capital may have fallen too far. ... forces are at work tending to drive capital ratios down below prior levels and under those that regulators believe are adequate. What are these forces? Do such pressures arise from the normal operation of a free market, or are they the result of the special regulatory environment of the banks?'

Capital strength became a major market status factor (7) and capital adequacy became more strategic as banks, under the combined impact of market forces and supervisory actions, have attempted to strengthen their capital base by raising new equity and, in some countries, long-term funds which can be assimilated to capital; eg convertible securities, various forms of preference shares and subordinated debt. There also has been a clear tendency to boost loan loss reserves and

provisions, including undisclosed reserves, where accommodated by the tax and regulatory authorities. The OECD notes that this tendency mainly reflects the perception of a deterioration in asset quality and a desire to build up a cushion against potentially adverse developments.

The OECD (1985) notes,

'The need to maintain and strengthen capital resources has become a major consideration for both supervisors and the banks themselves. A strong capital base makes for confidence in a bank and also provides a cushion against possible losses. The need to maintain sound capital ratios is also a spur to good credit assessment and control, which is particularly necessary in the face of structurally increases riskiness of banking. Provisions/losses arising from poor lending can be expected to lead to pressures from supervisors for more capital at a time when this may not be easily raised.'

Regulatory pressure to increase capital standards during the 1980's has been defended by Greenspan (1988). Putting forward the Federal Reserve Board's policy, he argues for the need for fortification of,

'the natural "shock absorbers" of the financial system - capital and liquidity - and concurrently to make better use of

market and market-like incentives to discourage excessive risk-taking at individual institutions. ... While the capital ratios of bank holding companies generally have been rising during the 1980's, they still tend to be considerably below those at nondepository financial firms. In many cases, this difference no doubt reflects real or imagined protection by the federal safety net. This tendency towards over-reliance on the safety net by both owners and depositors has inhibited, and in some cases may have eliminated, the private market signals that would have made much less likely many of the portfolio problems now facing numerous depository institutions. Thus, the safety and soundness of the financial system require that banks have adequate capital.'

Greenspan acknowledges that some banks not under market pressure to increase capital ratios may be reluctant to raise them, but argues that the federal safety net may be distorting market signals and weakening adequate capital incentives (8).

#### 4.2.3 Characteristic and Functional Definitions of Bank Capital

##### a. Pressure for Definition Development

In the light of the above developments, the regulatory definition of bank capital has come under pressure to transcend pure equity to accommodate other equity like items.

A particular pressure emanates from the increased financial innovation and its associated spawning of hybrid securities; these may be viewed as securities which do not possess the full complement of characteristic qualities associated with equity capital; on this basis "pure" debt may be viewed as extreme hybridism.

Ultimately this has precipitated a redefinition of bank capital which focuses on the properties of capital rather than the traditional dichotomy of debt and equity components. Essentially, these properties may be viewed as functional properties based on capital's characteristics. The OECD (1985) notes that, ...

'Problems of definition and measurement of what constitutes capital or own funds have become increasingly acute with the proliferation of new equity and debt instruments. Some of these instruments present complex legal and technical features which need to be carefully assessed to determine the precise legal status and economic value of the different elements admitted within the capital

base.'

b. Characteristics of Bank Capital

The bank liability structure may be viewed as a single structure of components (as per normal balance sheet presentation) or, alternatively and equivalently, a set of structures, each representing a characteristic. Maturity represents an obvious characteristic structure; also, relative seniority in terms of asset claim in liquidation represents another; there are many more. Any component may be uniquely defined by some minimum number of specified characteristic qualities.

Bank capital thus may be viewed in terms of a number of characteristic dimensions, each providing an absolute or proportional measure, rather than the traditional single structure equity-debt dichotomy which is unable to accommodate hybrid elements.

The characteristic structures approach also is conducive to more complex analysis. An early acknowledgement of the characteristics view of bank capital is provided by Pringle (1974) who isolates the maturity characteristic; he comments,  
...

'Of the characteristics that distinguish capital from other claims issued by banks, two are of primary importance (to this analysis): capital bears risk, and it is of long maturity. The capital decision thus must be analyzed along two

dimensions: optimality from the standpoint of risk-bearing, and optimality from the standpoint of the maturity structure of liabilities. Nearly all of the literature on financial structure of firms concerns the first question: risk-bearing and the debt/equity mix."

Pringle also notes the debate over the use of long term debt in bank capital structures which should focus he contends, ...

'specifically on differences in the characteristics of debt and equity claims and on the functions capital performs from the standpoint of the various interested parties.'

Also, the idea of characteristic structures may lend itself to arbitrage pricing theory which views the equilibrium return on any risky asset as a linear combination of various common factors which affect asset returns; ie a more general case than the capital asset pricing model in which equilibrium rates of return on risky assets is simply a function of its covariance with the market portfolio; See Chapter 2.

The representation of a financial instrument as a combination of characteristics has been used both to define financial innovation Desai & Low (1985), and to provide a model of the financial intermediation process Blake (1988). Desai & Low note that the idea of goods as being combinations of characteristics is now a familiar one as a result of the work of Gorman (1980), Lancaster (1966) and others.

Desai & Low (1985) extend the notion of location theory to characteristic space which they consider in terms of two dimensions, namely yield and liquidity; and indicate the possibility of using more dimensions. They apply this analytic structural device to the financial product market to determine the relative closeness and separation between available products measured by the angle of their individual positions from origin axes. This process allows the distinction of routine or trivial from important innovation and indicates existing innovation gaps in the product market.

### c. Functional Capital

The functions of bank capital may be viewed as being drawn from its characteristics, either singly or in combination. Although the set of characteristics, and functions, is conceivably extremely large, bank regulators, and authors on the topic of bank capital, appear to emphasise the importance of a number of functions (9). Some authors accord pre-eminent importance to a single function. Typifying these views, the Reserve Bank of Australia (RBA Bulletin February 1985) observes that, ...

'A bank requires capital: 1) As a cushion to absorb losses; 2) To evidence the willingness of shareholders to commit their own funds on a permanent basis; 3) To provide resources free of fixed financing costs; and 4) To finance investment in infrastructure and associates.'; see also Bank of England (1980)

Each of the above functions may be viewed as being based on one or more characteristic of bank capital. For instance, characteristics implicitly referred to in the above functions include, seniority (the low seniority of asset claim, eg of equity and subordinated securities), maturity (permanent), the discretionary payment of dividends (and perhaps floating interest).

d. Characteristic Capacity Versus Exclusivity

There appears to be a form of economy associated with capital's characteristics; namely while each function is based on one or more characteristic, a single characteristic may provide the basis for multiple functions. But some regulators have implicitly challenged this by allocating capital exclusively to a single function via the concept of "free" capital eg see Chapter 3.5.3d and its footnote 54; and also the Bank of England's (1980) definition of "gearing ratio" capital base.

e. Most Important Function

A number of authors and regulators ascribe a single bank capital function a "most important" status and distinguish it from a "most important" function for general industrial corporations.

Reed (1964 cited in Gardener 1981, p9) comments, ...

'In most business firms, the primary function of capital is to finance the

purchase of buildings, machinery and equipment. Its secondary function is to protect long- and short-term creditors, who make funds available to the business. In banking , however, the function of capital is primarily to serve as a cushion or insurance fund to absorb losses that may occur. As a source of funds for the acquisition of physical assets, bank capital serves a secondary function.'

Peltzman (1970) in likening bank capital investment to a production process notes, ...

'bank capital has two roles: (i) It cooperates directly with the other inputs in the production of bank services, and (ii) it is used to attract the deposit input by providing insurance to depositors against a decline in the value of a bank's assets; the more capital a bank has, the more the value of its assets can fall before depositors incur losses. The difference between banking (and financial institutions in general) and most other industries is in the relative importance of these two roles. The equity capital of any firm serves, in part, to guarantee the value of the firm's fixed obligations, but that function is usually subordinate to the provision of assets to the firm. However, in banking, equity capital (and equity is the form that almost all

non-deposit ownership interest in bank assets has taken) typically accounts for only about a tenth of total bank resources, and most of the returns to equity capital derive from its insurance function. Bank owners invest capital primarily to attract deposits, which are then used to buy assets, and only secondarily to buy assets directly.'

As evidenced by Staats's (1965) work, commercial bank managers and state regulators may accord pre-eminent importance to a single function. Although his survey results indicate some variety in opinions as to the single most important function, each response group displayed a majority in favour of 'the provision of depositor confidence' as the single most important function of bank capital.

#### f. The Unique Function of Bank Capital

In noting a uniqueness in the function of bank capital, Gardener (1981 p9) notes, ...

'The unique functional characteristics of bank capital compared with the role played by capital in non-financial firms ... derives essentially from changes in the emphasis of the role of capital.'

He ascribes this to asset financing, ...

'in proportionate balance-sheet terms, banks do not require such a heavy fixed-asset investment as a typical non-financial enterprise.'

Pressnell (1956), cited by Webber (1989), appears to emphasise the distinctive role of deposits as money, as shaping the unique function of bank capital, ie ...

'The capital of a bank stands apart from that of other enterprises. It is required to commence business, and to protect noteholders and depositors against possible loss; but for its ordinary activities, a bank acquires resources from the public. A banker's distinctive function is not to lend his own capital, for then he would merely be a species of money lender; nor is he a mere intermediary, between lender and borrower, for that would make him a money scrivener, or a broker: an agent, not a principal. What makes a man a banker, and not some other kind of financial specialist, is the use of claims upon him to settle debt."

Pressnell (1956, p225-6)

#### 4.2.4 Problems of Risk Definition and Identification:

##### a. Risk Definition

There are several dimensions to the problem of risk definition.

In practice the distinction between risk and uncertainty may not be clear cut (10). In a general linguistic sense, "risk" often serves as a shorthand way of referring to the parameters defining the probability distribution of an outcome. But the benefits of conciseness are confronted by the problem of meaning - what outcome is referred to by a term such as "bank risk"; greater specification is normally required such as "bank earnings risk", "bank insolvency risk" and "banking system failure risk". Consequently, a definition of risk requires to be qualified in terms of the particular outcome which is being considered, and by the parameters of its probability distribution.

While the risk of a particular outcome may be influenced by the risk of several other outcomes, it may itself also influence other outcomes; on this basis the risk of an outcome may be viewed as part of a continuum of risk influence and dependence the complexity of which may be compounded by the interdependence of certain of the influential and dependent risks.

##### b. Risk Identification

Bank management are concerned with risk identification, measurement and control. This triumvirate of risk management

elements, has been recognised as a key determinant of effective bank management by several authors. (Horrrigan 1969 cited in Gardener 1981 p71; and Revell 1975 p81).

Revell (1975 p82) notes the importance of risk identification to risk management and comments that, ...

'all possible sources of risk should be identified, and probably the most important service that the development of risk analysis has rendered to management has been its insistence on a conscious and continuous search for all the risks involved in management decisions and arising from changes in the environment.'

The chronological sequence of writings on bank risk identification generally displays an expanding range and growing refinement. In part this reflects the impact of both new techniques of risk analysis (viz. portfolio theory) and the development of new products, markets and the economic environment (eg floating exchange rates).

There are a number of dimensions to the problem of risk identification. These include notably inter-risk influence, risk recognition and the convenience of risk classification.

#### i). Risk Interdependence

The existence of inter-risk influence is recognised by Gardener (1981 p72) in terms of "primary" and "secondary" risks and demonstrated with the example of an initial demand for liquidity (cash) which may necessitate the sale of say, gilts at a loss, and adversely affect the bank's market rating

of its net worth or earnings; in this case the primary risk (of liquidity) may influence other secondary risks.

### ii). Risk Recognition

Uncertainty represents a serious constraint on risk management effectiveness. As well as the problem of risk non-recognition, there stands the hazard of low probability high cost risks which may be overlooked by bank management, a problem recognised by Guttentag & Herring (1986).

Vojta (1973a p17) commenting on the risk of loss notes that

...'In most businesses, risks of loss are both known and predictable and unknown and unpredictable in terms of the frequency of occurrence and magnitude of exposure. Loss of both types inheres in each of the generic categories of risk."

### iii). General Risk Classification

Drawing on the general risk classification scheme of Mehr & Hedges (1963), Revell (1975 p81) notes two fundamental bases of risk classification

#### Static versus Dynamic Risks:

Revell also terms these pure and speculative risks, respectively. Dynamic risk is distinguished by depending on future change, and more particularly the uncertainty of the timing and extent of future change which, by its very nature is difficult to provide against; and,

### **Insurable and Non-Insurable Risks:**

The straightforward distinction between insurable and non-insurable risks.

#### **c. Key Bank Risks**

A number of authors have sought to identify key bank risks. Vojta (1973a) provided an early work, identifying 6 generic risks which may occasion loss short of failure. Later works identified more risks, reflecting in part changing economic environment; eg Revell (1975), and Gardener (1981) who identified 11 categories; Liquidity Risk, Profit Risk, Investment Risk, Credit Risk, Risk from Contingent Liabilities, Operating Risks, Fraud Risks, Foreign Exchange Risk, Fiduciary Risk, Financial Risk, and Exceptional Risk. (11).

Other key bank risks of particular significance to regulators not highlighted in the above classifications are bank failure (insolvency) risk and banking system failure risk.

##### **i). Bank Capital Risk**

From the foregoing, bank capital risk may be viewed in terms of both its influence on other risks, and the influence of other risks upon it. The potential for disaggregating these risks is of an impractical magnitude, and for the purposes of this dissertation may best be viewed in terms of the influence of bank capital risk upon solvency risk, and major risks which

influence bank capital risk.

## ii). Solvency Risk

Regulators are primarily concerned with solvency risk. Key risks influencing solvency risk include the solvency risks of other banks via contagion effect (macro banking system failure risk), liquidity risk and earnings risk.

Solvency may be viewed as a minimum level of bank capital.

Maisel

(1981 p6) views insolvency risk as the interplay between bank capital and earnings risk. He notes that at the beginning of a period ...

'The risk that a bank will become insolvent depends on the level of expected (total economic) income and payments from it, the probable variance of this income, and its initial capital.'

The connection between solvency (based on net worth) and liquidity is stressed by Revell (1975 p12); both are based on a common concept of 'free assets' and are distinguished in terms of time horizon, ...

'liquidity is the ability to settle debts on the due date, whereas solvency is the ability to settle debts ultimately.'

The connection is also expressed by Clark (1976) who distinguishes four notions of insolvency, namely bottom line

insolvency, traditional equity sense insolvency, accounting insolvency and Bankruptcy Act insolvency (12).

Revell (1975 p88) comments that earnings risk is closely connected with liquidity risk (under which classification Vojta placed it). Also he notes that earnings risk ..

.. 'arises from changes in interest rates, changes in asset prices and changes in operating expenses. Of these changes in interest rates are the most general case, since changes in asset prices affect only those institutions a significant proportion of whose profits come from trading in assets rather than holding them to maturity. Changes in operating expense are a separate issue, but they have become a growing risk as the pace of inflation has accelerated. Earnings risk is concerned with the factors that can widen or narrow the margin between the income received on assets and the interest payments payable on liabilities or that affect the residual earnings'.

### iii). Interest Rate Risk

Maisel (1981 p33) identifies interest rate risk as the greatest risk influencing bank value (net worth) risk. He notes the problem of maturity (namely the maturity mismatch of assets and liabilities with fixed interest) and the use of duration to study effect of interest rate changes (13).

#### 4.3 THE ACCOUNTING DEFINITION OF BANK CAPITAL

##### 4.3.1 General Problems of Equity Capital Valuation:

The economist's general definition of the value of net worth, or equity capital, is the present value of future earnings (or cash flow). But in practice, such valuation is based on the unlikely accurate estimation of future earnings and the selection of an appropriate discount rate; eg Orgler & Wolkowitz (1976). The use of the market value of capital stock as a proxy for the present value measure is subject to assumptions of market efficiency; see Chapter 2.

The fundamental theoretical and practical problems of income definition have been well identified by Hicks (1946) who commented ...

'it would seem that we ought to define a man's income as the maximum value which he can consume during a week, and still expect to be as well off at the end of the week as he was at the beginning.'

Although he explores further refinements of this definition, eg to accommodate factors such as the risk of prospective receipts, he is ultimately led back to the generalisation of the above definition which he acknowledges at best, represents an approximation; See Annex 4.1.A.

The investor is confronted by the difference between accounting principles and economic principles relevant to the determination of earnings. This problem is further compounded by the variety of accounting principles which may be applied.

Treynor (1972) notes that,

'The accountant defines it (earnings) as what he gets when he matches costs against revenues, making any necessary allocation of costs to price periods; or as the change in the equity account over the period. These are not economic definitions of earnings but merely descriptions of the motions the accountant goes through to arrive at the earnings number'.

Consequently, economic earnings may be misrepresented by the accounted earnings. While standards of acceptable accounting procedure are developed, these accounted earnings are differentially distorted by the asset valuation and income calculation rules adopted by different firms.

Nevertheless, this problem understates the importance of non-accounting data in the context of the efficient market. Also, there is evidence that despite the ambiguity of accounting data, it may convey valuable information, Ball & Brown (1968), although this is qualified by Ball (1972) and others (14).

As noted by Rowe (1980) accountants have tended to bow to the "business utility test", producing answers required by the market without questioning their own activity. More particularly, they have induced standards, unwritten until recent years, of practice and methods of calculation from observation of the specific demands of their clients. Commenting that such a pragmatic approach fell short of the needs of academic discipline Rowe observes that a more deductive approach was required, and attempts to build a

general theory, have mirrored those of economists and lawyers, by beginning with fundamental, or universal, postulates; eg Hendriksen (1982) proposed a framework based on the ordered consideration of objectives, postulates, and constraints and, from which, definitions led to principles and ultimately accounting applications.

Problems encountered in accounting practice in terms of earnings measurement, equity capital valuation, and presentation, have generated a number of alternative approaches. Despite the problem of changes in currency unit value, particularly in recent decades, historic cost remains the traditional basis of asset and profit measurement in financial statements even though it renders financial reports not comparable over inflationary periods. In order to express financial statement amounts in terms of a standard unit of measurement, a number of methods have been devised, each with relative advantages and disadvantages; See Annex 4.1.B.

Accountants have recognised the need for the user of financial statements to be aware of the basis of statement construction, and accordingly indicated that the concepts of a going-concern, consistency, conservatism, and matching are utilised (15). Recently in the UK, under the auspices of the Accounting Standards Board (1991), discussion about the reporting of financial performance, and the presentation of financial information has included use of "comprehensive income" of which "income" is a component: See Annex 4.1.B.

The further problem of international compatibility of accounting standards is being addressed within the European Community (EC). As noted by Giraud & Walton (1990) work has progressed for many years to create a 'level-playing-field' to foster a Community-wide investment market but recent surveys

indicate that there is a 'very long way to go before an analyst can compare directly between the accounts of companies from different parts of the community' (16). In the UK-US context, a survey of differences between the two countries' generally accepted accounting measurements suggest that US company accounts show lower earnings but higher value for shareholders' funds; Walton & Wyman (see Whitelam 1990) (17). A further survey, undertaken by Choi & Levich (see Whitelam 1990) suggests that investors are influenced to some extent by accounting differences between countries in deciding where to invest or raise capital, but cast doubt on the need for international accounting standards (18).

Anatomically, accountants view equity capital as comprising a number of items, namely common stock, surplus (ordinary share capital and reserves in the UK) and minority interests in subsidiary companies (Annex 4.1.C). Otherwise a bank's liability side structure includes items not normally associated with an industrial corporation, and which reflect the nature of the its activities. These include deposits and loan loss provisions (both reflecting financial intermediation), contingent liabilities (reflecting underwriting) and market securities (which may reflect both a capital market making book and/or the needs of liquidity). Also, off-balance sheet items (commitments and contingencies) tend to be significant for banks, particularly those involved in trade finance and underwriting. Table 4.1 shows the on-balance sheet liability side size and basic structure for the six largest UK banks in the 1970, 1980 and 1990 years.

TABLE 4.1

## BALANCE SHEET: LIABILITY SIDE STRUCTURES

MAJOR UK BANKS (1970a, 1980, 1990)

LIABILITY SIDE ITEMS	BARCLAYS			LLOYDS			MIDLAND			MATHEIS			ROYAL BANK of SCOTLAND			STANDARD CHARTERED		
	1970 1980 1990			1970 1980 1990			1970 1980 1990			1970 1980 1990			1980 1990			1980 1990		
	£M	£M	£M	£M	£M	£M	£M	£M	£M	£M	£M	£M	£M	£M	£M	£M	£M	
1. ORDINARY SHARES	83	262	1,567	65	171	1,241	65	164	784	91	235	1,615	56	189	86	234		
2. RESERVES	387	1,710	4,518	214	1,224	1,030	193	1,184	1,638	225	1,586	4,279	429	1,319	562	756		
3. MINORITIES	67	102	475	2	9	456	0	33	161	4	19	133	0	8	115	30		
4. PREFERENCE SHARES										14	14	14	1	1				
5. LOANS	58	524	2,600	0	236	1,915	0	441	2,290	61	331	3,874	99	1,120	155	1,230		
7. DEPOSITS	5,778	31,980	110,788	2,877	18,118	50,388	3,322	22,906	52,881	4,899	31,820	104,332	5,183	25,750	14,425	19,819		
8. OTHER	776	2,499	14,919	31	108	172	110	615	1,882	99	584	4,853	370	1,750	53	71		
9. TOTAL	7,150	37,097	134,887	3,187	19,866	55,202	3,690	25,343	59,636	5,392	34,589	121,100	6,139	30,096	15,417	22,141		
10. LDM LOSS PROVISION	n/a	447	2,335	n/a	140	3,602	n/a	n/a	n/a	n/a	1,614	370	59	506	215	1,152		
10.a General		177	335		67	154		46	196		1,244		16	72	54	129		
10.b Specific		270	1,942		73	3,448		186	2,497				43	434	161	1,023		
PROPORTIONAL STRUCTURE																		
1. ORDINARY SHARES	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2. RESERVES	1.2	0.8	1.2	2.0	0.9	2.2	1.8	0.6	1.3	1.7	0.7	1.3	0.9	0.6	0.6	1.1		
3. MINORITIES	5.4	4.6	3.3	6.7	6.2	1.9	5.2	4.7	2.7	4.2	4.5	3.5	7.0	4.4	3.8	3.4		
4. PREFERENCE SHARES	0.9	0.3	0.4	0.1	0.0	0.8	0.0	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.7	0.1		
5. LOANS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
7. DEPOSITS	0.8	1.4	1.9	0.0	1.2	3.5	0.0	1.7	3.8	1.1	1.0	3.2	1.6	3.7	1.0	5.6		
8. OTHER	10.9	6.7	11.1	1.0	0.5	0.3	3.0	2.4	3.2	1.8	1.7	4.0	6.0	5.7	0.3	0.3		
9. TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
10. LDM LOSS PROVISION	n/a	1.2	1.7	n/a	0.7	6.5	n/a	0.9	4.5	n/a	n/a	1.3	1.0	1.7	1.4	5.2		
10.a General		0.5	0.3		0.3	0.3		0.2	0.3			0.3	0.3	0.2	0.3	0.6		
10.b Specific		0.7	1.4		0.4	6.2		0.7	4.2			1.0	0.7	1.4	1.0	4.6		

a: Data unavailable for Royal Bank of Scotland and Standard Chartered  
 b: Barclays (B. Other) contains £1,477m (5.5%) Trading Liabilities of Securities Business in 1990

Source: Balance sheets of individual bank groups

#### 4.3.2 Bank Equity Capital Valuation

Subject to the constraints of the accounting system, and prudential regulation strictures (eg loan loss provisioning policy), bank management may influence the presentation of accounted earnings and net worth - and/or balance sheet liability (and asset) side size and structure - by the selective use of various accounting policies. Recently, the use of a market valuation system of accounting for banks has been advocated in the US; Morris & Sellon (1991).

Accounting policies which may particularly influence the balance sheet representation of bank equity capital valuation include, provisions against bad or doubtful loans, attitudes to hidden or secret reserves, off-balance sheet liabilities, intangible assets, and window dressing. These 5 factors, detailed in Annex 4.1.D, involve,....

- i. Provisions: Major provisions for banks include loan loss (or bad debt) and deferred taxation provisions. Some bank regulators, including the USA and UK, have established minimal guidelines in provisioning policy.
- ii. Hidden Reserves: These may originate from the operating account, or automatically as current values of assets and liabilities change from values recorded in the balance sheet, Revell (1986).
- iii. Off-Balance Sheet Items: Off-balance sheet items traditionally represent a grey area of disclosure requirements. Banks often do not disclose the extent of items such as foreign exchange and financial futures contracts on the argument that the figures, which may greatly exceed balance sheet total liabilities, may be misleading.

iv. Intangible Assets: Failure to recognise intangible assets indicates an understatement of bank capital. Intangible assets, namely goodwill, are of undoubted importance to service industry entities such as banks which rely significantly on factors such as name, image and depositor inertia. Nevertheless goodwill is only recognised by accountants on acquisition or merger and then normally written off against reserves.

v. Window-Dressing: In practice it is difficult to differentiate those transactions undertaken for bona fide commercial reasons from those entered into for purely cosmetic purposes. While still practiced in some countries, particularly in order to improve liquidity or to increase footings, window dressing is being confronted by an increasing disfavour among the regulatory authorities. Evidence of bank asset window dressing among US banks is provided by Allen & Saunders (1988).

Recent US proposals noted by Morris & Sellon (1991) suggest that banks should replace the historic cost accounting basis with a market value system; The American Institute of Certified Public Accountants (1990), the Financial Accounting Standards Board (1990), the Federal Financial Institutions Examination Council (1990) and the Office of Thrift Supervision (1990).

Morris & Sellon comment that this appears a controversial issue and has been motivated in part by change in the financial markets (viz. increased interest rate risk). More particularly, from the point of view of providing an accurate measure of capital, the historic system reflects banks' principal risk exposure - credit risk (via losses in book

values). Nevertheless, it has two disadvantages. Firstly, it neglects another major banking risk - changes in interest rates. And secondly it allows banks to manipulate the book value of capital by selectively realising capital gains (ie asymmetrical treatment of realised and unrealised capital gains for most bank assets and liabilities) and consequently providing potentially misleading information.

As related by Morris & Sellon, the proposed market value system involves measurement of all assets, liabilities and off-balance sheet items at current market value (or where necessary by estimation via a present value model) in order to determine a market value measure of bank capital. Changes in this measure of the market value of bank capital will reflect changes in credit quality and interest rates on the bank's current and future earnings. Nevertheless, qualifications have emerged concerning proposals to implement the market value system (19).

## **4.4 CONTEMPORARY REGULATORY VIEWS OF BANK CAPITAL ADEQUACY**

### **4.4.1 Introduction**

The past couple of decades have been characterised by a move towards more formality and objectivity in capital adequacy assessment and control among bank prudential regulators. And, more recently, by convergence of capital adequacy standards both nationally (in the US) and internationally in the context of the Basle Committee (representing the G10 countries and Switzerland) and the members of the European Economic Community (EEC).

### **4.4.2 USA Development**

General:

The introduction, in 1981, of a minimum capital adequacy ratio regime by the three federal regulators has been followed by increases in the minimum required ratio level. Also, banks came under the purview of a bilateral UK-US (between the Bank of England and the three federal regulators) convergence proposal (January 1987) later superceded by convergence proposals of the Basle Committee agreed in 1988.

CHRONOLOGICAL TABLE 4.A

Development of Common Inter-Supervisory Authority  
Minimum Capital Ratio Standards

- 1981: US Introduction of Minimum Capital Ratio Standards  
Joint Federal Reserve Board and Comptroller of the  
Currency guidelines on capital to assets ratio
- 1987: US-UK Bilateral Accord.  
Use of minimum, asset risk weighted capital ratio  
proposed but level not set; superseded by,..
- 1988: G-10 Basle Agreement  
Use of minimum asset risk weighted capital ratio to  
be fully implemented at 8% level by end 1992
- 1989: EEC Directives  
Own Funds and Solvency Ratio Directives closely  
aligned with Basle Agreement requirements
- 1992: Full Implementation  
Minimum 8% Ratio level required by end of year by  
both Basle Agreement and EEC Directives

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**Pre 1981:**

Prior to the introduction of the 1981 regime, and as noted in Chapter 3, no uniform policies on capital adequacy existed among the three regulators: Federal Reserve System (FED), Federal Deposit Insurance Corporation (FDIC) and the Office of the Comptroller of the Currency (OCC).

Minimum capital requirements were applied only in absolute terms; ie minimum dollar amounts of capital necessary for new banks. The regulators had no formally stated minimum requirements for the ratio of capital to assets although they used this measure to assess capital adequacy. Nevertheless the definition of capital varied between regulators; a primary difference concerned the treatment of debt. Also, each regulator set different ratios for different types of banks. The Federal Reserve set minimum ratios according to the size of the bank, whereas the OCC assigned a bank to a particular peer group and minimum capital ratios were based on each peer group. Banks with relatively low capital ratios were encouraged to raise additional capital; Gilbert et al (1985).

**Post 1981:**

Under the 1981 regime, joint guidelines were issued by the FED and the OCC covering the definition of capital and minimum ratios; see Federal Reserve Bulletin (1981: p901-902, Dec). New categories of capital established included primary and secondary capital, together representing total capital.

Primary capital: was defined as common stock, perpetual preferred stock, surplus, undivided profits, contingency and other capital reserves, mandatory convertible instruments

(capital instruments with covenants mandating conversion into common or perpetual preferred stock), and allowances for possible loan losses.

Secondary capital: was defined as limited life preferred stock and subordinated notes and debentures, with certain restrictions; these include an original weighted average maturity of greater than seven years, the total qualifying secondary capital cannot exceed 50% of the amount of primary capital; also secondary instruments must be phased out of bank capital starting from the fifth year prior to maturity.

The regime requires the classification of banks into one of three groups based on (total asset) size; these included community banks (total assets less than \$1bn); regional banks (\$1bn to \$15bn); and multinational organisations as designated by their respective supervisory agency (effectively the 17 largest banks).

The assessment of a bank's capital adequacy requires the match of its capital ratio calculation against a three zone adequacy measure specified for each size group; eg Polonchek et al (1988) and Isberg & Brown (1987). For regional banks the adequacy zone minimums were, ...

Zone 1). acceptable: 6.5% or more of total capital with a minimum of 5% primary capital;  
Zone 2). possibly undercapitalised: 5.5% to 6.5% total capital; and  
Zone 3). undercapitalised: less than 5.5% total capital.

Zone 2 banks are subject to greater regulatory supervision and Zone 3 banks continuous supervision. For community banks the

primary capital to total assets ratio minimum was set at 6%. No specific guidelines were set for the 17 multinational banks, although the regulators expressed a clear expectation that these firms would improve their capital positions. They were to be assessed on an individual basis, allowing for greater flexibility than in dealing with other banks, and with a view to raising their capital ratios, in due course, to levels closer to those of the smaller banks.

The regional bank holding company standards were extended to the multinationals in June 1983, and uniform standards for firms of all sizes were adopted in early 1985 (20); these subsequent modifications to the minimum capital ratio standards and capital definition are noted in Annex 4.3.

#### 4.4.3 UK Development

Prior to the Banking Act, the regulation of banks was carried on informally by the Bank of England. Revell (1975 p46) notes..

'Full details of its methods have never been given, other than the fact that they place great emphasis on interviews with management, and no minimum levels of certain prudential ratios have ever been prescribed.

As previously noted in Chapter 3.5.1 (footnote 48) Revell observed that only cash, liquidity and reserve asset ratios had previously been publicised and these were for monetary regulation purposes.

Revell notes that in 1974, and following the fringe banking crisis of late 1973, the prudential regulation of banks was carried out by the Discount Office of the Bank of England whose main function was to influence short-term interest rates by intervention in the discount market.

Via correspondence and interview with the Bank of England, Revell obtained an indication of the Bank of England approach to prudential regulation. It appeared two ratios were significant;

(i). a solvency ratio measured by the ratio of free resources (shareholders' funds less fixed and capital assets) to public liabilities (current plus contingent liabilities), and a (ii). liquidity ratio of "quick assets" (all assets immediately realisable) to deposits. The need for liquidity was seen as arising from the risk of deposit withdrawal.

Revell gained further conversational evidence that the solvency ratio was viewed as having normal or average levels for differing types of institution (1:10 for a bank to 1:30 for discount houses). The ratios were viewed as internal screening devices for alerting the Discount Office to the possibility of overtrading. Real control was exercised in informal conversations with bank representatives when submitting their accounts, which was done more frequently than once a year.

While this system worked well, given the low level of bank failures, strains began to emerge in the 1960's with the growth in the number of banks and the great increase in people involved in directing bank affairs. This tended reduce the factor of close personal contact, and newcomers had difficulty in understanding the nuances of a system originally based on a tight knit community of bankers. Revell (1975 p47).

The fringe banking crisis of 1973 emphasised deficiencies in the supervision system and additional measures were introduced in August 1974. This involved setting up a new Banking Supervision Division and seeking both information from a wider range of banks, and supplementary information.

The matter of capital adequacy was first addressed by the Bank of England in 1974 through the establishment of a Joint Working Party with the London and Scottish clearing banks which reported in 1975; BEQB (September 1975, p240), Hall (1985c). The report recommended the use of two ratios, the free resources, or gearing, ratio and the risk asset ratio in the assessment of capital adequacy.

CHRONOLOGICAL TABLE 4.B

Major Developments in UK National Capital Supervision

1975: UK Bank of England first addresses capital adequacy with recommended use of gearing and asset risk weighting ratios

1979: UK Banking Act 1979, provided Bank of England with statutory power for its unofficial supervisory arrangements

1980: UK Bank of England publishes "The Measurement of Capital" defining both ratios but no minimum level stipulated.

1987: UK Banking Act 1987  
retains fundamental objectives of 1979 Act but provides Bank of England with greater powers, eg in obtaining information from banks and auditors

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The free resources ratio related current, non-capital liabilities to an adjusted capital base (21) and was taken to represent the acceptability of an institution's capital to its depositors and other creditors. To accommodate this purpose, emphasis was placed on allowing its construction from published information although, as noted by Hall, the inclusion of inner reserves and general bad debt provisions within the definition of capital militates against this.

The risk asset ratio was used as a measure of the adequacy of capital in terms of an institution's exposure to the risk of losses. It related the risk of losses to the capital available to absorb such losses and was regarded the more relevant of the two ratios for supervisory purposes. No standards were set for individual firms or groups of firms on the basis that it would be inappropriate given the great diversity of business operations between deposit-taking institutions.

Following a review of these recommendations in 1979, and the circulation of a consultative document with the banking system, the Bank of England established the system of assessment; the 1979 Banking Act provided statutory backing to the Bank's supervisory role and established a deposit protection scheme. (22).

The BEQB (September 1980, p324) 'The Measurement of Capital' defined the two complementary methods of assessing bank solvency,

(i). a gearing or 'free resources' ratio, which expressed an adjusted capital base as a percentage of deposits and non-capital liabilities.

Capital Base; same deductions as before except for unquoted investments and connected lending.

Non-capital Liabilities; exclude contingent liabilities.

(ii). an asset risk weighted capital ratio. The Bank of England gave more emphasis to the risk weighted ratio, but prescribed no exact numerical capital ratio. The ratio expressed the adjusted capital base as a percentage of the adjusted total of the risk assets.

Capital Base; same as for gearing ratio as well as deduction of premises.

Adjusted Total of Risk Assets: calculated by multiplying each balance sheet asset by an arbitrarily chosen weight. The weights are chosen to reflect the differing degrees of susceptibility of different types of asset to three specific types of risk, namely credit, investment, and forced sale risk; commercial advances are used as a benchmark and given a weight of unity. There are 7 weights ranging from nil for Bank of England notes and gold held physically in own vaults to 2 for property; the weights include nil, 0.1, 0.2, 0.5, 1.0, 1.5, 2.0.

As for the gearing ratio, the Bank of England's assessment of an institution's position on the risk asset ratio front is flexible, taking due account of the institution's particular business composition, its exposure to other risks, 'peer group' analysis, and ratio trends.

The Bank of England maintained a flexible approach, assessment was on a case-by-case basis and was influenced by the interests of the depositors with individual institutions and the need to preserve confidence in the overall system. Some adjustments were introduced in the calculation of the two ratios; namely the definition of the adjusted capital base for both ratios and the grading of risks involved in the calculation of the risk asset ratio. The subsequent adjustment to the definition of capital was largely to accommodate loan

stock issues and debt provisioning; Hall (1985c) (23).

In what proved a forerunner of the Basle Agreement, the Bank of England in co-operation with the three US regulatory authorities (the FED, OCC and the FDIC) published a joint proposal in January 1987 on primary capital definition and the assessment of capital adequacy (reproduced in BEQB, February 1987), 27:1 p85-93). The UK and US authorities produced the proposal in a low key manner by stating that 'the principal objective of the paper is to promote the convergence of supervisory policies on capital adequacy assessments among countries.' (24)

After agreement on convergence of capital measurement and standards by the governors of the Basle Agreement G10 central banks in July 1988, the Bank of England published an implementation scheme which has been modified most recently by the EEC Directives on Own Funds and Solvency Ratio; (Bank of England, December 1990).

#### 4.4.4 International Developments

Two areas of international integration of bank capital adequacy supervision have emerged since the 1970's. These stem from the continued integration of the European Community, and an initiative to seek consistency in the regulatory supervision of international banks of the G10 countries plus Switzerland, under the auspices of the Bank for International Settlements (BIS).

With 7 members of the G10 also members of the EEC, the need for consistency and compatibility in capital adequacy supervision, namely the agreement of a common approach towards the definition of capital and a solvency ratio to be applied to credit institutions in the EEC has been recognised. While the EEC proposals are to apply to credit institutions generally, the Committee framework is designed more specifically for banks undertaking international business.

##### a. Basle Committee

Disturbances in the banking industry in the early 1970's (25) focused attention on the inter-dependence of national banking systems and led to the creation of a standing committee of bank supervisors, under the auspices of the Bank for International Settlements (BIS) in Basle comprising the G10 ('Group of Ten') countries plus Switzerland and Luxembourg.

Called 'The Committee on Banking Regulation and Supervisory Practice' or 'Basle Committee' or sometimes 'The Cooke Committee' after its chairman (from the Bank of England), its objective was to ensure that all banks are supervised according to certain key principles, rather than harmonise

national laws and practices. An early step was to develop guidelines for the division of responsibilities among national supervisory authorities; the guidelines were approved by the governors of the G10 central banks in 1975 and became known as the 'Basle Concordat'.

Problems surfaced in terms of primary supervisory responsibility (host responsibility for foreign subsidiary solvency versus consolidated supervision of a bank's international business) and different supervisory standards. Also there developed a widespread, but mistaken, belief of commercial bankers that the supervisory and lender of last resort responsibilities of national authorities went hand in hand. Many of these, and other, regulatory weaknesses were manifest by events surrounding the collapse of the Banco Ambrosiano's Luxembourg subsidiary in 1982. The original Concordat was revised in 1983, closing certain regulatory gaps and addressing the question of adequacy of supervision, and consolidated supervision; Dale (1984a p175) (26).

In January 1987 a joint UK - USA proposal, or accord, was published (between the Bank of England and the three USA federal regulators) for the establishment of two risk-weighted minimum capital ratios; "the principal objective of the paper is to promote the convergence of supervisory policies on capital adequacy assessments among countries." (BEQB1, February 1987, 27:1, 87). This was to be superseded by a Basle Committee initiative.

CHRONOLOGICAL TABLE 4.C

Basle Committee: Agreement Development

- 1974: Collapse of Bankhaus I.D. Herstatt  
Establishment of Committee on Banking Supervision  
(The Basle, or Cooke, Committee)
- 1975: Basle Committee issued Concordat
- 1982: Collapse of Banco Ambrosiano Holdings
- 1983: Basle Committee issued revised Concordat
- 1987: (January) - bilateral, UK/US accord on capital adequacy  
(December)- Basle Committee issued consultative  
'Proposals for international convergence of capital  
measurement and capital standards'.
- 1988: July - Basle Committee issued agreement on  
'International Convergence of Capital Measurement  
and Capital Standards'.
- 1990: December - Minimum Capital standard as per agreement  
7.25%.
- 1992: December - Minimum Capital standard as per agreement  
8.0%.
-

Following the January 1987 UK/USA Accord and a December 1987 Basle Committee consultative paper on convergence of capital measurement and standards, the Basle Committee reached agreement (endorsed by G10 central bank Governors) on a framework for measuring capital adequacy and the minimum standard to be achieved. The agreement, published in July 1988 is titled 'International Convergence of Capital Measurement and Capital Standards'.

The 1988 convergence agreement contains four key elements; namely, a definition of the constituents of capital, a risk weighting system (for both on and off balance sheet items), a target standard ratio, and a schedule of transitional and implementing arrangements.

i). Capital

is defined in two tiers. The capital base comprises at least 50% of Tier 1 capital; Tier 2 capital is admitted up to an amount equal to Tier 1 capital.

Tier 1: The key element, core capital, comprises basic equity and disclosed reserves. Basic equity is defined as issued and fully paid ordinary shares/common stock and non-cumulative perpetual preferred stock (but excluding cumulative preferred stock).

Tier 2: Supplementary capital includes undisclosed reserves (ie hidden reserves passed through the profit and loss account), revaluation reserves, general provisions/general loan loss reserves, certain hybrid debt capital instruments, subordinated term debt (with an original maturity over 5 years to a maximum of 50% of core capital).

For the purposes of calculating the risk-weighted capital ratio deductions are made from the capital base; namely goodwill (from Tier 1), and investments in subsidiaries engaged in banking and financial activities which are not consolidated in national systems.

ii). The Risk-Weighting System

Capital adequacy is assessed by weighting different categories of asset or off-balance sheet exposure according to broad categories of relative riskiness.

Five weights are used (0, 10, 20, 50 and 100 per cent). The central focus is on credit risk (ie the risk of counterparty failure) and as a further aspect of credit risk, country transfer risk (based on differentiation of defined groupings of countries considered to be of high credit standing).

Off-balance sheet engagements are converted to credit risk equivalents by multiplying the nominal principal amounts by a credit conversion factor (five categories are distinguished), the resulting amounts then being risk-weighted according to the nature of the counterparty.

iii. A Target Standard Ratio

A target standard ratio of capital to weighted risk assets is set at 8% (of which core elements are at least 4%). This represents a common minimum standard which international banks in member countries are expected to observe by the end of 1992.

iv). Transitional and Implementing Arrangements

Banks are expected to maintain their end 1987 standards, achieve 7.25% by end 1990, and reach 8% by end 1992. Certain latitudes are allowed in measurement of the capital during the transitional period.

A full summary of the first three elements is provided in Annex 4.5, and the fourth (the implementation schedule) is shown in Table 4.2.A. Tables 4.2 B and C also show Basle Committee ratios for major banks in the UK and USA respectively.

TABLE 4.2

## BASLE AGREEMENT

## A: BASLE STANDARDS

## SCHEDULE FOR BASLE AGREEMENT RISK ASSET RATIOS

Year End	1988	1990	1992
MINIMUM STANDARD	Level Prevailing at end-1987	7.25%	8%
MEASUREMENT FORMULA	Core Elements + 100% (3.625% + 3.625%)	Core Elements + 100% (3.625% + 3.625%)	Core Elements + 100% (4% + 4%)
SUPPLEMENTARY ELEMENTS INCLUDED IN CORE	Max 25% of Total Core	Max 10% of Total Core (ie 0.36%)	None
LIMIT ON GENERAL LOAN LOSS RESERVES IN SUPPLEMENTARY ELEMENTS	No Limit	1.5% points, or exceptionally up to 2.0 % points	1.25% points, or exceptionally and temporarily up to 2.0 % points
LIMIT ON TERM SUBORDINATED DEBT IN SUPPLEMENTARY ELEMENTS	No Limit (at discretion)	No Limit (at discretion)	Max of 50% of Tier 1
DEDUCTION FOR GOODWILL	Deducted from Tier 1 at discretion	Deducted from Tier 1 at discretion	Deducted from Tier 1

Source: Annex of Basle Committee on Banking Regulations and Supervisory Practices, July 1988

B: UNITED KINGDOM BASLE AGREEMENT RATIOS  
(6 LARGEST BANK GROUPS)

Tier 1	TIER 1					TOTAL RISK ASSET RATIO				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
BARCLAYS			\$6.0	\$5.9	na			9.3	9	8.3
LLOYDS	5.7	4.8	5.6	4.4	5.2	10.7	9.1	10.1	7.4	8.5
MIDLAND			6.5	5.4	5.4			11.8	10	9.8
NATWEST			5.5	5.3	5.2			9.8	9.1	9.1
RBS			7.3	7	na			13	12.8	na
STANCHA			5.3	4.7	5.4			10.4	9.2	10.7

Source: Individual Bank Group Report and Accounts

\* Source Moody's Bank Credit Report

**C: UNITED STATES - BASEL AGREEMENT**  
**RISK-WEIGHTED CAPITAL RATIOS\***  
**Selected Bank Holding Companies\*\***

BANK	TIER 1			TIERS 1 + 2		
	1988a %	1989a %	1992E %	1988 %	1989 %	1992E %
BANC ONE CORP	10.6	12.9	8.98	10.6	12.9	11.01
BANK OF BOSTON CORP	7.6	7	NA	10.7	10.3	NA
BANK OF NEW YORK, INC	NA	6	4.61	NA	8.3	7.58
BANKAMERICA CORP	5.4	7.5	5.61	10.1	11.9	9.11
BANKERS TRUST NEW YORK	6.7b	5.7	4.34	9.2	11.3	8.08
BARNETT BANKS, INC	9.7	10.1	NA	10.2	10.3	NA
CHASE MANHATTAN CORP	5.8	5.8	4.44	10.4	10.6	8.87
CHEMICAL NEW YORK CORP	NA	6.9	4.65	NA	12.2	8.74
CITICORP	4.7	4.4	4.04c	9.2	8.6	8.08c
CORESTATES FINANCIAL CORP	10	11	8.1	12.5	13.1	12.8
FIRST BANK SYSTEM, INC	5.7	6.3	4.4	9.1	8.3	7.6
FIRST CHICAGO CORP	6.7	6.8	4.7	10.1	10.3	8
FIRST INTERSTATE	5.4	4.7	3.6	9.3	8	7.2
FIRST UNION CORP	NA	12.2	NA	NA	13.9	NA
FIRST WACHOVIA CORP	10.8	11.3	8.45	10.8	11.3	9.94
FLEET/NORSTAR FINANCIAL	10.9	11.6	7.26	12.3	12.6	10.7
J.P. MORGAN & COMPANY	12.5	6.8	5.9	14.9	12.1	10.1
MANUFACTURERS HANOVER	5.4b	8.7b	5.69	10.9	15.7	10.24
MELLON BANK CORP	3.8	7	4.6	7.5	10.1	8.79
NATIONAL CITY CORP	9.8	11.2	7.45	10.3	11.3	9.91
NBD BANCORP, INC	10.5	11.5	7.59	11	11.5	9.72
NCNB CORP	10.9	8.3	6.15d	11	10	9.1d
NORWEST CORP	7.7	8.9	5.4	12.4	14.1	10.5
PNC FINANCIAL CORP	10.2	10.8	7.4	10.5	10.8	9.73
REPUBLIC NEW YORK CORP	8.7	8.8	12.45	12	14.8	21.15
SECURITY PACIFIC CORP	5.7	5	4.2	9.1	7.2	8.4
SIGNET BANKING CORPORATION	10.1	11.1	7.47	11.1	12.2	11.2
SOVRAN FINANCIAL CORP	9.7	na	7.07	9.9	na	9.37
SUNTRUST BANKS, INC	10.3	12.4	8.03	11	12.8	11.01
U.S. BANCORP	10.2	10.7	6.57	11.1	11.3	9.73
VALLEY NATIONAL CORP	8.9	7.2	5.1	10.9	10.8	6.35
WELLS FARGO & CO	7.4	8.1	4.95	12.9	13.3	9.91

Source: Salomon Brothers "A Review of Bank Performance" 1989 and 1990 editions.

\* Ratio = capital as a percentage of estimated risk-weighted assets plus contingencies

\*\* Banks from Salomon Brothers Selection of 35 Bank Holding Companies

a: Includes elements borrowed from Tier 2 Capital as permitted by Proposal

b: After deduction of investment in unconsolidated subsidiaries

E: Risk weighted Capital Ratios, Management Estimates at end 1989, on a 1992 basis

- except c = 1990 basis, and d = Transition Basis

b. EEC Development

Pursuant to the market integration principles of the 1957 Treaty of Rome (later revised by the Single European Act of 1987) and the objective of completion of a unified internal market by 1992, the European Economic Community (EEC) Commission has issued a number of Directives aimed at internal finance/banking industry regulation.

Acting on advice, the EEC Commission may issue Recommendations or Directives, the latter alone carrying legal force. Advice is received from, the Contact Group of EC Supervisory authorities, the Banking Advisory Committee, and links with both the Basle Committee and individual national regulators (27).

After an earlier attempt (28), the First Banking Directive, aimed at the harmonisation of regulation of banks and other credit institutions within the Community, was issued in 1975 and agreed in 1977. Termed the First Banking Co-ordination Directive, it provided a basis for bank authorisation (including a requirement of a minimum, and separate, 'own funds' of an amount unspecified), and requiring supervisory authority cooperation (mostly in terms of information). The Directive required its Advisory Committee to decide on the content and method of calculation of the "observation ratios" between the various assets and/or liabilities of credit institutions; Allen (1978).

CHRONOLOGICAL TABLE 4.D

EEC Bank Supervision: Developments

1957: Treaty of Rome

1972: Draft Directive on harmonisation of bank regulation  
Establishment of the Contact Group of EEC  
Supervisory Authorities (Groupe de Contact)

1975: Revised First Banking Co-ordination Directive issued

1977: Revised First Banking Co-ordination Directive adopted

1979: Establishment of Banking Advisory Committee as required  
per First Directive of 1977

1987: Single European Act revised completion of internal  
market by end 1992

1988: Second Banking Co-ordination Directive issued

1989: Second Banking Co-ordination Directive adopted  
Own Funds Directive adopted  
Solvency Ratio Directive adopted

1991: (January) Compliance with Solvency Ratio Directive  
required

1993: (January) Full implementation of Own Funds and Solvency  
Ratio Directives required

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As noted by Hall (1989 p41),

'In broad terms , the Directive sought to pave the way for the gradual shift of effective prudential supervision from host to the parent supervisory authority - 'the home-country-control' objective - a move not entirely in keeping with the approach to allocating supervisory responsibility outlined in the Basle Concordat.'

Hall (1989 p42) noted a public airing of differences between the EEC and the Basle Committee (and Bank of England) over supervisory initiatives in the early 1980's since when little has emerged to indicate any continuing rift.

Subsequent supervisory initiatives aimed at completion of the internal market by 1992 include a Second Banking Coordination Directive, an Own Funds Directive and a Solvency Directive (29).

The Second Banking Co-ordination Directive, proposed in 1988 and adopted in 1989, is seen as the centre piece of the Commission's plan for the banking sector (Bank of England, June 1988) and, together with the liberalisation of capital movements, seeks to eliminate the remaining barriers to freedom of establishment in the banking sector and to afford full freedom to provide banking services; Hall (1989 p43).

The Directive provides that authorisation as a bank in any one EC country will be valid for all EC countries. Also included are provisions aimed at harmonising aspects of the supervisory

process, including a minimum capital requirements quantified at 5 million ECU. Other provisions include the fitness and propriety of major bank shareholders and the control of banks' participation in non-banking companies; British Bankers Association (1988).

Agreement was also reached on two related measures designed to harmonise the definition of bank capital and the calculation of risk asset ratios across the EEC; these follow closely the July 1988 proposals of the Basle Committee. The Own Funds Directive and the Solvency Ratio Directive were both adopted in 1989; Member States were required to comply with the Solvency Ratio Directive by January 1991, and full implementation of both Directives is required by January 1993.

The Own Funds Directive harmonises the definition of bank capital used for the purposes of the ratio calculation (and for other supervisory purposes); ie the numerator of the ratio. The expression 'own funds' is used throughout EEC Directives to describe bank capital.

The denominator is defined by the Solvency Ratio Directive, which provides risk-related weightings for the various assets and off-balance sheet items. Also, it lays down a minimum target ratio of 8%.

Despite the sense of political achievement in securing international agreement on the convergence of capital measurement and standards, the economic impact is less readily apparent.

A fundamental criticism of capital regulation regimes in general, and certainly in the UK, is the failure to validate their impost with a complementary cost-benefit study. Hall (1989 p118) comments that, ...

'no attempt has been made to demonstrate the existence of net social benefits arising from the implementation of any of the strands of banking supervision, be they administered under the Banking Act 1987, the Financial Services Act 1986 or according to the requirements specified in the Basle Concordat, the Basle Committee's capital adequacy proposals or EC Directives.'

The following considers questions which emerge about the efficacy of capital bank regulation in general, as well as the specifics of particular ratio methodology. Key relationships concern the inter-action of regulator, management and market viewpoints.

#### 4.5.1 The Efficacy of Bank Capital Regulation

##### a. Models of the Regulatory Constraint

As noted in the introductory chapter, a number of bank models assume various market imperfections, the exploitation of which yields optimal capital structures; these are reviewed in Annex 4.5. This sub-section focuses primarily on models incorporating the capital regulation constraint.

##### Capital Regulation and the Risk-Return Framework:

The risk-return framework of portfolio theory provides a basis for examining the effect of minimum capital regulation for a number of researchers; viz Kahane (1977), Koehn (1979) and Koehn & Santomero (1980), although these have been criticised by Keeley & Furlong (1990).

Kahane (1977) demonstrates that capital regulation provides an ineffective bound of the probability of ruin. He considers the effectiveness of a combination of regulatory instruments, namely an upper bound on leverage and constraining the composition of both asset and liability portfolios, in protecting a financial intermediary's solvency. Kahane concludes that neither constraining the portfolio composition of the intermediary per se, nor the minimum capital requirement per se, can be regarded as an effective means for bounding the firm's probability of ruin. Nevertheless he allows that the combination of these regulatory practices may reach the desired effect.

Koehn (1979) considers the effect of capital structure regulation, as well as two other forms of solvency regulation - portfolio restrictions and (deposit) interest rate ceiling restrictions, both individually and in combination. He demonstrates that the leverage constraint does nothing to increase the riskiness of banks *per se*, but reduces the number of combinations of risk and return available to the bank. More particularly, capital regulation serves to protect depositors from the loss of funds by constraining an intermediary from operating within the high risk area of its opportunity set. But, if the firm is unable to offset the effects of asset restrictions, it may not provide the return required by its owners. Koehn also notes that leverage constraints have only a negligible effect on the probability of failure relative to the unconstrained regime.

Koehn & Santomero (1980) consider the impact of bank capital regulation on individual bank behaviour, and whether the desired result is achieved. The authors argue that while typically, regulation is assumed to operate in a *ceteris paribus* environment whereby the mere addition of capital to a bank's balance sheet reduces risk, they explicitly examine the issue of portfolio reaction to capital requirements by investigating the effect of capital ratio regulation on the portfolio behaviour of commercial banks. The paper implicitly assumes that bank regulators do not constrain portfolio risk so as to prevent asset reshuffling.

After examining the portfolio allocation that flows from the portfolio decision of the firm, the paper examines the effects on bank portfolio risk of a regulatory increase in the minimum capital asset ratio that is acceptable to the supervisory agency.

For the system as a whole, the results of a higher required capital-asset ratio in terms of the average probability of failure are ambiguous, while the intra-industry dispersion of the probability of failure unambiguously increases.

Consequently the authors question the viability of regulating commercial banks in terms of a capital and say a discontinuation of regulation of bank capital via ratio constraints should be considered. Alternatively, they suggest regulation should be imposed on both asset composition and capital in a way that has heretofore not been considered.

The implication of these papers that capital regulation may be counterproductive has been challenged by Furlong & Keeley (1990) who criticise as inappropriate the use of Markowitz two-parameter models to analyse bank risk taking under a non-zero probability of bankruptcy, such as Koehn and Koehn & Santomero. Furlong & Keeley claim the models neglect the option value of the deposit insurance subsidy and use an inappropriate measure of risk, thereby mischaracterising both the risk return frontier, without capital regulation, and the shift in the risk return frontier due to capital regulation. They conclude that the models used are not applicable to analysing the effects of bank capital regulation on asset risk and cannot be used to support their results.

#### Deposit Insurance Substitution:

Deposit insurance represents a major form of prudential control but problems of pricing, its potential to encourage risk taking (ie. moral hazard) and assessing its substitution for capital regulation hamper its effective utilisation. Concerning deposit insurance which guarantees all deposits up to a statutory limit, Santomero (1984) - noting that over the

past couple of decades all depositors (not just the insured ones) in failed institutions have been protected - comments that, ...

'if one accepts the view that bank liabilities are essentially 100 percent insured, then the entire issue of bank capital and risk taking should be recast in terms of a discussion of insurance pricing.'

To this end, Merton (1977) and Sharpe (1978) apply similar approaches by deriving the optimal price for insurance from viewing the payoff pattern of the insurance scheme as a put option on the underlying assets of the institution. Merton sees the payoff pattern of the insurance fund as the payoff structure of a put option issued by the FDIC against the value of the assets in the bank, and using the Black-Scholes (1972) option pricing model derives an optimal price per dollar - and the value of deposit insurance. Sharpe uses a state preference approach noting the reality of the FDIC fixed net insurance fee, and the tendency for financial firms to accept higher risk levels than in the absence of the insurance subsidy. Sharpe notes that, given other factors, the value of a fair insurance fee declines as the capital-assets ratio increases and that adequate capital is that quantity which would make the current fixed rate insurance fee the correct price for the underlying put option implicitly issued by the FDIC.

Buser, Chen & Kane (1981) consider a combination of explicit and implicit pricing for deposit insurance employed by the FDIC as costs to offset the inherent benefits accruing to the insured liability issuers; they view implicit costs as including capital regulation, community development

accountability and the like. They reason that having accepted the benefits of insurance without paying the full cost explicitly, the firm can be manipulated by the regulator but the resultant profit of the firm must at least equal the uninsured case to maintain control.

## b. The US Experience

The efficacy of a number of aspects of the specific bank capital regulation measures has been considered in the US in terms of pre and post the 1981 introduction of minimum capital ratio guidelines.

### Capital Regulation influence on Capital Investment Level:

In the earlier period, Peltzman (1970) finds no evidence of the influence of bank capital regulation on the level of bank capital investment, while both Mingo (1975) and Mayne (1972) find some evidence. Orgler & Wolkowitz (1976, p115) comment that the evidence of Mingo, and Mayne, is more supportable than Peltzman's but that .."the influence that regulators appear to exert is quite minor". Mayne (1972) qualifies her results;

she found no significant difference in impact of different regulatory regimes - although regulatory practices and policies on bank capital differ from one agency to another, there does not appear to be any significant difference between regulation agency impacts on bank capitalisation. Mayne found some degree of explanation for this in terms of a management resistance to regulatory required increases in capital which was correlated directly with regulatory pressure.

Dietrich & James (1983) viewing a later period (1971-75) confirm Petzman's finding of no evidence of regulatory effect on bank capital and challenge Mingo's conclusion on the 1969-70 period due to the coincident influence of regulatory interest rate ceiling (30).

Focusing on the decline in capital to asset ratios over the decades of the 1960' and 1970s (11.7% in 1961 to 5.7% in

1978), Marcus (1983) finds evidence that it may be the response of profit maximising banks to a changing economic environment.

Marcus, unlike Peltzman, Mingo, or Mayne, focuses on the decline in ratios over time (using time series-cross section estimation rather than simple cross section estimation), uses market, rather than book, values and defines capital in terms of equity plus debt.

#### Deposit Insurance Substitution:

Peltzman (1970) provides evidence that regulators are largely ineffective in preventing the substitution of deposit insurance for capital. Mingo (1975) in a modified version of Peltzman's study also finds the implication, albeit without statistical significance, that deposit insurance and capital investment are substitutes. Mingo also enquires whether the substitution of insurance for capital is less likely to occur in the presence of capital regulation, and finds that banks with the lowest capital ratios are most successful in substituting deposit insurance for capital.

#### Post 1981:

In the post 1981 era, Keeley (1988a) examined the effect of the objective minimum capital-to-asset ratio requirements on the capital positions of the 100 largest BHCs. He found that the regulations succeeded in causing banks with low capital ratios to increase their book value capital ratios both absolutely and relative to banks with initially high capital ratios, and that banks achieved this largely by slowing asset growth.

Nevertheless, evidence on changes in market value capital ratios, while not necessarily inconsistent with the apparent book value capital increase induced by regulation, lends little independent support to the idea that regulation caused an actual increase in capital ratios.

### c. The UK Experience

UK bank capital regulation first received statutory backing with the 1979 Banking Act; and the first formal regulatory promulgation of capital measurement and assessment took place in 1980. The capital regulatory regime changed to an objective minimum basis with the advent of the proposed bilateral UK-US arrangement in 1987, which was superceded by the Basle Committee Agreement.

The equity (group shareholders' funds) capital ratio experience of the big four clearing banks and two other major UK banks is shown over the past couple of decades in Table 4.3; 1969 marks the year the UK banks undertook to eliminate secret reserves from their accounts. Also the banks' equity (ordinary share capital and reserves) ratios are shown in terms of book and market values in Table 4.4; this is provided in terms of a ratio in Table 4.5; these indicate, in end-of-year terms, that for the first time since the early 1970's some of the large banks were valued at a premium to book value in 1989. Also, the Basle agreement ratios of the major banks groups are shown in Table 4.2.B.

Apart from the general pressures on bank capital ratios noted in Section 4.2, the UK banks response prior to the minimum capital regime was determined largely by the Bank of England's policy on capital definition.

The limited inclusion of subordinated loan stock in capital definition was utilised by the banks in the early 1980's but by the end of 1984 most were near or up against the stipulated ceiling; Hall (1985c).

A particular pressure emerged in the 1984 Budget amendment to capital allowance and corporate tax liability (31); this precipitated transfers from reserves to cover the enlarged deferred tax payments of Barclays, Lloyds, Midland and National Westminster of £543m, £465m, £230m and £570m respectively. Also, a strong US dollar in 1984 exacerbated ratio pressure for banks with large proportions of dollar denominated assets. The accompanying 1984 drop in equity capital ratios is notable in Table 4.3.

TABLE 4.3

**Equity Capital Ratios of Major UK Banking Groups  
(Equity Capital to Total Assets)**

Year	Barclays	Lloyds	Midland	Natwest	†Average	RBS	Stancha
	%	%	%	%	%	%	%
1969	7.9	9.6	5.9	7.5	7.7	na	na
1970	7.5	8.8	7.0	5.9	7.3	na	na
1971	6.3	7.9	6.3	5.6	6.5	na	na
1972	6.0	7.0	5.4	5.3	5.9	na	na
1973	5.3	6.9	4.5	6.7	5.8	na	na
1974	5.3	6.1	4.8	6.0	5.5	na	na
1975	5.1	5.8	5.5	5.9	5.6	6.9	na
1976	5.1	6.1	5.4	5.5	5.5	7.0	na
1977	4.9	5.9	5.2	5.4	5.4	7.2	na
1978	6.0	7.0	6.2	6.0	6.3	6.9	6.2
1979	6.1	7.0	6.1	5.4	6.1	8.2	4.8
1980	5.6	7.1	5.5	5.3	5.9	7.9	5.1
1981	4.9	6.5	4.4	5.1	5.2	7.2	5.9
1982	5.0	5.9	4.2	4.7	5.0	7.8	5.4
1983	4.9	6.0	4.5	4.8	5.1	7.2	5.2
1984	3.8	4.7	3.5	3.7	3.9	5.2	4.6
1985	5.1	5.3	3.6	4.2	4.5	5.9	4.5
1986	4.8	5.8	4.0	5.6	5.1	5.8	4.4
1987	4.8	5.3	5.5	5.7	5.3	5.5	3.1
1988	5.6	6.3	5.7	6.1	5.9	5.9	5.1
1989	5.2	4.8	4.6	5.2	5.0	5.2	4.1
1990	4.9	4.9	4.3	5.0	4.8	5.0	4.6

Ratio calculated as Equity Capital to Total Assets at year end

Equity Capital = Ordinary Share Capital + Reserves + Minorities

Year End = 31st December; except RBS at 30th September

† = Average of the Big Four UK Clearers

RBS = Royal Bank of Scotland Group

Stancha = Standard Chartered

Source: Annual Report and Accounts of the individual banks

TABLE 4.4  
EQUITY RATIOS: BOOK VALUES & MARKET VALUES

YEAR	BARCLAYS		LLOYDS		MIDLAND		NATWEST		AVERAGES <sup>8</sup>	
	Book	Market	Book	Market	Book	Market	Book	Market	Book	Market
1970	6.6	4.0	8.7	6.6	7.0	5.2	5.9	5.5	7.0	5.3
1971	6.3	7.2	6.9	8.6	6.3	7.4	5.6	8.1	6.3	7.8
1972	5.9	8.5	6.1	7.9	5.3	7.7	5.2	9.3	5.6	8.3
1973	5.1	4.8	6.9	4.5	4.4	3.9	6.6	4.8	5.8	4.5
1974	5.1	1.7	6.0	1.5	4.8	1.3	6.0	1.4	5.5	1.5
1975	4.7	3.7	5.7	3.1	5.4	3.8	5.8	3.2	5.4	3.5
1976	4.7	2.6	6.1	3.0	5.3	3.0	5.4	3.0	5.4	2.9
1977	4.6	3.1	5.8	3.6	5.1	3.9	5.3	3.4	5.2	3.5
1978	5.7	3.6	7.0	3.3	6.1	3.8	5.9	3.0	6.2	3.4
1979	5.8	3.3	7.0	3.0	6.0	2.8	5.3	2.9	6.0	3.0
1980	5.4	3.4	7.0	3.0	5.3	2.2	5.2	2.7	5.7	2.8
1981	4.7	2.7	6.2	2.9	3.5	1.4	5.1	2.3	4.9	2.3
1982	4.7	2.3	5.7	2.3	3.3	1.1	4.7	2.0	4.6	1.9
1983	4.6	2.6	5.7	2.7	3.6	1.8	4.8	2.6	4.7	2.4
1984	3.5	2.7	4.7	2.9	2.7	1.4	3.7	3.0	3.7	2.5
1985	5.1	5.0	5.3	4.0	3.2	1.8	4.1	3.5	4.4	3.6
1986	4.7	4.5	5.7	5.0	3.8	2.7	5.5	4.8	4.9	4.2
1987	4.7	3.8	5.3	4.5	5.3	4.4	5.6	5.0	5.2	4.4
1988	5.5	2.9	5.5	5.1	5.5	4.1	6.0	4.0	5.6	4.0
1989	4.9	5.0	4.1	6.3	4.3	4.9	5.1	4.7	4.6	5.2
1990	4.5	4.3	4.1	6.5	4.1	2.5	4.9	3.6	4.4	4.2

EQUITY BOOK VALUE RATIO = (ORDINARY SHARE CAPITAL + RESERVES)/TOTAL ASSETS

EQUITY MARKET VALUE RATIO = EQUITY MARKET VALUE/(TOTAL ASSETS-BOOK EQUITY+MARKET VALUE EQUITY)

<sup>8</sup> : simple average of four ratios

Data Source: Annual Report and Accounts; Market Data from Datastream

TABLE 4.5

## RATIO OF MARKET TO BOOK VALUE OF EQUITY\*

YEAR	BARCLAYS %	LLOYDS %	MIDLAND %	NATWEST %	AVERAGE %
1970	59	74	73	94	75
1971	116	126	120	149	128
1972	150	131	148	186	154
1973	93	64	87	71	79
1974	33	24	27	22	26
1975	77	53	69	54	63
1976	54	47	56	54	53
1977	66	60	74	63	66
1978	62	46	60	49	54
1979	56	42	46	53	49
1980	61	41	41	50	48
1981	56	45	40	44	46
1982	49	39	33	42	41
1983	56	46	48	53	51
1984	75	61	51	81	67
1985	99	75	56	84	79
1986	95	86	69	86	84
1987	81	83	82	89	84
1988	52	91	74	65	71
1989	102	157	115	92	117
1990	94	161	61	73	97

\* Ratio = Market Value of Equity to Book Value of Equity (Ordinary Share Capital plus Reserves)

Source: Market Value from Datastream

Book Value from individual Bank Group Balance Sheets

Although Barclays relieved the pressure with an ordinary share rights issue in March 1985 the other banks resisted, using instead the avenue pioneered by Lloyds in May 1985 - a US dollar denominated perpetual FRN, accepted as capital by the Bank of England. The Lloyds \$750m issue was followed by similar issues by Midland (US\$750m), National Westminster (\$1bn), and Standard Chartered (£150m eurosterling bond issue). Earlier perpetual FRN's issued in 1984 issued by National Westminster, Barclays and Standard Chartered were termed junior subordinated FR loan stocks as they ranked between subordinated debt and equity; nevertheless they were not accepted as primary capital as they carried no provision for being treated as equity in the event of the issuing bank experiencing financial difficulties.

Three broad regulatory regime periods may be defined over the past two decades by two major developments; the introductions of bank capital supervision and the later introduction of the minimum capital ratio regime.

As indicated in Section 4.2 the introduction of capital supervision appears to have progressed over a number of years; from the emergence of the voluntary system in the mid 1970's to its formal statutory ratification in 1979, clarified by the publication of assessment methodology ratios in 1980. The introduction of the minimum capital regime may be more precisely dated with the announcement of the bilateral UK-US agreement in 1987.

The general bank environmental pressures noted in Section 4.1 applied to the UK banks fairly uniformly; The supervisory desire to improve bank capital ratios coincided with a need for adequate loan loss provisioning in response to deteriorating international business conditions. Fiscal

conditions favoured subordinated debt at the expense of equity capital by allowing tax relief on interest payments but not dividends; and specific provisions carried tax deductibility while general provisions did not. Also fiscal policy change impacted on UK banks severely with the 1984 Budget amendments to the systems governing the availability of capital allowances and liability to corporation tax; for the English clearing banks alone this prompted a £2bn transfer from reserves.

The response of the UK clearing banks to these pressures was in large part determined by the Bank of England's approach to defining capital. The official line taken on subordinated debt and debt provisioning proved particularly significant; Hall (1985c).

#### d. The Risk Asset Weighted Ratio (RAR)

The risk asset weighted capital ratio (RAR) as used by the Basle Committee, has evolved from earlier methodologies; see Chapter 3. The following criticism applies to RAR's generally, but focuses on specifications of the Basle Committee's RAR. Criticisms surround its construction and use as a regulatory minimum constraint, and its influence on commercial bank management.

As noted by Hall (1989) the use of the risk asset weighted ratio (RAR) by both the Bank of England and the Basle Committee is designed to provide a measure of a bank's financial strength and, to a degree, allows for ready comparability between institutions.

'In other words, the prescription of risk weights and a minimum (or target) RAR is designed to act as a safeguard against insolvency.'

##### (i). Precedence

As noted in Chapter 3, a progenitor of the Basle ratio, the Federal Reserve's increasingly complex ABC risk asset ratio methodology was ultimately abandoned in the mid 1970's because adequate capital levels could not be agreed; Moulton (1987). In a general sense, the potentials for both increasing complexity of the Basle ratio methodology (eg as more risks are formally identified) and future disagreement about minimum capital levels among national supervisors, are contingencies which may ultimately qualify the tenure of the methodology.

(ii). Capital Definition

Capital Sterilisation:

A fundamental paradox, which mitigates against bank operational efficiency, is inherent in mandatory capital ratio regulation. As noted by Gardener (1981), ...

'... whenever such a fixed ratio is prescribed in mandatory terms, banks are compelled to regard the ratio satisfying elements in their capital cushions as being unavailable for potential loss-absorbing purposes. ... (and) ... one may refer legitimately to the operational sterility for loss-absorbing purposes of the required capital elements of mandatory ratios as the paradox of prudential capital adequacy. ... In broader terms, the paradox ... has potentially significant welfare implications. These arise because margins may have to be widened to build up capital bases above functional needs in order to satisfy the mandatory ratios. Such required actions may then have the undesirable effect of raising the social cost of intermediation. Another undesirable effect might be the indirect incentive given to excessive banking competition in order to maintain returns on equity. Excessive competition, in turn, might itself lead to imprudent

banking.'

Another form of "sterilisation" occurs when capital is apportioned exclusively to match certain asset categories such as goodwill and investment in subsidiaries. Capital so apportioned is outside the definition of capital for ratio calculation purposes. Such sterilisation ignores the multi-functional capacity of bank capital. Also, it implies the simplistic additivity of risk; see later.

#### Tier 2 Capital:

The definition of a "tier 2" capital is essentially arbitrary. As noted in Chapter 3, Benston (1991 p223) argues for the full inclusion of subordinated debentures. He makes other relevant comments including, ...

'Given government-provided deposit insurance, the important constraint on excessive risk-taking is capital invested by bank owners, including debentures that are subordinated to deposits. ...  
Marketable debentures would provide the authorities with market evidence of the risks taken by a bank, as these would be reflected in the price at which the debentures traded. The ease or difficulty with which a bank refinanced its debentures as they came due also would provide the authorities with market evidence about risks. Hence it would be desirable for subordinate debentures to have staggered maturities, such that a bank would be continually forced to go to

the market for a reaffirmation of its risk profile.'

### (iii). Risk

#### Risk Recognition:

Although the regulators acknowledge a wide spectrum of risks, they incorporate few in their risk weights. The Basle committee focuses on credit risk (and within this, country transfer risk) but hopes for eventual incorporation of investment, and especially interest rate, risk. Off-balance-sheet items are also converted into credit risk equivalents before being weighted by the nature of the counterparty.

#### Risk Weights:

Even within the narrow context of credit risk, the assignment of risk weights is open to challenge. Hall (1989 p130) notes that the Committee failed to take into account the characteristics of the obligor, ... 'a necessity, for example, in any assessment of the true credit risk attaching to market advances'; ie Hall argues for differentiation in the weights attached to different categories of advances.

Hall also comments that no clear basis appears to exist for the weighting relativity between different asset components: ie ... 'is a claim on the private sector really 5 times more risky than a domestic interbank loan?' This may have ramifications for bank management; see next subsection.

Risk Additivity:

Under the tenets of basic portfolio theory, the overall riskiness of a bank cannot be assessed by the simple addition of the riskiness of component activities.

Hogan & Sharpe (1990 p188) also stress the omission of important balance sheet risks, ...

'With the focus on individual components of the asset portfolio and off-balance sheet exposures and the assigning of risk weights broadly, the risk-adjusted approach inevitably provides a confusing perspective on bank risk. By treating each component independently of all others, the opportunities for diversification and the many risk-hedging and immunisation strategies available to a bank in a portfolio framework complete in its treatment of assets and liabilities are ignored. Interest rate risk may be hedged by matching asset maturities to liabilities of roughly similar duration. Consequently it is wrong to examine asset risk independently of the composition of a bank's liabilities, as in the case with this risk-adjusted scheme. It is as if maturity transformation between liabilities and assets has no relevance to bank risk.'

### Influence on Insolvency Risk:

The relationship between bank capital and failure is not clear (see Chapter 4.1.1). Hall (1989) comments that historical evidence demonstrates that most bank insolvencies, where not a direct result of generalised financial panic, result from fraud or mismanagement rather than inadequate capital holdings.

Cooper & Fraser (1986 p168) similarly note, in terms of a normal failure - crisis failure dichotomy, that normal failures occur in good to moderate overall economic conditions as a result of mismanagement, fraud, or simple misfortune. Nevertheless, they concede that, ...

'while this rough dichotomy has a degree of usefulness, it is far too simple a description of the risk of failure in depository institutions... '.

These considerations challenge the ability of the RAR on its own to prevent insolvency. Also, as noted earlier in this section, there may be a danger that raising capital requirements will actually increase risk exposure.

Hall (1989) cites the example of switching to higher yielding (hence normally more risky) assets to generate the profit to cover the higher capital backing requirement and its servicing; and even if the risk weight differentials actively discourage such activity, risk may nevertheless rise if the structure of risk weights induces pure disintermediation and high quality loan business is 'securitised' leaving a higher level of risk exposure on the remaining portfolio.

As noted by Hall (1989), Llewellyn (1988) argues that supervisors have little to lose by exploring alternative diagnostic devices such as the 'multivariate discriminant analysis' developed by Vojta (1974) and the computerised 'contingency testing' proposed by Gardener (1981, 1982a).

(iv). Setting of a Minimum Level

Apart from the issue of using a minimum or target, RAR level, the actual selection of a minimum figure (8% by end 1992) appears unrelated to any process of reasoning and thus entirely arbitrary. Certainly no evidence is provided to indicate that this it is in any sense an optimal level.

(v). Competition

As noted by Hall (1989),...

'it is not clear that the 8% minimum ... recommended ... by the end of 1992 will achieve the degree of strengthening of international banks' balance sheets that the bulk of supervisory authorities insist they want.

Hall (1989) believes, that in terms of ratio application, the Basle initiative will secure a necessary degree of convergence and establish a floor to the RAR's run by internationally active banks. Nevertheless he notes that,..

'The "level playing field" will not materialise ..... partly because of the discretion afforded to national supervisors. This means that international banks will continue to compete on an (albeit reduced) inequitable basis and that the associated risks of financial instability, as business migrates to low-cost regulation centres, will remain within the system.'

There is also a view, noted in conversation with a representative of the Arab Bankers' Association, that the Basle RAR competitively disadvantages non-OECD banks; ie the 20% asset weighting for claims on OECD banks contrasts with the 100% required for claims on Non-OECD banks. This ultimately may have political/economic North-South ramifications. Certainly such a blanket dictate is difficult to reconcile to one of the two "fundamental" objectives of the Basle Committee Agreement (1988); viz., ...

'the framework should be fair and have a high degree of consistency in its application to banks in different countries with a view to diminishing an existing source of competitive inequality among international banks'.

Also, the net impact of possible distortionary effects of the imposed risk framework on bank risks remains uncertain; this remains a fundamental qualification to the other avowed "fundamental" objective, ...

'the new framework should serve to  
strengthen the soundness and stability of  
the international banking system'

#### 4.5.2 Managerial Allocation of Bank Capital

As implied in the foregoing, the influence of a minimum regulatory level risk asset ratio (RAR) on balance sheet management may be significant for bank risks, controls and costs.

##### Balance Sheet Management:

A range of techniques of bank balance sheet management have developed in recent decades.

Vlachakis (1988) observes two major ways of looking at the problem of managing a bank's portfolio; namely, various forms of asset or balance sheet allocation techniques and, secondly, by applying portfolio theory. The evolution of a variety of these techniques is noted in Annex 4.6.

A number of short term asset management techniques, each with advantage and disadvantages which influence the individual bank's choice (according to its needs and resources), are identified by Mason (1979). Also noting the variety of available techniques, Vlachakis (1988) comments that the choice of analytic framework may influence the degree of profitability or potential growth of a particular source of funds.

In long-term management, Mason (1979) notes the need for a means of controlling the allocation of funds to borrowers (and ultimately the risk-return attributes of the loan portfolio). Capital can be allocated either as a fixed proportion of loans, or the proportion of capital allocated to a loan can depend on the riskiness or type of the loan.

Mason notes arguments in favour of a system of allocation control rather than the alternative setting of lending limits. Capital allocation can be used to achieve changes in capital structure, and the return on capital (rather than on assets) is more appropriate for financial management. Also, allocated capital can serve as a control device by measuring the profitability of individual loans as well as judging the performance of personnel (32). Nevertheless, Mason adds that the difficulty in constructing and using a system of capital allocation should not be minimised, and this is one reason why the technique is not widely used; The added cost of implementing this type of system may be too great relative to the benefit that many banks would receive from applying the technique.

#### Influence of RAR:

Lomax (1987) points out that the assignation of risk weights to different balance sheet (and off-balance-sheet) activities fundamentally affects a bank's business strategy, pricing policy and capital allocation. Failure to reflect true risk in risk weights consequently leads to distortions in business policy and resource allocation.

Survey evidence of major international banks suggests a growing attention to the allocation of capital among lines of business. A Coopers & Lybrand (1988) survey, conducted in 1987-1988, of major international banks in the USA, UK and Canada suggests that the regulatory risk-based capital framework is converging with banks internal performance measurement needs.

The survey finds the majority of banks employ regulatory guidelines for capital allocation, but few have developed their own assessments of capital allocation for internal management purposes, relying instead on regulatory authorities' guidelines.

Consequently risk-adjusted capital allocation is relatively infrequently used for products which have not been assigned risk weightings by the authorities.

Most banks intend to use the G10-Basle framework as the basis for their future capital allocation procedures. This is despite the fact that the G10-Basle framework does not address certain types of risk, does not adequately differentiate among certain types of instrument, does not 'price' risk appropriately for certain products. Moreover the framework represents a political compromise and is a regulatory construct not a management tool.

#### 4.5.3 Market Views of Bank Capital Adequacy

##### a. The Potential Use of Market Discipline

Gilbert (1990) notes that in the light of recent US bank and thrift failures and their associated costs, the Financial Institutions Reform, Recovery and Enforcement Act of 1989 calls for government agencies to study changes in regulation and supervision of depository institutions; it specifically requests studies on the reform of deposit insurance, and the potential for improving the effectiveness of market discipline.

Gilbert provides a theoretical exercise to examine the implications of proposed changes to the deposit insurance system; he demonstrates that a change from full to partial insurance cover would reduce the incentives for banks to assume relatively high risk (34). Gilbert also reviews a number of empirical studies and concludes that, ...

'Empirical studies of the effectiveness of market discipline report mixed results. The most consistent result is that the stock prices of individual banks reflect the risk assumed by banks. Market discipline of such risk would tend to be more effective if bank creditors were forced to absorb losses in a more consistent fashion in bank failure cases.'

The empirical studies do not indicate the degree of risk that banks would assume if deposit insurance were reformed to enhance

the effectiveness of market discipline. Thus, the empirical studies do not permit us to determine whether the probability of bank failures would rise or fall if the current form of bank regulation were eliminated in favor of market discipline by bank shareholders and creditors.'

In the UK context, Saunders & Ward (1976) provide an early study of the market's assessment of the impact of bank regulation change in the 1965-75 period; this centres on the Competition and Credit Control reforms of 1971 and does not directly concern bank capital regulation (35).

#### b. The Relevance of Bank Capital Structure

Early studies on the relationship between bank capital structure and bank value (cost of capital) include Durand (1957), Van Horne & Helwig (1966), Magen (1971) and Jacobs, Beighley & Boyd (1975). Nevertheless, as noted by Orgler & Wolkowitz (1976 p103) the evidence of a relationship is more suggestive than conclusive. (See Annex 4.5.A).

#### c. Market Assessment of Capital Adequacy

Studies considering the market assessment of capital adequacy have been developed along a number of avenues. The primary concern of the studies varies; eg market discipline to augment regulatory control, Avery et al (1988), and the augmentation of flat rate insurance with risk-based capital adequacy

standards, Ronn & Verma (1989).

Apart from the focus on duality between insurance premium and capital ratio employed by Ronn & Verma (1989), other models derived market based capital adequacy assessments by examining the relationship between risk premia on capital securities and capital ratios, Pettway (1976) and Avery et al (1988); and also in terms of an equity valuation model, which provides a means of examining the relationship between equity value and financial risk proxied by capital ratios, Shome et al (1986, 1987).

#### Risk Premia Models:

The potential relationship between the market determined risk of bank capital securities and the capital structure, and in a wider sense, risk of banks is considered by Pettway (1976) and Avery et al (1988).

Pettway (1976) estimates the relationship between various proxies for component costs of capital (the risk premium on capital notes; and for common stock, beta and the P/E ratio) and the capital to asset ratio for large banks over 1971-1974. He found that in the years covered by his study, the capital ratio was generally uncorrelated with the proxies and concluded that investors are not sensitive to low capital ratios (33).

Avery et al (1988) emphasise the potential for market discipline in regulating bank risk, focusing on the default risk premium of subordinated notes and debentures (SNDs) and generally accepted measures of bank risk for the 100 largest BHCs during 1984. The default risk premium is defined in terms

of the spread between SNDs and Treasury securities identical in terms of maturity, coupon and call privileges. The risk premium is modelled as a function of various balance sheet measures of risk including the ratio of BHC primary capital to total assets (as well as bond ratings and an index proposed by the FDIC for the pricing of risk-based insurance). The SND risk premiums are found to be uncorrelated with any balance sheet variable and the FDIC Index, and weakly related to the bond ratings. The authors conclude that the potential for market discipline to augment regulatory controls via the SND capital market is weak; the pricing signals from the market appearing at odds with the directions desired by regulators.

#### Valuation Model:

The adequacy of bank capital from a market perspective has been investigated in an empirical study by Shome et al (1986, updated in 1987). The study determines whether banks hold capital above or below the value maximising optimum in terms of an historical relationship between the equity market value of banks and their capital ratios. The model, specified in Chapter 7, has a general form of price equals a function of earnings, payout ratio, equity capital ratio and asset size. The equity capital ratio is a measure of financial risk, and its coefficient is of focal interest in the study.

The Shome (1987) study analyses the relationship between the capital levels and valuation for the 99 largest banks each year between 1976-85. A positive relationship between equity value and capital ratios - implying that value would increase if capital were increased - would suggest that bank capital ratios are inadequate from the market (ie shareholders') point of view. A negative relationship implies that value would

increase by reducing equity, and that regulation forces banks to hold more equity than desired by the market. Finally, the absence of a statistically significant relationship between value and capital ratios would imply capital ratios are on average near the value maximising optimum.

Shome et al (1987) comment that the results indicate that over the 1976-85 decade, the market viewed the banks on average as having adequate or insufficient capital but not excessive capital.

Consequently this

challenges industry claims that regulation forces banks to hold more capital than desired by the market.

Also, they note that in the 1979-82 period the ratios were significantly positive implying the banks had insufficient capital even from the market perspective. Shome et al believe this market perception may be due to the combination falling capital ratios, and high volatility of interest rates over the 1979-82 period.

Finally, they note that insignificant coefficients over 1983-85 suggest the market perceived a return to adequate capital; they comment that this is clearly a reflection of the corrective action taken by regulators to require bank to meet an increased fixed capital standard since 1983.

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TABLE 4.6

Market View of Bank Capital Adequacy  
(99 Banks over the 1976-1985 Decade)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
EQR Coeffic	0.31	0.23	0.33	0.54	0.70	0.51	0.45	0.29	0.21	-.18
t statistic*	1.25	0.93	1.52	2.71	3.10	2.15	2.18	1.42	0.71	-.09

b b b a a a a b b b

EQR Coeffic = coefficient of Equity Ratio

\* values of the t-statistic for testing the statistical significance of the coefficient of EQR. Coefficient is statistically different from zero (at 5% significance level) when t-value is > or = to 1.98; a = significant, b = not significant

SOURCE: Shome et al (1987)

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Insurance Risk Premium:

As an alternative to risk based deposit insurance premiums, Ronn & Verma (1989) derive the capital adequacy standard that should be required of a bank under a flat deposit premium regime.

Their model views flat deposit premiums as consistent with industry-wide risk uniformity if combined with a rigid control of bank asset risk, or the adjustment of the leverage ratio through the application of risk based capital adequacy standards. The isomorphism between put options and deposit

insurance can be used to deduce the value of such insurance implicit in the observable market prices of banks' equity. (After the application of option pricing to deposit insurance pioneered by Merton (1977) and its later modification by Ronn & Verma (1986) to take into explicit consideration market perceptions of the regulatory agencies' bank closure rule). This valuation methodology can then be inverted to yield market and book value based capital adequacy standards.

#### 4.6 SUMMARY

A combination of economic and other factors led to supervisory pressure for change in relative, or balance sheet, structure capital regulation in the past couple of decades. The main dimensions of this change are the international convergence of capital measurement and the stipulation of a minimum standard. This development has been accompanied by improved analysis of capital definition and bank risks.

The accounting profession also appears to be moving towards a greater international compatibility of accounting standards, although the actual benefits of the exercise are unclear. Also, in the US, a market based accounting system is being advocated for banks although this is qualified by practical implementation problems.

In support of relative bank capital regulation, via a risk-asset weighted capital ratio, the regulatory agencies - as manifest in the Basle Committee (1988) Agreement - tend to stress the achievement of international agreement and the bluesky of improved risk analysis; ie in time, an increase in the identified risks taken into the purview of the ratio calculation. Nevertheless, the structure of the risk assessment framework appears fundamentally flawed in methodological terms, and arbitrary in its specifics.

Also they note that the individual regulatory authority has some latitude in interpreting the agreement, and the 'capital adequacy as measured by the present framework, though important, is one of a number of factors to be taken into account when assessing the strength of banks'; Basle Committee (1988). Nevertheless, underlying such implied adaptability and

looseness, the imposition of the capital definition, risk framework and minimum standard represents a real constraint which appears likely to influence bank management policy.

While bank capital regulation may be generally justified as a counter to systemic failure risk, and more particularly the moral hazard generated by protective regulation, the specific impact on bank costs and risks of the minimum standard risk-asset weighted ratio methodology is uncertain.

The following chapters, seek a market view of the impact of the new minimum standard regulatory regimes via the investigation of capital issue announcement price affects. Also, comparison of both the market's and the regulator's views of bank capital adequacy suggest a means of assessing potential costs in regulatory policy.

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## FOOTNOTES

- (1). The general change in financial regulation has been characterised as "deregulation" by some, eg Cooper & Fraser (1986), and "reregulation" by others, eg Baker (1986).
- (2). Examination of the relationship between bank capital and insolvency around the depression era has been undertaken by
- a. Secrist (1938), cited in Vojta (1973a), studied capital to deposit, and to total liabilities, ratios for a number of national banks which failed and similar ratios of those national banks which did not fail in the 1921-31 period.
  - b. Crosse (1962) quoted in Vojta (1973a), A study of 50 banks, 31 of which failed or were required to recapitalise before re-opening after the Bank Holiday, and 19 of which survived the Depression unscathed, showed that 'for the banks which were required to raise additional capital, the ratio (of capital to risk assets) averaged somewhat higher (22.8) than for the banks which survived. For the latter, the comparable figure was 18.7%...'
  - c. Cotter (1966), quoted in Vojta (1973a), used data for West Coast banks which failed between 1921-23 tested the hypotheses that ratios of capital to deposits, risk assets, and total assets showed significant differences in banks which have survived financial panics and depressions and those which did not. Such differences were not found among the banks studied and Cotter concluded these ratios would not have been useful in determining the need for capital in those cases".

(3). Santomero & Vinso (1977) cited in Wall (1985), provide empirical evidence that increased bank capital will not significantly reduce banks' risk of failure. Using historical data on the volatility of changes in banks' capital they estimate the risk that a sample of banks would exhaust their capital base. The evidence from their 1965-74 sample period suggests the probability of bank failure was small and that reasonable variations in the capital level would not have an economically significant effect on the risk of failure.

The authors employ the probabilistic theory of gambler's ruin to model the risk of bank failure. Following its use to predict business default risk, Wilcox (1971), Santomero & Vinso use it to calculate the risk of capital inadequacy for their sample of banks but, as Talmor (1980, p804) notes, they ignore both causes of change in capital and the nature of variations in other components of the balance sheet. Moreover their model provides only a general notion about the riskiness of the banking system as a whole and presents no predictive power for individual banks. Talmor (1980) builds on this work to derive an optimal capital structure for an individual bank based on the determination of an ex ante acceptable probability of bankruptcy. He constructs a testable theory of bank failure which focuses on the sensitivity of the bank's sources and uses of funds to basic market and policy factors as the major determinants for the capital requirement. Nevertheless, Santomero (1984) criticises the gambler's ruin approach on the basis that it is not clear how the acceptable probability of failure is defined.

Cates Consulting Analysts, Inc. (1985) cited in Wall (1985), examine bank failures in 1984 and conclude that capital risk was not a significant factor in failure. The study notes that

failed banks typically had lower capital ratios than their peers but points out that 70% of the failed banks had book capital values in 1982 that exceed the 1985 guidelines by 35 basis points or more.

(4). The relationship between financial sector development and the potential for crisis has been considered by Minsky (1982) who argues that, ...

'the larger a financial system grows in relation to the economy and the more complex and layered it becomes, the greater its fragility and its proneness to financial crises, and the more serious its effects on economic development.'

This quote, in Collins (1988 p83), is a paraphrase of Minsky's model by Goldberg, R.W. in - Kindleberger, C.P. & Laffargue, J. (eds) (1982) Financial Crises, Theory, History and Policy (Cambridge: Cambridge University Press). This contains Minsky, H.P. (1982) The Financial Instability Hypothesis: Capitalist Processes and the Behaviour of the Economy; p13-39.

(5). The general economic environment experienced a series of major structural changes. The OECD (1985) comments...

"The low-inflation/high-growth era of the sixties gave way to a period of high inflation, slower economic growth and rising unemployment. Two oil shocks contributed powerfully to an unprecedented widening of balance-of-payments imbalances and to greater volatility of relative prices. Imbalances in the real economy

were reflected in large swings in sectoral financial imbalances as well as in a rapid accumulation of domestic and international debt which continued well into the early eighties, calling for commensurate adjustment efforts."

Subsequent efforts in OECD countries to follow a policy of disinflation aimed at greater economic stability has reduced inflation rates - but the world economy experienced a sharp recession from which a slow recovery has developed since 1982-83. In the process a number of non-OECD countries have been confronted with severe debt and liquidity problems.

(6). The structure of the US banking sector reflects in part major regulation of geographic and product markets by statutory control. Dale (1984a p129-30) notes that, ...

'the 1933 Glass-Steagall Act separates investment banking business from commercial banking, the 1927 McFadden Act restricts inter-state banking, and the 1956 Bank Holding Company Act limits the scope of a banking company's activities to those that are closely related to banking.'

Dale also notes that, ...

'the effective prohibition of interstate banking has led to a highly fragmented financial system comprising some 14,000 banks, while limitations on the kinds of business banks may undertake has resulted in financial specialisation among

commercial savings and investment banks. However changes in financial technology, more permissive regulatory policies and statutory deregulation (notably the Garn-St. Germain Depository Institutions Act of 1982) have tended in recent years to blur the traditional distinction between banks and other financial businesses.'

(7). The OECD (1985) notes that Capital strength is a major factor in determining a bank's market standing - and consequently its ability to raise funds. Growing concern about an observed deterioration in asset quality in recent years has caused an emphasis on the strengthening of own funds by improving profit capability. One avenue used by banks desiring to economise on capital, has been via off-balance sheet business; this development has been recognised and accommodated in the capital adequacy requirements set by supervisory authorities.

(8). More particularly, Greenspan (1988) comments that, ...

'For many banks this means increased capital requirements. I recognize that some of these banks, not feeling market pressures to raise capital ratios, may consider increased capital requirements unnecessarily burdensome. However, given the existence of the federal safety net, market signals regarding the level of capital may not be appropriate from a broader perspective. The safety net has

the effect of overriding some forms of market discipline, and the implied partial backing of the federal government for some bank funds means that incentives for banks to maintain adequate capital are weakened.

The reluctance of banks to raise equity in capital markets may also be based, to an extent, on comparisons of book and market values of equity and the apparent consequences of a shortfall in market value for shareholder dilution. But the relevant consideration is clearly enhancing the market value of the firm over time. High-capital banks will be the ones that can react to the changing environment and profit from new opportunities.

Regulatory policy can and should do more than merely raise the level of capital. A risk-based system of capital standards should help deter excessive risk-taking by individual banks; and the greater capital costs imposed on high-risk banks will imply a fairer distribution of capital requirements within the banking system.'

(9). Staats (1965) identified 12 bank capital functions from a questionnaire sent to commercial bankers and state banking authorities. Respondents were asked to identify the most

important functions of capital, and the single most important function. Of the most important functions, the provision of depositor protection, to act as a cushion against losses, the provision of a basis for bank operations, and the inspiration of confidence were rated highly by the respondents while the provision of depositor protection was considered the most important single function by a majority of respondents.

Significantly, Staats's survey evidences a range of functions accorded to bank capital, and differences in the perceived importance of functions both within groups and between groups of responders.

Nevertheless, in the context of the provision of FDIC cover, the significance of the depositor-protection function, as an incentive to maintain or increase bank capital has been challenged by Friedman & Formuzis (1975). They stress the distinction between the failure-avoidance incentive (involving the probability of failure) which increases depositor confidence, and the deposit-protection incentive (involving bank failure) which provides more protection for uninsured depositors.

They argue that the deposit-protection incentive for increasing a bank's capital level has in fact little or no influence on a bank's capital holdings. More particularly they reason that an increase in the capital/liabilities ratio must exceed a critical level if an increase in capital is to be of any interest, via deposit-protection rationale, for any depositor; moreover even if this condition is satisfied, only depositors with balances above a certain level will find the increased ratio a potentially attractive feature. Both levels depend on the expected realisation rate of the bank's assets in liquidation and the depositor's sensitivity to potential savings in case of bank failure. They conclude that, ...

'The deposit-protection incentive, therefore, is of probable significance only in the case of small banks which hold but a tiny fraction of total bank capital and an even smaller share of total bank liabilities.'

#### (10). The Spectrum from Risk to Uncertainty

The distinction of risk from uncertainty enjoys a tradition in economics extending from J.M. Keynes (Guttentag & Herring 1986). Although risk is perceived in a general, non-specific sense, as a potential jeopardy or loss, finance literature defines risk in the sense of the known dispersion of possible outcomes around a known expected outcome. Uncertainty describes the situation where the parameters of the probability distribution, ie the measures of central tendency and dispersion of an event, are ill-defined and, at the extreme, unknown. Guttentag & Herring (1986) define the extremes, noting pure uncertainty as a situation where nothing is known about the size of the probability that a particular event will occur while pure risk describes a situation where the probability of that event takes on a value between one and zero. In practice, they note, knowledge of the event parameters is intermediate between pure uncertainty and pure risk

#### (11). Vojta's Generic Risk of Loss

Vojta (1973a) identified 6 generic commercial banking risks which may occasion loss or, put another way, negative claims on earnings and capital. His analysis was significant at the time but needs qualification in terms of the era (pre the rapid internationalism of banking) and the limited context of loss risk.

Vojta's framework identified risks, of loss, in the context of the capital, of a bank in difficulty, being adequate to absorb losses while the bank restored a normal level of earnings; or in his words, ...

'in conditions short of total economic collapse to provide protection against unanticipated adversity leading to loss in excess of normal expectations'.

The identified risks factors include,

- |                    |                     |
|--------------------|---------------------|
| 1) Credit Risk:    | 2) Investment Risk: |
| 3) Liquidity Risk: | 4) Operating Risk:  |
| 5) Fraud Risk:     | 6) Fiduciary Risk:  |

The expanded frameworks of Revell (1975) and Gardener (1981) are in Annex 4.2.

(12). Clark (1976 p68-70) distinguishes,

- i. Bottom Line Insolvency: unavoidable and massive contractual failure which occurs when a firm is generally unable to pay its debts as they become due and payable, without

'government intervention of the sort provided by the FDIC, even though the firm tries its best to obtain refinancing or to liquidate its assets at the best immediately available price.

ii. Traditional Equity Sense Insolvency: similarly occurs when a firm is generally unable to pay its debts as they become due and payable, but inability to pay here means,

'the firm cannot meet its due and payable obligations without engaging in a liquidation of assets at distress prices or jeopardizing the debtor's ability to meet future maturing obligations.'

iii. Accounting Insolvency: occurs when

'a firm's balance sheet, prepared in accordance with generally accepted accounting principles, shows an excess of liabilities over assets (a negative net worth). Accountants value many kinds of assets at their historic costs, less depreciation.'

iv. Bankruptcy Act Insolvency: occurs when

'a firm's liabilities exceed its assets, where the assets (but not the liabilities) are valued at their fair market or intrinsic value.'

Clark notes that i and ii. relate to short term capacity to meet imminently due obligations, while iii. and iv. are "balance sheet" notions that account for all, or nearly all, liabilities and the firm's long-term ability to meet them. He comments, ...

' all risk-regarding regulation of the soundness of financial intermediaries is directed toward preventing or coping with bottom line insolvency. ... Because the law aims at preventing contractual failure, regulatory tests of insolvency, or related, propaedeutic concepts such as minimum net worth and capital adequacy, are tests of insolvency or unsoundness in a more remote and abstract sense than bottom line insolvency. The relevant question then becomes whether there is a significant correlation between these remote tests and freedom from future bottom line insolvency.

... The relationships among the four concepts of insolvency are largely indeterminate; ... Since bottom line insolvency is the touchstone of policy, five negative propositions about indications of its presence should be expressly noted. First ... traditional equity sense insolvency does not imply bottom line insolvency. Second, accounting insolvency does not imply bottom line insolvency. Third ... Bankruptcy Act

insolvency does not imply bottom line insolvency. Fourth ... a balance sheet test of insolvency based on a statement which listed assets at fair market values and liabilities, not at their face values, but at their discounted negative present values ..., would not imply bottom line insolvency. Fifth ... solvency in neither the accounting nor the Bankruptcy Act sense implies that the firm will soon fall into bottom line insolvency.'

(13). Maisel (1981) notes that the most important risk of insolvency or of a fall in the net worth of a bank arises from a mismatch of the term to maturity of assets and liabilities with fixed interest rates. Samuelson (1945) and later authors have used the concept of duration to study the effects of interest rate changes on financial institutions. Duration is the measure of the weighted average time before payments are received from interest and principal on a security or loan; the bank's duration is a weighted average of the duration of its individual activities. (ie weighted by each activity's share of the present value of the portfolio).

Maisel (p52) notes that Morrison & Pyle (1981 published in Maisel 1981) show that, under the simplifying assumption that all spot and forward rates change by the same amount and that assets and liabilities remain constant, the percentage change in a bank's net worth will be proportional to the percentage change in interest rates. The proportion or actual value of such movements in capital will depend on the duration of the bank as a whole. Nevertheless, Morrison & Pyle show that the simplifying assumptions are unlikely to be met for two

reasons:-1) The discount rates for all future payments are unlikely to move together, and 2) because, not all of a bank's assets and liabilities have fixed payment streams and a well defined maturity.

(14). Ball & Brown (1968) argue that accounting earnings proxy for economic earnings by showing a positive relationship between unexpected earnings for a year and the unexpected rate of return to the stock. Nevertheless, Ball (1972) examines whether the market is influenced by changes in accounting technique, testing the hypothesis that the market cannot distinguish real from accounting effects on reported income. Using FFJR event methodology, Ball found no significant stock price effect in the month of the accounting change; also for these firms, no association between the sign of the earnings change and the sign of the annual abnormal returns. This is contrary to Ball & Brown's findings for firms in general, suggesting that the market does not mechanically adjust the stock price according to the observed change in earnings. Citing more recent studies, Copeland & Weston (1988) note that Sunder (1973, 1975) finds evidence that suggests investors value cash flow not earnings.

(15). Rowe (1980) notes that in view of a lack of academic unanimity about basics, the UK accountancy bodies issued a Statement of Standard Accounting Practice (SSAP2) in 1971 (see "Accountancy" December 1971) which indicated that the reader of published accounts could assume four concepts had been followed unless otherwise stated: viz 'Going-Concern' (as opposed to break-up or saleable values) the results and asset values are reported on the presumption that the business entity would continue operating in the foreseeable future; 'Consistency' of the bases used for asset valuation;

'Conservatism or Prudence' - profits and assets values should take account of probable, or even merely possible, present or future losses, but gains should only be taken into account when realised; 'Matching' - profits are computed by matching revenues against relevant costs which contrasts with the economist's view of profit as the net value change in a business between two dates.

(16). Giraud & Walton (1990) comment on two surveys. The one, published in October 1989, is based on a survey of company accounts carried out by a joint organisation set up by European professional accounting bodies; the Federation des Expertes Comptables Europeans (FEE). The FEE's survey assessed whether the first major instrument of accounting harmonisation, the Fourth EC Directive, did achieve greater harmonisation of practices and greater comparability of financial statements. The Directive itself does not impose consolidation, and also offers two basic approaches to disclosure within the profit and loss account, viz expenses shown by nature (ie salaries, materials etc) or by function (cost of sales, administration etc); these factors also represent a qualification to the survey findings. The survey findings concluded that while there was a high degree of harmonisation on matters covered by the Directive, including account presentation, significant differences exist in terms of measurement and disclosure practices, particularly in the areas of depreciation, intangibles, pension liabilities and leasing.

The second survey, by accountants Touche Ross, reviews practices in 7 EC states and provides comparative data based on a case study; this latter demonstrates, using local rule flexibility, a maximum, minimum, and most likely profit measurement for the case study in each country; an extreme

difference is represented by the UK minimum of 170 (Ecu) and a German maximum of 140 (Ecu).

(17). By analysing the reports of UK companies with a US listing, and thereby required to compute results according to both US and UK generally accepted accounting principles (GAAP), Walton & Wyman (reported by Whitelam 1990) consider which accounting differences between the two systems have the most significant impact on measurement of shareholders' funds and earnings. Whitelam reports that, ...

'In more than 75% of the sample, US principles gave lower earnings than under UK GAAP, while almost three quarters of the companies had a higher value for shareholders' funds on the balance sheet than under the UK system. The impact on earnings was found to be greater than on equity, with differing treatments of goodwill and deferred taxation having the greatest effect on the profit and loss account, resulting in a reduction of 7.3% in earnings, in aggregate, under US GAAP. Goodwill and deferred tax are also the cause of the main discrepancies in the balance sheet totals, but here the effects are opposite and almost equal, with the write-back of goodwill increasing equity by 14% and the extra provision for deferred tax reducing it by 18% in the US restatement.

The higher US balance sheet numbers naturally result in lower asset turnover values, but also give lower capital gearing ratios. And, since earnings are lower but shareholders' equity is higher, the powerful return on equity ratio is doubly distorted, to give a lower value using US rules, 20% for the sample in aggregate, compared with 27% under UK GAAP.'

(18). As reported by Whitelam (1990), the Choi & Levich survey of capital market practitioners finds that, ...

' ... half of the respondents felt that their capital market decisions were affected by variations in accounting disciplines ... (but this) ... actually understates the issue, since they found evidence that an additional number of users change the way in which they analyse investments when looking at foreign markets.

These sophisticated investors were found to cope with the problems by developing what was described by Choi & Levich as MPC - multiple principles capability - meaning that they familiarised themselves with each set of the relevant foreign accounting principles and then adopted a local perspective when analysing the foreign financial statements.'

Areas considered "tricky" by investment managers included, ...

' ... not only differences in accounting principles, but also differences in corporate financial disclosure practices. Some investors also mentioned different audit practices between countries as being important in this context.

Countries whose accounting principles were most often mentioned as a source of concern for analysts when investing outside the home country were Japan, Switzerland, West Germany and the US.

Industries which caused most problems included banking, insurance, financial services in general, semi-conductors and mining. The list of accounting areas where difficulties were encountered was long, and comprehensive, and included in particular: multinational consolidations, valuation of assets, deferred taxes, pensions, discretionary reserves, foreign currency transactions and translation, leases, provisions and goodwill.

Interestingly, investors taking part in the survey appeared evenly divided as to whether international accounting standards are necessary, and when asked whether there were any preconditions which would make them more willing to expand their

geographical scope or increase their international equity investments, no one voluntarily mentioned the need for a harmonised set of accounting standards.'

(19). Morris & Sellon (1991) comment that despite the capital measurement informational advantage of the market valuation system, vis a vis the historic cost system, qualification arise from the problems of implementation. Both partial and full market value accounting have been advocated. The partial valuation approach (applying only to tradeable securities) has the advantage of cost (security market values are easily obtained) and represents a solution to current accounting abuses such as gains trading, earnings and measured capital would become more volatile. The full valuation approach varies in terms of presentation; at one extreme banks merely disclose market values as footnotes on financial statements, while at the other the banks use market values instead of book values as the basis for the financial reporting.

In evaluating these implementation proposals Morris & Sellon note that,...

'partial approaches would reduce accounting abuses such as gains trading and would not be costly to implement. At the same time , however, partial approaches do not show an institution's full interest rate exposure and may lead to artificial and misleading volatility of

capital. Full market value accounting would show a bank's interest rate exposure and would also eliminate accounting abuses. However, this approach would be more costly to implement. Moreover, until better valuation models are developed, full market value accounting might not provide accurate measures of bank capital.

In deciding whether to require banks to adopt market value accounting, regulators will have to weigh these advantages and disadvantages. If regulators decide that the benefits of market value accounting outweigh its costs, the time and effort needed to develop accurate, market value models suggest a gradual approach to implementation.'

(20). The recent capital adequacy requirements for bank holding companies have been summarised by Isberg & Brown (1987) and may be represented as,

Year	17 largest BHCS Multinational	BHCS Assets>\$1bn Regionals	BHCS Assets<\$1bn Community
1981	no explicit standards	5.5 Total Cap 5.0 Primary	6.5 Total Cap 6.0 Primary
1983	5.5 Total 5.0 Primary	5.5 Total 5.0 Primary	6.5 Total 6.0 Primary
1985	6.0 Total 5.5 Primary	6.0 Total 5.5 Primary	6.0 Total 5.5 Primary

#### Regulatory Definition of BHC Capital

##### Primary Capital:

Common Stock (par) + Perpetual Preferred Stock(par) + Undivided Profits + Surplus + Capital Reserves

= Equity Capital

+ Mandatory Convertible Instruments + Loan Loss Reserve + Minority Interest in Consolidated Subsidiaries - Equity Commitment Notes

= Primary Capital

##### Secondary Capital:

Limited Life Preferred Stock + Subordinated Debt + Other Mandatory Convertible Instruments

= Secondary Capital

Total Capital = Primary + Secondary Capital

As noted in the following section on international developments, multinational US banks came under the purview of the Basle Committee capital adequacy requirements during the latter half of the 1980's.

(21). The capital base, as noted by Hall (1985c) comprised,

- amounts partly or fully-paid up on issued share (ordinary and non-redeemable preference) capital and share premium,
- loan capital (up to a third of the total capital base net of the outstanding goodwill and subject to straight line 'amortisation' in the last five years of life) which is fully subordinated to other creditors (including depositors) and which has an initial term to maturity of at least five years of life and involves no restrictive covenants.
- general bad debt provisions, less any associated deferred tax asset,
- general reserves (including inner reserves) plus the balance on the profit and loss account, and
- minority interests, when included in accounts as a result of the consolidation of subsidiary companies not wholly owned.

The adjusted capital base was defined after the deduction of

premises, equipment and other fixed assets, goodwill, investments in subsidiaries and associated companies and trade investments, unquoted investments and connected lending were all deducted

(22). Also, the Banking Act 1979 was designed to provide statutory backing to the Bank of England's unofficial supervisory arrangements. Certain shortcomings in its structure became apparent and were addressed by the 1987 Act. As noted by the Bank of England Deputy Governor (BEQB August 1987).

'It (the 1979 Act) conferred on the Bank functions with respect to the control of institutions carrying on deposit-taking businesses and created the Deposit Protection Board. The objective of supervision in the Act was to safeguard depositors and its focus was individual banks. It was not - and is not - directly concerned with the soundness of the overall banking system or with the protection of shareholders, though both can have a bearing on the protection afforded to depositors and so need to be borne in mind by our supervisors.'

'While the 1979 Act certainly met many of the intentions of its drafters, it did not prove wholly satisfactory....the new 1987 Act... retains the same fundamental objectives as its predecessor, but gives the Bank greater powers - for example, in

obtaining information from banks and from auditors; and removes the distinction between licenced and recognised institutions, which was an obstacle to effective supervision of the latter.'

Also, in accordance with the 1979 Banking Act, a statutory deposit protection fund was first introduced in February 1982. The scheme is administered by the Deposit Protection Board, chaired by the Governor of the Bank of England. The scheme protected depositors for the first £10,000 of sterling deposits with an original maturity of up to 5 years held with either a recognised bank or a licensed deposit-taking institution. The protection was amended by the 1987 Banking Act; cover was increased to 75% of the first £20,000 of sterling deposits held with an "authorised institution". Interbank deposits are excluded from cover which is otherwise extended to all personal and corporate depositors (except those associated with the institution).

The protection fund is financed by a levy on each authorised institutions proportional to its deposit base; this is subject to a minimum of £10,000 and a maximum of £300,000. Arrangements for supplementary contributions exist, although these are subject to a limit of 0.3 per cent of the sterling deposit base. Hall (1989 p 113).

(23). Major features of changes in capital definition included loan stock and debt provisioning, as noted by Hall (1985c).

**Loan Stock:**

The Bank of England's 1975 view of loan stock, which was required to be subordinated and medium to long term, was as finance for part of the infrastructure of the business and not to provide a loss cushion; this was reasoned on the basis that, unlike shareholders' funds, loan stock was impermanent, inflexible with respect to servicing costs, and not available to absorb losses without a liquidation.

The Bank adopted a more lenient attitude by 1980, emphasising that fully subordinated medium to long term loan stocks might reduce the threat to creditors confidence in the event of an institution experiencing difficulties and so enhance its ability to survive; also, when of long term and denominated in foreign currency, maturity and currency mismatches may be reduced.

Accordingly, the Bank allowed the inclusion of fully subordinated loan stock, up to a maximum of one third, within the capital base provided they were of a minimum initial period to maturity of 5 years, did not incorporate unduly restrictive covenants triggering early repayments, and were subject to an amortisation factor once within 5 years of maturity. The last point was designed to discourage unduly short initial terms, soften the impact on capital ratios when loan stocks mature and are not replaced, and reflect the diminishing comfort afforded. Also, in order to prevent an illusory boosting of capital for the banking system as a whole, and in recognition of the fact that the bulk of bank issues are held by other banks, the Bank insisted that all banks operating in the UK deduct their holdings of other banks' issues from their own issues in calculating the size of their capital base.

Innovations in capital market products resulted in the Bank circulating a note to members of the British Bankers' Association in November 1984; Hall (1985c). The Bank proposed that a maximum of half of primary capital could be held in FRN form provided that,

- i. the issue never has to be repaid, except in the case of liquidation,
- ii. the issue converts automatically into equity if the issuing bank gets into financial difficulties, and
- iii. no clauses are contained in the terms of the issue which trigger early repayment of the monies raised.

A pioneering perpetual floating rate note issue, by Lloyds in 1985, was accepted by the Bank as primary capital, albeit in a slightly modified form to that previously stipulated by the Bank. The Lloyd's issue was allowed as primary capital because interest payments could be suspended if no dividend was declared on common stock and that, in the event of Lloyds going into liquidation, noteholders would be deemed preference shareholders ranking behind all bar ordinary shareholders for repayment.

#### Debt Provisioning:

Prior to 1980 both general and specific provisions were included in the capital base. The justification for including only general provisions post 1980 was that provisions set aside for likely losses already identified, are not available to cushion future unidentified losses. This ruling, making allowance for the tax deductibility of specific reserves, favours general rather than specific provisioning for all but the relatively well capitalised banks.

(24). The proposal adopted a uniform capital definition as well as a five tier risk-weighting framework which incorporated off-balance sheet items. A risk asset ratio is calculated by applying to each category of on or off-balance sheet obligations a weight ranging from 0% to 100% and reflecting the relative inherent credit risk: ie the nature of the counterparty-obligor, maturity, or in limited cases the quality of the collateral. Two ratios of primary capital to total risk-weighted exposures were proposed, namely,

- i. a common minimum ratio which would apply to all banks in both the US and UK, and
- ii. an individual minimum ratio which would account for each institution's idiosyncrasies.

(25). Dale (1984a p172) notes that until the Herstatt crisis of 1974 there was formally no machinery for co-ordinating national regulatory arrangements and supervisors were very much domestically orientated.

(26). Focusing on the demarcation of responsibilities of national supervisory authorities in international banking, the Basle Concordat of 1975 contained a number of principal guidelines  
summarised by Cooke (1981, p240)

1: The supervision of foreign banking establishments should be the joint responsibility of host and parent authorities.

2: No foreign banking establishment should escape supervision, each country should ensure that foreign banking establishments are supervised, and supervision should be adequate as judged

by both host and parent authorities.

3: The supervision of liquidity should be the primary responsibility of host authorities since foreign establishments generally have to conform to local practices for their liquidity management and must comply with local regulations.

4: The supervision of solvency of foreign branches should be essentially a matter for the parent authority. In the case of subsidiaries, while primary responsibility lies with the host authority, parent authorities should take account of the exposure of their domestic banks' foreign subsidiaries and joint ventures because of the parent banks' moral commitment in this regard.

5: Practical co-operation would be facilitated by transfers of information between host and parent authorities and by the granting of permission for inspections by or on behalf of parent authorities on the territory of the host authority. Every effort should be made to remove any legal restraints (particularly in the field of professionals secrecy or national sovereignty) which might hinder those forms of co-operation.

As noted by Hall (1989 p12) the revised edition of the Concordat issued in June 1983 was designed to incorporate agreements reached since 1975 on the principle of consolidation which had been recommended by the Committee in 1976 and formally agreed by the Group of Ten Governors in 1978. Under the principle of consolidation, the risks undertaken by the banking group as a whole are assessed by the supervisor of the parent bank.

The revised Concordat also clarified and amplified some of the original points in the light of experience - most notably the collapse of the Luxembourg-based Banco Ambrosiano Holdings in 1982, which raised questions about the treatment of intermediate institutions (such as bank holding companies like Banco Ambrosiano). The revision also reaffirmed that lender of last resort function was outside the remit of the Basle Committee.

(27). As noted by Hall (1989), the advisory groups include;

- i) the Contact Group of EC Supervisory Authorities (Groupe de Contact); the first advisory body to be established (1972) is an informal club comprising the supervisory authorities of the Member States. Its role is to provide a forum for the exchange of views by national supervisors so as to achieve closer understanding of supervisory practices and promote practical co-operation. It commissions its own research studies and submits reports to the Banking Advisory Committee and the EEC Commission.
- ii) The Banking Advisory Committee, comprises representatives (not more than three) from each Member State and the Commission. Established in 1979 (following the First Banking Co-ordination Directive of 1977), the Committee is responsible, along with the EEC Commission for determining general policy guidelines on supervisory co-operation for the Community

iii) Close contact is maintained with the Basle Committee of Supervisors and individual national regulators.

(28). Revell (1975 p69) notes that in July 1972 the Commission of the European Communities issued a draft directive on the subject of harmonisation of regulation of banks and other credit institutions within the Community. But in the climate of the time before the fringe banking crisis was foreseen it did not find favour in the UK - provoking one former Governor of the Bank of England to refer to 'vexatious legislation'. The draft directive, which was based on West German banking law, was eventually withdrawn and the commission decided on a step by step approach to harmonisation; the revised Directive issued in 1975 covered only part of the ground.

(29). As noted by Hall (1989), other subsequent initiatives relevant to banking supervision include two further Directives and two Recommendations.

- i) The Consolidated Supervision Directive, obliging Member States to supervise credit institutions with financial subsidiaries on a consolidated basis, was adopted in June 1983.
- ii) The Bank Accounts Directive, requiring standardisation of the presentation of the annual accounts of banks and other financial institutions, was adopted in 1986.  
Recommendations relating to
- iii) Large Exposures, and
- iv) Deposit Protection Arrangements, were both adopted in 1986.

(30). Working on a larger (10,000 bank), and later (1971-75) data base, Dietrich & James (1983) note that when interest payments are limited by rate ceilings, banks have an incentive to increase capital in their financial structure in order to compete for noninsured deposits since an increase in capital raises the risk-adjusted expected return to depositors. And in the 1969-70 period analysed by Mingo (1975), banks were unable to raise interest payments on deposits to market clearing levels because of Regulation Q ceilings. They conclude that the increase in bank capital detected by Mingo may have been due to this capital-oriented competition for deposits and not to direct regulation of bank capital.

(31). Capital Allowances: The first year allowances on plant, machinery and assets were cut from 100 to 75% on 14 March 1984 and to 50% after 31 March 1985, and to zero after 31 March 1986; an annual allowance of 25% was then to apply.

Corporation Tax: The rate was cut from 52 to 50% for 1983/84, to 45% in 1984/85, to 40% in 1985/1986 and to 30% in 1986/87.

(32). Mason (1979) notes reasons for using allocation instead of lending limits include,

- i. The bank can use capital allocation to achieve desired changes in its capital structure. It can set its capital-asset ratio to the value it hopes to achieve rather than at historical levels. Then as loans are booked, the actual capital-asset ratio will move towards the desired ratio. Working with loan amounts does not necessarily achieve this

result.

- ii. Although bankers have historically considered return on assets the most important measure of the yield on a loan, the return on capital is more appropriate from the standpoint of financial management. There are two reasons for this;
  - loan decisions are, in a sense, capital budgeting decisions, and capital budgeting techniques compare returns with the cost of capital, and
  - if owners want their wealth maximised, the appropriate measure for wealth maximisation is the return on capital, not the return on assets.

Also, allocated capital can serve as a control device, since a loan area must earn a given yield on its capital. That is, in assigning capital to a profit centre, top management expects it to earn at least an amount consistent with the annual plan and with the specific loan types and risks for which the centre is responsible. If these explicit quantitative standards are not set up, then there is no way to measure performance consistent with optimisation of return for a given risk.

Mason also notes that lack of adequate control variables has caused banks to rely on very unsatisfactory measures of portfolio performance; eg, the number or amount of loan losses attributable to a loan officer has frequently been used to judge his or her performance. But if bank considers only losses without considering the potential earnings it could receive, it is taking into account only half the problem of portfolio construction.

(33). Focusing on capital market sensitivity to differential capital standards, Pettway (1976) asks whether the market requires differential risk premium. If there is no relationship between the risk premiums required by the market and the capital position of the issuing banks, capital must be adequate, or perhaps abundant for the perceived risk in these investments; Also, if the market demands significant risk premiums which are a function of the banks' capital position the market is questioning the bank's capital adequacy.

Pettway's study considers the years 1971-74, testing firstly the relationship between risk premium on new capital notes issued (defined as the market yield to maturity of the capital notes on the day of issue minus the market yield to maturity of a Treasury security of the same maturity on the same day expressed as a percentage) by large banks to capital adequacy ratios and other banking factors. The regression coefficients for two measures of capital adequacy proved insignificant and Pettway concludes that capital adequacy ratios of capital note issuing firms was not considered a significant factor in determining the risk premium demanded. Also, the market appeared to make no distinction between of risk premiums demanded between capital in the form of equity and equity plus capital notes.

For common stocks Pettway tests the relationship between the systematic risk of the bank's common stock (Beta) and the bank's capital and other bank variables, and similarly the relationship of the common stock's price/expected earnings ratio to bank capital and other variables. In the beta test capital adequacy was significant (and negative) in 1974, and significant (and positive) in 1972 and 1974 for the P/E test. Pettway notes that the significance of the capital adequacy coefficients was much below those of more traditional non-

capital variables and concludes that investors were not very sensitive to unacceptable levels of risk due to thin capital ratios.

(34). Gilbert (1990) observes a general consensus that deposit insurance creates an incentive for banks to assume higher risks (ie choose asset portfolios with higher variance in rates of return and/or lower capital ratios) than they would otherwise; in other words deposit insurance blunts the penalty of banks having to pay higher interest rates on deposits. He notes recent proposals designed to increase the effectiveness of market forces in reducing the risk assumed by banks. The proposals involve exposing bank owners and creditors to larger losses if their banks fail; the idea is that if they have a greater exposure to loss, they will limit the risk assumed by banks.

Gilbert uses a theoretical exercise to examine the implications of a number of proposed changes in deposit insurance on the optimal choice of risk by a banker. He considers four cases.

- i). All liabilities fully insured
- ii). No deposit insurance
- iii). Co-insurance; ie federal deposit insurance coverage is limited to a fraction of each deposit, and
- iv). bank is required to have liabilities that are uninsured and subordinated to deposits, and equal to at least 10% of its assets.

He concludes that market forces could limit the incentives for banks to assume risks; if the insurance coverage of bank creditors were dropped from full to partial coverage the incentives for banks to assume relatively high risks would be reduced. Also, he notes that a key difference among approaches

to developing market discipline of banking risks concerns the vulnerability of banks to runs. He notes that run vulnerability

is greater if depositors are at risk than if the risks are borne by long term subordinated debt.

(35). Although not directly concerned with bank capital, an early UK bank sector study utilising market assessment of regulatory change is provided by Saunders & Ward (1976). The study focuses on the 1965-75 period and the impact of regulatory changes surrounding the introduction of Competition and Credit Control (CCC) on the clearing banks. More particularly the study considers the effects on risk performance and efficiency of the big four clearers and the merchant bank sector over the period May 1965 to August 1975.

Saunders & Ward identify three regulatory phases, viz

(i). May 1965 to May 1971, from the imposition of the first quantitative lending ceiling until the publication of the Competition and Credit Control (CCC) reforms.

(ii). June 1971 to Sept. 1973, from the introduction of comparatively unrestricted competition until the modification of CCC in Sept. 1973.

(iii). Oct 1973 to August 1975, a period of constrained competition until the end of the study.

They conclude that in periods of close regulation (ie i and iii) clearing banks appear to have performed (in terms of cumulative monthly residuals) badly in comparison with merchant banks; only in period ii. in which regulations applying to all banks were relaxed and standardised did the clearing banks achieve a relatively superior performance.

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## CHAPTER 5

### US BANK CAPITAL ISSUE ANNOUNCEMENT EFFECTS

#### 5.1 INTRODUCTION

Recent studies have assessed common stock abnormal returns (ARs) associated with capital issues announcements by bank holding companies (BHCs) in the USA. Generally the ARs reflect both the negativity and the issue type based relative magnitudes observed in the industrial and utility sectors; see Chapter 2.4. The BHC results particularly resemble those of the utility firms; the absolute magnitude of BHC ARs is lower than those for industrial firms; also, preferred stock issue announcements have been associated with a positive AR, eg Keeley (1989) Wansley & Dhillon (1989) (1).

While the BHC studies estimate the ARs of a variety of security type issue announcements, the analytic focus primarily has been upon common stock issue announcements (2); these tend to experience the largest absolute magnitude of (negative) AR. Observations have been disaggregated according to the influence of regulatory regime (pre and post the introduction of the 1981 regime) and the regulatory status of individual banks; ie via capital adequacy-or-inadequacy and also multinational-or-"other" categorisations.

TABLE 5.1  
 Bank Capital Issue Announcement Effect Studies  
 - Observations and Common Stock Issue Effects -

PAPER		PERIOD	OTHER	AR %
Isberg & Brown	(1987)	1981-85	A	a
Wansley & Dhillon	(1989)	1978-85		-1.5
Wall & Peterson, P.	(1988)	1982-86		-1.5
Polonchek et al	(1989)	1975-84		-1.4
pre change		-81		-1.7
post change		1981-	B	-1.1 b
Keeley	(1989)	1975-86		-1.5
pre change		-81	A	-2.6
post change		1981-	A	-0.8 b

PERIOD = Period of Study, and sub-periods (pre and post 1981).

OTHER = Further Bank Observation Criteria

A: Adequacy or Inadequacy of Regulatory Capital.

B: Multinational or "Other".

AR% = Abnormal Return on Common Stock Issues

- a. One-day average AR of -0.8% for BHCs above, and -1.1% for BHCs below, the capital regulation standard; on a two-day (-1, 0) cumulative average AR basis the corresponding results are -1.1% and -2.0%.
  - b. Not statistically significant.
-

## 5.2

## OBSERVATIONS

### 5.2.1 Security and Sector Types

#### a. Security Type

Polonchek et al (1989) describes a pattern of results parallel to those found in non-financial organisations; nevertheless his results for the 1975-84 period are only significant for common stock issue announcements (-1.38%).

Keeley (1989) comments that, in sum, his own results (tabulated in Annex 5.1A) ...

'strongly suggest negative announcement effects for issues of common stock and securities with characteristics similar to common stock, such as mandatory convertible debt.' (with the acknowledged exception of a positive effect for perpetual preferred stock);

Keeley records a common stock issue announcement effect of -1.5%, and -0.74% for mandatory convertible debt. Nevertheless preference share issue announcements appear associated with a positive AR as noted by Keeley (1989), Wansley & Dhillon (1989) and Poloncheck et al (1989).

#### b. Sector Type

Polonchek et al observe common stock issue announcement ARs as only 40% of that reported for industrial firms and the

difference is highly significant; eg Mikkelson & Partch (1986) measure -3.56% for industrial firms,

Polonchek et al comment that, ...

'Overall, the evidence for the impact of securities issuance by BHCs parallels that of industrial firms in terms of the differential reaction to debt versus equity issues ... (but) ... negative announcement returns for the issuance of common stock and convertible debt are much less negative than the results for industrial firms.'

#### 5.2.2 Increase in Regulatory Regime Pressure

Polonchek et al (1989) and Keeley (1989) both consider the 1981 change in regulatory regime; ie the implementation of joint capital definition and minimum capital ratio standards by the federal regulators; see Chapter 4.

Polonchek et al (1989) estimate pre and post 1981 ARs for a variety of security type issue announcements but the results suffer from a lack of statistical significance, although the common stock issue announcement effect of -1.7%. pre 1981 is statistically significant (at the 1% level); the post 1981 effect of -1.1% is not.

Otherwise they note that the AR results are less negative post 1981, and argue that the fact that the changes move in the same direction in all five cases of security type issuance has

a probability of only 0.03; they conclude that this allows rejection of the hypothesis that it is the result of random variation.

Keeley's pre and post 1981 results (summarised in Annex 5.1B) show a striking decline in the absolute size of the AR from -2.6% to -.79% for common stock issue announcement effects and the change is statistically significant. The -.79% AR in the post 1981 period is not statistically significant and contrasts with the magnitude of -1.5% (and significant) found by Wall & Peterson, P. (1988) in the same period; Keeley attributes this to sample differences.

Keeley also reports a significant +1.1% AR for perpetual preferred stock issue announcements in the post 1981 period. Otherwise, he generally finds that pre and post 1981 ARs for the other security type issue announcements appear slight and insignificant, and AR changes between periods also appear insignificant.

### 5.2.3 Regulatory Status Pressure

#### a. Capital Adequate or Inadequate

Isberg & Brown (1987) and Keeley (1989) consider the regulatory capital adequacy/inadequacy status of the individual BHCs.

Isberg & Brown (1987) assess common stock, preferred stock, and subordinated debt issue announcement effects for BHCs

distinguished as capital adequate, or inadequate, in the post 1981 period. The study estimates ARs in the 10 day period either side of the announcement day, calculating both average ARs and cumulative ARs; the Z scores are not reported. The announcement day ARs for common stock issues are -0.8% for capital adequate BHCs, and -1.1% for capital inadequate BHCs; similarly, for preference stock the ARs are 0.3% and -0.17% respectively, and for subordinated debt -0.36% and 0.76%. As noted in Table 5.1 the two-day cumulative average prediction errors for common stock issues appears to be -1.1% for BHCs above the capital regulation standard and -2.0% for those below. Keeley (1989) criticises Isberg & Brown's classification of BHCs as capital adequate/inadequate; he argues that many of the common stock issues by capital adequate BHCs were intended to comply with expected future standards.

In his own paper, Keeley (1989) distinguishes BHCs that would meet the 1985 primary capital requirements in 1981 as capital sufficient, and other banks as capital deficient; he argues that the 1985 standards were the goal as early as 1981 (3); in this dissertation the terms "capital adequate" and "capital inadequate" are used, but accordingly these terms should be qualified in reference to Keeley's work.

Keeley distinguishes his common stock issue announcement AR results in terms of capital adequate and inadequate BHC groups, and also in terms of pre and post 1981 periods; the disaggregated results are shown in Annex 5.1C. Other issue types provided no significant differences either between time periods or between capital adequate and inadequate groups of BHCs.

Keeley notes that capital sufficient BHCs changed from -1.2% pre 1981 to +1.5% post 1981 and the change is statistically significant. For capital insufficient BHCs the change was from

-3.3% to -2.0% but the change was not statistically significant. Although Keeley argues for the apportioning of capital adequacy/inadequacy status on the basis of future (1985) standards from the 1981 initiation of the objective regulatory regime, using this as a basis to apportion the status retrospectively to the 1975-1981 period appears less justifiable and does not appear to be addressed in the text of his paper.

Consequently, this stands as a qualification to his disaggregation of pre 1981 AR results on a capital adequacy/inadequacy status basis.

b. Multinational or 'Other'

A particular aspect of the 1981 regulation, was the regulator's identification of 17 BHCs as multinational banks to which the specific capital ratio guidelines did not apply, preferring to apply individual criteria relevant to each bank's unique characteristics; see Chapter 4.

Polonchek et al (1989) estimate announcement effects for common stock, preferred non-convertible, and straight debt in the post 1981 period in terms of multinational and "other" BHC groups. The average ARs for multinationals are more negative than for "other" BHCs but the results are qualified by a lack of statistical significance; nevertheless differences between the ARs for the two type of BHCs is significant in two of the three types of security issuance.

Another feature is the positive average ARs for announcements of both preferred non-convertible and straight debt of the "other" BHCs group; but only the preferred non-convertible announcement result is significant (indeed this is the only significant AR in the bank status exercise of Poloncheck et al.).

#### 5.2.4 Dilution Effects of Common Stock Issues

##### a. General Dilution

For all BHCs, Keeley (1989) finds a mean dilution effect (4) of 27%; similar to the 31% dilution effect recorded by Asquith & Mullins (1986a) for industrial firms. While BHC common stock issue ARs are smaller than those for industrial firms, the dilution effect is about the same. Keeley says this is presumably because BHC stock issues typically raise far less funds in proportion to their pre-issue value than do industrial firms.

##### b. Dilution by Group and Period

Keeley reports that the pattern of dilution effects is basically the same as the stock price ARs; ie capital deficient BHCs have more negative dilution effects than the capital sufficient BHCs, and both groups show less negative effects during the post 1981 period. He concludes that, ...

'systematic differences in issue size do not appear to explain the pattern of abnormal returns across capital deficient and sufficient organizations.'

## 5.3 REGRESSED DETERMINANTS

Regression analysis of hypothesised determinants of the ARs are undertaken by Wansley & Dhillon (1989) and Keeley (1989). Keeley, focusing on common stock issue announcement ARs, considers the percentage change in capital/asset ratio. Wansley & Dhillon undertake a regression of five hypothesised determinants of straight debt issue announcement ARs.

### 5.3.1 Common Stock Issue Announcements

Keeley analyses the relationship between common stock issue announcement ARs and the percent change in the capital/asset ratio due to common stock issues. Nevertheless, his definition (5) of this variable appears ambiguous.

Regressions are carried out on the ARs for capital sufficient and deficient BHCs separately, and also in terms of three periods for the whole 1975-86 period and the pre and post 1981 sub-periods); nevertheless Keeley acknowledges that the results should be treated with caution due to small sample size; see Annexes 5.1C and 5.1D.

For capital deficient BHCs Keeley observes that pre 1981, issues that had a larger effect on the capital/asset ratio had less negative ARs. Post 1981 the point estimate suggests a negative relationship but is not significant.

For capital sufficient BHCs, the regression coefficient is not significant pre 1981, but post 1981 indicates a statistically significant positive relationship between ARs and the size of the issue.

### 5.3.2 Straight Debt Issue Announcements

To better explain the announcement effects, Wansley & Dhillon (1989) regress a number of potential explanatory variables; limited sample size precluded examination of common stock issue announcement effects.

For straight debt issue announcement effects they find, in single predictor variable regressions, a negative relationship for

- i). Relative Size of Offering; Defined as dollar amount of offering divided by total bank capital before offering.
  - ii). Pre-Issue Cumulative AR (from day -60 through day -2 relative to announcement day).
  - iii). Variance of Stock Returns (from day -60 through day -2).
- No relationship was evidenced for the dummy variables
- iv). Quality of Debt; (=1 if bonds rated AA or higher, =0 otherwise)
  - v). Issue Registration (Shelf or Non-Shelf).

## 5.4 INTERPRETATION OF RESULTS

### 5.4.1 Regulatory Factors

#### a. General Regulation Environment

The lower absolute magnitudes of ARs for both utilities and BHCs, compared with industrials, may be explained in terms of their relatively stronger regulatory environments which require greater disclosure and monitoring.

It may be argued that a stronger regulation environment mitigates information asymmetry; ie increases the predictability of an issue announcement and/or reduces its information content.

Nevertheless, there are differences in the regulatory system for utilities and BHCs (6).

#### b. General Increase in Regulatory Pressure

There is some evidence that the change to the more objective 1981 regulatory regime was associated with a reduction in absolute magnitudes of announcement ARs, at least for common stock issue announcements; eg Keeley (1989), see Annex 5.1B, and Poloncheck et al (1989). This tends to support the view that an increase in regulatory pressure, as represented by the introduction of the new objective regime tended to diminish information asymmetry.

### c. Bank Regulatory Status Based Pressure

Polonchek et al (1989), notwithstanding statistical insignificance, suggest that multinational BHCs experienced a greater magnitude in announcement ARs than the more stringently regulated non-multinationals (which were obliged to follow the 1981 guidelines).

Contrarily, there is some evidence of greater absolute magnitudes of announcement ARs for capital inadequate BHCs; this is supported for common stock announcements; Isberg & Brown (1987); and Keeley (1989) in both the pre and post 1981 periods. Also, Keeley notes that the regulatory change of 1981 saw the absolute magnitude of ARs of capital deficient BHCs decrease, although the change was not statistically significant.

#### 5.4.2 Issue Types

##### a. Preference Stock

The announcement effect for preferred stock issues, or at least certain classes of preferred stock, appears positive. Keeley finds a positive, and significant, AR of +1.1% for perpetual preferred stock (limited life and convertible were both negative but insignificant). Wansley & Dhillon find a similar +0.8% AR (preference stock other characteristics unspecified). Also, Polonchek et al record a positive AR (+1.57%) for non-convertible preference stock, although this is for non-multinational banks in the post 1981 era; (an insignificant positive effect is found for the combined BHC groups in both the pre and post 1981 era and the full 1975-1984 period).

While preference stock is close to the risk characteristics of common stock, Keeley notes important differences.

- i). The risk characteristics of preference stock effectively may be closer to bank deposits than common stock. The market may view perpetual stock as implicitly insured in the light of the FDIC's resolution of the Continental Illinois failure in 1984; the FDIC implicitly insured preferred stock holders as well as debt holders since the BHC was never declared insolvent.
- ii. A preference stock issue may contain information about the ability of the organisation to meet preferred stock dividends, which the market would view favourably.

In terms of preference stock issues by financial firms, Linn & Pinegar (1988) suggest they generally issue adjustable-rate preferred stock and that the positive common stock AR associated with the issue announcement is most likely explained in terms of tax benefits and/or regulatory conditions (7).

b. Straight Debt

Wansley & Dhillon (1989) observe that straight debt issue announcements are associated with a very small (0.095%) AR which does not approach conventional levels of significance. Among the other studies Keeley (1989) and Poloncheck et al (1989) also detect small, statistically insignificant ARs for straight debt issues.

Wansley & Dhillon comment that the negative relationship between ARs and size, noted in section 5.3.2, is contrary to most prior findings on the security issuance process for industrial and utility firms; eg Masulis & Korwar (1986). Nevertheless, they comment that it is consistent with information asymmetry models which assert that negative announcement effects are related to the magnitude of the financing rather than the change in capital structure. Also, they observe a negative relationship between ARs and the pre-issue cumulative ARs which they interpret as providing weak evidence for market timing.

#### c. Common Stock

Keeley's results show that capital sufficient BHCs experience common stock issue announcement effects that change with statistical significance from -1.2% pre 1981 to + 1.5% (insignificant) post 1981. Capital deficient BHCs similarly record a change from -3.3% to -2.0% (both statistically significant, but the change is not); see Annex 5.1C.

The greater absolute magnitude of the common stock issue announcement effect for capital deficient BHCs, compared with capital sufficient BHCs in both pre and post 1981 period, appears as an anomaly in terms of information asymmetry; ie capital inadequate BHCs announcement effects should be more predictable and contain less information.

#### 5.4.3 Keeley's Analysis of "Anomalies"

##### a. "Anomalies":

The hypothesis that the imposition of a more stringent regulation regime (which makes equity issues more predictable and diminishes announcement information content) should lower common stock issue announcement ARs is borne out by Keeley's results for pre and post 1981; see Annex 5.1B.

Nevertheless, when the results are further disaggregated by the capital adequacy/inadequacy status of the BHCs (see Annex 5.1C) two basic hypotheses are challenged.

The hypotheses that an increase in regulatory "pressure", via the imposition of the more stringent post 1981 regime, should reduce the AR absolute magnitude appears to be contradicted in the case of capital adequate BHCs; also the sign changes from negative to positive.

Also, the hypothesis that announcement ARs for capital inadequate BHCs should be of a lesser absolute magnitude (because of greater predictability) than those for capital adequate BHCs, appears to be contradicted.

Keeley considers that these results cast doubt on the simple signalling hypothesis. Seeking an explanation for the "anomalous" pattern of ARs, he suggests other explanatory hypotheses, which are not mutually exclusive.

i). Diminution of the value of the deposit insurance guarantee: Keeley suggests that the larger (negative) stock price effects for capital inadequate BHCs, especially post

1981, are consistent with the view that, ...

'the value of (underpriced) deposit insurance is capitalized in the share prices of capital deficient banking organizations and that increases in their capital diminished the value of that asset.'

ii). Regulators have inside information which is revealed to investors by the nature of a security issuance.

b. Diminution of Value of Deposit Insurance Guarantee

Hypothesis:

In order to explore these hypotheses, Keeley considers the explanatory power of two size factors; namely a dilution factor and a capital structure change factor. As indicated in Section 5.2.4 the dilution factor does not appear to provide an explanation.

The factor of percent change in capital structure is considered in Section 5.3.1. Keeley reasons that if issues with the greater proportional effect on the capital-to-asset ratio have more negative ARs, this reflects a diminution of the value of deposit insurance.

He acknowledges the problem of small sample sizes for the regressions. For the capital inadequate BHCs, he notes the (insignificant) indication of a negative relationship post 1981 which provides a heavily qualified suggestion of evidence of the diminution of the value of deposit insurance guarantee.

Also, Keeley observes that capital adequate BHCs post 1981 show a statistically significant positive relationship between

ARs and the size of the issue (relative to capital); ie large issues (relative to capital) are viewed as positive signals by the market. And as such issues are voluntary they presumably do not reflect a diminution in the value of the deposit insurance guarantee.

Keeley concludes that these regression results, ...

'provide some support for the capital structure theory, which predicts that issue size relative to capital is important and that stock price effects become more negative for capital deficient organisations as the size of the issue increases. They also suggest that the deadweight costs of common stock issuance for well-capitalised banking organizations are small or nonexistent since, on average, stock price announcement effects are not negative and even become more positive as the relative size of the issue increases.'

### c. Information Hypothesis

Keeley argues that results of the regression also provide evidence consistent with an information hypotheses; namely that the type of securities issued conveys inside information about earnings prospects obtained by regulators from BHC examinations.

Keeley reasons that while market investors can readily determine, from the balance sheet, whether a BHC is under

regulatory pressure to increase its capital ratio, they do not necessarily know the future prospects of the BHC nor the method the BHC will use to augment capital.

For the capital inadequate BHC, a common stock issue may signal management and regulator skepticism about future earnings generation; ie it may suggest an inability to meet the cash flow requirements of additional debt or preferred stock, or to accumulate sufficient retained earnings to meet capital requirements.

For a capital adequate BHC, the presumption is that a common stock issue is voluntary and would not provide a negative signal; and might even signal the availability of a positive net present value project.

Consequently, argues Keeley, the positive effects of issue size on the ARs associated with securities issuance by capital sufficient BHCs might also be explained by this hypothesis.

Keeley observes that prior to the institution of specific minimum capital guidelines, market participants would have been unsure whether a banking organisation's common stock issuance was due to regulatory pressure. Since there was some chance that it was, there was a small mean negative announcement effect even for capital sufficient organisations.

But, after specific capital guidelines were introduced, market participants could be confident that a common stock issue by a capital adequate BHC was not a signal that regulators viewed the organisation's earnings prospects unfavourably. As a result, in the post-1981 regulatory period, the estimated mean ARs associated with capital adequate BHCs' common stock issues

were positively related to the size of the issue.

In other words, Keeley appears to be implying that the new objective regulation, namely the categorisation of the regulatory capital adequacy, or inadequacy, status of BHCs, facilitates the provision of additional information when a common stock capital issue is announced.

## 5.5 SUMMARY

### General Findings:

The BHC studies indicate announcement effects similar to those in the industrial and utility sectors. There is a general propensity toward negative announcement effects, the magnitudes are similarly patterned according to security type of the proposed issue, and the absolute magnitude of the results, like utilities, are lower than those for industrial. The BHC studies focus on regulation based explanations for the ARs.

The BHC results frequently are qualified by statistical insignificance, and caution where sample size is a problem. Also the basis for categorisation of a BHC as being capital adequate or inadequate in terms of regulation requirements is based upon assumptions; and these assumptions vary among studies; ie Isberg & Brown (1987) versus Keeley (1989); the validity of Keeley's pre 1981 categorisation appears questionable.

Common stock issue announcement effects are broadly consistent with the hypothesis that BHC regulation reduces the information content and increases the predictability of securities offerings, since the absolute magnitude of issue announcement effects are smaller than those for industrial firms. Also the influence of increased regulatory pressure, namely the impost of the 1981 regime, appears to have further mitigated information asymmetry as demonstrated by common stock issue announcement effects; see Keeley (1989) and Annex 5.1B.

Nevertheless, these results do not identify any particular aspect of the regulatory process which may contribute to the mitigation of information asymmetry.

In an attempt to determine better those aspects of the regulation framework which may influence the information content, studies have been undertaken on common stock issue announcement effects in terms of different regulatory regime periods, and the regulatory capital adequacy/inadequacy status of the observations; Isberg & Brown (1987), Polonchek et al (1989) and Keeley (1989).

The explanatory power of the simple hypothesis that regulatory pressure mitigates information asymmetry is challenged by the results of Keeley's joint disaggregation of common stock issue announcement AR results; ie in terms of different regulatory regime periods, and the capital adequacy status of the BHCs. Nevertheless, these results appear to warrant particular qualification in terms of pre-1981 disaggregation.

More particularly, the hypothesis is challenged by results which indicate an increase in the absolute magnitude of ARs for capital adequate BHCs post 1981 (and a change in sign from negative to positive). Also capital inadequate BHCs appear to experience a greater absolute magnitude of AR than capital adequate BHCs.

Keeley views his disaggregated results as consistent with both capital structure and signalling hypotheses; namely he finds some indication of a diminution of the value of the deposit insurance guarantee, and suggests that the announcement of a common stock issue signals good or bad earnings prospects information depending on the capital adequacy/inadequacy status of the BHC.

Keeley's latter hypothesis appears to imply that the formal identification of banks in terms of differential regulatory pressure may be an aspect of the new objective regulatory regime which has mitigated information asymmetry.

Thus, in a broad sense, it may be concluded that regulation and increased regulation pressure appear to mitigate information asymmetry; ie presumably increase the predictability of an issue, and decrease its information content. Nevertheless, Keeley's disaggregation analysis appears to suggest a refinement of information content stemming from the capital adequacy status categorisation of the new regulatory regime.

Also, in the realm of capital structure hypotheses, Keeley further suggests that if a capital issue is regulation-induced it may involve a costly change of a BHC's capital structure away from its private optimum (ie due to distortions such as taxes and agency costs); but this appears untested.

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## FOOTNOTES

(1). BHC results do appear to differ in the realm of "pure" leverage transactions. Wansley & Dhillon (1989) note that Scott, Hempel & Peavy (1985) find no significant AR on BHC stock-for-debt swap announcements which contrasts with the significant negative announcement effect found in the non-financial sector, eg Peavy & Scott (1985). Noting this difference, Wansley & Dhillon suggest the swaps reduce the potential costs of regulatory interference and that accounting for this may explain the differences in findings.

(2). Some studies crudely define the type of debt and preferred stock issues; ie no distinction of characteristics such as convertibility, and maturity (eg perpetual or limited life).

Also, the studies vary in definition of event period and AR estimation methodology. Instead of the more common two day event period, Isberg & Brown (1987) use a one day event period; Poloncheck et al (1989) use a mean adjusted return model instead of the more commonly accepted market model, and use a three day event period. Wansley & Dhillon (1989) use an announcement period of the announcement day and the day after, instead of the more conventional announcement day and the day before; also, while they consider the 1978-85 period, they do not consider the influence of the regulatory regime change of 1981. The study by Wall & Peterson, P. (1988) could not be obtained; consequently analysis of its findings relies on the commentary of Keeley (1989).

(3). Keeley (1989) argues that, ...

'although objective minimum capital regulations were phased in over the 1981 to 1985 period, ... the 1985 standards were the ultimate goal even as early as 1981. The main reason the 1985 standards were not immediately imposed was to give institutions time to raise the necessary capital to bring them into compliance. In keeping with this interpretation, this paper distinguishes those banking organizations that would have met the 1985 primary capital requirements in 1981 from those that would not have. Throughout the paper I refer to the latter as "capital sufficient" and the latter as "capital deficient" banking organizations'

(4). Keeley (1989) defines dilution as the ratio of the change in the aggregate equity value of the outstanding shares (percent change in share price, times share price, times number of shares, divided by 100) to the total dollar value of the issue. For example, a dilution ratio of 100% means that the decline in existing share value equals the value of the new capital raised by the issue.

(5). Keeley (1989) defines this as, ...

'the value of the issue divided by the pre-issue market value of the firm's equity minus the value of the issue divided by the pre-issue market value of the firm's assets.'

(6). Wansley & Dhillon (1989) note that

i. Utilities are state regulated while BHCs are federally regulated (by the Federal Reserve System).

ii. (Equity) Issue Anticipation

As utilities have extensive capital requirements, they are frequent participants in the capital markets. Pettway & Radcliffe (1985) find a high degree of regularity in the calendar dates of new equity sales among companies that sold new equity annually; they conclude that it is possible that utility equity issues are partially anticipated by the market.

In contrast BHCs are heavily regulated but nonetheless infrequent participants in the issue market for common stock; consequently a common stock issue announcement should represent a surprise similar to comparable announcements by industrials.

(7). Linn & Pinegar (1988) also find that generally, utilities issue straight fixed-rate preferreds and industrials issue convertible fixed-rate preferreds. Their findings also suggest that returns to preferred stockholders support neither the wealth distribution nor the price pressure hypothesis.

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## CHAPTER 6

### UK BANK CAPITAL ISSUE ANNOUNCEMENT EFFECTS

#### 6.1 GENERAL OBSERVATIONS AND QUESTIONS

##### Observations:

While bank sector capital issue announcement effects have been examined in the US, as discussed in the previous Chapter, no comparable analysis appears to have been undertaken in the UK.

Key factors in the US analysis have included change in regulatory regime environment (the introduction of imposed objective minimum capital ratio standards) and the associated regulatory capital status (ie under regulatory capital adequacy pressure or not) of individual BHCs. There is some US evidence that, for common stock issues announcements, the change in regulatory regime reduced the absolute magnitude of issue announcement effects; but, combined with the factor of BHC regulatory capital adequacy status, this becomes less clear.

Questions:

The deficiency in comparable UK research leads to the primary question, do UK banks exhibit common stock abnormal returns (ARs) coincident with capital issue announcements? And, if so, is there a discernible pattern of common stock announcement ARs based on the security type issued?

A further question concerns the possible impact upon capital issue announcement effects of changes to the regulatory regime. Chapter 4 provides details of UK regulatory developments; two broad regime changes may be observed.

Firstly, the imposition of an objective, minimum capital standard regime was mooted in early 1987 under the bilateral US-UK agreement. While a minimum standard was not set, it was intended to be declared and an associated methodology for capital measurement was formally promulgated. Nevertheless this development was superceded later that year by the Basle Committee's proposals, carrying a quantified minimum capital standard, and which culminated in the 1988 Agreement.

Secondly, 1979-1980 represent a period of marked regulation change; the 1979 Banking Act provided statutory backing to the supervisory power of the Bank of England; and 1980 saw the official promulgation of a supervisory capital measurement methodology (albeit without the specification of any minimum standard); ie Bank of England (1980) 'The Measurement of Capital'.

Each of these two periods of regulatory change represent a move to greater formality and objectivity of capital regulation. Generally, it is hypothesised that an increase in regulatory stricture causes a reduction in information

asymmetry, and an associated decrease in the absolute magnitude of any capital issue announcement effects; as was found in the US context.

The following analysis seeks to assess any change in announcement effects associated with the regulatory changes.

## 6.2 SAMPLE AND DATA

Observations are drawn from the 6 largest banks groups in the UK; namely, Barclays, Lloyds, Midland, National Westminster, Royal Bank of Scotland, and Standard Chartered (1).

### a. Market Data

Market data was obtained from Datastream which provides historical daily closing stock prices and market indices for the UK market.

### b. Capital Issue Details and Dates

Issue details and dates were gained from two sources, Extel News Cards and newspaper indexes; viz. "The Times" (1975-80) and "The Financial Times" (1981 and onwards).

The Extel News Cards records were purchased from Extel itself; nonetheless the records were missing in some years and tended to provide a lesser news coverage in the 1970s. The Cards provide news reports from newspapers and from stock exchange company announcement releases; but, while each news report in the Card service is dated for the day of original publication, the source is not indicated. Capital issue announcements selected were of confirmed publicity - appearing in both the Extel News Cards and the newspaper index. The Extel News Card report was used as the primary source of issue details.

The news origin day,  $t = 0$ , is defined as the stock exchange company news announcement day. The (morning) newspapers publish news released the previous day. Consequently, relative

to the two sources, news origin day is defined as the day prior to newspaper publication day, or the Extel News Card date. whichever is the earlier.

Based on the Extel News Cards, the capital issues are for cash and are screened according to two criteria; namely the coincidence of other news announcements on the issue announcement day and the purpose of the issue; the screening may be imperfect but represents the best use of available information from the Extel Service.

Accordingly the capital issue announcements were categorised into (a). "clean" announcements: which had no coincident announcement and concerned capital issues for general or non-specific purposes, and

(b). coincident announcements: those accompanied by coincident announcements and/or concerning capital issues for specific non-general matters such as take-over finance. General purpose was assumed unless a specific purpose was stipulated.

The capital issues comprised ordinary share issues made by the parent company and loan stock issues made either by the parent or its subsidiaries. The loan stock was categorised in terms of maturity (dated or undated) and the nature of the interest charge (fixed or floating). One preference share issue was also documented.

c. Period

Datastream price data is available as far back as the 1960s but the Extel News Cards, searched since 1970, yielded the first confirmation of a capital issue in 1975. Consequently the overall period of analysis runs from 1975 to the end of

1990; nevertheless, years 1980 and 1990 yielded no confirmed issue, and 1989 yielded one preference share issue; see Table 6.1.

Sub-periods are defined for the analysis of both pre and post the impact of regulatory regime change. These included,

(i). 1975-1986 and 1988

The introduction of a minimum capital standard regime was first mooted in early 1987 with the UK-US accord and minimum standards actually proposed (in the Basle Committee proposal later that year). Pre and post impact sub-periods are defined either side of 1987.

(ii). 1975-1978 and 1981-86

It was decided to treat the contiguous years of the 1979 Banking Act and the 1980 "Measurement of Capital" promulgation as a single change in regulatory regime. Pre and post impact sub-periods are defined either side of 1979-80.

d. Statistical Package

Regression analysis was undertaken using the SPSS/PC Statistical package. The Lotus 123 spreadsheet was used for other calculations and tabular presentation.

### 6.3 ABNORMAL RETURN MEASUREMENT

#### a. Model Specifications

The measurement of ARs has been a major methodological tool used in empirical testing of the efficient market hypothesis (EMH) and a variety of models have developed. Generally, the method involves the assumption of a return generating function, acting as proxy for the true return process, from which expected returns may be estimated. ARs are calculated as actual deviations from the expected return. The market model is chosen as the appropriate return generating model; full specification of the model is provided, for instance, by Fama (1976) (2).

A two stage methodology, as employed for instance by Mikkelsen & Partch (1986) and Keeley (1989), is employed. The first stage involves estimation of the parameters of the return generating process during a period which excludes the announcement event date; in the second stage the parameters are used to calculate the AR at the announcement event date.

#### b. Event Day

In lieu of more detailed announcement timing information, ARs are estimated over a two-day event announcement period. The news is published in (morning newspapers) on day  $t = +1$  following its announcement during the previous day,  $t = 0$  (the news origin day), either before or after the market closes; if before, the market's response to the news actually predates the publication by one day; and if after, the market responds the next day and the reaction is on day  $t=1$ . Consequently, there is a two-day announcement "day"  $t=0$  and  $t=+1$ .

A stock's rate of return is defined as the change in the stock's price plus dividend payments on the day, if any, divided by the previous day's closing stock price.

Unfortunately the effect of any dividend is not included in the Datastream service and is consequently excluded from the rate of return calculations; this must stand as a qualification to the results.

c. Announcement Event AR

The market model, shown in equation...1), is used as the assumed return generating process.

where

$R_{jt}$  = the actual rate of return on bank  $j$ 's common stock over day  $t$

R<sub>mt</sub> = the rate of return on the market portfolio (proxied by the FTA All Share Index) over day t

$a_j$  and  $b_j$  are coefficients for bank  $j$ 's common stock

$\epsilon_{jt}$  = the error term for bank j's common stock for day t.

### i). Step One: Parameter Estimation

The parameters,  $a_j$  and  $b_j$ , are estimated by using the least squares regression as provided by the SPSS Statistical Program. Ordinary least squares (OLS) regression is shown by Brown & Warner (1985 p25) to be well specified in determining the market model parameter estimates when using daily data.

The estimation of the market model parameters requires

specification of an estimation period which is separate from the event period associated with the announcement; ie it provides a forecast of what the ordinary share's returns would have been absent the announcement of a security issuance. This separation is needed, unless the strong assumption of no cross-sectional correlation between announcement date returns and market returns is made; eg Thompson (1985 p158).

Among the banking studies, Keeley (1989) estimates his model parameters over a 60 day period, beginning 80 trading days before and ending 20 days before the announcement day. In this dissertation the example of Keeley is followed by estimating the parameters over a 60 day period; this is defined as beginning 80 trading days before and ending 20 days before  $t=0$ , the announcement origin date (3).

ii). Step Two: Two-Day Event AR

Abnormal returns are thus calculated from the difference between actual and predicted AR for each day recorded by the bank common stock over the two-day announcement period.

where

$AR_{jt}$  = the abnormal return on ordinary shares of bank  $j$  over day  $t$

$R_{jt}$  = the return on ordinary shares of bank  $j$  over day  $t$

Rmt = the return on FTA All Share Index over day t

In order to facilitate statistical testing, the AR is standardised in order to allow the use of the t-distribution for tests of significance.

The calculation of the standardised AR (SAR) for bank  $j$  is shown in equation...3); and the particular form of the standard error calculation in equation...4) is used by Mikkelsen & Partch (1986), and Keeley (1989).

$$\text{where } s_{jt} = \left[ V_j^2 \left[ 1 + \frac{1}{M} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum (R_{mi} - \bar{R}_m)^2} \right] \right]^{\frac{1}{2}}$$

$V_j$  = the market model residual variance for bank  $j$  obtained from the regression over the estimation period.

M = the number of days in the estimation period, (M=60)

$\bar{R}_m$  = the mean return on the FTA All Share Index over the estimation period.

Rmt = the actual return on the FTA All Share Index on day t.

The summation over the index  $i$  represents summation over the period used to estimate the market model.

Finally,  $SARjt / \sqrt{2}$  ..... 5)

allows for sample size adjustment and is a component used in the hypothesis test that the average two day AR is zero; see AISAR , equation ...9) below.

d. Average AR for a Class of Announcement Events

In assessment of average two-day ARs for a class of

announcement events, such as ordinary share issue announcements, the following calculations are made, ...

Average AR on day  $t$  for a class of announcement events of sample size  $N$ ,

Average standardised AR for a class of announcement events  
of sample size N,

e. Significance of Average AR for a Class of Announcement Events

As noted by Mikkelsen & Partch (1986), the variance of ASART approximately equals  $1/N$  (4) so, for each day, the Z-statistic is computed

$Z = \sqrt{N}$  (ASART) . . . . . 8)

To test the hypothesis that the two day AR averaged over N events (in a given class of security type issue announcement) is zero, the average two-day standardised abnormal return is calculated as

$$\text{AISAR}_{t_c, t_{c+1}} = \frac{1}{N} \sum_{j=1}^N \sum_{t=c}^{t+1} \frac{\overline{SAR}_{jt}}{\sqrt{2}} \quad \dots \dots \dots 9)$$

and the Z statistic is calculated as,

The significance of all Z statistics referred to in Chapter 6 are two-tailed, and assessed from "t" tables in Salvatore (1982).

The Z statistic is assessed for assessment of the null hypotheses that,

- two-day AR averaged over N events is zero, and
  - for a particular security type, there is no difference between the average two-day AR averaged over a period of years from that in another period of years; in this case the Z statistic is assessed in terms of a pooled variance estimate (5);

## 6.4 RESULTS

### a. Presentation of Results

Each of the 42 announcement events is itemised in Annex 6.1; this identifies the issuing bank and assumed news origin date

( $t = 0$ ) as well as details of the security's characteristics.

Details of the AR measurement calculations associated with each announcement event are itemised in Annex 6.2.

The AAR and Z results for the whole sample of 42 announcement events (ie including both "clean" and coincident announcement events) classified according to security type, is presented in Annex 6.3. These indicate a significant AAR of -3.4% for ordinary share issue announcements; loan stock issue announcements show a positive AAR (+1.1%) significant at the 5% level.

The observations classification of event AR and SAR/ $\sqrt{2}$  results, from which the AAR and Z are drawn for the several analyses, are shown in Annex 6.4.

More particularly, Annex 6.4A shows the whole sample classed in terms of security type (these results are summarised in tabular form in Annex 6.3).

The remaining tables, 6.4B to 6.4E, are based on the "clean" announcement events, which number 33, and provide the basis for the analysis presented in Tables 6.1 to 6.5 and discussed in the following sections.

b. Security Type

The distribution of the "clean" capital issues are noted by security type and year in Table 6.1, and by bank and security type in Table 6.2.

The "clean" announcements, shown in Table 6.3 show ordinary share issue announcements register a significant AAR of -4.2% while loan stock remains at an AAR of +1.1% significant at the 5% level. Disaggregation of the loan stock by the factor of maturity suggests that dated loan stock provides a more positive AAR than undated loan stock; but the difference is not significant. Similar disaggregation by nature of interest charge suggests that loan stock with a fixed interest charge experience a greater positive AAR than those with a floating charge; the difference is significant at the 1% level.

c. Sub-Period Analysis

Pre and post 1987:

Analysis of the impact of the introduction of the minimum capital standard regime, which is defined as occurring in 1987, is provided in Table 6.4. This considers issue announcements in the previous 1975-1986 period and also in the post regime introduction period; the latter period yielded scant observations and in 1988 only.

Ordinary share issue announcement AARs of a significant -4.5% are found in the 1975-86 period. An AAR of -2.98% in the post 1987 period is not significant, but the difference between the pre and post 1987 ARs is significant at the 5% level.

Loan stock issue announcement AARs record 1.1% (significant

at 5% level) in the pre 1987 period; similar to ordinary shares, the magnitude of AARs appears to drop (to an insignificant 0.5%) in the post period but the change is not significant.

Pre and post 1979-80:

Analysis of the combined impact of the 1979 introduction of statutory backing for prudential supervision and the 1980 promulgation of capital measurement methodology are considered in Table 6.5. Neither the ordinary share (-3.7%) nor the loan stock (+2.2%) AARs appear significant in the pre 1979-80 period. Post 1980 (effectively post 1981 as no announcement events are recorded in that year) ordinary share capital issue announcement ARs appear to increase in absolute magnitude to a significant -5.3%, but the change is not significant.

Loan stock issue announcement AARs similarly appear to increase from an insignificant +.22% to a (significant at 5% level) +1.4%, and the change is significant.

TABLE 6.1  
DISTRIBUTION OF NUMBER OF ISSUES BY SECURITY TYPE

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	ALL YEARS
Ordinary Shares		2			1				2	1	1	1	1	2	10	
Preference Share														1	1	
Loan Stock of which:-	1	1	1	2	2			2	5	1	1	1	2	1	2	22
a. Maturity	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Dated	1	1	1	2	2			2	5	1	1	1	1	1	19	
Undated										1	1	1	1	1	3	
b. Interest Charge																
Fixed			1					1	5	1			1		9	
Floating	1	1		2	2			1		1	1	2	2		13	
TOTAL	1	3	1	2	3	0	2	5	3	2	2	3	1	4	1	33

TABLE 6.2  
DISTRIBUTION OF SAMPLE BY BANK AND SECURITY TYPE

Bank Group	Ordinary Shares	Preference Shares	Loan Stock	Total Issues
Barclays	1		4	5
Lloyds			3	3
Midland	1	1	8	10
National Westminster	3		2	5
Royal Bank of Scotland	1		1	2
Standard Chartered	4		4	8
TOTAL	10	1	22	33

TABLE 6.3  
AVERAGE TWO-DAY ABNORMAL RETURNS (AAR) 1975-1989.  
BY SECURITY TYPE

EVENT	AAR	Z	Number of Events
Ordinary Shares	-0.04213	-7.28109 ***	10
Preference Shares	0.008344	0.680745	1
Loan Stock	0.010803	2.593803 **	22
of which:-			
a. Maturity			
Dated	0.011128	2.495361 **	19
Undated	0.008745	0.744196	3
b. Interest Charge			
Fixed	0.015547	2.375489 **	9
Floating	0.007515	1.397719	13

----- "t" Test

\*\*\* Significantly different from zero at 1% level

\*\* Significantly different from zero at 5% level

\* Significantly different from zero at 10% level

TABLE 6.4

AVERAGE TWO-DAY ABNORMAL RETURNS (AAR) PRE AND POST 1987  
 (Number of Events in Parentheses)

EVENT	1975-1986		1988		Absolute Difference	
	AAR	Z	AAR	Z	AAR	Z
Ordinary Shares	-0.04521 (8)	-6.94641 ***	-0.02985 (2)	-2.38819	0.01536	-2.34084 **
Loan Stock	0.010838 (19)	2.371889 **	0.065322 (2)	0.549816	0.005516	0.757246

———"t" Test

- \*\*\* Significantly different from zero at 1% level
- \*\* Significantly different from zero at 5% level
- \* Significantly different from zero at 10% level

TABLE 6.5

AVERAGE TWO-DAY ABNORMAL RETURNS (AAR) PRE AND POST 1979-1980  
 (Number of Events in Parentheses)

EVENT	1975-1978		1981-1986		Absolute Difference	
	AAR	Z	AAR	Z	AAR	Z
Ordinary Shares	-0.03726 (2)	-3.80822	-0.05309 (5)	-5.84225 ***	0.01583	-0.18772
Loan Stock	0.002193 (5)	0.279882	0.014632 (12)	2.466648 **	0.012439	-3.25921 ***

———"t" Test

- \*\*\* Significantly different from zero at 1% level
- \*\* Significantly different from zero at 5% level
- \* Significantly different from zero at 10% level

## 6.5 SUMMARY

To the extent that ordinary share issue ARs are negative and of a greater absolute magnitude than other securities examined, the results mirror those experienced by BHCs in the US. A point of difference concerns the significance of positive ARs recorded for loan stock issues; disaggregating loan stock by characteristics indicates that those with a fixed interest charge and/or a dated maturity appear to experience a positive AR.

In terms of the impact of regulatory change, there is some suggestion that the introduction of a minimum standard capital ratio regime in 1987 has resulted in a reduction of the AR magnitude for ordinary shares. Consequently this provides support, albeit nominal, for the hypothesis that increased regulatory pressure in a form which facilitates identification of the capital adequate, or inadequate, status of a bank from a regulatory perspective may mitigate information asymmetry.

There is no significant change in ordinary share ARs pre and post the 1979-80 period. Nevertheless, here the suggestion of an increase in the absolute magnitude of the ordinary share ARs, hints that increased regulatory pressure (albeit loosely defined in terms of statutory backing and promulgation of capital measurement methodology) increases ordinary share issue announcement ARs; notwithstanding its significance limitations, this tends to contradict the hypothesis that increased regulatory pressure mitigates information asymmetry. Loan stock ARs appear to have significantly increased post the 1979-80 period.

Overall, the UK bank AR results tend to confirm the pattern based on security type evidenced in the US by, for instance, Keeley (1989). A paucity of observations tends to

diminish the "strength" of conclusions.

Keeley (1989) provided some evidence of the hypothesis that increased regulatory pressure (via the introduction of a minimum capital standards regime) may reduce information asymmetry.

Nevertheless, the above UK evidence provides a suggestion that increased regulatory pressure, via greater formality from 1979, may increase ordinary share ARs; presumably greater supervisory formality involved banks in new administrative compliance costs. Also, while capital measurement methodology was promulgated - which allowed some degree of relative capital regulatory pressure experienced by the banks to be assessed - the absolute degree of capital pressure was not assessable.

The 1987 minimum capital standard regime provides absolute, as well as relative, capital regulation pressure information. The suggestion that ordinary share issue announcement ARs were reduced may reflect a mitigation of information asymmetry; namely the ability to classify banks as capital adequate, or inadequate, from the regulatory perspective. Further, as a suggestion, the potential costs of a move away from some optimal level of capital structure caused by the regulatory standards, do not appear strong.

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## FOOTNOTES

### (1). US Sample and Data

The estimation of abnormal returns on US bank capital issue announcements, particularly for issues of common stock and non-redeemable preference shares for the purpose of Chapter 8, are of interest in this dissertation. Unfortunately satisfactory information necessary to make this estimation was not available.

Although as for the UK banks, market data is available for US banks, access to US capital issue details and dates proved difficult to obtain. SEC filing and other publications used by researchers in the US appear unavailable here. "Moodys Bank and Finance Manual" provide capital structure and issue details on US banks and a list of common stock and preference issue stock issues was compiled over the 1983-1987 period (to accord with the availability of IBCA account data). Nevertheless, it proved difficult to categorise the preference stock as redeemable or non-redeemable on a consistent basis. Also, the list was substantially reduced when issue confirmation was sought in the "Wall St Journal Index".

### (2). As noted by Fama (1976), specification of the market model is based on the assumption of the bivariate normality of the joint distributions of the return on any security and the return on a market portfolio of all securities.

Brown & Warner (1980, 1985) find the market model as powerful as competing models in detecting abnormal returns when they

exist. Schadler (1987) comments that the, ...

'market model performs better than alternatives when the event date is not known precisely. This advantage is attributed to the market model's ability to track general market movements over the event period.'

(3). While Keeley's methodology is followed, the choice of estimation period length and position, relative to announcement day, varies among studies. Some studies use a longer estimation period; eg Wansley & Dhillon (1989) use an event estimation period of 130 days,  $t = -250$  to  $t = -121$ .

Schadler (1987) uses an estimation period post the security issuance; he notes that Mikkelson & Partch (1986) observe systematic average price movements prior to and immediately subsequent to the announcement of a new issue of common stock and convertible debt; consequently including these systematic movements in the estimation period will also bias the market model parameters; eg Thompson (1985), Mikkelson & Partch (1986).

(4). Mikkelson & Partch (1986) note that, if the individual daily prediction errors are assumed to be normally distributed, each SARjt is distributed Student t with a variance equal to,

$$\frac{M}{(M - 2)}$$

where M is the number of days in the period used to estimate the market model (ie M = 60).

Also, under the Central Limit Theorem, and assuming that the individual ARs are cross-sectionally independent, Mikkelson & Partch observe that ASART is asymptotically normally distributed with a variance equal to,

$$\frac{M}{(M - 2)N}$$

and since M is large,  $M/(M-2)$  is very close to one, and so the variance of ASART approximately equals

$$\frac{1}{N}$$

(5). In considering the samples from the two periods, Mikkelsen & Partch, see Footnote (4), have shown that the variance of ASART is approximated by  $1/n$  therefore,

$$s_1^2 = 1/n_1 \text{ and } s_2^2 = 1/n_2$$

where,

$s_1$  is the standard deviation of sample 1 (ie for period 1)

$s_2$  is the standard deviation of sample 2 (ie for period 2)

also let,

$\bar{x}_1$  = the mean of sample 1 (ie the AISAR of sample 1)

$\bar{x}_2$  = the mean of sample 2 (ie the AISAR of sample 2)

Salvatore (1982 p95 section 5.15) considers testing hypotheses for differences between two means when each of the samples is  $< 30$ . He assumes both populations are normally distributed and  $\sigma_1^2 = \sigma_2^2$  (but unknown), so the sampling distribution of the difference between the two means has a t distribution with  $n_1 + n_2 - 2$  degrees of freedom.

$$z = \frac{\bar{x}_1 - \bar{x}_2}{\sigma_{\bar{x}_1 - \bar{x}_2}}$$

Using  $s_1^2$  as an estimate of  $\sigma_1^2$  and  $s_2^2$  as an estimate of  $\sigma_2^2$  he notes that,  $s^2$  is a weighted average of  $s_1^2$  and  $s_2^2$

$$s^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

and  $\sigma_{\bar{x}_1 - \bar{x}_2} \approx \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$

Consequently, in assessing the Absolute Difference between the AARs of two periods, as shown in Tables 6.4 and 6.5, "AAR" is the absolute difference (ie between the AARs of the two periods), and Z is calculated as per Salvatore (1982) above, and the level of significance (two-tail) is assessed from "t" tables.

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## CHAPTER 7

### MARKET VIEWS OF UK AND US BANK CAPITAL ADEQUACY

#### 7.1 AN ASSESSMENT OF KEELEY'S RESULTS

##### 7.1.1 The Duality of Capital Adequacy

The introduction of a minimum capital standard regulatory regime in the US, UK and other countries (see Chapter 4) formally categorised banks as either capital adequate or inadequate; ie in terms of some notional bureaucratically determined minimum capital standard.

Also, under the capital structure relevance hypothesis, the market's view of the adequacy of a bank's capital may be considered in terms of an optimum determined by the influence of market imperfections. Consequently it is possible to consider capital adequacy in terms of dual, ie market and regulatory, criteria; accordingly, four possible categorisations of banks are represented in Table 7.1A.

Generally, under the basic capital structure relevance hypothesis, a firm's voluntary capital issue decision may be expected to move the capital structure towards an optimum defined by various market imperfections. In the particular environment of the banking sector, a capital issue may be required of, or coerced from, a bank by the regulatory regime irrespective of whether it represents a move towards or away from the bank's capital structure optimum.

#### 7.1.2 Issue Announcement Evidence

The evidence of Chapters 5, and to some degree Chapter 6, suggests that common stock (and ordinary share) issue announcement effects are negative and tend to decline in (negative) magnitude after the imposition of a minimum capital standard regulatory regime. It is difficult to draw any direct evidence supporting the capital structure relevance hypothesis from these announcement effects.

Keeley (1989) analysed banks' common stock issue announcement effects in terms of their regulatory status; his results indicate a negative announcement effect for capital inadequate banks, and a positive effect for adequate banks; see Chapter 5. These results are indicated in Table 7.1B. Keeley reasons that common stock issues by capital inadequate banks are coerced, while those by banks with adequate capital are voluntary.

### 7.1.3 Regulatory and Market Views.

Keeley's (1989) evidence viewed banks as either regulatory capital adequate (bank groups A & B) or inadequate (groups C & D) according to the regulatory view. His announcement effect results are also indicated in Table 7.1B; ie positive for A & B, negative for C & D. He views the latter as implying a voluntary issue decision and the latter implying a coerced issue.

Nevertheless, Keeley's analysis neglects the market's view of a bank's adequacy of capital. Table 7.1B also presents the hypothesised influence on issue announcement effects of a bank's capital adequacy from the market perspective; if inadequate the influence should be positive, and if adequate the influence should be negative. In other words, if it is assumed that the market's view of capital adequacy, or inadequacy is based on a defined optimal structure, then it may be hypothesised that the announcement effects would be negative for capital adequate banks (A & C) and positive for capital inadequate banks (B & D).

Table 7.1

A: Regulatory and Market Capital Adequacy Status

		MARKET VIEW	
		Adequate*	Inadequate
REGULATORS VIEW	Adequate	A	B
	Inadequate	C	D

(\* Adequate, or Optimal, and Over Adequate)

B: Issue Announcement Effects

Bank Group	Keeley's Evidence	Hypothesised Market Reaction
A	voluntary	+
B	voluntary	+
C	coerced	-
D	coerced	+

#### 7.1.4 Criticism of Keeley's View

Based on Table 7.1, a capital issue decisions by the various bank groups would be, ...

Bank Group A: voluntary, but unlikely as it would represent a costly move away from the optimum as defined by the market.

Bank Group B: also voluntary and, because it represents a move towards the optimum defined by the market, would represent a positive influence on issue announcement effects.

Bank Group C: coerced by the regulators; also, because the market views capital as adequate, a capital issue represents a move away from the optimum structure - a costly addition to capital which would represent a negative influence on issue announcement effects.

Bank Group D: coerced by the regulators; but the market also views capital as inadequate and would view a capital issue as a move towards the optimum capital structure; this would represent a positive influence on issue announcement effects.

Thus while capital issues from banks in group A would be unlikely (and costly), issues by those in group B would influence announcement effects positively.

Capital issues by banks in group C would influence capital issue announcements negatively. This represents a cost of bank capital regulation; this cost arises from the conflict of an imposed regulatory capital standard higher than that assessed as necessary by the market.

Nevertheless, issues by banks in group D while nominally coerced, would provide a positive issue announcement effect; this suggests that not all capital issues by banks with inadequate regulatory capital should necessarily influence announcement effects negatively.

These hypotheses suggest a new insight, and invite a reassessment, of Keeley's results; the positive announcement effects of voluntary common stock issues (ie by regulatory adequate banks) may represent a movement towards the optimal capital structure by a bank judged capital inadequate by the market (ie group B). Also, an issue announcement by a regulatory capital inadequate bank may be either negative or positive, depending on the market's assessment of the bank's capital adequacy, ie groups C or D; the negative influence on group C represents the cost of a conflict between market and regulatory views of a bank's adequacy of capital. Thus a "coerced" capital issue by a bank judged regulatory capital inadequate may indeed be voluntary if the bank is simultaneously judged capital inadequate by the market.

## 7.2 PROPOSED ANALYSIS

### 7.2.1 Objectives

The assessment of adequacy of US bank capital from a market viewpoint has been reported by Shome et al (1987); See Chapter 4. No comparable study appears to have been undertaken in the UK. The following analysis assesses the adequacy of bank capital in the UK and the US. Additionally, it seeks to assess the potential for the cost of conflicting regulatory versus market views of bank capital adequacy; this latter analysis is carried out by assessing the market view of the adequacy of groups defined as capital adequate or inadequate by the minimum capital standard regime.

### 7.2.2 Sample and Data

Observations are qualified by the small number of large UK banks and a frustrating limited access to US bank data which, while apparently available in the US, is not readily disseminated elsewhere; in this regard, the kindness of IBCA who provided account data on 103 US banks over 1983-87 is particularly acknowledged. The following data relates to the needs of the market assessment model specified in Section 7.3. Regression analysis is undertaken using the SPSS/PC Statistical Package with tabular presentation using the Lotus 123 Spreadsheet.

a. UK Banks

Observations are drawn from the 6 large banks groups in the UK; namely, Barclays, Lloyds, Midland, National Westminster, Royal Bank of Scotland, and Standard Chartered. All have a year end balance date at end December, except Royal Bank of Scotland at end September.

Account Data:

Per share data (earnings per share and dividend per share; both adjusted for subsequent issues) are provided by Datastream from 1978. Nevertheless, in years when banks made losses (such as the late 1980's), earnings per share is recorded as zero which invalidates the observation which is thus excluded from the assessment - and unfortunately reduces the already small number of observations

Asset, and capital data are derived from the 'Annual Report and Accounts' of the individual UK banks.

Price Data:

Balance date share price data, adjusted for subsequent issues, is provided by Datastream.

b. US Banks

**Account Data:**

As for the UK banks, per share account data is gained from the Datastream service, and is available since 1978.

**Capital and Asset Data -**

Unfortunately, other account data from Datastream is limited; while equity account data is reasonably comprehensive, total asset data is not available.

The IBCA service provides account data on 103 US banks; while the data is arranged in a purpose designed bank analysis format, the equity account data is provided in aggregate form; the service also itemises primary capital. Data for the 1983-87 period is available.

For an exercise using Basle Risk-Weighted Capital, the capital ratio data was gained from the 1990 edition of Salomon Brothers "Review of Bank Performance".

**Price Data:**

As for the UK.

**Screening:**

The resultant data used requires the amalgamation of Datastream and IBCA sources. The original number of IBCA banks

had to be reduced due to a number of factors (See Annex 7, Table 7B).

- incompatibility between IBCA and Datastream figures for equity capital (and other items) in certain years; where this exceeded more than 1% of the Datastream equity figure the observation for that year was excluded.
- lack of corresponding price data on the Datastream service. This may in some cases be caused by the bank being taken-over in subsequent years and its deletion from the Datastream service.

#### c. Adequacy of Capital: Market Assessment Model

The equity valuation model used by Shome et al (1986) to provide a market assessment of capital structure adequacy (of 99 large US banks over 1974-83) provides a basis for the assessment of the adequacy/inadequacy of bank capital structures.

The focus of the Shome model, noted in Chapter 4, is upon the parameter of the variable used to represent financial risk. Shome uses the ratio of equity capital to total assets; also he alternatively used total capital (common equity + loan loss reserves + capital notes and debentures) to total assets, but this did not qualitatively alter the regression results.

## 7.3 MODEL SPECIFICATION

### 7.3.1 The Model

The model, which employs a two-stage least squares regression, is derived by Shome et al (1986) from whom the following specifications are taken.

The model is based on the proposition that the current price of a stock ( $P_0$ ) is equal to the present value of the expected future dividends ( $D_t$ ) to existing shareholders discounted at a rate  $k_t$  the market determined required rate of return commensurate with the risk of the security for period  $t$ ; ie

$$1). \quad P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+k_t)^t}$$

With  $D_0$ , the current dividend known, and assuming constant growth, then it follows that ...

$$2). \quad D_0 = \sum_{t=1}^{\infty} \left( \frac{1+g_t}{1+k_t} \right)^t$$

Recognizing that equation 2) is linear in logs and that  $D_0 = (\text{POR})E_0$

$$3). \quad \ln P_0 = \ln E_0 + \ln \text{POR} + \ln \left[ \sum_{t=1}^{\infty} \left( \frac{1+g_t}{1+k_t} \right)^t \right]$$

where

$E_0$  = current earnings per share

POR = the payout ratio, and

$g_t$  = the expected growth rate in earnings for the firm in period  $t$ .

Because neither the level nor time path of  $k_t$  or  $g_t$  (or their ratio) is directly observable, a general solution is found in employing observable variables which are highly correlated with  $k$  and  $g$ . Shome et al select leverage, dividend and size variables and use a functional form which allows for their interactive influence on the risk and/or growth variables (1).

$$4). \sum_{t=1}^{\infty} \left( \frac{1 + g_t}{1 + k_t} \right)^t = B_0 (\text{POR})_t^{B_1} (\text{EQR})_t^{B_2} (S)_t^{B_3} e_t$$

where

POR = payout rate

EQR = equity ratio, a measure of financial risk

S = total assets, a size variable that proxies for business risk

$B_i$  = constants,  $i = 0, 1, 2, 3$ , and

$e$  = disturbance term which, by assumption, is lognormally distributed

In equation 4), Shome et al note that the payout rate should be inversely related to  $g_t$ , which implies  $B_1 < 0$ . The sign of  $B_2$  is of focal interest, as EQR will influence both  $k_t$  and  $g_t$ . Shome et al comment that while the net impact is not clear, the literature suggests the null hypothesis is  $B_2 \leq 0$ . Either the value maximising capital structure is chosen or regulators force managers to hold excess capital (2). The size variable

is expected to be inversely related to  $k_t$ ; ie,  $B_3 > 0$ .

Taking logs of equation 4) yields,

$$5). \ln \left( \frac{1 + g_t}{1 + k_t} \right)^t = \ln B_0 + B_1 \ln(\text{POR})i + B_2 \ln(\text{EQR})i + B_3 \ln(S)i + \ln e_i$$

and substituting 5) into 3) results in a valuation equation that relates share price to the equity ratio.

$$5a) \quad \ln P_i = \ln B_0 + \ln E_i + (1 + B_1) \ln(\text{POR})i + B_2 \ln(\text{EQR})i + B_3 \ln S_i + \ln e_i$$

or

$$5b) \quad \ln P_i = a_0 + a_1 \ln E_i + a_2 \ln(\text{POR})i + a_3 \ln(\text{EQR})i + a_4 \ln S_i + u_i$$

where

$$a_0 = \ln B_0 - (1/2) \epsilon_i^2$$

$$a_3 = B_2$$

$$a_1 = 1.0$$

$$a_4 = B_3$$

$$a_2 = (1 + B_1)$$

$$u_i = \ln e_i + \frac{1}{2} \epsilon_i^2 \sim N(0, \epsilon_i^2) \quad (3)$$

Concerning equation 5b), Shome et al comment that if dividend policy is irrelevant,  $a_2$  should be zero; per se, the payout ratio should have no influence on price per share. Also, the

equation assumes a log-linear approximation for the relationship between P and EQR within the range of the sample data; the validity of this assumption may be checked using a Durbin Watson test (4).

In order to purge the system of measurement error with respect to E, and simultaneous equation bias, Shome et al employ two-stage least squares (5). The first stage regression equation is specified as

$$6) \quad E_i = d_0 + d_1 D_i + d_2(EQR)_i + d_3 S_i + v_i$$

The predicted value,  $\hat{E}_i$ , from equation 6) is used in place of  $E_i$  in equation 5a).

#### 7.3.2 Financial Risk Variables

In the above model, the choice of financial risk measure (EQR) represents a definition of capital. The definitions of capital, and asset size used in the following exercises include:-

1). UK: 1978-89: 6 Banks.

Capital Ratio:

Equity Capital (Ordinary Capital + Reserves)/ Total Net Assets

Size:

Total Net Assets.

2). US: 1983-87: IBCA database banks (see Annex 7, Table 7B).

**Capital Ratio:**

Equity Capital (defined by IBCA)/ Total Net Assets

**Size:**

Total Net Assets.

3). US: as above

**Capital Ratio:**

Primary Capital (defined by IBCA)/ Total Gross Assets

**Size:**

Total Gross Assets (ie Total Net Assets + Loan Loss Reserves)

4). US: 1988-89: Salomon Brothers and IBCA data bases.

**Capital Ratio:** (from Salomon Brothers)

Basle Risk-Weighted Capital Ratio as determined by management  
on a 1992 basis.

(ie Tier 1+2 / Total risk-weighted assets plus contingencies)

**Size:**

Total Gross Assets (from IBCA)

## 7.4 RESULTS

The results of the above four regression studies are summarised in Table 7.2 (A,B,C,D); full regression results are detailed in Annex 7.

### 7.4.1 UK: Equity Capital

The UK results, Table 7.2 A, are qualified by a low number (six) of observations; an insufficient number of observations precluded regression in the years 1987, 1989 and 1990 (6). Also while the results for 1979, 1986 and 1988 suggest a significant regression (significance of F ratio < .05) the other years do not.

Although the coefficient is negative in 1979, indicating excessive capital levels, the insignificance (> .05) of the t statistic suggests capital levels were at or near the optimum.

The significant and positive (albeit small) coefficient for 1986 indicates a capital level which is inadequate. By 1988, following the announcement of the introduction of a minimum capital adequacy regulatory regime, the level appears to have regained adequacy with the coefficient, while negative, qualified by insignificance.

TABLE 7.2  
MARKET ASSESSED ADEQUACY OF CAPITAL - SUMMARY

(Summary of regression results contained in Annex 7)

a3 = coefficient of capital ratio

t = t statistic; sig t = two-tailed significance of t statistic

adj R2 = adjusted R2; sig F = significance of regression

- UK BANKS -

A: 6 MAJOR UK BANKS: CAPITAL DEFINED AS EQUITY

6 Cases      EDR = (Ordinary Capital + Reserves)/Total Net Assets

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
a3	-1.66	-1.25083	-2.1361	0.41561	0.19644	-1.23049	-3.62828	-0.02482	0.31	NA	-0.8426	NA	NA
t	-1.31	-6.641	-1.165	0.524	0.157	-1.631	-9.456	-0.032	37.29		-2.276		
sig t	0.42	0.10	0.45	0.69	0.90	0.35	0.07	0.98	0.02		0.26		
adj R2	0.96	1.00	0.95	0.98	0.94	0.99	1.00	0.89	1.00		1.00		
sig F	0.13	0.02	0.15	0.09	0.17	0.09	0.05	0.22	0.00		0.04		

- US BANKS -

B: US BHC's: CAPITAL DEFINED AS EQUITY

RISK RATIO = EDR = (Ordinary Capital + Reserves)/Total Net Assets

YEAR (Cases)	1983 (58)	1984 (52)	1985 (56)	1986 (52)	1987 (66)
a3	0.37837	0.2462	0.22569	1.75727	-0.20353
t	2.501	1.786	1.055	3.287	-0.761
sig t	0.02	0.08	0.30	0.00	0.45
adj R2	0.84	0.87	0.73	0.55	0.37
sig F	0	0	0	0	0

## D: US BHC's: CAPITAL DEFINED AS PRIMARY CAPITAL

RISK RATIO = PCR = Primary Capital/Total Gross Assets

(# Primary capital defined by IBCA)  
 (# Gross Total Assets = Total Assets + Loan Loss Reserves)

YEAR (Cases)	1983 (58)	1984 (52)	1985 (56)	1986 (52)	1987 (66)
a3	0.27866	0.24579	0.21227	1.71538	-0.21628
t	1.663	1.782	0.991	3.229	-0.807
sig t	0.10	0.08	0.33	0.00	0.42
adj R2	0.84	0.87	0.73	0.55	0.36
sig F	0	0	0	0	0

Observations categorised into one of two groups:

D = Group of observations with PCR equal to or greater than Regulatory Minimum Standard

U = Group of observations with PCR less than Regulatory Minimum Standard

Minimum Regulatory Standard: 5% in 1983, 1984

5.5% in 1985, 1986, 1987

## OVER::

YEAR (Cases)	1983 (56)	1984 (30)	1985 (20)	1986 (28)	1987 (49)
a3	0.27728	1.26277	-0.07701	0.46595	0.57143
t	1.64	6	-0.136	1.1	2.021
sig t	0.1072	0	0.8937	0.2826	0.0497
adj R2	0.83375	0.85849	0.47203	0.74499	0.58564
sig F	0	0	0.0076	0	0

## UNDER::

YEAR (Cases)	1983 (2)	1984 (22)	1985 (36)	1986 (24)	1987 (17)
a3	NA	0.54478	-0.14399	5.49064	-1.60073
t		1.476	-0.483	3.276	-1.138
sig t		0.1595	0.6326	0.004	0.2775
adj R2		0.92859	0.88941	0.61171	-0.05791
sig F		0	0	0.0002	0.5587

D: US BHC's; CAPITAL DEFINED AS BASEL AGREEMENT

RISK RATIO = BASEL RISK-WEIGHTED CAPITAL RATIO (RWC) = Tier 1+2 Capital / Total Risk-Weighted Assets plus Contingencies

(\* Capital Ratio Source - Salomon Brothers: Management Estimates)

S = Gross Assets

YEAR (Cases)	1989 (28)
a3	0.57173
t	1.403
sig t	0.19
adj R2	0.46
sig F	0.0454

- OVER

YEAR (Cases)	1987 (23)
a3	-0.95661
t	-1.791
sig t	0.10
adj R2	0.35
sig F	0.0648

UNDER

YEAR (Cases)	1989 (5)
a3	Insufficient Data
t	Regression Skipped
sig t	
adj R2	
sig F	

#### 7.4.2 US: Equity Capital

The results for the 1983-87 period (Table 7.2B) suggest that equity capital levels were inadequate in 1983 and 1986 and, indicated by statistical insignificance, at or near optimal levels in the other three years.

#### 7.4.3 US: Primary Capital

The primary capital adequacy results (Table 7.2C) tend to mirror those for US equity capital, although the coefficient for 1983 appears insignificant ( $>.05$ ) and therefore at or near an optimal level. As for equity capital, primary capital appears inadequate in 1986.

In a further exercise, the bank sample is disaggregated into two groups based on regulatory capital adequacy (ie the exercise assumes a primary capital ratio of 5% or more is adequate in 1983, 1984, and similarly a ratio of 5.5% in 1985, 1986 and 1987; a lesser ratio is inadequate); eg see regulatory capital constraints in Chapter 4.4.2 (and footnote 20) and Annex 4.3.

The significance of the regression of the disaggregated groups is qualified (F statistic significance  $>.05$ ) in 1987 for the "under" (ie 5.5%) group. Also regression was precluded in the 1983 "under" sample because of a lack of observations.

Otherwise the results for the "over" group suggest an inadequate level of primary capital in 1984 and 1987. Also, based on the insignificance of the coefficient (t statistic significance  $>.05$ ) the results indicate a primary capital level at or near optimum levels in 1983 and 1985 and 1986.

For the "under" group, the market appears to view primary capital as being near optimal levels in 1984 and 1985. In 1986 primary capital levels appear inadequate.

The regression results for the "over" and "under" groups suggest market assessments of capital adequacy which conflict with the regulatory view.

Using the format of Table 7.1A, the results may be categorised as depicted in Table 7.3

TABLE 7.3

## US Primary Capital Assessment (Years 1983-1987)

		ADEQUATE*	INADEQUATE
		1983	1984
REGULATORS VIEW		1985	1987
	ADEQUATE (Over Minimum Standard**)		.
	INADEQUATE (Under Minimum Standard**)	1984 1985	1986

#### \* Optimal and Over Adequate

**11 Minimum Standard: 5% in 1993, 1994**

5.5% in 1985, 1986, 1987

NOTE: Table Omits: 1983 Under - only 2 observations  
1987 Under - Insignificant Regression

This evidence suggests the potential for both conflict and cohesion between market and regulatory views of capital adequacy. Via the capital structure relevance hypothesis, "Under" banks stock prices would be likely to receive a positive influence on the announcement of primary capital issues in 1986 while, similarly, "over" banks would be likely to be influenced negatively by announcement effects in 1983, 1985 and 1986. These likelihoods run contrary to Keeley's observations.

#### 7.4.4 US: Basle Capital

Under the Basle regulation regime, and defining capital (tiers 1 and 2) by the 1992 requirements, the market appears to view the capital level as at or near optimal in 1989.

The capital level for banks defined as capital adequate under the 1992 regulatory requirement of 8% (the "over" group), appears to be verging on an excessive level from the market perspective judging by the sign of the coefficient; nevertheless the coefficient's insignificance suggests a capital level at or near the optimum.

## 7.5 CONCLUSIONS

Generally, this analysis has looked beyond the simple influence of regulatory capital adequacy status as a determinant of capital issue announcement effects as observed by Keeley (1989).

By acknowledging the capital structure relevance hypothesis and the market's view of capital adequacy, vis a vis optimal capital structure, the potential for conflicts between market and regulatory views has been suggested.

Analysis indicates that, from the market perspective, at times banks may hold capital levels which are excessive or inadequate rather than adequate. Also, periods of conflict, and agreement, between market and regulatory views have been assessed in the US; this evidence provides encouraging grounds for testing the hypothesis that such conflict and agreement may influence capital issue announcement effects.

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## FOOTNOTES

(1). In terms of selecting observable variables highly correlated with  $k$  or  $g$  Shome et al note that,

- Hamada (1972) demonstrates that the firm's beta is an increasing function of financial leverage and its basic business risk.
- Sealey (1983) shows that the required rate of return for financial intermediaries should be a declining function of size if there economies of scale in providing liquidity services to depositors.
- Gordon (1974) suggests that investors may also view dividends as less risky than capital gains; therefore, conclude Shome et al,  $kt$  may be a declining function of the dividend payout ratio.
- Also, Shome et al reason that if there exists an inverse relationship between size and the likelihood that regulators will allow the bank to fail (and therefore the probability that the BHC will fail) size and price per share should be positively associated.

Shome et al similarly argue that these same variables may have a potential influence on growth. More particularly,

- An increase in the payout ratio will, ceteris paribus, reduce  $gt$ .
- Leverage will tend to increase  $gt$  to the extent that earnings are now shared by a smaller group of equity holders.

- Earnings growth may be a function of size due to better product or geographic expansion opportunities enjoyed by larger firms.

Shome et al use the multiplicative functional form to allow for the interactive effects of the financing/investment decision.

They note that the size variable is a proxy for business risk since larger banks have better product and geographic diversification possibilities; they cite Edwards & Heggestad (1973) who provide a direct test of the joint hypothesis that larger banks have lower risk levels and better 'growth' opportunities.

(2). Shome et al note that while the required rate of return on equity,  $k_t$ , is a non-increasing function of EQR, the impact of EQR on  $g_t$  is not so clear. Increases in the equity ratio through new stock financing decrease  $g_t$  if the new stock is sold at a price below the book value per share. If managers are more concerned with growth than maximising share prices, they may choose a capital structure to force  $B_2 > 0$ , even though  $k_t$  is a declining function of the equity ratio.

(3). Since  $e_i$  is lognormally distributed with an expected value of 1,  $\ln(e_i)$  is normally distributed with a mean of  $-\frac{1}{2}\sigma_e^2$  where,  $\sigma_e^2 = \text{Var}(\ln(e_i))$  and  $\text{Var}(\ln(e_i))$  is the variance of  $\ln(e_i)$ . This result follows from the fact that

$E[e_i] = \exp\left[E(\ln(e_i)) + \frac{1}{2}\sigma_e^2\right] = 1$ . Assuming homoscedasticity of the error term allows for a constant to be added to  $\ln B_0$  in order to leave the relationship unaltered.

(4). If the approximation is seriously in error, and the actual relationship is concave to the origin within this sample, then the residuals ranked according to the equity ratio values would exhibit significant positive serial correlation. Shome et al check the validity of this assumption by applying a Durbin Watson test to the cross-sectional residuals ranked according to EQR values; Kmenta (1971) provides a description of the test and Litzenberger & Rao (1971) an example of its application.

(5). Although equation 5b) could be estimated using ordinary least squares, Shome et al comment that if the firm's economic earnings are not equal to current accounting earnings, the measurement error will cause its coefficient to be biased towards zero. Also, dividend and capital structure decisions, as well as size, may provide information concerning economic earnings. Using the two-stage least square procedure removes the information impact of dividends, capital structure, and size and reduces the measurement error bias.

(6). Also, the low number of observations (six) in other years were not accommodated in available tables of the Durbin Watson statistic.

## CHAPTER 8

### THE PREDICTABILITY OF SECURITY TYPE ISSUED

#### 8.1 INTRODUCTION

##### 8.1.1 Objective

The type of security issued appears to be an important determinant of issue announcement common stock abnormal return (AR). The hypothesised inverse relationship between an announcement AR and the predictability of the security type of the announced capital issue is examined in this chapter. Previous assessment of this hypothesis in the industrial sector found at best very weak supporting evidence, Schadler (1987).

This investigation requires the estimation of ARs for different security types issued and the construction of a security type to be issued predictability model. Such predictability models have been successfully constructed in the industrial sector but not apparently in the banking sector, although problem bank early warning systems and bank failure predictability have been modelled, eg Sinkey (1979), Sinkey et al (1987).

### 8.1.2 Industrial Models

The estimation of issue security type predictability, given the need for external financing, has been explored with varied success in the industrial sector over the past two decades. Industrial firm studies include Baxter & Cragg (1970), Martin & Scott (1974), Taub (1975), Marsh (1982) and Schadler (1987). A number of financial characteristics have emerged as indicators of issue type. Marsh (1982) achieved an issue security type predictive ability of 73% in a relatively methodological rigorous model largely using theoretically backed variables.

The studies generally employ three types of predictive model. Issue security type, as a discrete dependent variable, has invited the use of multivariate discriminant analysis (MDA) as well as logit and probit models.

### 8.1.3 Model and Predictor Variable Selection

The MDA is selected as an appropriate model for this dissertation. Apart from its use in previous security type predictor models, see Table 8.1, the MDA model has been used in a variety of financial applications including, for example, the prediction of bond ratings (Pinches & Mingo 1973), company failure (Taffler 1982), bank problem and failure (Sinkey 1979), and debt servicing problems in developing countries (Taffler & Abassi 1984). Generally, MDA is a multivariate statistical technique concerned with separating distinct groups of observations and allocating new observations to the previously defined groups. The MDA reduces the task of examining group differences among a large number of variables to a univariate problem. The selection of MDA also is supported by Taffler & Abassi (1984) (1).

TABLE 8.1  
SECURITY TYPE ISSUED PREDICTION STUDIES

STUDY	SECURITY TYPES	MODEL	NUMBER OF VARIABLES	SUCCESS
Baxter & Cragg (1970)	5	L & P	11(90)	n a
Martin & Scott (1974)	2	MDA	6(23)	75% (77%)
Taub (1975)	2	P	6	n a
Marsh (1982)	2	L & P	8	75% (73%)
Schadler (1987)	3	MDA	9	58% (56%)

NOTE:-

SECURITY TYPES: 5 = Five security types; 2 = Debt or Equity; 3 = Debt or Equity or Convertible Debt.

MODEL: MDA = Multivariate Discriminant Analysis; L = Logit,  
P = Probit.

NUMBER OF VARIABLES ; Number of predictor variables in final specification: initial selection in parenthesis.

SUCCESS ; Correct classification of model; tested best predictability in parentheses.

A degree of experimentation in variable selection is necessary due to the novelty of forming a bank capital issue security type predictability model. Nevertheless, it is intended to emphasise Schadler's (1987) approach; namely predictor variable nomination is designed to reflect public information available to determine the bank issue security type, rather than the result of exhaustive 'data mining' in order to obtain the highest degree of predictability.

The selection of potential predictor variables is assisted by reference to those selected in previous industrial studies; see Annex 8.1. Among the previous industrial studies, the framework of predictor variables developed most recently by Marsh (1982) and Schadler (1987) provide a particularly useful reference point.

## 8.2 MODEL SPECIFICATION

### 8.2.1 Discriminant Function

In application of MDA, a linear combination of the independent (or predictor) variables is formed and used as the basis of assigning observations to groups, thus summarising in a single index the information contained in multiple independent variables. Variable weights are estimated to provide the 'best' separation between the groups.

The linear discriminant equation is of the form,

$$Z = d_0 + d_1 V_1 + d_2 V_2 + \dots + d_m V_m$$

where,

Z = the discriminant function score

$V_1, V_2 \dots V_m$  are the m variables selected for the analysis,  
and

$d_0, d_1 \dots d_m$  are the optimal coefficients estimated from the data.

The coefficients are chosen so the values of the discriminant function differ between the groups as much as possible. In other words, for the discriminant scores, the ratio .....

$$\frac{\text{between-groups sum of squares}}{\text{-----}} \\ \text{within-groups sum of squares}$$

is maximised; this also minimises the probability of classifying an observation to the wrong group. Any other linear combination of the variables will have a smaller ratio.

### 8.2.2 Assumptions

Basic requirements for the application of MDA include the ability to divide the sample of observations into separate and discrete known groups, and that each observation in each group must be described by a set of measurements on  $m$  variables, where  $m$  is greater than or equal to two.

Also, to provide a classification rule that minimises the probability of misclassification, certain assumptions about the data must be met. For each group, the  $m$  variables are assumed to come from a multivariate normal distribution. Also, the within-group covariance matrix for the variables in the data matrix is assumed to be the same for each group. Violation of these assumptions may influence the performance of the linear discriminant model (LDA).

#### a). Multivariate Normal Distribution of each Group's Variables

As with most multivariate techniques, multivariate normality of the independent variables is required in formal development of the model. It is assumed that either multivariate normality exists, eg Martin & Scott (1974), or that the MDA classification procedure is robust to deviations from multivariate normality, eg Schadler (1987).

#### b). Equality of Groups' Covariance Matrices

Violation of the assumption of equality of the within-group variable covariance matrices is common in practice; such violation indicates that the use of a quadratic discriminant analysis (QDA) model may be more appropriate than a linear

discriminant analysis (LDA) model. Nevertheless, under some circumstances the LDA may perform better than the QDA despite differences in covariance matrixes (2).

### 8.2.3 Classification Result:

The classification result is inflated because a model usually fits the sample from which it is derived better than it will fit another sample from the same population.

A common technique used to obtain a better estimation of the misclassification rate is the 'hold-out' method. If the sample is large enough, it may be split into two sub-samples; the one is used to obtain the discriminant coefficients, while observations in the second (or 'hold-out' sample) are then assigned to their respective groups. Schadler (1987) who uses this method notes that it provides consistent and unbiased error estimates but is less efficient with small samples.

The 'jack-knife' or 'leaving-one-out' method involves leaving out each of the n observations in turn, calculating the discriminant function based on the remaining n-1 observations and then classifying the left out case. Since the observation being classified is not included in the calculation of the function, the observed misclassification rate is a less biased estimate of the true one: eg Lachenbruch (1975).

The predictive estimation is illustrated in Table 8.2; the "confusion" matrix shows whether bank observations are classified correctly (in the main diagonal c11 or c22)) or incorrectly (off-diagonal c12 or c21).

TABLE 8.2

## CONFUSION MATRIX

		Classified Group Membership	
		Security Type A	Security Type B
Actual Group	Security Type A	c11	c12
	Security Type B	c21	c22

## 8.2.4 Predictability Hypothesis

The hypothesis that the predictability of security type issued is inversely related to its abnormal return, is assessed in a number of steps.

a). The observations associated with each cell of the matrix are formed into portfolios, and the portfolio abnormal returns calculated, ...

$$AAR_c = \frac{\sum_i AR_{ci}}{N_c} \quad \text{where } N_c \text{ is the number of observations in cell } c,$$

$$c = 11, 12, 21, 22$$

$$i = 1, 2, \dots, N_c$$

b). The following hypothesised relationships are considered,

$H_0: AAR_{c11} = AAR_{c12}$

$H_a: AAR_{c11} \neq AAR_{c12}$

and

$H_0: AAR_{c22} = AAR_{c21}$

$H_a: AAR_{c22} \neq AAR_{c21}$

The average abnormal returns from each portfolio must be compared, as indicated in the above hypotheses tests.

## 8.3 SAMPLE AND DATA

### 8.3.1 Observations

Although the US provides a potentially rich observation source, lack of data restricted the analysis to the UK where a paucity of valid observations compromises the validity of the hypothesis assessment (3). Notwithstanding this fundamental qualification, the following exercise is constructed with a view to future hypothesis tests utilising a more suitable observation sample.

The UK observations total 11 and were derived from the 6 large banks; 5 banks contributed 2 observations. The discriminator variable is based on the distinction of a bank announcement of an ordinary shares issue or debt issue in a given year. These observations (6 debt and 5 ordinary shares) are drawn from the pool of issue announcements identified in Chapter 6; although this pool offers a potentially greater number of observations these were reduced by using only "clean" observations (issue is for a non-specific purpose, and there is no coincident announcement) and the need for common predictor variable data for each observation.

A residual problem concerns the selection of distinct classes of observation suitable for discrimination. A bank making an ordinary share issue announcement in a particular year may also have made debt issues; also a bank making a debt issue announcement in a particular year may have made other debt issue announcements in that year. The use of a specific debt type issue announcement, namely perpetual/undated, which is less frequent and better identified would conceivably overcome

these problems; but they represent only two of the 6 debt observations. Consequently the validity of the discriminator variable is compromised.

Data for the predictor (independent) variables are drawn from both market and account sources. Market data is derived from Datastream and the Bank of England's "Financial Statistics". Account data is drawn from each banks annual report and accounts; also data from the IBCA account format is used for comparability of certain account data between banks. The SPSS/PC+ V2.0 and Advanced Statistics V2.0 program is used for discriminant analysis.

### 8.3.2 Predictor Variables

Generally, the frameworks of Marsh (1982) and Schadler (1987) identify three categories of variable; namely variables they consider proxies for target leverage, deviations from target leverage, and market and timing variables (4). The variables proxying for target leverage include size, asset composition and financial risk.

Variables representing financial risk are conveniently identified and selected from bank specific models. These include the "early-warning" model developed by Sinkey (1979) (5) and the failure prediction model of Sinkey et al (1979) (6).

A fourth category of variable, regulatory capital pressure, may also be identified. Variables selected include the Bank of England defined "free capital ratio" and a dummy variable to represent the introduction of a minimum capital standard

during the latter part of the observation period (post 1986).

In all, 21 variables are identified. These are listed in this section and more precisely defined in terms of accounting data in Annex 8.2.

a). Market Conditions

V1. Equity Market Conditions (EMC)

The cumulative market return in the period prior to the issue announcement. The market return (on the FTA index) is cumulated over days -60 to -2 inclusive.

V2. Short-Term Debt Market Conditions (STDMC)

The price of three month UK Treasury Bills (middle rate price, monthly data) averaged over the previous 12 months, bar the issue announcement month, divided by the issue month's price.

V3. Long-Term Debt Market Conditions (LTDMC)

The gross redemption yield on British Government Securities (long dated 20 year, quarterly data). The average of the previous 8 quarters, bar the issue announcement quarter, divided by the issue announcement quarter.

b). Deviation from Target Leverage

Two measures of capital are used; the narrow measure contains ordinary capital, reserves and minorities (ie equity capital); the wider measure also includes preference capital and debt capital.

Variables concerning the wider capital measure include,

v4. Wide Capital Ratio (WCR)

The ratio of wide capital to total assets.

v5. Average Wide Capital Ratio (AWCR)

The average wide capital ratio over the previous four years bar the last.

v6. Deviation of Wide Capital Ratio (DWCR)

The ratio of v5 to v4.

Variables concerning the narrow capital ratio mirror those for wide capital.

v7. Narrow Capital Ratio (NCR)

The ratio of narrow capital to total assets.

**V8. Average Narrow Capital Ratio (ANCR)**

The average narrow capital ratio over the previous four years bar the last.

**V9. Deviation of Narrow Capital Ratio (DNCR)**

The ratio of V8 to V7.

**c). Proxies for Target Leverage**

This category covers variables which represent size and asset composition and financial risk. These are selected from the respective problem bank and bank failure prediction models of Sinkey (1979), variables V10 to V14 inclusive; and Sinkey et al (1987), variables V15 to V19 inclusive.

**V10. Size**

The variable of size is represented by the natural log of total assets.

**V11. Revenue Concentration (RC)**

The ratio of interest and fees on loans, to total operating income.

**V12. Net Interest Margin (NIM)**

The ratio of net interest income after loan loss provisions, to total interest income.

**V13. Operating Efficiency (OE)**

The ratio of non-interest expenses, to pre-tax profit before the non-interest expenses.

**V14. Loan Volume (LV)**

The ratio of loans, to total assets.

**V15. Return on Assets (ROA)**

The ratio of earnings for ordinary shareholders to total assets.

**V16. Standard Deviation of Return on Assets (SDROA)**

The standard deviation of return on assets over the past five years.

V17. Retained Earnings (RE)

The ratio of retained earnings to total assets

V18. Liquidity (LQ)

The ratio of liquid assets to total assets

V19. Gross Interest Margin (GIM)

The ratio of total interest income to interest expense.

d). Regulatory Pressure

V20. Free Capital Ratio (FCR)

The free capital ratio as defined by the Bank of England.

V21. Minimum Capital Ratio Standard (MCRS)

A dummy variable to accommodate the announced introduction of a minimum capital standard in 1987.

## 8.4 RESULTS

The discriminator variable observations, numbering 11, are listed in Table 8.3A. This also shows the issue announcement abnormal return associated with each observation.

### 8.4.1 Predictability Model

#### a). Initial Exploration

The 21 potential predictor variables are listed in Table 8.3B. This shows in total, as well as discriminator groups terms, the mean and standard deviations for observations of each variable. Tests for equality of group means for each variable are indicated by Wilks' lambda as well as the F value and its significance (7). Generally, the most significant differences appear among asset composition measures; ie the liquidity measure V18, and the loan volume measure V14. The regulatory free capital ratio measure, V20, also appears to provide one of the more separable variables.

In order to identify "good" predictor variable a stepwise selection process employing the minimisation of Wilks' lambda is used; at each step the variable that results in the smallest Wilks' lambda for the discriminant function is selected for entry; additional criteria also apply (8).

The resulting 8 variable discriminant function is shown in Table 8.3C. The unstandardised coefficients are the multipliers of the variables when expressed in original units;

the standardised coefficients are used when the variables are standardised to a mean of 0 and a standard deviation of 1. As the variables are correlated, it is not possible to assess the importance of an individual variable.

Unfortunately the validity of the discriminant function cannot be assessed; in testing for equality of group covariance matrices the programme warns that there are not enough non-singular group covariance matrices.

Notwithstanding this fundamental qualification to its validity, the discriminant function's effectiveness may be gauged from the ratio of between-groups sum of squares to within-groups sum of squares (ie using an anova table with the discriminant score as the dependent variable and the discriminant variable as the independent variable); this ratio is represented by the eigen value (which is 188.9858); a large eigen value is associated with "good" functions.

Another gauge of the effectiveness of the discriminant function, and one of particular interest for this dissertation, is the percentage of cases correctly classified. The classification output indicates that 100% of observations are classified correctly; the programme indicates a posterior probability of 1.0 for each observation (9). Attempting the "jackknife" procedure (see below) on a discriminant function comprising the forced entry of the 8 identified variables proved unsatisfactory; ie an inability to test for equality of group covariance matrices in any of the 11 "jackknife" process, a number of which excluded V20 due to the tolerance criteria.

TABLE B.3A  
DISCRIMINANT OBSERVATIONS  
ON CAPITAL ISSUES

BANK	ISSUE	YEAR	GROUP 1	GROUP 2	AR
Lloyds		1984	1		0.0055
Natwest		1984		1	-0.0376
Royal Bank of Scotland		1985		1	-0.0813
Standard Chartered		1985	1		0.0283
Midland		1985	1		0.0105
Natwest		1986		1	-0.1095
Barclays		1987	1		0.0211
Barclays		1988		1	-0.1333
Lloyds		1988	1		-0.0002
Royal Bank of Scotland		1988	1		0.0108
Standard Chartered		1988		1	0.0736
	TOTAL		6	5	

GROUP 1 = DEBT ISSUES

GROUP 2 = ORDINARY SHARE ISSUES

AR = Two-Day Abnormal Return derived in Chapter 6.

TABLE 8.3B  
 PREDICTOR VARIABLES  
 MEAN, STANDARD DEVIATION, AND TESTS FOR UNIVARIATE EQUALITY OF GROUP MEANS

VARIABLE	MEAN			STANDARD DEVIATION			WILKS' LAMBDA	F	SIGNIFICANCE
	GROUP 1	GROUP 2	TOTAL	GROUP 1	GROUP 2	TOTAL			
V1 EMC	-0.01874	0.015	-0.003	0.176	0.104	0.142	0.984	0.145	0.712
V2 STDMC	0.95421	0.996	0.973	0.132	0.084	0.110	0.960	0.378	0.554
V3 LTDPMC	1.04095	1.037	1.039	0.072	0.084	0.074	0.999	0.006	0.938
V4 WCR	0.07772	0.074	0.076	0.007	0.006	0.006	0.921	0.776	0.401
V5 AWCR	0.07652	0.077	0.077	0.008	0.010	0.008	0.999	0.010	0.922
V6 DWCR	1.49855	1.035	1.288	1.283	0.155	0.944	0.934	0.634	0.447
V7 NCR	0.0497	0.044	0.047	0.008	0.008	0.008	0.889	1.127	0.316
V8 ANCER	0.05191	0.050	0.051	0.008	0.011	0.009	0.988	0.108	0.750
V9 DNCR	1.8059	1.217	1.538	1.807	0.244	1.323	0.946	0.513	0.492
V10 SIZE	10.63688	10.676	10.655	0.485	0.773	0.598	0.999	0.011	0.921
V11 RC	0.65196	0.652	0.652	0.030	0.070	0.049	1.000	0.000	0.991
V12 NIM	0.21663	0.179	0.199	0.065	0.122	0.092	0.954	0.437	0.525
V13 DE	0.82697	0.922	0.870	0.174	0.372	0.270	0.966	0.314	0.589
V14 LV	0.62878	0.574	0.604	0.063	0.030	0.056	0.738	3.191	0.108
V15 RDA	0.0036	0.002	0.003	0.005	0.008	0.006	0.973	0.246	0.632
V16 SDRDA	0.01439	0.003	0.009	0.029	0.002	0.021	0.926	0.722	0.418
V17 RE	0.00187	-0.003	0.000	0.005	0.009	0.007	0.893	1.076	0.327
V18 LQ	0.26638	0.338	0.299	0.067	0.045	0.067	0.687	4.110	0.073
V19 BIM	1.45272	1.422	1.439	0.057	0.060	0.058	0.921	0.774	0.402
V20 FCR	5.95	5.420	5.709	0.766	0.719	0.760	0.867	1.378	0.271
V21 MCRI	1.5	1.400	1.455	0.548	0.548	0.522	0.990	0.091	0.770

GROUP 1 = DEBT ISSUES  
 GROUP 2 = ORDINARY SHARE ISSUES

TABLE B.3C  
 CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS: 8 VARIABLES  
 DERIVED BY STEP-WISE SELECTION FROM TOTAL 22 VARIABLES

VARIABLE	UNSTANDARDISED		STANDARDISED
V1 EMC	53.20792		7.88
V2 STDMC	-60.0718		-6.8
V4 WCR	2376.9		14.8
V8 ANCR	1350.308		12.8
V9 DNCR	-2.11016		-2.8
V10 SIZE	48.13879		30.3
V18 LD	260.3324		15.2
V20 FCR	-26.9050		-20.
(Constant)	-625.352		

TABLE 8.4A  
 CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS: 4 VARIABLES  
 DERIVED BY STEP-WISE SELECTION FROM 7 VARIABLES  
 (V1, V2, V3, V6, V10, V18, V20)

VARIABLE	UNSTANDARDISED	STANDARDISED
V2 STDMC	4.793133	0.54
V10 SIZE	1.95975	1.23
V18 LQ	29.45386	1.72
V20 FCR	-1.60775	-1.1
(Constant)	-25.1746	

TABLE 8.4B  
 CLASSIFICATION RESULTS: FOUR VARIABLE MODEL

:::CLASSIFICATION:::(a)

	Ordinary Shares	Debt	Total Observations
Ordinary Shares	4 (80%)	1 (20%)	5
::::ACTUAL::::			.
Debt	1 (16.7%)	5 (83.3%)	6

(a) Percent of observations in cell shown in parentheses

Percent correctly classified:  $(4 + 5) / 11 = 81.8\%$

Percent correctly classified by chance  $(5/11) + (6/11) = 50.4\%$

TABLE B.5  
PORTFOLIO AAR's: FOUR VARIABLE MODEL CLASSIFICATION

	:::CLASSIFICATION:::		I
	Ordinary Shares	Debt	Absolute Difference
Ordinary Shares	-0.03894 (-4.042) <sup>a</sup> (4)	-0.13326 (na) (1)	0.09432 (na) (1)
::::ACTUAL::::			
Debt	0.021106 (na) (1)	0.010998 (1.279) <sup>b</sup> (5)	0.010108 (na) (1)

Classification Matrix:::

Each cell shows in order from top:  
 - The within cell AAR; and in parentheses,  
 - Z value  
 - Number of observations in the cell

Absolute Difference:::

The absolute difference in cell AAR; and in parenthesis  
 - Z value (pooled variance method)

-----From "t" tables:

Significance (two-tail) of AAR: null hypothesis AAR=0

a: Significantly different from zero at 5% level

b: not significantly different from 0

(na): unable to be assessed

Significance (two-tail) of difference in AARs: null hypothesis of no difference

(na): unable to be assessed

b).       The Schadler Approach

The philosophy of Schadler's (1987) methodology, ie emphasising the selection of variables which reflect public information rather than the results of more exhaustive data mining, suggests an alternative approach to the hypothesis test. Also, this approach may circumvent the problem of too few observations and the associated inability to gauge the equality of group covariance matrices.

Accordingly, a potential variable list was drawn from the pool to more closely reflect the type of variables utilised by Marsh (1982) and Schadler (1987) as well as a regulatory factor. The list included 7 variables: V1, V2, V3, V6, V10, V18 and V20.

Using forced entry of these variables, the discriminant function provided 100% correct classification with an eigen value of 4.3812; nevertheless, once again the equality of group covariance matrices could not be tested.

Applying stepwise entry to these 7 variables resulted in a discriminant function of four variables; viz V2, V10, V18 and V20, see Table 8.4A. This function provided an eigen value of 3.1938 and a 100% correct classification rate. Also equality of group covariance matrices is suggested (10).

In order to improve the estimate of the classification rate a "jackknife" technique is employed on forced entry of the variables selected in the original model (ie V2, V10, V18 and V20); ie the discriminant function is calculated for 10 of the 11 observations, and the left out observation is classified on the basis of the new function; this process is repeated in turn for each of the 11 observations. The "jackknife" process indicates a correct classification rate of 81.8% (incorrect

classification of two of the 11 observations) ; see Table 8.4B. Nevertheless the jackknife assessment is fundamentally qualified by inability to assess group covariance equality in 5 of the 11 functions.

#### 8.4.2 Hypothesis Assessment

The "improved" jackknifed classification, shown in Table 8.4B, is used in the assessment of whether the predictive ability of the market influences the issue announcement AR.

The average ARs (ie AAR - see Chapter 6 for definition) for each cell in the classification matrix are shown in Table 8.5; eg correct classification of ordinary shares has four observations, and the portfolio containing these observations has an AAR of -0.03894; while the ordinary share issues incorrectly predicted as debt have a scant single observation of -.13326.

Prima facie, the classification matrix indicates that ordinary share issue announcements correctly anticipated have a lower magnitude than those (albeit one only) incorrectly anticipated as debt. Similarly for debt, correctly anticipated issues of debt appear to have a lower magnitude than those incorrectly anticipated as an ordinary share issue announcement. Nevertheless these AARs are subject to the qualification of significance.

The table contains the Z figures for the test for the hypothesis that the cell AAR equals zero (11); two of the four cells could not be assessed for significance, and of the other two, one only was significantly different from zero at the 5% level.

Finally, Table 8.5 also shows the differences in the portfolio AARs. In assessing the difference between the AAR of correctly classified versus incorrectly classified issues, the null hypothesis is that there is no difference. Insufficient data precludes assessment of the significance of difference.

Rejection of the null hypothesis would imply that investors use publicly available information to forecast the type of security anticipated to be issued. And, common stock prices adjust prior to the issue announcement.

## 8.5 CONCLUSIONS

While the high classification rates achieved in the discriminant model superficially tempt the conclusion that a successful bank capital issue security type predictability model has been constructed, this is qualified by several key points. Fundamentally, the distinction of the discriminant groups is not assured. Also, lack of observation numbers limits the testing and integrity of the derived models.

Such flaws in the predictability model weaken the foundation for the assessment of the hypothesis that issue type predictability and the magnitude of announcement AR are inversely related.

Of the two correctly classified cells, only one has an AAR which is significantly different from zero; tests of the other two cells were invalidated. Also, while superficially indicating that for either issue type a correctly predicted issue has a lower AR than an issue incorrectly predicted, inability to provide an assessment of the significance of their difference denies any conclusion.

Nevertheless, the foregoing provides the methodology suitable for assessing the predictability hypothesis on a suitable number of valid observations. More particularly, a pool of potential predictor variables suitable for the bank model have been defined; these are drawn from similar industrial models and from bank failure/early warning models.

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## FOOTNOTES

(1) Taffler & Abassi (1984) comment on debate about the use of either MDA or logit techniques. They note that the rationale for the use of the logit model is that it does not depend on assumptions of multivariate normality and equality of covariance matrices, and is robust to the use of binary independent variables. Nevertheless, they conclude that

'there is little evidence in the literature of the superiority of such techniques (viz logit analysis) compared with conventional discriminant analysis particularly with continuous explanatory variables and where the groups are well separated.'

Also they note that Efron (1975) shows that if the data satisfy conventional normality and common covariance assumptions, the logistic approach could lead to a substantial loss in efficiency particularly with well-separated groups.

In selecting the MDA model, Schadler (1987) noted that a major advantage was that (by taking account of the interaction among the independent variables in deriving the discriminant function) it reduces the problem of multicollinearity often found in regression studies.

(2). Nevertheless, as noted in Section 1.42 of the SPSS reference manual, citing Wahl & Kronmal (1977), if the covariance matrices are not too dissimilar, the LDA performs quite well, especially if the sample sizes are small.

(3). In seeking a suitable sample of observations, the US banking sector provides a particularly interesting source by virtue of the potentially great number of valid observations. Apart from the sheer number of banks this is likely because of the nature of the post 1981 regulatory regime.

More particularly, because equity stock and non-redeemable preference stock rank equally as capital under the post 1981 US regulatory regime, the predictability of capital issue of either security type would be less likely simply to reflect differential regulatory pressure. Also, such issues tend to be less frequent than those of other security types; consequently the identification of distinct observations which fall into either discriminant group, namely the announcement of a single such security issue in a year by a bank, is more readily ascertained.

Although work was undertaken on suitable US predictor variables, adequate US data on security issue details and announcement dates proved unavailable; see Chapter 6, Footnote 1.

#### (4). Industrial Predictor Variable Types

##### Deviations from Target Leverage:

Marsh (1982) uses the difference between historical (10 year average) and current ratios of long term debt plus preference shares to capital employed as a measure of the deviation. The short term deviation from target leverage is similarly calculated using short term debt to total debt.

Schadler (1989) uses a target leverage based on the past 5 years (bar the last) divided into the last years leverage as a gauge for deviations from the target. He defines target leverage in terms of long term and short term; respectively, long term debt (over one year maturity) to total assets (less depreciation), and short term debt to total assets. As well as the two deviation measures, Schadler also incorporates the two target leverage measures as predictor variables in his model.

#### Proxies for Target Leverage:

- i. Size in terms of total assets (expressed as a natural log).
- ii. Asset composition; Marsh (1982) uses fixed assets to total assets (on a net of depreciation basis) and Schadler (1987) uses fixed asset financing with long term debt (long term debt to net property, plant and equipment).
- iii. Financial Risk: Previous models consider financial/bankruptcy risk; Marsh (1982) considers several measures relating earnings to fixed charges and the distribution of earnings changes as well as market factors; Schadler (1987) considers average earnings cover over five years previous to the last year divided by that of the last year.

#### Market Conditions:

- i. Equity: Schadler (1987) includes a variable for favourable market performance. This is represented for each observation as the cumulative return on the market portfolio prior to the issue announcement (calculated over days -60 to -2 inclusive).

ii. Debt: Schadler (1987) uses the ratio of the average yield on a portfolio of AAA corporate bonds over 36 months preceding the issue announcement divided by the most recent month's AAA portfolio bond yield.

Marsh (1982) considered three market conditions and timing variables. To reflect bond and equity market conditions, variables used were the total amounts of equity and debt which would be raised by all UK companies during the quarter in question. These were derived from a simple forecasting model using data and forecasting coefficients available prior to the current quarter. The third variable provides a measure of the issuing company's share price performance, adjusted for the market, over the year preceding the issue; this is simply calculated as the difference between the share return and the return on the market.

(5). In identifying the financial characteristics of problem-nonproblem banks, Sinkey (1979) identifies a seven variable early-warning system. This allowed examiner-determined problem-nonproblem situations to be reclassified with about 75% accuracy using a quadratic equation. These variables include, ...

i). Revenue Concentration: interest and fees on loans as a percentage of total operating income.

ii). Operating Efficiency: total operating expense as a percentage of total operating income.

iii. Liquidity and Asset Composition: US government securities as a percentage of total assets.

- iv. Asset Composition: state and local securities as a percentage of total assets.
- v. Loan Volume: total loans as a percentage of total assets.
- vi. Federal Funds Activity and Aggressiveness of Liability Management: net federal funds (sales minus purchases) as a percentage of total assets.
- vii. Capital Adequacy: capital and reserves for bad debt losses on loans as a percentage of total assets.

(6). Sinkey et al (1987) apply a successful, non-financial firm bankruptcy prediction (zeta) model to bank failure prediction in order to test the model's cross-industry validity. The model successfully identifies bank failure in about three out of four cases; but this is less accurate than the original model. The model utilises seven variables.

- i. Return on Assets: net income divided by total assets.
- ii. Standard Deviation of Return on Assets: over the previous five years.
- iii. Interest Margin: total interest income divided by total interest expense.
- iv. Retained Earnings divided by total assets.
- v. Asset Composition-Liquidity: liquid assets divided by total assets; liquid assets are defined as the sum of cash and due, US Treasury securities, and net federal funds (sales minus

purchases).

vi. Leverage: total assets divided by total equity capital.

vii. Size: the natural log of the bank's total assets.

(7). A small F significance indicates rejection of the hypothesis that group means are equal. Also, Wilks' lambda is the ratio of the within-groups sum of squares to the total sum of squares; a lambda of 1 indicates that all observed group means are equal, while values close to 0 when within-groups variability is small compared to total variability - ie most of the total variability is attributable to differences between the means of the group.

(8). Selection criteria used in SPSSPC include,

Minimum Tolerance: A check against independent variables that are linear combinations of other independent variables.

Tolerance is a measure of the degree of linear association between the independent variables; for variable "i" it is  $1 - R_i^2$ , where  $R_i^2$  is the squared multiple correlation coefficient when the ith independent variable is considered the dependent variable and the regression between it and the other independent variables is calculated.

The significance of the change in Wilks' lambda when a variable is entered or removed from the model can be based on an F statistic; more particularly, either the actual value of "F" or its significance level can be used.

The specific criteria set in the application of the SPSSPC programme include a F-to-enter (and F-to-remove) of 1.0. And a minimum tolerance level of .001; variables with small tolerances (less than .001) are not permitted to enter the model; nor if their inclusion would cause the tolerance of a variable already in the model to drop below .001.

(9). The SPSSPC+ programme, using the discriminant score classifies observations into one of the two groups on the basis of Baye's rule. The probability that a case with a discriminant score of D belongs to group "i" is estimated by,

$$P(G_i|D) = \frac{P(D|G_i) P(G_i)}{\sum_{i=1}^g P(D|G_i) P(G_i)}$$

where,

$P(G_i)$  = Prior Probability: estimate of the likelihood that an observation belongs to a particular group when no information about is known. This is set at .5 (equal likelihood) in this dissertation.

$P(D|G_i)$  = Conditional Probability; ie of D given the group membership. The probability is calculated by assuming the case belongs to a particular group, and the probability of the observed D score given group membership is estimated.

$P(G_i|D)$  = Posterior Probability; when group membership is unknown, the estimate of likely group membership from the available information. It can be estimated from  $P(D|G_i)$  and

$P(G_i)$  using Baye's rule.

(10). The SPSSPC programme records a Box's M test figure, based on the determinants of the group covariance matrices, of 25.648; (the test is not defined).

The significance probability is based on an F transformation; this is measured at .2608 (based on an approximate F of 1.2452 with degrees of freedom of 10 and 347.6). A small probability may indicate rejection of the null hypothesis that the covariance matrices are equal. Nevertheless this test is sensitive to departures from multivariate normality - it tends to suggest matrices are unequal if the normality assumption is violated.

(11). As in Chapter 6, the Z figure is derived from,

$$Z = \sqrt{N} \left( AISAR_{t_0, t_1} \right)$$

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## CHAPTER 9

### CONCLUSION

#### 9.1 SUMMARY

This dissertation explores bank capital and its regulation in both historical and contemporary terms, and in the UK and US contexts. The analysis focuses on a critical assessment of bank capital regulation, and the evidence of bank capital issue announcement effects.

Major themes and hypotheses considered include,

##### a. The Historical Efficacy of Bank Capital Regulation.

In a "free" market context, regulation may be justified to prevent market failure; nevertheless, other rationales such as industry trade with government have been suggested, eg Stigler (1971).

Bank prudential regulation, including bank capital regulation, is fundamentally justified by the market's inability to account for the cost of systemic market failure but focuses on regulation of the individual bank. Nevertheless, in the banking context, Benston (1991) concludes that regulation tends to disrupt financial stability.

The historical efficacy of bank capital regulation is difficult to assess, in part due to the problems of defining and isolating the influences of other bank regulation. Bank capital regulation may be viewed as possessing two forms; absolute and structural.

Historical examples of "free" banking are a matter of definition and lack any strong conclusions as to the influence of untrammelled absolute capital levels; although, controversially, arguments of the 1820s for joint stock banking (ie abolishing a minimum absolute capital limit) in England & Wales were based on the contrasting experience of "free" Scottish banking during common economic exigencies.

Absolute capital regulation (in terms of maximum and/or minimum levels) was used to control the competitive nature of the banking industry (ie monopoly control); developments in bank capital regulation facilitated the establishment of greater market efficiency through share or common stock democratisation and a shift from uncertainty to risk through the evolution of limited liability. Bank cost structure also may have been influenced by the shift from private owner managed to professionally managed banks; viz improved management skills, economies of scale and new agency (management) monitoring costs.

Relative, or structural, capital regulation has a long established formal history in the US but has been established in the UK in recent years only. The efficacy of structural capital regulation in terms of failure risk control is controversial; particularly in the light of US experience in the Depression era.

b. Contemporary Efficacy of Bank Capital Regulation.

In recent years formal regulatory attempts have been made to re-define capital in a manner which better recognises the complex risk capacities it carries, and set a minimum level of capital matched against an assessed (credit) risk potential. Nevertheless, the patent deficiencies of such a regulatory regime may result in costs running contrary to the intended benefits.

Under the auspices of the Basle Committee, and the EEC, structural capital regulation provides the current focus of a common international bank capital regulation in the form of a capital to risk-asset weighted ratio (RAR) set at a minimum level.

Nevertheless this methodology is subject to much criticism. This includes the arbitrariness of measures such as capital definition, risk weights, and the minimum capital ratio level. Also the use of a minimum capital ratio operationally sterilises capital for loss absorbing purposes; and few risks are recognised; moreover the simple additivity of risk denies the basic tenet of portfolio theory. And elements of national supervisory discretion may continue to frustrate the objective of equitable international competition; some observers claim that such a regime imposes a competitive advantage to the developed countries in the North-South context.

The risk weight assignation of the RAR may also have ramifications for bank management; failure to reflect true risk may lead to distortions in business policy and resource allocation.

### c. Market Assessments of Bank Capital Regulation

The phenomenon of bank common stock abnormal price reaction to the announcement of capital issues (ie issue announcement effects), found in the US, similarly is found in the UK. Available evidence gives some indication of a reduction in the magnitudes of common stock issue announcement effects following the imposition of a minimum RAR regime.

### d. Regulatory Versus Market Views of Capital Adequacy

The analysis of common stock announcement effects in the US by Keeley (1989) suggests that from a regulatory perspective, capital inadequate banks experience a negative announcement effect while capital adequate banks experience a positive effect.

Consideration of the market view of capital adequacy suggests that Keeley's results may be further disaggregated and challenged by the capital structure relevance hypothesis; ie the assumed voluntary, or coerced, nature of the issue in regard to the regulatory view may be qualified by the market's assessment of the adequacy, or inadequacy, of capital. More particularly, the negative announcement effects for regulatory capital inadequate banks discovered by Keeley may represent conflict with the market's view of the banks' capital adequacy.

Conflict, and/or harmony, between market and regulatory views of capital's adequacy is examined by assessing the market view of the adequacy of groups of banks deemed as either capital adequate, or inadequate, under minimum capital standard regulation. Evidence of conflict is observed in some years.

### e. Security Type Issued Predictability and Announcement Effects

A range of potential bank security type issued, predictor variables was defined; and notwithstanding certain challenges to its validity, a predictability model constructed. Superficially, the classification results suggest that investors use publicly available information to forecast the security type issued, and prices accordingly adjust prior to announcement. Nevertheless the hypothesised relationship between the predictability of security type issued and the magnitude of the announcement effect was unable to be tested fully due to lack of data.

## 9.2 CONCLUSIONS

The preceding quantitative and qualitative research has focused on diverse yet inter-related matters and allows a number of conclusions.

### a. Capital Issue Announcement Effect Evidence

US evidence of common stock abnormal returns coincident with capital issue announcements has been strengthened in the banking sector, and extended to the UK context. Similarly, the pattern of abnormal returns based on security type to be issued has been confirmed. In the UK, change in bank capital regulation appears to have some degree of influence on the announcement effects.

Following the work of Shome et al (1986) in the US, it has been demonstrated that the market's view of banks' equity capital adequacy appears to vary in the UK. Also, in the US, the market's view of the adequacy of regulatory defined

capital appears to vary; at times it appears to conflict with the regulatory assessment of adequacy.

This extended evidence of bank capital issue announcement effects provides varying support for a number of hypotheses.

#### b. Relative Announcement Effects

The evidence of relative announcement effects based on security type provides a limited support for the signalling hypothesis of Myers and Majluf (1984) which otherwise has been qualified and diminished by Dybvig & Zender (1988) who reassert the irrelevance of capital structure; but the non-zero evidence contributes further to a considerable body which challenges capital structure irrelevance.

The explanatory power of the predictability hypothesis remains untested in the banking sector, although the methodology for such a test has been specifically developed.

#### c. The Influence of Capital Regulation Pressure

US evidence tends to support the hypothesis that increased bank capital regulation rigour (the imposition of a minimum capital ratio regime) reduces information asymmetry and the signal content of capital issue announcements. This hypothesis finds some degree of support in the UK.

#### d. Market View of Capital Adequacy

The suggestion that banks' regulatory capital adequacy status (in a minimum capital regime) influences the sign of their (common stock) issue announcements effects has been explained in terms of capital structure relevance and information hypotheses; Keeley (1989).

Drawing further on the capital structure relevance hypothesis, this dissertation hypothesises that the coincident views of the regulator and the market on banks' capital adequacy status may provide further explanation. Encouragingly, evidence of both agreement and conflict in views has been assessed.

#### e. Free Banking and Prudential Arguments for Capital Regulation

A survey of current bank capital regulation methodology reveals wide ranging deficiencies; a potential source of cost has been suggested by the above evidence of intermittent conflict with market discipline (ie conflicting views on capital adequacy).

Historical research indicates that bank capital regulation has been used to directly influence bank market competition. No strong conclusions can be drawn about a relationship between bank capital failure and the existence or absence of capital regulation, nor its form. This lends no support to the justification for capital regulation as a form of prudential regulation, at least prior to the introduction of formal deposit insurance. The development of bank capital regulation has also influenced bank costs, risk and capital market efficiency.

### 9.3 RECOMMENDATIONS FOR FURTHER RESEARCH

The foregoing analysis suggests a number of avenues for further research into the cost of bank capital regulation and explanations for capital issue announcement effects.

Some of these require access to appropriate bank data; namely access to US sources. This would facilitate a more complete assessment of the predictability hypothesis considered in Chapter 8. Also, the potential for assessment of the hypothesised issue announcement effects in Chapter 7 appear potentially rewarding in the light of the evidence of conflicting regulatory and market views of bank capital adequacy; such evidence may be pertinent to the validity of the capital structure relevance hypothesis. Also, evidence supporting the Chapter 7 hypothesis would highlight potential costs of conflict between market and regulatory views about the adequacy of bank capital.

The theme of costly conflict between market and regulatory views of capital adequacy, may be further refined by considering capital in terms of its functional definitions. Answers to the question of whether regulatory views of capital adequacy conflict with the market's assessment of the adequacy of some form of functionally defined capital (eg floating charge capital, dated capital etc) may provide a means of monitoring costs stemming from the regulator's particular definition of capital.

The influence of the imposition of more objective bank capital regulation regimes may be more fully considered by also assessing the impact on bank market risk.

The use of bank case study methodology may also complement the foregoing analysis.

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