BANK CAPITAL: DEFINITION, ADEQUACY AND ISSUE ANNOUNCEMENT EFFECTS

VOLUME 2

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ANNEXES

ANNEXES TO CHAPTER 2

ANNEX 2.1

A: Criticisms, Tests and Applications of the REH

Criticisms of the REH have focused upon certain of its assumptions; also, empirical tests been conducted directly, on surveyed expectations data, and jointly via tests of economic models.

Assumptions:

The assumed rational behaviour of economic agents has been criticised by subjectivists. Also, the implication that agents expectations about variables should change when the conditional probability distribution governing the variables changes has been challenged (1).

A further criticism centres on the lack of any description within the REH of how individuals learn about the true probability distribution for the system, from which they calculate the expected value of key variables. As noted by Sheffrin (1983 p14) this criticism is not, in itself, sufficient to challenge the REH.

Nevertheless, Sheffrin acknowledges the view that given the continual flux and increasing complexity of structural changes (eg institutions continuously adapt, government agencies become more complex) how can individuals' expectations depend on the true probabilities governing the system. This criticism hinges on the degree to which the economic system may be described as a stable stochastic system (2).

Survey Tests:

The direct tests for Muthian rationality conducted on survey data comprise four basic types, effectively representing different ways of testing for properties of conditional expectations. Generally, the tests on inflation and interest rate expectations provide results ranging from mixed to unfavourable (3).

Nevertheless, Sheffrin (1983, p22) points out such poor results may be discounted on at least three grounds. Namely, people may not do what they say. Secondly, while surveys are used to determine average expectations, in many market situations the marginal participant plays the key role; even when average expectations are biased and inefficient, a few sophisticated arbitrageurs could make the markets function as predicted by the REH, particularly in markets in which transaction costs are low. Finally, as noted by Prescott (1977, cited in Sheffrin 1983, p23), expectations (like utility) are not observed and surveys cannot be used to test the REH.

Economic Theory Tests:

One can only test if some theory (incorporating rational, or for that matter irrational, expectations) is, or is not, consistent with observations. The problem of joint tests of the REH, as noted eg by Begg (1982 p26), is that a rational expectations model embodies both a particular expectations assumption and an assumption about the structure of the economic model in which the expectations assumption is embedded. If the joint assumption model does not provide an adequate explanation of the data, it is difficult to infer whether this is due to a failure of the expectations

assumption or the assumption about the structure of the model or both.

Macroeconomic Applications:

Although developed by Muth (1961) in a microeconomic context, the REH coupled with an assumed information asymmetry emerged dramatically in the early 1970's as 'structural' parameters of Keynesian macroeconomic models developed an overwhelming instability which confounded forecasting and policy control (eg the emergence of persistent inflation). The title of the new classical macroeconomics or the equilibrium approach to macroeconomics was coined after the publication of a series of key papers (4).

The chief characteristic of the new classical macroeconomics was the assumption that economic agents acted rationally within their environments, and assembled and used information in an efficient manner. The analysis explained real-world business fluctuations in the context of fully worked out equilibrium theories; fluctuations had to reflect real or monetary disturbances, whose dynamic economic effects depended on costs of obtaining information, costs of adjustment and so on, rather than correctable market failures.

Barro (1989) notes that initially the new classical approach focused on explaining why money was nonneutral and, in particular, why monetary disturbances played a major role in business cycles. Theory developed that short term real effects of monetary disturbances could arise from imperfect information about money and the general price level. Lucas (1972, 1973), Sargent (1973), Barro (1976).

Monetary disturbances, which affected the general price level in the same direction, could be temporarily viewed as shifts in relative prices, a misperception that led to adjustments in the supply of labour and other quantities. These real effects vanished in the long run but could persist for a short period because of information lags and costs of adjusting the quantities of factor inputs. Conversely, anticipated monetary changes - which include systematic monetary policies - would not matter, because they did not lead to informational confusions (Sargent & Wallace 1975).

Empirical support for the new classical approach derived from some evidence that monetary disturbances seemed to be major sources of business fluctuation, and that it was mainly the unanticipated or surprise part of monetary movements that mattered for real variables (eg Sargent 1976a). But this is qualified; eg the informational lag in observing money and the general price level did not seem to be very important as noted by Grossman (1989).

Barro (1989) contends that the initial focus of the new classical approach on explaining major short-run nonneutralities of money was misplaced, and the focus has shifted over the past 5 to 10 years from the analysis of monetary shocks towards real disturbances as sources of business fluctuation. He reasons that if information about money and the general price level mattered much for economic decisions, people could expend relatively few resources to find out quickly about money and prices. Also he believes that the inability of the new classical approach to account well for an important role of money in business fluctuations may not be serious, as the empirical evidence for the role of money in business fluctuations appears to be overstated.

B: Formulation of the EMH

Fama (1976) defines an efficient market as one that is "efficient in processing information. The prices of securities observed at any time are based on 'correct' evaluation of all information available at that time. In an efficient market, prices 'fully reflect' available information". Also he notes that...

> 'the ideal is a market where prices are accurate signals for capital allocation ... if the capital market is to function smoothly in allocating resources, prices of securities must be good indicators of value.'

Fama assumes all events of interest take place at discrete points in time: t-1, t, t+1, and so on, and defines the following,

a. Information

The set of information available at time t-1, ϕ_{t-1} relevant (5) for determining security prices at t-1; and ϕ^{m}_{t-1} that the market uses to determine security prices at t-1.
Thus ϕ^{m}_{t-1}, is a sub-set of ϕ_{t-1}, and contains at most the information in ϕ_{t-1} but could contain less.

b. Prices

$P_{j,t-1}$ is the price of security j at time t-1

j = 1, 2, ...,n where n = number of securities in the market

$fm(P1,t+\gamma,...Pn,t+\gamma \mid \phi^{m}_{t-1})$ is the joint probability density function for security prices at $t+\gamma$ ($\gamma \geqslant 0$) that is implied by information ϕ^{m}_{t-1},
and
$f(P1,t+\gamma,....Pn,t+\gamma \mid \phi_{t-1})$ is the "true" joint probability density function for security prices at time $t+\gamma$ ($\gamma \geqslant 0$) that is implied by the information ϕ_{t-1}.

The security prices $P1,t+\gamma,....Pn,t+\gamma$ that appear as arguments in f() and fm( ) are taken to be prices of securities at time $t+\gamma$ plus any dividend or interest payment at $t+\gamma$.

The prices $P1,t-1,...Pn,t-1$ are just the actual prices at time t-1.

c. Price Formation

Fama envisages a process of price formation; starting at time t-1, and on the basis of information ϕ^{m}_{t-1}, the market assesses a joint distribution of security prices for time t, ie $fm(P1t, ...Pnt \mid \phi^{m}_{t-1})$. From this assessment of the distribution of prices at t, the market then determines appropriate current prices p1t-1....pnt-1 for individual securities. The appropriate current prices are determined by some model of market equilibrium; ie a model that determines what equilibrium current prices should be on the basis of characteristics of the joint distribution of prices at t.

d. Efficient Market Hypothesis

The hypothesis that the capital market is efficient is stated as

1)... $$\phi^{m}_{t-1} = \phi_{t-1}$$

ie the information the market uses to determine security prices at t-1, includes all the information available.

Market efficiency also implies that

2)... $$fm(p1t,....pnt \mid \phi^{m}_{t-1}) = f(p1t,....pnt \mid \phi_{t-1})$$

ie the market understands the implications of the available information for the joint distribution of returns.

Since ϕ_{t-1}, the set of available information includes whatever is knowable about the process that describes the evolution of the state of the world through time, equation 1 implies equation 2. Stating the two conditions separately however, emphasises that market efficiency means that the market is aware of all available information and uses it correctly.

Having correctly assessed the joint distribution of prices for t, the market then uses the equilibrium model to set prices at

t-1; the equilibrium model says what the current prices of securities p1t-1,...pnt-1 should be in the light of the correctly assessed joint distribution of security prices for t.

In this sense, both the joint density function $fm(p1t.....pnt \mid \phi^{m}_{t-1})$ and the current prices p1,t-1,....pn,t-1 that are based on this joint density function "fully reflect" all the information available at t-1.

e. Assumptions

Fama concedes that in the description of the price formation, the "market" assesses probability distributions and the "market" sets prices, can only be an accurate view of the world if all the individual participants in the market
a. have the same information and
b. agree on its implications for the joint distribution of future prices.
Nor is it completely realistic to presume that when market prices are determined, they result from a conscious assessment of the joint distribution of security prices by all, or even many, investors.

f. Test Methodology

Need for a Model of Market Equilibrium:

Tests of market efficiency are concerned with whether or not the market correctly uses available information in setting security prices. More particularly, the tests determine whether prices fully reflect specific sub-sets of information.

But in order to be in a testable form the model requires a more detailed specification of how equilibrium prices at t-1 are determined from the market assessed joint distribution of prices at t. (ie a link between $fm(P1t,...Pnt|\phi^{m}_{t-1})$ and $P1,t-1,....Pn,t-1$). Some model of market equilibrium, however simple, is required.

The need for a model of market equilibrium represents a fundamental qualification to any test of market efficiency -

which is simultaneously a test of market efficiency and of assumptions about the characteristics of market equilibrium, ie a joint hypothesis test.

If the test is successful, ie the hypothesis that the market is efficient cannot be rejected, this also implies that assumptions about market equilibrium are not rejected. But if the test is unsuccessful, problems arise of deciding whether this reflects a true violation of market efficiency (the simple proposition that prices fully reflect available information) or poor assumptions about the nature of market equilibrium; Fama (1976 p137), Strong & Walker (1987 p126).

Information Sets:

Fama distinguishes three tiers of informational structure (each successive structure adding information to the previous structure) comprising weak, semi-strong and strong forms of information efficiency.

The capital market is said to be weak form efficient if equilibrium security prices fully reflect the information available in previous share prices, and returns. An immediate consequence of weak form efficiency is that investors will be unable to earn abnormal returns from exploiting any pattern in share prices whether from charting price movements or from an investment strategy employing some mechanical formula base on past prices.

Semi-strong efficient market conditions prevail if prices reflect all information that is publicly available, including the past history of share prices. Semi-strong form efficiency

precludes earning abnormal returns from so called fundamental analysis (ie the study of published accounting reports) and other publicly available information; ie prices adjust fully and instantaneously to the public announcement of an event of interest (eg announcement of a new issue of securities).

Thirdly, the market is categorised as strong form efficient when equilibrium share prices reflect not only publicly available information but also information to which an investor might have monopolistic access (Strong & Walker 1987). In other words, strong form tests include information held only by a sub-set of the market as well as all the publicly available information.
These are individuals or groups (eg fund managers) who are adept at investment selection in the sense that their choices reliably provide higher returns than comparable choices by other investors; evidence of such adeptness would imply access to information not utilised by the market in setting prices, or better ability to evaluate available information - in either case the market is not efficient.

g. Equilibrium Models

A few simple models of market equilibrium have produced many successful tests of market efficiency, or more precisely, many successful joint tests of market efficiency and of the models of market equilibrium.

Models of market equilibrium (asset price determination) have been cast in terms of expected return, of which four basic model types, each a particular efficiency test, have been used in the literature; see Fama (1970, 1976). The distinction between the fair-game (Martingales) and random walk models may

be noted (6).

The models include, ..

i. positive expected returns; eg 'filter' strategies for securities (eg Alexander 1964); used to test chartist claims of market inefficiency, and

ii. constant expected returns; eg check for zero autocorrelations; if the market is efficient there is no way to use any information available at time t-1 as the basis for a correct assessment of an expected value of Rjt which is different from the assumed constant equilibrium expected return E(Rj) (which is unknown).

The tests i. and ii. focus on whether prices fully reflect any information in past prices or returns (weak form efficiency tests). These early tests were followed by more advanced tests which focus on speed of price adjustment to other publicly available information; more particularly information generating events (eg new issue announcements).

iii. Returns conform to the Market Model

This model, based on implications of assumed multivariate normality, is specified in Chapter 6 and used in empirical testing for bank abnormal returns. As noted by Fama (1976), FFJR (1969) was the first study to use the market model as the basis of a test of market efficiency.

iv. Returns conform to a risk-return relationship, ie follow a two-parameter asset pricing model.

This type of equilibrium model is based on the assumption that returns conform to the capital asset pricing model (CAPM) in which the market sets prices at any time t-1 so there is a positive relationship between the expected return on a security from time t-1 to t and the risk of the security. Testable hypotheses include linearity of the risk-return line (between the expected return on a security and its risk in the value weighted market portfolio), and whether the market rewarded only non-diversifiable risk; tests are reviewed by, eg Jensen (1979).

h. Application of EMH

The combination of Fama's concept of information efficiency with a theory of equilibrium price determination provides testable implications for the stochastic behaviour of share prices. Numerous tests of informational efficiency have been carried out along these lines and an overwhelming majority conclude that the stock market is informationally efficient at least regards publicly available information; eg Koh (1989).

From the early 1960s stock market price independence has enjoyed significant academic investigation which has generally confirmed the prevalence of randomness, and the fair game. The findings generally were misunderstood and provoked derision within the community of market participants. And, paradoxically both technical and fundamental analysts maintain their roles within the market. A countercharge emerged that the academic tests have been uni-dimensional and too restrictive and/or simplistic to prove conclusively that price movements cannot be forecast. Nevertheless, as argued by Koh (1989) empirical evidence has yet to demonstrate the existence

of any market inefficiency, and market analysts have yet to provide evidence of consistently significant outperformance. More recently LeRoy (1990) has attributed the feud between "fundamentalists" and EMH advocates to simple misunderstanding (7).

Fama's formulation of information efficiency is still widely used by empirical researchers, with emphasis now focusing on how and at what speed the market reacts to the receipt of various types of information, as well as the limits of informational efficiency exhibited by the market.

C: Criticisms of the EMH

a. General Criticisms

Murphy (1977) argues that the assumptions and the 'efficiency' description may not be close enough to reality. Also, too many 'pockets' of winners have been found to accommodate the strong form of the EMH comfortably.

Other general criticisms of the EMH are typified by Ferguson (1983) who states market efficiency is implausible on the basis of common sense experience and that inefficiency is based on the relative advantages of the individual investor in terms of information, analysis, judgement and idiosyncratic behaviour.
Similarly, Sorensen (1983) highlights the paradox noted by Lorie et al (1985 p80) that in order for the EMH to be true, it is necessary for many investors to disbelieve it; namely, a stock price will reflect what is knowable about a company only if investors seek to make superior returns and analyse relevant information - if that activity were abandoned market efficiency would diminish rapidly.

Abnormal performance based challenges to the EMH are exampled by
Rosenberg, Reid & Lanstein (1985) who use two diverse strategies (book price strategy and specific return - reversal strategy); these achieve abnormal performance and lead to the conclusion of market price inefficiency, and the potential of greater profitability. Also, Treynor & Ferguson (1985) show that past prices, when combined with other valuable information, can indeed be helpful in achieving unusual

profit; nevertheless, it is non-price information that creates the opportunity.

b. Equilibrium Models

The CAPM:

A major criticism of the EMH has stemmed from the problem that its test is a joint hypothesis test with the validity of the equilibrium model, viz the CAPM, which itself is a joint hypothesis; this has encouraged the development of new equilibrium models.

The CAPM itself is a joint hypothesis with that which states the market portfolio is an efficient mean-variance portfolio. Evidence of market inefficiency based on this model has been attributed to the empirical form of the model itself, rather than an indication of market efficiency; eg the Roll Critique (8). Apart from empirical shortcomings (9), other criticisms include the fact that the CAPM is static, not dynamic.

Alternatives:

Alternative equilibrium models developed include the asset pricing model and the consumption model (10). Attention has tended to shift away from the simple CAPM as an equilibrium model of asset pricing. The consumption-based asset pricing model (CCAPM) presents a dynamic construct in which a single estimable parameter measures asset risk; this model has met criticism on matters of data measurement and inconclusive empirical evidence of its usefulness. Recent work nonetheless

presents some support for further research in this area. Tallman (1989) notes that

> 'The intertemporal CAPM and arbitrage pricing theory, though clearly different models, suffer similar empirical difficulties. Neither provides insights into the identity of the multiple sources of asset risk. For arbitrage pricing theory, empirical applications using factor analysis cannot interpret risk sources. But the two models provide a motivation for investigating multiple sources of asset risk.'

c. Information microeconomics:

The nature of information, as a commodity, and the difficulties of creating a market for it have been noted by Arrow (1962); he points to the indivisibility of information and the fundamental paradox in the determination of its demand - its value for the purchaser is not known until he has the information, but then he has in effect acquired it without cost; see Annex 2.3A.

Nevertheless, the microeconomics of information and its arbitrage appears to be accommodated by the EMH. The efficient market, in the sense of information processing, is one in which prices fully reflect available information. A key challenge to the EMH is provided by Grossman & Stiglitz (1976, 1980) who suggest that the price system will never be totally informative as that would destroy the incentive to gather information.

Conventional micro theory previously ignored the potential gain from aggregating information; economic actors were assumed in a sense to be myopic. In forecasting in an uncertain world they only consider what they bring initially to the market and ignore any potential information that may be communicated through prices thus neglecting one of the most important sources of information - the price system; Sheffrin (1983 p117).

In the 1970's, as the topic of expectations excited macroeconomists, informational issues attracted micro theorists. A particular topic which emerged was the issue of market prices revealing information to traders; it was shown how a market clearing price reveals all relevant information; but, in these circumstances, there would be little incentive to collect information; Grossman (1976, 1978). If market prices reveal information to uninformed traders, they get the benefit of information without the cost of obtaining it, while informed traders would no longer collect information as it brings them no advantage; but if no one collects information, then an incentive exists to begin doing so - an equilibrium does not exist as individuals will always want to change their decisions about collecting information.

Grossman and Stiglitz (1976) raise a central question; if markets are perfectly arbitraged all the time, there are never any profits to be made from arbitrage activity, then how do arbitrageurs make money, particularly if there are costs associated with obtaining information about whether markets are already perfectly arbitraged.

An answer is provided by Grossman & Stiglitz (1980). Their model considers identical individuals who may purchase

information about the return on a risky asset. But uninformed traders cannot obtain this information simply from observing the market price, because the authors add an additional source of uncertainty - the supply of risky assets - so the price is a 'noisy' signal. Consequently prices no longer simply convey the information of the informed traders but also reflect information about the uncertain supply of risky asset stock.

Traders decide whether to become informed or not, and in equilibrium a trader is indifferent; informed traders outperform the uninformed but have to pay for the information. Some information is communicated to the uninformed traders by the price signal which is nonetheless 'noisy' and the informed traders maintain a competitive advantage. The greater the proportion of informed traders, the more information conveyed by market prices, and the informed traders lose their competitive advantage; in equilibrium the number of informed traders and the informativeness of the system are simultaneously determined. Nevertheless, the price system will never be totally informative as that would destroy the incentive to gather information. Consequently Grossman & Stiglitz argue that the EMH doctrine is not a coherent doctrine.

Nevertheless, no models of rational expectations equilibria suggest that costless information could be used to make a profit in a financial market; indeed the literature demonstrates the possibility of constructing models in which incentives for information gathering remain without any trader being able to earn excess profits; Sheffrin (1983 p123).

And empirically, a reasonable interpretation of the empirical tests of the efficient market hypothesis is, given that the data is collected at discrete intervals, that the process of

arbitrage already has occurred within the period. Consequently the implication of available information being fully reflected in the collected price data can then be analysed without modelling the process of arbitrage itself and this is the usual assumption in empirical work; Begg (1982 p206), Minford & Peel (1983 p120).

d. Volatility Tests:

Volatility tests are based on a simple premise - forecasts based on conditional expectations should have lower variances (be less volatile) than actual outcomes (11). Volatility tests were developed by Shiller (1981a) and LeRoy & Porter (1981).

The question of whether observed share price volatility, which at times may seem extreme, is a sign of collective irrationality or is consistent with the responses of rational investors to new information has been the subject of a number of studies, the combined evidence of which is to date the most damaging to the information efficiency of the stock market; Strong & Walker (1987 p129). Sheffrin (1983 p142) points out that volatility tests have been extremely provocative because they have generally pointed to market inefficiencies, whereas traditional (orthogonality) tests have not detected these inefficiencies. Samuelson (1989) finds the volatility evidence sufficiently strong to doubt macro market efficiency (although he supports micro efficiency); see Annex 2.2C.

There are at least two possible sources of excess volatility in stock prices; investors could be over-reacting to relevant information, and second they could be reacting to information which is irrelevant according to the efficient markets model;

LeRoy (1990). Roll argues that irrelevant information appears to be of dominant importance; Roll (1984, 1988).

West (1988) reasons that the most important direction for future research on stock volatility is not more volatility tests but development of parametric models to explain the excess volatility, and that the consideration of fads is likely to be productive. Shiller (1989a) comments that while some of the implications of the EMH (that speculative prices always represent the best information about true economic value) are substantiated by data, investor attitudes are very important in determining the course of prices of speculative assets; prices change in substantial measure because the investing public en masse capriciously changes its mind.

e. Mean Reversion

Recent evidence suggests that major stock market indices are mean reverting over long horizons; eg Fama & French (1988), Poterba & Summers (1988). This challenges market efficiency, ie price changes are predictable not random, but also provides support for the conventional wisdom that long investing horizons do call for more equity exposure than short horizons; Samuelson (1989), see Annex 2.2C.6.

De Bondt (1991) notes that the evidence shows that after a three to five year bull market, a future decline is more likely than continued upward movement and, after a major decline, the chances of a rise exceed those of a further decline. Over shorter horizons similar negative autocorrelation in returns occur, but only when the initial price change is extreme; mean-reversion literature is reviewed by De Bondt and Thaler (1989) (12).

De Bondt comments that motivation for the tests stemmed in part from Shiller's convincing evidence that stock prices are excessively volatile, and from evidence in the psychology field that individuals tend to overweight recent data in making forecasts and judgements; Kahneman & Tversky (1973), Grether (1980).

De Bondt (1991) views the mean reversion evidence in the context of a match of the validity of the EMH against a psychological alternative, the overreaction hypothesis (13).

Nevertheless, Fama & French (1986) observe that, in the context of the limitation that tests of market efficiency are joint tests with some model of equilibrium prices, the mean reversion evidence may reflect time varying expected returns generated by rational investor behaviour and dynamic macroeconomic variables.

A particular avenue for arguing that the mean reversion evidence may be consistent with market rationality has been considered in terms of 'smart money' behaviour; De Bondt (1991) argues that market rationality loses force if 'smart money' traders display the same biases as naive subjects in controlled experiments. 'Smart money' groups considered include security analysts; De Bondt & Thaler (1990) find their forecasts of company earnings changes systematically too extreme, ie consistent with overreaction. Economists behaviour is considered by De Bondt (1991) who concludes they make systematic errors; more particularly he observes a lack of predictive power for the direction and magnitude of stock market changes, their predictions amounting to pure error - behaviour consistent with overreaction and the findings of Kahneman & Tversky (1973). Batchelor & Dua (1989b) provide an analysis of economist behaviour based on improved data sources

(14).

f. Alternative Efficiency Definition:

Partly in an attempt to overcome Fama's use of the ambiguous term 'the market', Beaver (1981a,b) advances an alternative definition of information efficiency.

According to Fama (1976) it is the market that assesses the joint probability density function of future prices, and the market that sets current prices. Fama also refers to the 'true' density function of security prices implied by the 'information available'. Strong & Walker (1987) comment that in a world in which individuals have heterogeneous beliefs and differential information, the relationship between the beliefs of the individual and the beliefs of the market, are not well defined; nor, they add, are the concepts of the 'true' density function of security prices, nor the 'information available' vis a vis their use by Fama (1976).

Beaver distinguishes between information system efficiency (n-efficiency), and signal efficiency (y-efficiency). In terms of y-efficiency, a securities market is efficient with respect to a signal yt, if and only if the configuration of security prices {Pjt} is the same as it would be in an otherwise identical economy (ie with an configuration of preferences and endowments) except that every individual receives yt as well as yit (individual i's private signal). In terms of n-efficiency, a securities market is efficient with respect to nt, if and only if y-efficiency holds for every signal (yt) from nt.

As noted by Strong & Walker (1987), this definition allows information efficiency to be considered in terms of specific information functions of interest and represents an alternative to the three level taxonomy used by Fama. Although the Fama taxonomy provides a convenient classification of empirical tests, they note it is nonetheless a crude theoretical partitioning of the information sets of potential interest (15).

FOOTNOTES to ANNEX 2.1

(1). Sheffrin (1983 p12) notes a number of criticisms.

Subjectivists object to the notion of a true or objective probability distribution apart from the beliefs of particular agents; they seen no need for individual probability beliefs to coincide with each other or some outside 'objective' standard.
Lucas (1977) while not disputing the subjectivist (Bayesian) theory of the foundation of probability, argues that the hypothesis that economic agents are Bayesian decision makers, with no way of inferring an agent's subjective view of the future, is of no help in understanding behaviour.

Concerning changes in expectations, Rappoport (1980) using the logic of scientific inference argues that rationality requires classical hypothesis testing to determine if a particular expectation mechanism is no longer consistent with the data. Sheffrin (1983) argues that an expectation formation theory must stand on its own merits, and independently of support from another discipline.

(2). The learning criticism is less robust if the economic system does not undergo significant structural change; economic agents are likely to eventually understand the system. But in circumstances of continual structural change the criticism is less readily challenged. More generally, a key question for positive economics is whether economic systems can, at most times, be described as stable, stochastic systems, as distinct from a stable deterministic system which

may be disturbed occasionally but always returns to a stationary equilibrium - ie system settles to a state of rest until a new shock hits it.

In a stable stochastic system shocks, which follow stable probability laws, are always impinging and the system never settles to a particular state. As long as the shocks follow stable probability laws, the system can potentially be described as being in a stable, stochastic equilibrium.

Sheffrin (1983 p16) notes the question whether economic systems may, 'at most times', be described as stable stochastic is similar, in a philosophical sense, to the question whether there exists, structural change which could not be characterised ex ante by a probability distribution; eg Sargent & Wallace (1976) take the view that it is difficult to talk of shifts in policy - if individuals can assign probabilities to potential policies, then any actual policy is just a realisation from the probability distribution over policies. And, in a practical sense, Sheffrin justifies the use of the phrase 'at most times' by noting that even strong advocates of the REH believe the hypothesis may not be appropriate for times of radical structural change.

(3). Tests for Rational Expectations

Noting the apparent diversity of tests for rational expectations based on survey data, Sheffrin (1983 p18-19) comments that there are in essence four different tests which have been used extensively, viz. unbiasedness, efficiency, forecast error unpredictability, and consistency.

Although the four tests appear dissimilar, Sheffrin notes that they are simple different devices to test whether the reported survey expectations are consistent with being conditional expectations or, more particularly, simply different ways of testing properties of conditional expectations. Conditional expectations must satisfy all four properties.

Batchelor & Dua (1989b) succinctly define the four conditions (albeit using different terms) for rationality and this is reproduced below.

We denote by $f_{i\,t-h,t}$ the forecast made by individual i in the forecast month t-k for some variable, the value of which will be known in the month t. Month t is the target month for the forecast, and h is the forecast horizon. The realised value of the variable is written y_t, and the individual forecast error defined as $e_{i\,t-h,t} = y_t - f_{i\,t-h,t}$. For $f_{i\,t-h,t}$ to be a rational expectation of the mean value of y_t, we require

$$f_{i\,t-h,t} \equiv E(y_t | \Omega_{i\,t-h}) \qquad (1)$$

where $\Omega_{i\,t-h}$ is the information set of individual i at t-h. The information set can be written $\Omega_{i\,t-h} = \{x_{i\,t-h}\}$, where $x_{i\,t-h}$ is a vector of variables known to i at t-h. The information set cannot diminish over time, so

$$\Omega_{i\,t-h} \supset \Omega_{i\,t-h-k}, \quad k>0 \qquad (2)$$

These definitions imply that errors from a rational forecast necessarily obey the following conditions:

- Unbiasedness $E\left[e_{i\,t-h,t} \,\middle|\, \Omega_{i\,t-h} \right] = 0$

- Othogonality $E\left[e_{i\,t-h,t}\, X_{j\,t-h} \,\middle|\, \Omega_{i\,t-h} \right] = 0, \quad X_{j\,t-h} \in \Omega_{i\,t-h}$

- Martingale $E\left[e_{i\,t-h,t} - e_{i\,t-h-k,t} \,\middle|\, \Omega_{i\,t-h-k} \right] = 0, \quad k > 0$

- Convergence $E\left[e^2_{i\,t-h,t} \,\middle|\, \Omega_{i\,t-h} \right] - E\left[e^2_{i\,t-h-k,t} \,\middle|\, \Omega_{i\,t-h-k} \right] \leq 0, \quad k > 0$

The unbiasedness and orthogonality conditions follow directly from (1). They require errors from rational forecasts to have zero mean, and be uncorrelated with information known to the forecaster at the time the forecast is made. The martingale and convergence condition follow from (2). The martingale condition requires changes in errors from successive forecasts to be uncorrelated with information known to the forecaster at the time the earlier forecast is made. Since

$$e_{i\,t-h,t} - e_{i\,t-h-k,t} = -\left[f_{i\,t-h,t} - f_{i\,t-h-k,t} \right]$$

this is equivalent to the requirement that revisions to the forecasts be uncorrelated with variables known at the time of the earlier forecast. The convergence condition requires that the error variance be nonincreasing as the forecast horizon shortens.

Tests of the Livingston survey of inflation expectations provided at best, mixed results: Sheffrin (1983 p20) summarises the studies by Pesando (1975), Carlson (1977), Mullineaux (1978), and Figlewski & Wachtel (1981); also, testing of the Goldsmith-Nagan Bond and Money Letter forecasts of interest rates for rational expectations by Friedman (1980) provided results that were mixed to unfavourable. Note also the use of the Blue Chip Economic Indicators by Batchelor & Dua (1989b); Footnote 14.

(4). Keynesian macroeconomics developed due to the seeming inability of classical economic theory, adhering to the postulates that markets clear and agents act in their own self interest, to explain the characteristics of the business cycle, (ie time series measuring important economic aggregates).

The new classical approach, eg described by Lucas & Sargent (1979), allows the time series correlations while adhering to the classical postulates that markets clear and agents optimise by taking the key step of relaxing the ancillary postulate used in much classical economic analysis that agents have perfect information (eg Lucas 1972, 1973). Agents make their supply and demand decisions based on real variables, including perceived relative prices. But each agent is perceived to have limited information and to receive information about some prices more often than other prices. On the basis of their limited information - the lists they have of current and past absolute prices of various goods - agents are assumed to make the best possible estimate of all of the relative prices that influence their supply and demand decisions.

A powerful criticism of much econometric model building and policy evaluation is provided by the Lucas critique; Lucas (1976). As quoted by Attfield et al (1985 p125), Lucas comments that, ...

> 'if expectations are rational they will be determined by the process governing that policy, the policy regime; and changes in policy regime will alter the precise way in which people form their expectations about policy. Estimated models of the economy which do not allow for changes in

expectations when policy regimes change are therefore likely to be seriously flawed in that they will begin to predict the behaviour of the economy badly whenever a policy regime change occurs. By implication these models should not be used as they often are used to evaluate different policy regimes since it is precisely when a different policy regime is adopted that they become unreliable.'

(5). this includes not only states of the world at t-1 but also whatever is knowable about the process that describes the evolution of the state of the world through time. More particularly, it is assumed that one of the things knowable about the process is the implication of the current state of the world for the joint probability distributions of security prices at future time.

(6). Fair-Game (Martingales) and Random Walk Models

Fair-Game Models:

This genre provides time series models of price behaviour which may be used to test certain predictions of the efficient market hypothesis. A fair-game implies that expectations are not biased, the expected return on an asset equals its actual return. The fair-game model is based on the behaviour of average returns, not on the entire probability distribution. Particular forms of the fair-game used in EMH tests are the martingale and submartingale. The martingale is a fair-game in which tomorrow's price is expected to be the same as today's price, while the submartingale is a fair-game in which tomorrow's price is expected to be greater than today's price.

Or in returns form, expected return conditional on the current information structure are zero, and positive, respectively.

Random Walk:

The random walk model requires stronger conditions than the fair-game or martingales. It posits that there is no difference between the distribution of returns conditional on a given information structure and the unconditional distribution of returns. The random walk's stronger conditions requires all the parameters of a distribution (eg mean, variance, skewness, kurtosis) to be the same with or without the information structure. Also, successive drawings over time must be independent, and taken from the same distribution. More particularly the random walk hypothesis requires all drawings to be independently taken from the same distribution whereas the fair game does not; ie a random walk requires that serial covariances between returns for any lag must be zero, but significant serial covariances of one-period returns are not inconsistent with the fair game. If returns follow a random walk, then the mean of the underlying distribution does not change over time, and a fair-game will result.

Most empirical evidence indicates that security prices do not follow a process that has all the properties of a random walk. This makes sense as the condition that the entire underlying probability distribution of returns remains stationary through time is simply too strong.

As Copeland and Weston (1988) point out, it is reasonable to believe that because of changes in the risk of a firm, the variance of stock returns will change over time. The fair-game model makes no statement about the variance of the

distribution of security returns and consequently the non-stationarity of return variances is irrelevant to its validity.

(7). LeRoy (1990) notes that "fundamentalists", who analyse stock by computing discounted cash flows, focus on the predictable part of prices while EMH advocates, who believe rates of return cannot be forecast, focus on unpredictable returns. LeRoy comments that the mathematical equivalence between the two models guarantees that there is no inconsistency, and that the feud between the two parties is largely based on misunderstanding.

(8). Roll (1977) focuses on the models sensitivity to the true market portfolio proxy. The efficiency of the market portfolio and the validity of the CAPM are joint hypotheses which are almost impossible to test because of the difficulty of measuring the true market portfolio. Roll (1977) points out that the fact that portfolio residuals exhibit no significant departure from linearity merely implies the market index selected was ex post efficient; the only way to test the CAPM directly is to test whether the true market portfolio (of all assets, and unobservable) is mean-variance efficient. Nevertheless, Stambaugh (1982) showed that while tests are sensitive to the selection of assets, inferences about the CAPM are insensitive to the use of several different proxies for the market portfolio.

(9). Two of the better-known anomalies which undermine the CAPM are the January effect and the small firm effect; Keim (1983) shows the effects are related, ie smaller firms outperform larger firms in January. Nevertheless these

anomalies are mitigated when portfolios weight the individual assets by their proportion of total market value as opposed to the standard practice of weighing assets in a portfolio equally; Ritter & Chopra (1989).

(10). A consumption CAPM, Breeden (1979), provides a link between macroeconomic growth models and financial models of asset pricing thus allowing an analysis of asset price determination in a model economy that fluctuates over time. Nevertheless empirical results are mixed; Tallman (1989). Also the arbitrage pricing theory of Ross (1976a) does not require normally distributed returns and suggests that a number of variables, known as factors (risk sources) describe asset returns, in contrast to the traditional CAPM which relies on the return to the market portfolio as the benchmark variable that describes asset return behaviour relative to it.

(11). More generally let Pt* be the variable to be forecast. Then the optimal forecast is given by $Pt = E[Pt^* \mid It-1]$. Let ul denote the forecast error, which by the orthogonality principle, must be uncorrelated with the forecast Pt.
Thus, $Pt^* = Pt + ut$ and taking the variance of both side,

$$var(Pt^*) = var(Pt) + var(ut)$$

or $var(Pt^*) \geqslant var(Pt)$ since $var(ut) \geqslant 0$.

(12). In reviewing these studies, De Bondt and Thaler (1989) note that an early study, Fama (1965), presented contemporaneously 'strong' evidence in favour of the random walk hypothesis. Fama suggested that stock prices were unpredictable based on simple short-run correlations using data bases that, by today's standards, appear small; viz day-

to-day price changes of the 30 stocks composing the Dow Jones Industrial Average over 1957-62. Although statistically significant positive serial correlation were found, Fama concluded that the serial correlations were too small to be of economic significance.

Nevertheless, De Bondt & Thaler comment that different patterns emerge over a longer time period and a greater number of stocks; eg French & Roll (1986) repeated Fama's tests for all NYSE and AMEX stock over 1963-82 and find significant negative serial correlation in daily returns.

Similarly, Fama & French (1988) obtain strong evidence by considering monthly data over 1926-85 for NYSE listed firms in terms of equal-weighted, and value-weighted indices, as well as portfolios based on firm size criteria. They regress the index return over some time period on those for the prior period of equal length - if prices are a random walk, then the slope in the regression should be zero and, if prices are mean-reverting the slope should be negative. The slopes of the regression are generally negative from 18 months to 5 years with the goodness of fit and slope increasing with the length of the horizon up to five years then decreasing. The slopes are more negative for portfolios of smaller firms and for the equal-weighted index than for the larger firms or the value-weighted index. Also, mean-reversion appears to have declined in more recent decades.

Poterba & Summers (1988) use a variance ratio test. As noted by De Bondt & Thaler, this utilises the fact that ...

> 'if the log of stock prices follows a random walk, then the return variance should be proportional to the return

> horizon. That is, the variance of monthly returns should 1/12 of the variance of annual returns, which in turn should be 1/5 of the variance of 5 year returns. The variance ratios are scaled so that if the returns are uncorrelated the ratios equal 1.0. A variance ratio of less than unity implies negative serial correlation, while a ratio greater than one implies positive serial correlation.'

Poterba & Summers (1988) confirm the results of Fama & French, both for real returns and returns in excess of a Treasury bill yield. Also they find that mean reversion is more pronounced in less broad-based and less sophisticated foreign equity markets.

(13). De Bondt (1991) notes that the overreaction hypothesis allows temporary disparities between prices and fundamentals, on the basis that ...

> 'prices "misbehave" because many "noise traders" violate Bayes Theorem and overreact to new information ... (while) ... rational "information traders" can do little to counter the behaviour of noise traders'.

Nevertheless, they may not desire to; De Long et al (1990) note that it is usually assumed that rational speculation dampens fluctuations caused by 'noise' traders. But, this is not necessarily the case if noise traders follow positive-feedback strategies (ie buy when prices rise and sell when

they fall).
In such circumstances it may be rational for speculators to 'jump on the bandwagon' rather than against the trend; rational speculators who expect some future buying by noise traders buy today in the hope of selling at a higher price tomorrow. And purchases by rational speculators can make feedback traders even more excited and move prices further away from fundamental values.

Consequently prices overshoot, but eventually are corrected as actual future events predictably turn out to be more, or less, well than originally thought. De Bondt (1991) also comments that such price behaviour explains the profitability of contrarian strategies which argue that stock market 'losers' are much better investments than prior 'winners'; see De Bondt & Thaler (1985).

(14). Noting that previous survey tests appear to be based on the idea that the performance of specialists sets an upper bound on the degree of rationality that may be expected (vis a vis other agents in the economy), Batchelor & Dua (1989b) test for rationality in the forecasts made by economists who contribute to the Blue Chip Economic Indicators consensus forecasting service; this provides data with certain relative advantages vis a vis some other surveys, eg forecasts are reported for each individual forecaster rather than an average, and forecasts are made repeatedly for fixed target dates rather than for a fixed forecast horizon. Batchelor & Dua find differences among the abilities of the individual forecasters, and note that some variables (viz GNP growth and interest rates) are forecast rationally by more forecasters than are others, most notably inflation. Also, the most common source of inefficiency in individual forecasts of one variable

is failure to correctly incorporate information contained in the current forecasts of the same individual for other variables. In further considering deviations from rationality they find that a forecast is more likely to be rational if it is based on mainstream economic theory, and also if it does not come solely from an econometric model- but incorporates a substantial element of forecaster judgement.

(15). Strong & Walker (1987) also note the question of information efficiency with respect to information to be released in the future. They cite two papers on this matter. The one, Milgrom & Stokey (1982), contrasts the general 'static rational expectations model' with a 'dynamic rational expectations model' in which there are markets both before and after traders receive information. The other, Rubenstein (1975), defines the necessary and sufficient conditions for 'new information' to be reflected in prices albeit for a rather specialised economy.

ANNEX 2.2

A: Samuelson (1965)

Proof that Commodity Futures Prices follow a Random Walk

Samuelson (1965) proof: (in Sheffrin 1983, p 125). Inspired by the evidence that market prices followed a random walk, Samuelson proved that under certain assumptions, namely a property of conditional expectations, futures prices for commodities would exhibit a random walk.

The proof rests on one fundamental property of conditional expectations. Consider an individual at time t, who forecasts the price of a stock, P_T, several days ahead in the future, and his forecast is the conditional expectation of the price;

$$\text{today's forecast} = E[P_T | I_t] \qquad T > t$$

The next day, the individual's next forecast is also his conditional expectations

$$\text{tomorrow's forecast} = E[P_T | I_{t+1}] \qquad T > t+1$$

At time t the forecast the individual will make tomorrow is a random variable because new information will be available between today and tomorrow.

Conditional Expectation:

Because these forecasts are conditional expectations they will have the following property:

Today's expectation of tomorrow's forecast equals today's forecast, ie

$$E\{E[P_T | I_{t+1}] I_t\} = E[P_T | I_t]$$

Intuitively, although new information will be available tomorrow to improve the forecast, the best guess of what the information will be is already embodied in today's forecast.

Key Assumption:

Thus today's best guess of tomorrow's forecast is simply today's forecast - a fundamental property of conditional expectations.
Samuelson's proof that future prices fluctuate randomly rests on this property.

Using this property, Samuelson makes the key assumption that the market sets futures prices equal to the conditional expectation of the spot price at the closing date of the contract.

This assumption can be expressed, letting F(t,T) stand for the price at time t for future delivery of a commodity at time T,

$$F(t,T) = E(P_T | I_t)$$

Similarly, tomorrow's price F(t+1,T) is

$$F(t+1,T) = E(P_T | I_{t+1})$$

Proof:

Samuelson proves that the expected gain from holding a future contract from period t to period t+1 is zero.

$$E[F(t+1, T) - F(t, T) | I_t] = 0$$

The gain from holding a contract one day is F(t+1, T) - F(t, T); the theorem says that the expected gain from holding the contract is zero. This implies that futures prices have the martingale or 'fair-game' property.

The proof is an immediate application of the property of conditional expectations previously outlined. Substituting the expressions for the futures prices

$$E[\, F(t+1, T) \,|\, I_t \,] = F(t,T)$$

or, $$[F(t+1, T) - F(t, T) \,|\, I_t] = 0$$

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.

B: Samuelson (1973)

Derivation of the Martingale Property of Stock Prices

Samuelson (1973) (in Strong & Walker 1987, p123) combined two basic assumptions, the one equivalent to an ideal market with the other that the price of a security at any time is equal to the market's expectations of all future dividends discounted at a constant rate to give

$$Pjt = \sum_{T=1}^{\infty} Et\ [\tilde{x}jt+T\ /\ (1 + rj)^{T}\ ]$$

where

rj is the discount rate appropriate to security j,

Pjt is the equilibrium price of security j at time t+T,

$\tilde{x}jt+T$ is the uncertain dividend paid on security j at time t+T, and

Et is the expectation conditional on information available at time t.

On the basis of these assumptions, Samuelson was able to derive the martingale property of stock prices and the importance of his contribution was to demonstrate that such apparently erratic price behaviour is to be expected in ideal markets. If prices reflect all currently available information and change to their new equilibrium values immediately and only on the receipt of new information then price changes will be uncorrelated (Strong & Walker p124).

C: Samuelson (1989)

The Judgement of Economic Science on Rational Portfolio Management: Indexing, Timing, and Long-Horizon Effects.

Samuelson recalls his 1974 paper, titled "Challenge to Judgement" in which he challenged discretionary portfolio selection, and reviews the basis for his challenge largely in terms of market efficiency evidence, and with special reference to the special influences of timing and long-term horizons.

1. The 1974 Paper:

The 1974 paper was based on the fact that the vast preponderance of pre-1974 evidence suggested that

i. The security industry does not on the average perform quite as well over time as an indexed portfolio; ie one that passively holds stocks in proportions approximating their respective market capitalisations.
ii. The lucky money managers, who happen in any period to beat the comprehensive averages in total return, seem primarily to have been merely lucky.
iii. If money managers do not on the average deliver superior performance , and if high turnover of selections merely generates high transaction costs (explicit brokerage costs and hard-to-calculate other costs), then a buy-and-hold program of broad diversification is the preferred strategy.
iv. The findings of economic science in 1974 did not, in Samuelson's interpretation, provide either deductive proof or cogent empirical evidence that security markets were so 'strongly efficient' as to make it implausible that any

persons or methods could beat the odds on a risk corrected basis.

2. Subsequent Findings

Reviewing developments since 1974, Samuelson comments that the case for efficient markets is a bit stronger. 'Out of the thousands of published and unpublished statistical testings of various forms of the hypothesis, a few dozen representing a miniscule percentage have isolated profitable exceptions to the theory.'

He notes a few not-very-significant apparent exceptions to the micro-efficiency of markets. These are exampled by, ...

i). Closed-end funds that sell at a discount to asset value may give the calculating investor a slim edge.
ii). Small stock have risen relative to large capitalization in January for several years. Mondays fare differently from Fridays. Opening and morning price movements have been observed to differ from late-day movements. Perhaps as fast as people recognize these oddities and begin to act on them, they will disappear as systematic effects.
iii). Occasionally, and particularly in emergency times, arbitragable price discrepancies appear on the screen. Quick small killings may then be possible.
iv). A few hundred trend-following traders may display a genuine knack for earning super-normal profits.

Samuelson also allows a very few money managers with remarkable talents may also provide exceptions to efficiency. He cites some of the few, including Warren Buffet, John Templeton, and John Tudor Jones. He concludes that,..

> 'a thousand to ten thousand money managers all look about equally good or bad. Each expects to do 3% better than the mob. Each has put together a convincing story. After the fact, hardly ten out of ten thousand perform in a way that convinces an experienced student of inductive evidence that a long-term edge over indexing is likely. ... it may be the better part of wisdom to forsake search for needles that are so very small in haystacks that are so very large.'

3. Time Diversification Versus Genuine Diversification:

Samuelson notes a common trap for those who advocate market timing investment policy; random diversification across time (time diversification) is an inefficient way to diversify as compared with genuine diversification.

He stresses the difference between diversification across time and diversification during each time period; the former involves a lowered risk-corrected mean return. That is, moving the whole fund from one investment to another during the time period (diversification across time) is inefficient compared to genuine diversification (holding the fund in diverse investments during the time period).

4. Macro Versus Micro Market Efficiency:

Samuelson believes the balance of evidence is strongly in favour of considerable market efficiency at the micro level. He comments that ... 'A security's price is always bid to a level from which we must expect it could subsequently either rise or fall.' .. and cites the martingale property of an efficient market (as against a 'sure-to-rise' property) ; see his 1965 deductive enunciation of this prior discounting theorem in Annex 2.2A.

Nevertheless, he is prepared to doubt macro-market efficiency, which gives 'hope' (but no guarantee of net success) for a rational approach to timing. He notes two distinct camps of economic scientists on this matter; the one views the market as always in equilibrium (eg Fischer Black), while the other, with which he sides, perceives a market capability to generate self-fulfilling oscillations above and below any fundamentalist's discounted dividend parity (eg Shiller).

5. Mean-Reversion Patterns:

Samuelson acknowledges some recent belief in deviations from the strict random walk dogma based on mean-reversion patterns of negative serial autocorrelations observed over time horizons as long as a few years; Porterba & Summers (1988), Fama & French (1988). He comments that if mean reversion is truly significant, modification is required in certain dogmas of rational behaviour.

Nevertheless, this mean-reversion evidence also provides a basis of support for the scientific case for long-run equity investing; see 6.c.i below.

6. Long-Horizon Effects:

6.a Rational Age Effects on Risk Taking;

Samuelson observes that conventional wisdom answers in the affirmative to questions such as, ...

i. As you grow older and the time horizon of your investing shortens, should you rationally cut down on your exposure to lucrative but risky equities.
ii. When you are young with many chances ahead to recoup any transient losses, can you afford to take a 'businessman's risk'.
iii. College endowments and portfolios of permanent foundations, expecting to be operating and growing virtually forever, by the same logic largely ignore short run riskiness and invest heavily in common stocks with high average mean returns, relying on 'diversification over time and the cancellations of repeated chances in the Law of Large Numbers'?

6.b Samuelson's Initial Rejection

Nevertheless, Samuelson notes that, like so much conventional wisdom, such dogma as yet lacks scientific validation.

Samuelson (1969), investigating rational life-cycle investing for those who maximise expected utility and who possess constant-relative-risk aversion, derived the surprising theorem that an elderly person with a few years to go should hold exactly the same fraction of wealth in risky (random walk) stocks as he did when young, and as the young do now. In

other words, rational investors should be myopic, ignoring the length of their time horizon; this is a specific denial of the conventional wisdom.

Samuelson reached this conclusion on the basis that repeated investing over many periods does not cause risk to wash out in the long run. For instance, insurance companies do not eliminate total risk by insuring more and more ships.

This is addressed in Samuelson (1963) which, considers the fallacies of interpreting the Law of Large Numbers, and shows that each new independent risk adds to the absolute total of risk. But total absolute risk grows as the square root of the number of independent ships insured and not in proportion to their numbers. It is the subdividing of risk by bringing in new members to the insuring syndicate that, together with bringing in of new independent ships, does reduce the relative riskiness per dollar.

More particularly, $\sqrt{N}$ does grow with N; but making the denominator in Total Riskiness/Total Number of Insurers be proportional to N does produce $\sqrt{N}/N$, which does decline like $1/\sqrt{N}$ toward zero). Samuelson also notes that there is a misleading spurious parallel between the decline of $\sqrt{N/N}$ with time horizon and the decline with $\sqrt{N}$ of the variance of a portfolio's mean annual return with N. For independent probabilities, Variance [log(mean annual return)] $\rightarrow 0$ as $1/\sqrt{N} \rightarrow 0$. Nevertheless, the dispersion of my terminal year's log Wealth, $\mathrm{Var}[\log W_N]$, does rise with N in proportion to N and, ceteris paribus, that does lower my $\mathrm{Exp}[U_N(W_N)]$.

Thus, concludes Samuelson, the diversification over time achieved by a pension fund (or young person) when investing over many periods cannot cancel, or effectively reduce, the

dispersion of wealth outcomes that occurs at distant dates in the future.

6.c Loopholes for Reverting to Conventional Wisdom

Samuelson establishes three bases for accepting conventional wisdom.

i. Equity Exposure

Samuelson notes that his rejection is based on equity markets that are truly random walks. But the evidence of Poterba & Summers (1988), Fama & French (1988), Modigliani & Cohen (1979),
Tobin & Brainard (1977) and others that over long periods of time, epochs of strong equity returns tend to be followed by epochs of weak, and vice versa, allows him to deduce some rational basis for the conventional wisdom according to which long investing horizons do call for more equity exposure than short horizons.

Samuelson (1988) demonstrates that, when equity return rates of one 5 year period are negatively correlated with those of the last such period, extreme runs tend to be self-cancelling. This makes the wealth outcomes at the end of a long horizon bunch up around their middle in comparison with the lognormal outcomes of the random walk.

Paradoxically, he notes, such a bunching around the middle does not compel all risk averters to plunge more heavily into equities. For risk-averse investors who maximise the expected value of their utility, (which happens to be the logarithm of their wealth - a la 1738 Daniel Bernoulli), the time horizon

turns out to be no matter at all - both in the Poterba-Summers rebound model and the random walk model.

Nevertheless, the bulk of empirical evidence (cross sectional and time series) is that real-life investors are more risk averse than Bernoulli. Instead of having a utility function like log (Wealth), their behaviour is better rationalised by a hypothesis something like, ...

$$U(W) = -1/W \text{ or } -1/W^2$$

Samuelson notes that when he calculates for (- 1/W) the one-period and two-period optimal equity shares in the rebound case, he deduces that the longer time horizon does mandate some greater tolerance for lucrative but risky stocks. QED. Long time-horizon risk-taking is thus justified.

He adds that the intuitive reason for the result is that a bad outcome for his equities in a pre-ultimate period just ahead is not so bad as it shifts the odds towards a remunerative rebound, a consideration that relieves equity exposure of some of its abhorrent short-run riskiness.

ii. Focus on Terminal Wealth

Samuelson also establishes a second rational basis for being more risk-tolerant when young than when old, which holds even in a random walk world.

He notes the argument that a very long term investor (namely a pension fund with a fairly sure net growth and little need for liquidity for redemptions) ought to be able to tolerate more riskiness, in the sense that many short-run ups and downs can

be expected to actuarilly cancel out.

That is, cannot the fund aim at every point in the short run to be on the Markowitz efficiency mean-sigma frontier at a higher-mean and higher-variance location, relying actuarilly on ending (for its long run participants) on a high-mean-low-variance point that is not-attainable by short run investors subject to irreducible liquidity returns.

Initially Samuelson doubted this. Under time-independent probabilities, variance does not cancel out even in the longest runs (instead growing proportional to time). Samuelson put forward his (1969) finding that any investor with constant- relative-risk aversion and facing a random walk world is deduced to choose rationally the same equity fraction in his portfolio when aged 30 as when aged 65 and almost ready to retire. That is, if his U(terminal W) is like log W, the Samuelson results of zero age effects on equity fraction is vindicated.

But the original argument is supported, if it is supposed that the individual's utility of terminal wealth at age 70 is all he cares for; ie, if it is supposed human nature is such that we are each most anxious not to fall below a 'subsistence' level of terminal wealth - so that log(W-S) and not log W is the utility whose Expected Value we seek to maximise.

In other words in such circumstances the individual is concerned to get the probability distribution of such terminal wealths that is most desirable: high mean, low dispersion about the mean, and so forth. Older people will put less into risky stocks when they have fewer years to go before the terminal date of retiring or bequeathing.

Samuelson (1988) explains this truth by pointing out that the present discounted value of the terminal subsistence wealth, which is $S/(1+i)^T$, must in effect be put into escrow in the form of safe cash or money market funds. As T,the time left in the horizon shrinks, $S/(1+i)^T$ will rise, thereby displacing from one's equity portfolio a larger and larger fractional share.

iii. Opportunities of the Young for Compensation

Bodie & W.F.Samuelson (1989) simultaneously developed a quite different third basis for greater risk tolerance on the part of a worker when young than when old. Their theorem holds even in a random-walk world and rests on the greater opportunities of the young to compensate for risky outcomes by working harder or less hard.

Consider the individual who can work hard or less hard. An extreme example is provided by the Alfred Marshall case where the individual's marginal utility of leisure happens to be constant.
He always works up to the point where he consumes the same market baskets of consumption goods - that precise amount that brings his marginal utility of consumption to equality with his unchanged marginal disutility of work. In this extreme case, any extra dollar of rentier wealth entails no extra consumption of goods, instead causing only leisure to rise.

When young the individual can dare to plunge heavily in high-mean, high-variance equities, because if luck turns out bad and he loses principal, he can and will always choose to work enough more to keep his consumption up. Nevertheless, he cannot subtract further from leisure when it all has been

usurped by work; beyond that point Marshall's extreme case of marginal disutility that is constant, is lost.

Samuelson considers two particular cases. If an individual has already determined his final years supply of labour, then as a very short term investor, he must be wary of putting too much in equities lest by bad luck he is unable to afford his minimum of subsistence. Secondly he considers a younger brother with 2 years to go in making his penultimate decision on the fraction to put into stocks. The younger brother realises if bad luck leaves him with low principal as he comes to his final year, he can plan to compensate by supplying more labour. The consequences to him of a loss from a lucrative gamble are seen to be less.
And rationally the younger brother puts a larger fraction into attractive-but-risky equities than does the older brother.

ANNEX 2.3

Arrow and Debreu Contributions

A: Arrow (1962)

Economic Welfare and the Allocation of Resources for Inventions

(Information Markets)

Information as a Commodity:

Arrow (1962), writing in the context of economic welfare and resource allocation, notes that uncertainty usually creates a particular problem in resource allocation - information becomes a commodity. Information will frequently have an economic value, in the sense that anyone possessing the information can make greater profits than would otherwise be the case. Arrow describes information as an observation, made in a certain part of the economy, whose outcome - if known - would affect anyone's estimates of the probabilities of the different states of nature. Such observations arise out of research, as well as from the course of daily economic life as a by-product of other economic activities.

Although information is traded, as evidenced by the many economic institutions for information transmission, the problem of the optimal allocation of information arises in many instances.

The cost of information transmission is frequently very low, and at zero cost optimal allocation would call for unlimited

distribution of information without cost. Arrow points out that a given piece of information is by definition an indivisible commodity, and the classical problems of allocation in the presence of indivisibilities will occur.

The information owner should not extract the economic value if optimal allocation is to be achieved; but to some small extent he is a monopolist and will seek to take advantage of this fact.

Nevertheless, without special legal protection, the owner cannot
simply sell information on the open market - any one purchaser can destroy the monopoly by reproducing the information at little or no cost. Consequently, the only effective monopoly would be the use of the information by the original possessor. But, Arrow concludes that this will be socially inefficient, and also may not be of much use to the information owner if he, or she, cannot exploit it as effectively as others.

Suitable legal protection may allow information to become an appropriable commodity, and consequently the exertion of monopoly power. But no amount of legal protection can make a thoroughly appropriable commodity of something so intangible as information; the productive use of information is bound to reveal it, at least in part.

The Market for Information:

Arrow also points to the difficulties of creating a market for information if one should be desired for any reason. He notes problems with properties of demand for information. Arrow notes, firstly,..

'.... the use of information is certainly subject to indivisibilities; the use of information about production possibilities for example, need not depend on the rate of production.'

and secondly,...

'there is a fundamental paradox in the determination of demand for information; its value for the purchaser is not known until he has the information, but then he has in effect acquired it without cost. Of course, if the seller can retain property rights in the use of the information, this would be no problem, but given incomplete appropriability, the potential buyer will base his decision to purchase information on less than optimal criteria. He may act, for example, on the average value of information in that class as revealed by past experience. If any particular item of information has differing values for different economic agents, this procedure will lead both to a nonoptimal purchase of information at any given price and also to a nonoptimal allocation of the information purchased.'

Arrow comments that from the standpoint of efficiently distributing an existing stock of information, the difficulties of appropriation are an advantage, provided there are no costs of information transmission, as then optimal

allocation calls for free distribution.

He concludes that costs of transmitting information create allocative difficulties which otherwise would be absent. Also, information should be transmitted at marginal cost, but then the demand difficulties, already cited, will exist. He finally remarks that there is a strong case for centralised decision making under these circumstances.

B: Arrow (1963)

Insurance, Risk and Resource Allocation

(Insurance and the Moral Hazard)

The third of his series of Yrjo Jahnsson lectures, 'Aspects of the Theory of Risk-Bearing', delivered in 1963 in Helsinki, and published in Arrow (1970).

Arrow describes insurance as exchange of money now for money payable contingent on the occurrence of certain events. He notes that the shifting of risks, the very essence of insurance, occurs in many forms in the economic system but always with some limits which hobble the economic system. Nevertheless, examination of insurance shows strong reasons for its being limited to such a relatively narrow field. Arrow reasons that by understanding the restrictions on the insurability of risks, the reasons why the economic system in general is so limited in its risk-bearing ability can better be understood.

Risk Shifting Limitations:

Arrow notes the universality of risks in the economic system and, focusing on the capitalist economic system, that the owner of a business typically is supposed to assume all the risks of uncertainty - paying out unexpected losses and enjoying unexpected gains. Nevertheless, society has long recognised the need to allow him to shed some of the risks. 'A man's capacity for running a business well need not be accompanied by a desire or ability for bearing the accompanying risks, and a series of institutions for shifting risks has evolved.'

While insurance itself represents an early example of such institutions, Arrow comments that others have emerged including importantly, the market for common stock; this allows the owner to divest himself of some risks by allowing others to share in the benefits and losses. And,...

> 'Since each individual could now own a diversified portfolio of common stocks, each with a different set of risks attached, he could derive the benefits of a reduced aggregate risk through pooling; thus, the stock market permits a reduction in the social amount of risk-bearing.'

Apart from explicit risk-shifting institutions, such as insurance and stock markets, Arrow discerns the universal presence of risk, even if implicitly, in any contract requiring performance in the future.

He cites the case of cost-plus contracts, such as when the government purchases very large and expensive items and agrees to beforehand reimburse the producer for all his costs, whatever they may be, plus an agreed profit. Arrow views this contract as comprising two contracts, the one a fixed-price contract of the usual commercial type, and the other an insurance contract by which the government agrees to reimburse the manufacturer for his unexpected costs.

Arrow notes the ideal arrangement, facilitated by the introduction of any risk-shifting institutions wished for (ie expanding from the confinements of the historically developed institutions). The individual could find a market in which any

economically relevant event could be insured against. The individual should be able to bet, at fixed odds, any amount he wishes on the occurrence of any event which will affect his welfare in any way. The odds, or premium, on the insurance should be determined as any other price so demand and supply are equal.

The incomplete shifting of risks causes problems recognised by society and solved in different ways. Arrow cites the example of an individual needing a physicians care but uncertain of the quality of medical care he will get; he is further unable to
buy insurance against poor quality of care. Society has met this problem by requiring the licensing of physicians; uncertainty is reduced by a special process of information gathering and, at the same time restriction of entry. Nevertheless, it is not left to the market to discriminate among different qualities of physicians.

A further solution is exampled by bankruptcy and limited liability laws which, in effect, require creditors to assume some of the risk of the debtor. The laws do not leave the creditor free to negotiate a risk-free investment, and it provides for an inalienable limitation of risks to the debtor. The law thus steps in and forces a risk-shifting not created in the market place.

Arrow also notes the expansion of the scope of direct authority as a solution to the market limitations to risk-shifting. He cites the example of large integrated business organisations; rather than pay large premiums for insurance against critical delivery delays from outside suppliers, there is a tendency towards vertical integration.

Although the failures of the market to achieve adequate risk-shifting leads to compensatory adjustments in social institutions, licensing, bankruptcy and limited liability, and large business organisations, this falls short of the free working of the price system, and leads to a diminished use of prices, even in contexts where they would be most useful in bringing about a careful and flexible confrontation of needs and resources.

Insurance Limitations:

After noting market limitations to the shifting of risks, Arrow examines the workings of the insurance sector and asks why the economic system has not developed a more completely adequate set of markets for risk-bearing.

Firstly he notes that many risks are classified as 'uninsurable'; eg Lloyds of London insure many risks that many insurance companies will not.

Secondly, insurance is frequently limited as to amount; eg insurance against property loss is invariably limited to the amount of the actual loss. This is relevant because if the loss is a purely random affair, the insurance company is engaging in a bet; if it finds the odds satisfactory there is no reason why it should not take as much of the bet as the insured wants - provided any individual policy is still relatively small compared to the company's total resources.

Thirdly, direct controls over the insured form a further limitation; eg in the case of life insurance the insured must submit to medical examination, fire insurance may involve the inspection of premises and agreement to certain precautions.

Moral Hazard:

A major reason for these limits, from Arrow's perspective (he acknowledges that insurance literature discusses many others), is the moral hazard. The insurance policy might itself change incentives and therefore the probabilities upon which the insurance company has relied. In this context, a fire insurance policy for more than the value of the premises may represent an inducement to arson or at least carelessness.

Arrow comments that the principle of moral hazard explains the limitations of both insurance in particular and risk-shifting through the market in general. He notes that,...

> 'The problem is that the insurer, or more broadly, the risk bearer cannot completely define his risks; in most circumstances he only observes a result which is a mixture of the unavoidable risk, against which he is willing to insure, and human decision. If the motives of the insured for the decision are to reduce loss, then the insurance company has little problem. But the insurance policy may, as we have seen, lead to a motive for increased loss, and then the insurer or risk bearer is bearing socially unnecessary costs. Either he will refrain from insuring or he will resort to open inspection and control, to make as certain as he can that the insured is minimizing all losses under the latter's control.'

C: Arrow (1964), Debreu (1959)

(Complete Capital Markets)

Copeland & Weston (1988, p110) note the contribution of Arrow and Debreu to the formulation of pure securities and complete capital markets.

The formulation of a complete capital market draws upon state-preference theory and the concept of a pure security.

State Preference Model:

In the state-preference model, uncertainty takes the form of not knowing what the state of nature will be at some future date. To the investor, a market security represents a set of possible pay-offs each of which is associated with a mutually exclusive state of nature; the exact pay-off is established when the uncertain state of the world is revealed. Consequently, a market security represents a claim to a set (or vector) of state-contingent payoffs.

In principle there can be an infinite number of states of nature, and therefore an infinite number of end-of-period pay-offs for a risky asset. This set of states must meet the critical properties of being mutually exclusive and exhaustive; ie one state of nature alone will be realised at the end of the period, and the sum of the probabilities of the individual states of nature occurring equals one.

Pure Securities:

The concept of a pure security facilitates the extension of microeconomic analysis, from the generalisation of timelessness and certainty, to a multiperiod economy under uncertainty with securities markets.

Pure, or primitive, or Arrow-Debreu securities, were first specified by Arrow (1964) and Debreu (1959). A pure security is defined as one that pays $1 at the end of the period if a given state occurs and nothing if any other state occurs. This concept allows the disaggregation of market securities into portfolios of pure securities; any market security may be considered a combination of various pure securities.

A market security thus consists of a set of pay-off characteristics distributed over states of nature; the complexity of this may range from numerous payoff characteristics in many states to no payoff at all except in one state.

Complete Capital Markets:

In the state-preference context, uncertainty about market securities' future values is represented by a set of possible state-contingent payoffs. Linear combinations of this set of state-contingent market security payoffs represent an individual's opportunity set of state-contingent portfolio pay-offs.

The market is said to be complete when the number of unique linearly independent market securities is equal to the total number of alternative future states of nature.

In a complete market, and assuming the market is perfect, any pattern of returns can be created. In particular, a complete set of pure securities can be created as linear combinations of existing market securities.

The pure securities may be obtained, via linear algebra, from any arbitrary complete set of market securities; once formed, any
other security may be replicated from a linear combination of the pure securities.

Copeland & Weston note that, under such complete market conditions, uncertainty about the value of future wealth may be reduced to zero, regardless of which uncertain future state of nature actually occurs. In other words, by dividing wealth in a particular way among the available securities, it is possible to construct a portfolio that is equivalent to holding equal amounts of all the pure securities. This portfolio would have the same payoff in every state even though the payoffs of individual securities varied over states.

Although a complete market may appear to require an unreasonably large number of independent securities, Copeland & Weston point out that Ross (1976b) has shown generally that an infinite number of linearly independent security and option payoffs can be formed from a small number of securities - if option contracts can be written on market securities and market securities have sufficiently variable payoffs across states.

(General Equilibrium):

The above work on complete capital markets by Arrow and Debreu was preceded by their proof of the existence of an equilibrium for a competitive economy; Arrow & Debreu (1954).
Koutsoyiannis (1979 p485) notes the contribution of Arrow and Debreu,

- Partial Equilibrium

Economic Analysis developed along a partial equilibrium approach, focusing on an isolated segment of the economy. This ceteris paribus approach, also known as the 'Marshallian Approach' after Alfred Marshall, who used it as his basic method of analysis in his 'Principles of Economics (Macmillan 1920). Under this methodology each market is regarded independently of others; price and quantity in each market is determined by demand and supply curves drawn on the ceteris paribus assumption.

Nevertheless, this approach neglects the interdependence among the constituent parts of any economic system. Commodity and productive factor markets are interrelated, and the price in all markets are simultaneously determined.

- General Equilibrium

An earlier general equilibrium model was developed by the French economist Leon Walras in his Elements of Pure Economics:
Elements d'Economie politique pure (Lausanne, 1874). First translated in English by William Jaffe (Allen & Unwin, 1954).

Arrow and Debreu (1954) provided a proof of the existence of a general equilibrium in perfectly competitive markets, in which there are no indivisibilities and no increasing returns to scale. This was followed by Arrow & Hahn (1971) who proved the existence of a general equilibrium for an economy with limited increasing returns and monopolistic competition, without indivisibilities.

Koutsoyiannis (1979) notes that both proofs are limited to specific market structures and are based on restrictive assumptions, regarding in particular the necessity of 'well-behaved' continuous production and demand functions. Consequently, available 'existence proofs' do not hold for the typical real world cases of discontinuities and indivisibilities in production processes. She notes,..

> 'Our current state of knowledge does not enable us to be sure of the existence of a general equilibrium in the real world, which is dominated by oligopolistic firms and production processes which are characterised by indivisibilities.'

Nevertheless, proof of the existence of general equilibrium for a perfectly competitive economy (with neither indivisibilities nor increasing returns to scale) is important, as such an economy has certain ideal properties which result in an efficient allocation of resources. Koutsoyiannis also notes that apart from the problem of an equilibrium's existence, there stand the problems of its stability and uniqueness.

ANNEX 2.4

The Nature of Agency Problems

Derived from Barnea et al (1985); Agency Problems and Financial Contracting.

1. Assumptions:

Barnea et al's general analysis of agency problems is prefaced by two basic behavioural assumptions. Firstly, all individuals are assumed to choose actions that maximise their own personal welfare and, secondly, individuals are assumed to be rational and capable of forming unbiased expectations regarding the impact of agency problems and associated future value of their wealth. Under the first assumption, when decision making authority is delegated by principal to agent, the agent uses this power to promote his/her own self interest; but such actions by the agent may not be in the best interests of the principal. The rationality assumption implies every individual recognises the self-interest motivations of all others so future decisions of agents, based on their own self-interest, are anticipated by principals.

2. The Economic Theory of Agency (ETA)

In the context of two individuals, a principal providing capital and an agent (manager) providing effort, who both are assumed utility maximisers both valuing end-of-period wealth. For the principal such wealth is derived from his/her share of the realised value of the firm, while the agent's wealth stems

from both his/her share in the value of the firm and his/her work (effort) - which is a factor in the firm's production function.

Agency problems arise because, under the self-interest assumption, agents do not invest their best efforts unless such investment is consistent with maximising their own welfare. Effectively, this formulates to the principal's problem of choosing the 'best' employment contract for the agent. 'Best' contract, defined in the Pareto-optimal context, is such that no other contract can improve the welfare of the one party without reducing the welfare of the other. Contracts are assumed to be self-enforcing when the effort is unobservable, but a forcing contract may be designed if the effort is fully observable.

Observability:

The observability of the agent's effort represents the key to the incentive problem. Barnea et al [ ] stress the distinction between observability at end-of-period value and observability of the effort level; misleadingly, these are sometimes thought equivalent.

The agent's effort level affects the level of output of the firm (end-of-period value or cash flow), but output is also governed by other random events outside the control of the agent. An agency problem arises when the consequences of the agent's effort cannot entirely be distinguished from the consequences of other random events by observing output alone.

Self-Enforcing and Enforcing Contracts:

In traditional ETA, the output (pay-off) is mutually observable by principal and agent, but the effort level is observable only by the agent. While the agent's effort level is not observable by the principal, the cost arising from the agency problem may be mitigated by the design of a contract, or sharing rule, that provides the right incentive for the agent to provide the optimal effort. This represents a self-enforcing contract; ie it is in the agent's best interests to perform.

A forcing contract may be used if the effort level is fully observable; ie the contract imposes an explicit penalty on the agent if the desired effort is not provided. Barnea et al also note that both self-enforcing and forcing contracts must depend
on parameters that are jointly observed (including the realisation of output or the end-of-period value of firm) so that pay-offs to the parties are observed and determined without ambiguity.

Enforceable contracts unambiguously specify each party's share in the observed value of the firm, but the contractual distribution of this value between principal and agent implies a given risk sharing - as the end-of-period value of the firm is uncertain. Barnea et al note that a contract providing a constant dollar compensation for the agent implies all the risk is imposed on the principal, while one that provides a constant dollar compensation to the principal implies all the risk is borne by the agent.

'First Best' and 'Second Best' Contracts:

'First best' contracts motivate the agent to invest an optimal amount of effort: ie they simultaneously solve the incentive

problem and produce an optimal distribution of risk between principal and agent.

'Second best' contracts are those best relative to the amount of information available for inclusion in the contract. Full information (viz, on firms output, agents' efforts, state of the world) enables the construction of first best contracts. Limited information produce contracts inferior to first best contracts and, among such inferior contracts (and subject to the availability of information) second best contracts are optimal.

Common Assumptions and Qualifications:

Barnea et also note that research in this area is qualified by a number of other assumption factors. Most studies, ...
i). Consider a single period analysis only. But ignoring the implications of the outcomes in one period on the structure of contracts in the future periods ignores the learning process of market participants, from which may emerge 'goodwill' and human capital which may affect agent behaviour and mitigate agency problems.
ii). Ignore the existence of markets and the implications of competition among principals and agents (save the introduction of a reservation, or minimum, utility level which must be satisfied to attract agents).
iii). Assume that the manager's preferences and action alternatives are known perfectly by principals.
iv). Consider the end-of-period wealth of both parties is limited to the realised value of the analysed firm. This ignores the possibilities of diversifying via the capital market and thereby reducing the amount of risk that is shared.

v). Contracts are assumed binding, thus implying any commitment in an enforceable contract is perfectly honoured. This ignores the possibility of default on the part of either principal or agent.

3. The Financial Theory of Agency (FTA)

The FTA may be viewed as an application of the ETA to contractual relationships in finance, and is distinguished by an explicit consideration of financial markets. A basic classification of such agency problems is based on their origins, while another emphasises the financial asset (equity or debt) which is subject to a particular agency problem.

The origin basis, suggests three types of problem, ...
i). Partial ownership of the firm by owner-managers may provide an incentive to consume nonpecuniary benefits (or perquisites) beyond that which a sole-owner would consume optimally.
ii). The existence of debt financing under limited liability creates an incentive for stockholders to engage in high-risk activities which transfers wealth from bondholders to stockholders.
iii). The problem of information asymmetry which arises when management, presumed to be acting in the interests of existing securityholders, attempts to raise additional capital from outsiders. Although management possesses inside information on the future values of the firm, it cannot convey this information to the market unambiguously because of the moral hazard problem.
If management sells the securities to outsiders at undervalued prices, existing securityholders suffer a loss which may be

viewed as an agency cost.

The alternative classification considers, ..
i). the agency problems of equity; these are associated with information asymmetry and excessive perquisite consumption, and
ii). the agency problem of debt; these are associated with the same problems as equity as well as risk incentive, investment incentive, and bankruptcy problems.

ANNEX 2.5

Empirical Studies of Capital Issue Announcements

A: Semi-Strong Tests of Capital Issues

Under the taxonomy of Fama's (1970, 1976) efficient market formulation, semi-strong conditions prevail if equilibrium prices reflect all information that is publicly available. A variety of tests have been contrived for this level of information efficiency. Given the practical problems of testing an immense, heterogeneous body of publicly available information, semi-strong tests have centred on information release to the public domain, namely announcements considered to have a major effect on stock prices; eg announcements of stock splits, bonus issues (or capitalisation issues), rights issues. These tests focus on how long it takes share prices to digest and respond to the new information.

An early key study, of common stock (monthly) abnormal returns around stock split ex-dates was provided by Fama, Fisher, Jensen & Roll or FFJR (1969). Conventional 'wisdom' held that the total value of an issue of common stock was increased by increasing the number of shares, ie by a stock split; FFJR supported the EMH by showing that investors buying a sample of split stocks will earn normal returns from that investment strategy.

A number of early studies of common stock issues (focusing on issue dates) are noted by Marsh (1979); in the US, Scholes (1972) observed abnormal gains in the pre-issue period, a small price fall (0.3%) in the issue month, and normal returns

thereafter; Smith (1977) observing US rights issues, noted abnormal returns (8-9%) in the pre-issue year and virtually no abnormal returns thereafter. Smith also noted a small (1.4%) decline in the two months prior to issue followed by a 'recovery' of similar magnitude in the two months following the issue.

In an Australian context Ball, Brown & Finn (1977) obtained results similar to Smith's, although in terms of the more immediate period around the issue they noted a temporary price decline (0.9%) in the month after the announcement; also they were able to identify announcement dates which suggests some departure from market efficiency.

In the UK, Merrett, Howe & Newbould (1967) observing rights issues, found abnormal capital gains (1%) over the issue date and (3%) in the following year; but, as noted by Marsh (1979), while widely quoted, the study is based on a relatively small sample size.

Also in a UK context and focusing on share rights issue announcements, Marsh (1979) himself found evidence of rights issue stock outperformance but necessary methodological qualification (including the influence of a company size factor during the period under review) led him to conclude there was no strong evidence against the EMH; or more precisely the hypothesis that the UK market is efficient with respect to rights issues could not be rejected.

In general these studies show no significant departure from market efficiency. A supplementary dimension of market efficiency considered by some studies is an assessment of a further conventional 'wisdom', namely the Price Pressure Hypothesis; this holds that an increase in the supply of a

company's shares, such as in a rights issue, will depress the share price. This implicitly assumes that the demand curve for a company's shares is downward sloping. Effectively, this represents a statement of market inefficiency.

The contrary view, consistent with the EMH, holds that the demand curve may be regarded as perfectly elastic; the Substitution Hypothesis. On this basis an increase in supply of a company's shares will not in itself lead to a fall in its share price due to the existence of very close substitutes (alternative risky assets). In other words the single company's supply of shares is minor relative to the total supply of risky assets.

Marsh (1979) directly examines the slope of the demand curve by examining the relationship between issue size and share price movements. Although a small price set-back (0.5% to 1%) was observed when the shares went ex-rights, no evidence emerged that returns over either the issue, or announcement, period were related to the size of the issue.

Marsh (1979) also notes that Scholes (1972) was also able to reject the price pressure hypothesis as price behaviour in the issue month was independent of the size of the issue. A later US study, Kolodny & Suhler (1985), finds no evidence of abnormal returns in the 21 day period surrounding the time of issue, and notes that this is consistent with the substitution hypothesis, ie an efficient capital market; and endorses the view that ... 'all information is reflected in security prices when it is first made available at announcement time'.

B: "Pure" Leverage Announcements

Masulis (1980a) finds highly significant announcement effects (ie ARs) on the announcement date; positive for leverage increasing, and negative for leverage decreasing, announcements. These findings appear consistent with the tax shield hypothesis (tax shield creation with leverage increase). Also the wealth redistribution hypotheses appears to be supported, but this is qualified by direct examination of nonconvertible debt issues which generally fails to provide strong support for the bondholder wealth expropriation hypothesis. No conclusive evidence could be found for bankruptcy costs due to the inability to disaggregate the influence of the other hypotheses. Masulis (1983) uses regression to model the abnormal stock returns from his earlier (1980) research. The evidence is consistent with the tax-shield and wealth redistribution hypotheses.

Mikkelson (1981) observes the announcement effect of management calls for conversions of convertible preferred stock, and convertible debt; ie similar to exchange offers. Convertible debt call announcements are associated with a negative (2%) return; common stockhjolders' wealth is not affected by convertible preferred stock calls. Mikkelson notes that capital structure change announcements affect securityholders' wealth; and more particularly that his evidence suggests a corporate tax effect like Masulis (1980a). Also, Mikkelson suggests that negative common stock returns maybe explained by an information signalling hypothesis, ie they may convey bad news about the firm.

Further support for the information content of leverage change is provided by Pinegar & Lease (1986) who study exchange

offers involving common and preferred stock. As summarised by Copeland and Weston (1988), the study finds a statistically significant positive common stock return for leverage-increasing preferred-for-common exchange offers and similarly, a statistically significant negative return for leverage-decreasing exchange offers. The results favour the signalling hypothesis over the tax hyopothesis - but they cannot be used to reject the latter as it may still be relevant in those exchange offers where the interest tax shield is afffected.

C: Seasoned Capital Issue Announcement Studies

Early studies focusing on the capital issue announcement effect are noted by Kolodny & Suhler (1985); these include Bowyer & Yawitz (1980) who examine utilities, White & Lusztig (1980) who examine rights offerings, and Korwar (1983). Later, a cluster of papers from a symposium "Investment Banking and the Capital Acquisition Process" were published by the Journal of Financial Economics in 1986; these include Asquith & Mullins (1986a), Eckbo (1986), Masulis & Korwar (1986), Mikkelson & Partch (1986), Schipper & Smith (1986). A number of these and other relevant papers are reviewed below.

i. Korwar (1983) an early, unpublished study reported by Kolodny & Suhler (1985), provides evidence which (a) supports the presence of a negative signalling effect when a new issue is announced, (b) provides weak support for wealth transfers, (c) does not indicate that the tax effect is very important, and (d) provides no evidence of a transaction cost effect. Korwar relies on cross-sectional regressions and earnings prediction models in his analysis.

ii. As reported by Schadler (1987), Dann & Mikkelson (1984) find significant negative common stock ARs on both the announcement, and issuance, dates for convertible debt issues, but, in contrast, similarly find ARs not significantly different from zero for straight debt issues. By assuming convertible debt is primarily a debt security at announcement and issuance, their results are at odds with the exchange offer and tender offer results of Masulis (1980a, 1980b, and 1983), Dann (1981) and Vermaelen (1981). Finding no contemporary hypothesis support for their results, they

describe them as an anomaly.

iii. Kolodny & Suhler (1985) determines significant negative common stock abnormal returns on the announcement of new equity issues from industrial, non-utility, firms. These returns are inversely related to the magnitude of the capital structure change caused by the new issue; but no relationship is found with the pre-issue degree of financial leverage.

The study considers an explanation for the abnormal return in term of four hypotheses. The maximum transaction cost effect accounts for 22.6% of the shareholder loss (negative return) and the authors view the strong negative relationship between return and capital structure change as further evidence that transaction costs are a significant explanatory variable. The authors determine that the tax shield dilution effect accounts for only 7.8% of the negative, announcement day return and thus plays a minor role in explaining the observed loss to shareholders. Thirdly, tests for changes in debt values provide no evidence that wealth transfers are a determinant of return.

The authors conclude that portion of the negative return unexplained by the above factors, approximately 70%, represents the effect of the signal conveyed by the announcement, namely new unfavourable information. (They acknowledge this requires the strong assumption that other factors such as agency costs do not contribute to the explanation).

iv. Mikkelson & Partch (1986) conclude that significant negative ARs on common stock and convertible debt compared to the insignificant small AR on straight debt is consistent with Myers & Majluf (1984), and the more general argument that

market participants tend to infer the market price is too high whenever an issue of common stock or convertible debt is announced.
Nevertheless, support for Myers & Majluf (1984), and Miller & Rock (1985), could not be further refined by regression on a range of variables including debt quality rating, use of funds, the relative net amount of new financing, and the relative size of the offering, although certain qualifications attach to their rejection. Only security type issued proved a consistent explanatory variable.

v. Asquith & Mullins (1986a) find significant negative ARs on the announcement of common stock issues, for either industrial or utility firms. The aggregate reduction in equity value as a percentage of the planned proceeds of the issue averages 31% for industrials and 12% for utilities. Regression of the industrials' ARs shows a significant negative relationship with the size of the offering (ie as a percentage of total equity); ie larger issues are associated with larger announcement day price reductions. Also, better risk-adjusted stock price performance in the months prior to the issue is associated with a smaller price reduction on announcement. Similar relationships are not apparent for utilities; the authors note this may be explained by the larger information content of industrial issues. No significant ARs around the issue date are interpreted as being consistent with the semi-strong EMH.

The authors comment that the reduction in firm value on issue announcement, as a percentage of the issue proceeds is too large to be explained by transaction costs; and, is not related solely to tax effects, or leverage-related information effects associated with a change in capital structure. Rather the authors view the AR results as consistent with the

hypothesis that equity sales are interpreted as unfavourable signals about a firm's current and future performance, and the regression results consistent with the price-pressure hypothesis that there is a downward sloping demand curve for a firm's shares.

They conclude that the AR results are consistent with Myers & Majluf both in terms of the reluctance of firms to issue equity,
and the timing patterns associated with equity issues (ie Myers & Majluf argue that firms should time equity issues to minimise attendant adverse stock price effect; and firms tend to issue equity following a stock price rise - this is when equity issue price reductions tend to be small).

vi. Masulis & Korwar (1986) consider industrial and utility firms and obtain significant negative ARs which are similar for both common stock and dual stock-bond issues. A regressions is undertaken testing for variables that explain both the ex ante likelihood of a common stock issue and the magnitude of the stock price reaction. The issue likelihood variables, some of which borrow from Marsh (1982), include cumulative ARs for both the stock and the market; both are distinguished as the only significant coefficients, the latter being positive and the former negative, for the industrial firms; the market variable loses its significance for utilities. Other variables considered include, the frequency of prior equity offerings, previous issue authorisations, and an increase in the average leverage ratio. Variables based on theory include, percentage change in shares of common stock outstanding, change in financial leverage, the stocks total risk (variance over 60 days prior to issue announcement), and management share sales in the secondary component of combined

primary-secondary offerings.

The authors find support for both the Jensen & Meckling agency, and the Leland & Pyle signalling, models which predict a fall in firm value with a decrease in management's fractional ownership of shares. Support for Myers & Majluf (1984) prediction that securities are issued when overvalued comes from the significant coefficients for issue 'run-up' cumulative ARs for the stock (negative) and the market (positive); further limited support comes from the negative coefficient for the risk (variance) variable which is only significant for utilities. Also noted, as for most other capital structure change studies, ARs appear positively related to the direction of the leverage change. The authors acknowledge an overall weak explanatory power for the regressions but note the few statistical significant variables are consistent with some theories considered. Also, relationships between utility ARs and the explanatory variables appears very different to those of the industrials.

vii). Eckbo (1986) finds ARs which are non-positive for straight debt and significant and negative for convertible debt. For public utilities, non-convertible bonds produce marginally negative ARs; significantly negative ARs result if the proceeds are used to finance the utility's investment programm. Cross-sectional regression find no relation between the issue announcement ARs and issue size, rating, post announcement changes in abnormal earnings or debt related tax shields. The evidence is inconsistent with hypotheses that predict a positive relation between ARs and the direction of leverage change.

viii). Schipper & Smith (1986) find average positive ARs on the announcement of public offerings of equity in wholly owned subsidiaries, so called 'equity carve-outs', in contrast to average negative ARs for issues of parent equity. But the 'carve-out' issue is characterised by structural and managerial changes; it enables separate public investment in subsidiary growth opportunities without investing in the parent's assets. Myers & Majluf (1984) predict shareholders are better off ex ante with two separately financed companies rather than one, and hence may explain the more favourable share price reaction to equity 'carve-outs' than parent issues.

The marketing of the issue may also influence the announcement reaction of stock prices. After the decision to issue a particular security has been made, management is confronted with the choice of a particular marketing avenue. The issue may be offered to existing shareholders on a pro rata basis (a rights issue), to the general public, or privately placed. Other marketing decisions concern the use of an underwriter and, if so, the terms. Unresolved questions concerning the marketing process include whether the stock price reactions to announcements of new security sales differ between rights and underwritten offers; and why there is a dramatic difference in the use of rights between the USA and UK, Smith (1986). Direct costs of an underwritten equity issue are from three to 30 times higher than the costs of a non-underwritten rights offering, but over 80% equity issues examined are underwritten, Smith (1977). Eckbo (1986) notes that 5% of bond issues are issued through rights offers during 1964-81. Some authors argue that underwriters, by monitoring the firms activities like a bond rating agency, provide a potentially valuable service in view of information asymmetry between management and outsiders, Smith (1986).

ix). Schadler (1987) confirms negative common stock ARs coincident with the announcement of issues of common stock, convertible debt and straight debt. The study focuses on explaining the relative magnitudes of the ARs in terms of the predictability of the issue security type; evidence of a relationship is found weak at best.

D: Smith (1986)

Tabular Summary of AR Results

Average Abnormal Returns on Issue Announcement
(average sample size)

	Type of Issuer:	
Type of Security Offering:	Industrial	Utility
Common Stock	- 3.14 a (155)	- .75 b (403)
Preferred Stock	- .19 c * (28)	+ .08 d* (249)
Convertible Preferred Stock	- 1.44 d (53)	- 1.38 d (8)
Straight Bonds	- .26 c * (248)	- .13 f (140)
Convertible Bonds	- 2.07 c (73)	n.a. g

Sources:
a: Asquith & Mullins (1986a), Kolodny & Suhler (1985), Masulis & Korwar (1986), Mikkelson & Partch (1986), Schipper & Smith (1986).
b: Asquith & Mullins (1986a), Masulis & Korwar (1986), Pettway & Radcliffe (1985)
c: Linn & Pinegar (1985), Mikkelson & Partch (1986).
d: Linn & Pinegar (1985).
e: Dann & Mikkelson (1984), Eckbo (1986) Mikkelson & Partch (1986)
f: Eckbo (1986).
g: not available (virtually none are issued by utilities).
* interpreted by authors as not statistically significantly different from zero.

SOURCE, Smith (1986): Table shows average two-day abnormal common stock returns and average sample size (in parenthesis) from studies of announcements of security offerings. Returns are weighted averages by sample size of the returns reported by the respective studies (unless noted otherwise, returns are significantly different from zero).

ANNEXES TO CHAPTER 3

ANNEX 3.1

Aspects of the Political Process

Derived from Stigler (1971), " The Theory of Economic Regulation"

a). Characteristics of the Political Process

Stigler views the state as possessing one basic resource which is not shared - the power to coerce; and, under the laws of a civilised society, may seize money by one method only - taxation. Other powers of the state include control over the physical movement of resources, and the economic decisions of households and firms without their consent. He considers the potential demand for an industry (or occupation) to use the state powers to increase its profitability via four avenues,

i). A direct cash subsidy
ii). Control over entry by new rivals
iii). The state's power over substitutes and complements
iv). Price-fixing.

Nevertheless there are limitations to the acquisition of these political benefits. Stigler comments that the industry does not gain these political pay-offs in a pure profit-maximising form as the political process places certain limitations on the exercise of cartel policies by an industry; these limitations which enter into the calculus of the profitability of regulation of an industry are of three types,

i). The distribution of control of the industry among the firms in the industry is changed; ie political decisions take

account of the political power of the various firms - Stigler comments that small firms tend to have a larger influence than they would possess in an unregulated industry.
ii). The procedural safeguards required of public processes are costly
iii). The political process automatically admits powerful outsiders to the industry's councils.

b). Analysis of the Political Process

Stigler (1971) comments that ...

> 'Because the political process is coercive, the decision process is fundamentally different from that of the market. .... This compelled universality of political decisions makes for two differences between democratic political decision processes and market processes,
>
> i). The decisions must be made simultaneously by a large number of persons (or their representatives): the political process demands simultaneity of decisions ... (a condition which) ... places a major burden on the political decision process ... (by making) ... voting on specific issues prohibitively expensive.' To accommodate this simultaneity condition, ... 'the voters must employ representatives with wide discretion and must eschew direct expressions of marginal changes in

> preferences. This characteristic also implies that the political decision does not predict voter desires and makes preparations to fulfill them in advance of their realisation.'
>
> 'ii). The democratic process must involve 'all' the community, not just those directly concerned with a decision. ... The political process cannot exclude the uninterested voter, ... hence the political process does not allow participation in proportion to interest and knowledge. Although this may be mitigated by activities apart from voting, which allow a more effective vote to interested parties; persuasion, employment of skilled representatives etc. Nevertheless, the political system does not offer good incentives, like those in private markets, to the acquisition of knowledge.'

Stigler notes that these characteristic of the political process can be modified primarily by employing representatives organised in (or disciplined by) firms which are called political parties or machines. Modification is also achieved by having numerous levels of government (the individual has more incentive to acquire information about local issues than whole state systems) and by selective use of direct decision (referenda). Consequently, the political decision process is characterised by infrequent, universal (in principle) participation.

c). Industry Payments for Regulation

Stigler notes the industry seeking political power must go to the appropriate seller, the political party, which has costs of, ...

> 'operation, of maintaining an organisation, and of competing in elections. ... elections are to the political process what merchandizing is to the process of producing a commodity, only an essential final step. The part maintains its organisation and electoral appeal by the performance of its costly services to the voter at all times, not just before elections. Part of the costs of services and organisation are borne by putting a part of the party's workers on the public payroll. An opposition party, however, is usually essential insurance for the voters to discipline the party in power, and the opposition party's costs are not fully met by public funds.

In terms of payment, Stigler notes, ...

> 'The industry which seeks regulation must be prepared to pay with two things a party needs: votes and resources. The resources may be provided by campaign contributions, contributed services, and more indirect methods such as the employment of party workers. The votes in support of the

measure are rallied, and the votes in opposition are dispersed, by expensive programs to educate (or uneducate) members of the industry and other concerned industries.

The costs of legislation probably increase with the size of the industry seeking the legislation. Larger industries seek programs which cost society more and arouse more opposition from substantially affected groups. The task of persuasion, both within and without the industry, also increase with its size. The fixed size of the political "market", however, probably makes the cost of obtaining legislation increase less rapidly than industry size. the smallest industries are thus effectively precluded from the political process unless they have some special advantage such as a geographical concentration in a sparsely settled political subdivision.'

ANNEX 3.2

The Case for Central Banking

Derived from Goodhart (1985) "The Evolution of Central Banks: A Natural Development"

i). The Case for Free Banking

Goodhart (1985 p13-16) notes that elements in the argument for free banking include, ...

a). by analogy with general economic arguments for free trade and free competition; currently enjoying general academic and political support.

b). a distrust of government management of paper currency. In the context of the 18th and 19th centuries and certain monopoly rights in note issuing, in times of crisis a Central Bank's notes could be made inconvertible legal tender - in order to provide the authorities with receipts of an inflationary tax.

ii). The Macro Argument

Advocates of free banking did not suggest the privilege of issuing legal tender should be extended to private commercial institutions (who could also levy an inflation tax for their own benefit).

Rather, they argued against the development of a monopolistic institution such as the Central Bank which might seek to manage the currency.

The case for public authority discretionary management of the note issue and money stock appears to entail the need for a Central Bank to undertake such operations. Consequently, the argument for free banking requires an attack on the desirability of such central 'monopolistic' management.

But it is not necessary to go to the extent of abolishing a Central Bank in order to remove the authorities ability to manage their own monetary system in a monopolistically discretionary manner.

The Central Bank may be constrained by various rules; for instance the maintenance of a constant, such as a fixed exchange rate (eg, with gold - the Gold Standard), or preordained rate of growth of the money stock.

But acceptance of the rule methodology by the Central Bank carries the potential for conflict with the need to prevent a liquidity crisis in a fractional reserve banking system. Goodhart citing Hayek (eg 1960, 1978) notes that, ..

> 'Hayek, for example has been of the opinion that, in such systems, there is a need for Central Banks, that such conflicts between alternative objectives could well occur, and that on such occasions the needs of the banking system would have to be paramount. Although Hayek did see the practical need for a Central

> Bank in the banking system as it exists, he became increasingly concerned (as the constraints on governmental misuse, as he saw it, fell away with the collapse of the gold standard, the rise of Keynesianism, and the acceptance of deficit financing) with the risks that the existence of a monopolistic Central Bank provided to governments for excessive monetary expansion.
>
> Initially Hayek thought that it might be sufficient as a constraint on national over-issues of money, to allow and to encourage competition between national currencies, eg by removing all exchange controls and allowing any contract to be legally conducted in any currency. Subsequently, however, he went on to propose the more radical step of allowing and encouraging private note issuers to compete.'

Goodhart notes that this proposal was akin to 19th century arguments for free banking in which there would be no central bank and no central reservoir of reserves; this would entail each individual bank being responsible for keeping its own reserves and the convertibility of its own note, and deposit, liabilities.

The case for having a Central Bank gets mixed up with the argument about money management being conducted via rules or discretion, because the latter tends to imply the existence of a Central Bank. Also some proponents of free banking argue

that the mere existence of a Central Bank, even one with set rules of conduct, 'represents a standing temptation to the authorities to change the rules of the game and debauch the currency'.

iii). The Micro Argument for a Central Bank

Goodhart (1985 p1-12) generalises the evolution of central banks, and their micro (ie regulatory - supervisory) function in particular, and argues that such a function foments naturally but cannot be provided adequately by commercially oriented institutions due to conflict of interest. Also he argues against free banking on the basis of the problem of information asymmetry.

More particularly, Goodhart notes that the first European Central Banks emerged by virtue of the financial advantages governments felt they could obtain from such banks; this function involved favouritism, often supported by legislation, in return for financial assistance.

Further associated purposes included; to unify note issue (which had become chaotic in some countries such as Germany), to centralise, manage and protect the metallic reserve of the country, and to facilitate and improve the payments system. While viewed as economically beneficial, more particular benefits accrued to the government from these latter purposes; viz a share in the profits of seignorage and greater centralised control over the metallic (gold) reserves.

Once established, and usually in an unconscious and natural manner, the Central Bank became the bankers' bank via its

central position within the economy, its 'political' power as the government's bank, normally a command over the national metallic reserve and, importantly, its ability to rediscount. Goodhart notes that while initially the Central Bank's maintained the convertibility of its own notes (into gold or silver) like any other bank, its privileged legal position (namely as government banker, and in note issue) caused an evolving centralisation of banking system reserves within the Central Bank - so it became the bankers' bank.

Goodhart comments that the evolution of the role as bankers' bank led Central Banks to develop their particular art of monetary management which had two inter-related aspects. Namely,..

'a macro function and responsibility relating to the direction of monetary conditions in the economy at large, and a micro function relating to the health and well-being of the (individual) members of the banking system'.

While the macro objectives of monetary management have altered, the inter-related concern for health of the financial system has remained paramount. Goodhart notes the significance of the argument about the dominance of either function over the other; ie macro (monetary) versus supervisory functions. This implicitly bears on the rationale for the existence and operation of a central bank.

Focusing on the micro function, Goodhart notes that as the Central Banks came to represent the ultimate source of liquidity and support to individual commercial banks an element of 'insurance' developed; but carried with it the risk of moral hazard which led Central Banks to involvement with the regulation and supervision of their banking system.

The regulatory and supervisory role was largely a natural and evolutionary development, at least for Central Banks founded in the 1800's. In the particular case of England, Goodhart notes that the 1844 Bank of England Act hindered the development of the Bank's regulatory function by dividing the Bank of England into two Departments (the Issue Department to closely constrain the note issuing function vis a vis the maintenance of the Gold Standard, and the Banking Department to act as an ordinary commercial bank). Goodhart argues this on the basis that the micro functions of a Central Bank cannot be undertaken by a commercial competitor due largely to conflicts of interest.

The advantages of having some institution(s) to provide micro Central Banking functions is evidenced by the fact that they emerged naturally, after a fashion, from the private sector in countries without a Central Bank. Goodhart examples clearing houses in the USA and large central commercial banks providing quasi-Central Bank functions.

Nevertheless, Goodhart comments that conflicts of interest denied, and always will deny, the adequate provision of the micro functions by competing institutions. He notes that while some Central Banks originally had private ownership (eg Bank of England, Banca d'Italia and the Commonwealth Bank of Australia) metamorphosis of their commercial banking from a competitive, profit-maximising bank among many to a non-competitive non-profit-making role represents the development of proper Central banking.

Generally, Central Banks established in the 20th century (eg the US Federal Reserve System in 1913) were designed to be non-competitive with other commercial banks, and non-profit-making, and consequently found less structural difficulty in

adopting a regulatory role. Nonetheless, some of these purpose designed non-competitive banks have been less involved in the micro functions of regulation.

Goodhart comments that despite the purposeful non-competitive design of these banks, it is surprising that relatively they have been involved less in the micro-functions of regulation. For example, the Reichsbank and Swiss National Bank were designed to regulate overall monetary conditions but generally left the supervision of individual commercial banks to other government bodies. While there is no clear cut explanation for the varying degrees to which Central Banks undertake the micro supervisory function, he surmises the cause may be a tendency to allocate the function to a separate body in countries where conflicts of interest are more regulated and supervision provided by official bodies set up by legislation; this contrasts with countries where (self) regulation has been provided more informally and any representation of the micro function evolved under the aegis of the Central Bank.

In terms of the argument for a return to free banking (ie without a Central Bank) Goodhart (1985) is opposed 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. This contrasts on the nature of the debate in the 19th century which centred on the question of whether market discipline imposed by a well functioning clearing house would suffice to keep the banking system in order.

ANNEX 3.3

Forms of Prudential Regulation

Derived from Dale (1984a) "The Regulation of International Banking"

Dale (1984a p55-70) views bank prudential controls as falling into two broad categories, preventive regulation designed to control risk taking by bank management and thereby reduce the likelihood of liquidity and solvency problems, and protective regulation designed to support both banks and depositors if problems materialise. Dale categorises capital regulation in the preventive area.

a. Preventive Regulation

Under this general heading, Dale distinguishes three distinct motives for controlling bank risk taking.

> ' ... first, as a surrogate for market forces, 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.
>
> A second objective may be to rule out the additional risk-taking that would

> otherwise be encouraged as a result of ... protective regulation; (ie) ... the removal of normal market penalties for excessive risk-taking may necessitate offsetting official action to guard against ... the moral hazard problem.
>
> 'Finally, regulators may wish 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.'

Dale notes that

> 'the national authorities typically do not differentiate among these three rationales for preventive regulation, but the relation between regulation, market discipline and moral hazard are widely recognised.'

Apart from capital adequacy, Dale lists a number of other areas within the preventive regulation domain; viz,

i. Anti-Competitive Regulation:

Generally, this is aimed at curbing the risks incurred by banks; ie to reduce incidence of bank failure and/or the need for official support.

It may be imposed via limits on the competitive process itself; ie to increase the returns (and reduce the prospect of loss) associated with any given level of risk, and to retrain a bank's propensity for risk-taking. There are two kinds of limits, ...

- controls on market entry: may be achieved via, ...

> 'licensing conditions which include in addition to the usual requirements of professional competence, a perceived "need" for the additional banking services of the kind proposed. Similar conditions may be applied to the opening of new branches or, alternatively, absolute constraints may be imposed on the geographical scope of branch networks. ... evidence suggests that entry controls do indeed tend to increase banks' profitability, although the cost in terms of reduced efficiency is correspondingly high.'

- limitations on price competition:, ...

> 'may take the form of cartel-type interest rate agreements between the bank's themselves, officially administered ceilings on rates payable on bank deposits an/or the prohibition of interest payments on demand deposits. ... (Nevertheless such restraints on pricing) ... can create serious distortions in the financial system by promoting non-price competition

> in areas such as free chequing services, conferring a competitive advantage on unregulated non-bank financial institutions and encouraging financial "disintermediation" - the channelling of funds directly to borrowers rather than through the banking system - during periods of tight money.'

Dale comments that restraint of the competitive process was a common feature of much national banking legislation introduced in the 1930's, but the focus is shifting towards control of the levels and kinds of risks incurred by banks within a regulatory framework that favours unfettered competition.

ii. Liquidity:

Dale comments that, ...

> 'Liquidity is a term of art used loosely to describe a bank's ability to meet its future cash needs ... (and is assessed in terms of) ... prospective net cash requirements, as determined by the maturity distribution of assets and liabilities, and the capacity to meet those requirements from existing cash holdings, the sale of realisable assets and/or new borrowings.'

Also, Dale notes that, ...

> 'Liquidity cannot be measured, since the ease with which assets can be realised depends on the time available to dispose of them, ... (and more importantly) ... a bank's capacity to borrow is necessarily uncertain ...(in terms of) the stability of a bank's existing deposit base and to its ability to "purchase" fresh funds from the market should the need arise.'

Dale notes the conceptual distinction between liquidity and solvency ; 'the essence of liquidity is the ability to raise cash to meet all maturing obligations in ways that do not impair net worth'. Risk of such impairment may arise from the need for speedy asset sales at discounts to book value, or when borrowing must be undertaken at above market rates - causing funding losses.

Nevertheless, he notes that in practice it is questionable whether a bank can have a liquidity problem independent of a solvency problem, and acknowledges the linkage between the two as discussed by Revell (1975 p12-25). Dale comments that, ...

> ' ... a bank's solvency can never be undoubted. In the first place a bank's financial condition is always a matter of uncertainty to outsiders, and secondly, markets are alert to the fact than an otherwise sound institution can be pushed into insolvency through being forced into distress sales of its assets. A bank known to be experiencing liquidity problems therefore becomes a prime suspect and will either have to pay a risk premium on its

> borrowings or, more probably (since a risk premium may further frighten off potential lenders) be subject to credit rationing. Market fears that liquidity difficulties may be linked to solvency problems, even if initially groundless, can soon become self-fulfilling. The corollary is that a bank that would otherwise fail may be kept solvent through a temporary injection of liquidity - this being the underlying rationale for the lender of last resort function.

Because lack of liquidity is separable from but can nevertheless lead to insolvency, bank regulators generally seek to impose liquidity as well as capital adequacy controls.

> Two general points ... about the regulation of liquidity. First, a liquidity shortfall, unlike capital impairment, can in principle be remedied by the authorities through the exercise of their lender of last resort function. Furthermore, the moral hazard problem that would otherwise accompany such action can be eliminated by charging a penal interest rate that is calculated to deter banks from running down their liquidity positions in the expectation of being able to borrow through the official discount window. Given the scope for such discretionary assistance, it is not clear that regulators need concern themselves

> with formal liquidity controls, particularly in view of the intractable difficulties involved.. The second general point is that in a world of 100% deposit insurance the liquidity issue becomes irrelevant. Under these conditions, an illiquid but solvent institution can presumably borrow freely on normal (or nearly normal) market terms without the risk of being subject to credit rationing. The link between illiquidity and insolvency is therefore broken and banks can be allowed to form their own judgments about their liquidity needs.'

iii. Interest Rate Risk:

Dale considers that while nominally an aspect of liquidity risk, the risk that market interest rates may move up - thereby exposing a bank to losses if it has borrowed short and lent long at a fixed rate of interest - known also as maturity mismatching or gapping, is best treated as part of interest rate risk.

More particularly, Dale notes that maturity mismatching carries two types of risk, ...

Refunding risk: if funding long-term loans with short-term borrowings it is open to the risk of refunding difficulty when borrowings fall due. - ie only able to borrow at above market rates, or shut out of the markets altogether because of credit rationing; and,

Interest rate risk: this may arise even when a bank has unrestricted access to credit markets - ie a loss on fixed interest rate loans if short term borrowing costs rise in response to market-wide increase in interest rates.

Notably, maturity mismatching always involves a funding risk, but not necessarily an interest rate risk (eg if interest rates on loans are "floating").

Dale comments that interest rate risk, unlike a liquidity shortfall, may cause an immediate impairment of net worth; ...

> '... a sudden rise in interest rates may erode lending margins while also reducing the capital value of the bank's fixed interest loan portfolio. In a world of volatile interest rates such losses may be dramatic.'

Dale acknowledges Maisel's (1981) comment that interest rate risk is the greatest risk facing banks; nevertheless, Dale notes that,

> ' ... individual bank's sensitivity to interest rate movements can be objectively measured, which suggests that this is an area amenable to regulatory control as well as market discipline.'

iv. Permissible Business Activities:

Regulators frequently constrain product diversification by limiting banks to banking and closely related areas of

business activity. Rationales for this regulation include political objections to concentrations of economic power such as financial conglomerates, and the view that unacceptable conflicts of interest emerge from a mixing of banking and non-banking business.

Additionally, prudential rationales focus on the possibility of an overall increase in a bank's riskiness by engaging in non-bank business. For instance, the non-bank business may be inherently more risky; or banks may inclined to imprudence such as an over-concentration of lending in support of their non-bank business.
Moreover, because regulators view a bank in its entirety, their task is complicated by having to consider non-bank businesses.

Nevertheless, it is argued that

- diversification into businesses whose risks are not co-variant with banking may reduce the overall degree of risk, and

- imprudent intra-group financial dealings may be avoided by appropriate regulation without a blanket prohibition on diversification, and

- some argue that banks can safely engage in riskier non-bank activities if they are conducted through legally distinct subsidiaries or affiliates. Contrarily, others hold that it is not possible to "build a wall" ...

> 'if only because financial markets (and particularly depositors) are liable to link any difficulties experienced by a

> bank's subsidiary affiliate with the parent institution.'

v. Loan Limits:

With risk diversification a key precept of prudent banking, regulators often impose a limit on the amount which a bank can lend to a single borrower, require a spread of lending among different sectors of the economy, and avoid loan concentrations to borrowers with co-variant risks. Such regulation has the problem of defining what constitutes a separate borrowing entity - this is particularly significant in the international context.
Lending limits to a borrower may be expressed as an percentage (albeit arbitrarily derived) of the bank's capital, and may be varied according to collateral backing. Notably, small regional banks may be particularly vulnerable to lending concentration.

vi. Bank Examination:

Bank examination serves a variety of purposes including, ...

> 'the evaluation of management, the assessment of interest rate control procedures, the determination of asset quality and the enforcement of national laws and regulations.'

A broader objective is the identification of problem banks with a view to taking pre-emptive corrective action. Controversy surrounds the degree of public disclosure which should be afforded examiners' findings and other prudential

data, as a means of improving market discipline on the banking system; Dale relates disclosure to deposit insurance - see below.

b. Protective Regulation

Dale identifies both deposit insurance and lender of last resort support within this area.

i. Deposit Insurance

Dale notes that national regulatory arrangements usually include some form of deposit insurance, to safeguard depositors in the event of a bank's failure, which may be provided as

> 'a form of consumer protection in recognition of the fact that the average depositor is unable to monitor or assess the riskiness of banks. More importantly, the existence of depositor insurance helps underpin the banking system as a whole by reducing or even eliminating the potential for large scale precautionary withdrawals that may lead to multiple bank failures.'

Dale identifies two stabilising elements of deposit insurance.

> a). 'At any given level of risk taking, an individual bank is less likely to fail because depositors will have less incentive to withdraw their funds when it experiences financial

difficulties',

and

b). 'the failure of any one bank is much less likely to result in contagious failures elsewhere to the extent that depositors are assured of repayment.'

Dale cites Friedman & Schwartz (1963) who comment that...

> 'deposit insurance is ... a form of insurance that tends to reduce the contingency insured against ... (and conclude that) ... federal insurance of bank deposits was the most important structural change in the banking system to result from the 1933 panic, and indeed, in our view, the structural change most conducive to monetary stability since state bank notes were taxed out of existence immediately after the Civil War...'.

Nevertheless, costs are associated with deposit insurance. Dale notes that, ...

> 'if depositors know they will be repaid whatever risks may be taken with their deposits, then they have no need to ensure that banks behave prudently ... (and in turn) ... banks .. have an incentive to both increase the riskiness of their

> assets and to reduce their capital, since a high risk bank will pay no more for its deposits than a low risk bank.'

Dale cites Peltzman (1970) who, noting the secular decline in USA bank capital ratios comments that, ...

> 'virtually all of the decline in the capital-deposit ratio since the 1920's can be accounted for by the substitution of deposit insurance for capital'.

Dale notes that while deposit insurance necessitates other forms of regulation, the nature and scope of that regulation will depend on the precise terms of the insurance scheme, particularly in terms of the coverage offered and the way in which insurance premiums are calculated. He identifies four schemes, viz, ...

- one hundred percent coverage with flat rate contributions; this eliminates the danger of contagious deposit withdrawals and makes liquidity regulation redundant (assuming banks can always fund themselves by borrowing at market interest rates). The appropriate regulatory objective becomes protection of the insurance fund rather than preventing individual bank failures.
Nevertheless, this system erodes market restraint on excessive risk taking and regulators must formulate and impose capital adequacy norms and lending controls. Dale also notes that, ...

> 'in the absence of formal 100 per cent insurance, regulatory authorities may nevertheless follow a policy of protecting depositors in full. De facto protection

> may be preferred to de jure insurance on the grounds that it will strengthen market discipline by creating uncertainty, but the danger is that it will also fail to prevent large-scale destabilising deposit withdrawals, particularly in times of crisis.'

- partial deposit coverage; this requires,

> 'the depositor to bear some proportion of any loss, (and) cannot be expected to reduce bank failures, or serve any other prudential purpose ... (and must be viewed as) ... a form of consumer protection (ie inducing depositors to withdraw from a suspect bank) rather than as a mechanism for safeguarding the banking system'

- full coverage subject to a fixed ceiling; ie provide 100 percent coverage up to a specified maximum deposit size, beyond which there is no reimbursement. This approach may be based on a consumer protection rationale (small depositors are afforded greater protection than large or corporate depositors) apart from the prudential rationale which is, ...

> 'based on the view that large depositors are in a better position than small depositors to monitor the financial condition of banks with which they place their funds. The reasoning here is that such sophisticated depositors will impose a needed market discipline, thereby encouraging a degree of self-regulation in

the market place.'

Nevertheless, Dale notes that even with extensive disclosure it is not clear that sophisticated depositors can effectively assess the riskiness of banks, and even if they could their actions may increase financial instability; ie in times of uncertainty large depositors are more likely to favour large banks in the belief that these will not be permitted to fail; and the risk of contagious precautionary deposit withdrawal remains. Dale also notes a contradictory element in, ...

> 'a situation where "captive" retail deposits are further stabilised through deposit insurance while potentially volatile wholesale deposits are viewed as a stabilising force.'

- variable rate deposit insurance; the economists' ideal providing a 100 percent coverage with each bank's premium related to its particular risk; this would shift the regulatory objective from risk prevention to risk assessment. Each bank could determine its own risk-return trade-off and the moral hazard would disappear. Practical difficulties emerge in practice and a number of variants relying partly on market assessment have been suggested.

ii. Lender of Last Resort

The term 'lender of last resort' applies to a variety of official support actions including injections of liquidity into the banking system as a whole, and more generally, access to the official discount window for a bank's routine (eg seasonal) liquidity needs; also it includes emergency

financial support to an individual bank experiencing severe funding difficulties.

Dale comments that in terms of an otherwise sound bank experiencing liquidity difficulties which threaten its survival, the lender of last resort function may be characterised as, ...

> 'the authorities' response to imperfections in the financial market, as in a perfect market no solvent bank would be denied credit'.

In the real world, concern about a bank's solvency, whether justified or not, typically results in a rationing of credit. In these circumstances the lender of last resort function compensates for this market failure, and if provided on market terms to a solvent but illiquid bank can be justified in its own right, ...

> 'quite apart from any additional costs in the form of damage to market confidence associated with a forced closure. It is sufficient that a sound bank is "wrongly" denied credit by the market and that the lender of last resort has a better view of the bank's true financial condition than outsiders.'

Dale also notes that in practice the distinction between solvency and liquidity is not clear. For a bank insolvent in the liquidation sense but solvent as a going concern (ie due to the difference in net worth as a going concern and in liquidation) it may make sense to provide official support if

heavy liquidation costs can be avoided. And, even where a bank is clearly insolvent as a going concern, official support by capital infusion may be justified if the alternative is a collapse leading to widespread loss of confidence and further bank failures.

Dale comments that official support to a solvent bank on market terms need not in itself involve moral hazard if the market, not the bank, has malfunctioned. But generally a bank is likely to require liquidity support because the market for some good reason has lost confidence in its management and, in these circumstances the availability of official support gives rise to moral hazard.
Dale notes that, ...

> 'The view currently favoured by central bankers is that the moral hazard can be minimised by keeping the market guessing as to when and on what terms assistance might be given.'

Also, he comments,

> 'It should be stressed that moral hazard may operate to undermine both the self-discipline of individual banks and the disciplining of others by the market place. So far as self-discipline is concerned, the problem can in principle be handled by having the authorities provide liquidity assistance at a penal rate of interest and capital assistance on terms which penalize shareholders. It is more difficult to counteract moral hazard as it

affects general market discipline (even variable rate deposit insurance fails to do this) although since the penalties imposed by financial markets on excessive risk-taking are at best highly inefficient and at worst self-destructive it is not clear that this is a hazard that should be guarded against. After all, it is the deficiencies of the market as a disciplining mechanism that create the need for deposit insurance and a lender of last resort in the first place.'

ANNEX 3.4

Major US Regulatory Developments Post 1913

Derived from Cooper & Fraser (1986) "Banking Deregulation and the New Competition in Financial Services"

The McFadden Act:

To encourage national bank chartering (and Fed membership), Congress passed the McFadden Act in 1927 which was designed to liberalise branching and investment powers of national banks - but has become synonymous with geographic restriction on banks (the prohibition of interstate banking). Prior to 1922 the National Banking Act was interpreted, by a series of Comptrollers of the Currency, as a prohibition on branch banking which placed national banks at a competitive disadvantage vis a vis state banks in states where branching was allowed. This became a controversial issue by the end of the 1900's and, in 1922, the Comptroller of the Currency ruled that national banks in states which permitted branching could establish branches and this was clarified, after further dispute, by the McFadden Act of 1927. The Act allowed a national bank to establish branches where permitted by state law (an initial condition that restricted branching to the home city was removed in a 1933 amendment), increased the loan that could be made to a single borrower, broadened national bank investment powers to include corporate bonds and certain other securities, and expanded real estate lending.

The Federal Reserve Act contained no implication for bank entry and the number of banks continued to increase passing 30,000 in the early 1920's. Failures were common in the 1920's

and more than 5,700 (mainly state rural banks) failed between 1921 and 1929, the year of the beginning of the Great Depression. The number of commercial banks declined from 24,970 to 14,208 and deposits dropped 35% between 1929 to 1933 (end June years). Following banking crises in late 1930 and early 1931 and a third in 1933 (and a subsequent 'banking holiday'), a series of bank reforms were implemented.

The Glass-Steagall Act:

The Banking Act of 1933 (The Glass-Steagall Act) separated commercial and investment banking, prohibited payment of interest on demand deposits, gave increased regulatory authority to the Federal Reserve System, raised the minimum capital of national banks, and established the Federal Deposit Insurance Corporation (FDIC) - the small number of state deposit insurance plans were all defunct by 1930.

The Banking Act of 1935:

The Banking Act of 1935 primarily aimed to strengthen the Federal Reserve System and its money management power. Also the Comptroller of the Currency was provided with greater authority to exercise discretion in granting national bank charters. Cooper & Fraser comment that new power of the Comptroller marked the end of free-banking; and the creation of the FDIC also caused the termination of free-banking as while it can be expected to insure the deposits of new national banks, state bank applicants are carefully scrutinised and this effectively gave them power of veto over the granting of state bank charters.

The Bank Holding Company Act of 1956:

The Bank Holding Company Act of 1956 allowed significant federal regulation over the formation of bank holding companies (BHC's) and their acquisition of additional banks. Originally, the Banking Act of 1933 included provision for Fed regulation of BHC's which held Federal Reserve member banks - but these limited powers did not extend to their formation and expansion. The Douglas 1956 Amendment to the Bank Holding Act prohibited BHC's from acquiring an affiliate in another state, unless permitted by the laws of that state. The Act defined a BHC as owning 25% or more of the stock of two or more banks (thus excluding one-bank holding company's) and provided the Fed with power both to supervise BHCs and control new acquisitions of banks and the formation of new BHCs. Cooper and Fraser note that, ...

> 'The 1956 legislation was intended to halt interstate banking expansion (existing holdings were 'grandfathered'), separate nonbanking activities from bank holding company activities, and avoid concentration of financial resources in holding companies. However, in a classic example of the sometimes perverse consequence of regulatory action, the effect was quite different.'

Cooper & Fraser observe in 1954 there were only 46 BHCs largely because there was uncertainty about their status. The 1956 legislation, ..

> 'was hardly draconian and mainly served to clarify the status of BHCs. As a result, it actually encouraged their formation and expansion as a means of overcoming

geographical and functional barriers.'

The exclusion of one-bank holding companies (OBHCs) from the 1956 Act constituted a major loophole as these were able to continue non-banking activities and, with this advantage over individual banks and multi-bank holding companies (MBHCs), their number exceeded 1,000 by 1970. A 1970 amendment to the 1956 Act extended its power to OBHCs, thus closing the loophole, but also authorised the Fed to develop a new list of allowable BHC activities which Cooper & Fraser describe as 'more liberalised'.

Subsequent major legislation in an emerging deregulatory atmosphere include the Depository Institutions Deregulation and Monetary Control Act of 1980 (DIDMCA), and the Garn-St Germain Depository Institutions Act of 1982. Resultant features included the almost complete removal of pricing restrictions on deposits.

The DIDMCA made wide changes in the regulation, and allowable functions of depository institutions; eg gradual elimination Regulation Q interest rate ceilings, and authority for the Fed to set reserve requirements on all depository institutions. A prime feature of the 1982 legislation was the rescue and support of the thrift institutions, as well initiating a process of reform for deposit insurance, and allowing an increase in operating flexibility of national banks; viz the limitation that national banks could lend no more than 10% of their capital to any one borrower was relaxed to 15% plus an additional 10% for loans secured by readily marketable collateral, as well as the ability to form banker service companies (allowing competition with the existing correspondent banking system) and invest in export trading companies.

ANNEX 3.5

The Decline of UK Bank Capital Ratios

Derived from Webber (1989), and Wilcox (1979) "Capital in Banking: An Historical Summary"

a. Private Banks: Webber (1989)

Webber (1989) comments that, ...

> 'In 1895, of 109 English private banks, "The Economist" was able to publish the balance sheets of 38 in its "Banking Supplement". These balances grouped capital and reserves together showing an average ratio to assets for the London private banks of 13.5% and 13.3% in the case of the provincial private banks. There appeared to be no relationship between the size of the published ratio and the size of the bank. By this time these banks would have held hidden reserves as well as partners accounts.
>
> By the First World War these ratios had changed little in the case of the London private banks, rising to 14.9% in 1913 as smaller banks disappeared, but for the few provincial private banks remaining the ratio of capital and reserves to assets fell to 9%.

> The First World had an adverse affect upon the capital asset ratios of the London private banks due to the huge expansion in deposit liabilities. ... There were no significant private banks remaining by 1920, and none that published a balance sheet. Private banking had almost entirely disappeared by the inter-war years. Hoares Bank in London remained almost the sole example of such companies, with a history dating back to 1673. In 1920 its capital and reserve to assets ratio was 10.3%, having fallen as a result of growth in other liabilities, namely deposits, during the First World War. A £15,000 increase in capital and a fall in deposits restored the ratio to its pre-war level of 15.5% by 1930, and the depression and a further fall in deposits had increased it to 16.9% in 1932. In 1938 the growth of deposits in the 1930's brought it down to 12.8%. This was much higher than the ratios of the London joint stock banks in this period which averaged around 6%.'

b. Joint Stock Banks: from Wilcox (1979)

Wilcox notes that in the two decades prior to WWI, a period of bank amalgamation developed mainly between local banks, and also banks with complementary activities. Pressure for amalgamation stemmed in part from government calls for larger

banking reserves following the Baring crisis of 1890. Wilcox comments that, ...

> 'These developments had a lasting effect on the level of capital in banking. The amalgamation movement enabled the larger banks thus created to exercise greater efficiency in the use of capital, and this tendency, combined with the fact that deposits were increasing, caused a general downward trend in the average published ratio of capital to deposits. In 1880 it was about 20% for joint stock banks; by 1900 it had dropped to about 13% and, as a result largely of the wartime inflation, it was no higher than 6% by 1917.'

By 1918, the amalgamation trend, particularly the union of major joint stock banks with extensive branch networks, and the continuing fall in the proportion of equity capital to deposits caused concern and culminated in a the setting up of a Treasury Committee under Lord Colwyn. It recommended that while mergers should be allowed to continue, those involving substantial territorial overlap should be subject to official investigation. Wilcox notes, ...

> 'The level of bank deposits in fact rose significantly between 1914 and 1918 and, to ease the pressure on their capital, the banks substantially increased their proprietorship funds in 1920, when the average published ratio of capital resources to deposits rose from 5.25% to nearly 6.5%. The overall level of deposits

> was little changed in the 1920's but, with a fall in public sector assets, lending to the private sector rose. As 1930 approached, however, it was apparent that the banks' loan portfolios were beginning to reflect the excess capacity and non-competitiveness of the old staple industries - coal, iron and steel, shipbuilding and textiles.'

The onset of world depression in 1929 brought the question of supply of funds to industry to the fore in the Macmillan Committee of 1931; Wilcox notes that bank capital was not mentioned in the Committee's Report and, although the gold standard was abandoned in September 1931, the stability of the banking system did not come into public question.

The clearing banks' ratio of capital to deposits stood at 7% by 1931 but then entered a period of decline which saw a level as low as 2.5% by 1951. Wilcox comments this decline was initiated in a period of cheap money which saw a fall to 5.75% by 1939, and then more rapidly due to inflation (particularly during the war years) reaching 3% by 1945. The balance sheets of the clearing banks experienced dramatic structural change during this period. Deposits trebled and public sector debt (viz gilts) took a much larger proportion of asset portfolios as private sector lending demonstrated a sharp relative decline; Advances fell from over 50% of deposits in 1931 to less than 17% by 1945 and banks were generally excessively liquid, and significantly underlent.
Nevertheless these UK balance sheet structures are subject to aberration due to the maintenance of hidden reserves; this policy was endorsed by the Cohen report on company law amendments (HMSO 1945) and found legal expression in the

Companies Act, 1948.

Banks encountered a number of problems in capital growth via earnings retention during the 1950's. The end of the cheap money era and the re-instatement of orthodox interest rate policy in November 1951 saw a sharp fall in the market price of gilts - which had come to form an unusually high proportion of banks' assets. This caused banks to abandon the tradition of writing down investments (from hidden reserves or current earnings).
Moreover Wilcox notes banks had the problem of generating an adequate level of earnings from advances during much of the 1950's due to credit controls. This contributed to a fall in banks' average ratio of capital to deposits (to an all time low of under 2.5% in 1951 and 1953) which did not improve to any extent until the end of the decade. Wilcox notes that a clearing bank witness to the Jenkins Committee in 1960 stated that 'the whole history of the past 15 years has been an effort to get the shareholders' money in the business into a proper trading relationship to the deposits' (HMSO 1961).

The Radcliffe Committee, appointed in 1957, did not subject bank capital to scrutiny but concluded that banks operations had been unduly hampered by controls which depressed earnings and accepted the banks' contention that an officially prescribed liquidity ratio of 30%, which had formed part of the controls since the early 1950's, was too stringent and a lower ratio would be compatible with prudence.

An improved economic climate in 1958 coupled with a period of credit relaxation which lasted till 1961, provided the banks with the opportunity to re-organise their balance sheets to conform with their pre-war pattern. This encouraged the clearing banks to embark on a programme of capital raising

which, coupled with improved earnings and asset revaluations, enabled a substantial increase in published capital resources throughout the 1960's. Moreover, as Wilcox notes,

> 'The beginnings of the attempt to restore balance sheet orthodoxy coincided with the emergence of a demand for capital for a new purpose, namely diversification. The initial steps were taken in 1958 when most of the clearing banks made equity investments in finance houses, thus widening the market - both industrial and personal - in which opportunities to lend were available.'

Capital resources were also of importance during the early 1960's because of growth in deposits and advances. By mid 1961 advances had risen to nearly 49% of deposits, their highest relative level since 1932; and gilts had fallen to 14%, their lowest level since 1930.

Bank profitability tended to reflect the general trend in interest rates, and rate levels in the 1960's were generally higher than in the previous decade. Nevertheless, the banks liquidity requirements precluded them from participation in the rapid growth of the new money markets in sterling and foreign exchange. To confront this problem the major banks set up, by the late 1960's, specialist subsidiaries which, unencumbered by liquidity requirements were able to trade in these markets.
Another feature of the 1960's were amalgamations among three of the clearing banks, the first for more than 40 years which brought the clearing banks to approximately their present form.

Also, the banks decided to make full disclosure of profits and asset values in the annual accounts for 1969. The initiation of this policy saw a dramatic effect on published capital ratios. In 1968, prior to disclosure, the 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%.

Wilcox notes that before the 1970's (and the general banking environment pressures mentioned in previous sections) two long term trends may be identified,

> 'On the credit side, the pattern of banking developed - through integration and improved financial intermediation - in a way that promoted the more efficient use of capital. The amount of capital needed to support a given volume of deposits and assets hence declined. On the debit side, however, the effects of inflation operated to erode the real worth of the capital base, and created the need for frequent increases from whatever sources these reasonably could be obtained.'

ANNEX 3.6

BANKS IN ENGLAND & WALES: 1844, 1884, 1904, 1934
(Numbers, Branches & Liability Side Structures)

SOURCE: CRICK, W.F. & WADSWORTH, J.E. (1936) "A Hundred years of Joint Stock Banking".
: Equity Ratio derived for purposes of this Dissertation

A: 1844

1844	Number	Branches	A Capital & Reserves £'000	B Note Circulation £'000	C Deposits £'000	A/(A+B+C) EQUITY RATIO %
BANK OF ENGLAND						
(September 7)	1	12	18,118	20,176	12,275	35.8
LONDON BANKS						
Private	63	none	?	nil	27,000a	na
Joint Stock	5	45‡	2,244	nil	7,984	21.9
LONDON AND PROVINCIAL BANKS						
Joint Stock						
PROVINCIAL BANKS						
Private:	273	71	?			na
Issuing.....	208			5,153	?	na
Non-issuing..	65			-	?	na
Joint Stock:	100	441	7,244b			
Issuing.....	72			3,478	?	na
Non-issuing..	28			-	?	na

‡ Of which 36 were accounted for by the London and County Bank
a. Estimate by Joplin: Currency Reform : not Depreciation
b. 48 banks did not give full figures, and this amount represents capital only of the remainder
Note - London branches of foreign and Colonial banks are not included in this or later tables.
From: "Bankers' Magazine", 1884;
Select Committee on the Bank Acts, 1857: and
Handbook of London Bankers - Hilton Price

B: 1884

1884	Number	Branches	A Capital & Reserves £'000	B Note Circulation £'000	C Deposits £'000	A/(A+B+C) EQUITY RATIO %
BANK OF ENGLAND (September 24)	1	11	18,295	25,102	29,372	25.1
LONDON BANKS						
Private	35	10	?	nil	68,000‡	na
Joint Stock	21	52	18,147	nil	76,654	19.1
LONDON AND PROVINCIAL BANKS						
Joint Stock	6	517	9,000	nil	69,738	11.4
PROVINCIAL BANKS						
Private:	172		?		78,561‡	na
Issuing.....	100	330		1,439		na
Non-issuing..	72	103		nil		na
Joint Stock:	91					
Issuing.....	45	523	15,749	1,541	54,456	22.0
Non-issuing..	46	529	18,728	nil	80,887	18.8

‡ Estimates: the private banks did not publish balance sheets, while 11 provincial joint stock banks did not give full figures

From: "Economist" Banking Supplements 1884;
"Bankers' Almanac", 1884; and
James Dick; paper entitled "Banking Statistics: A Record of Nine Years' Progress 1874-83", read before the Institute of Bankers, May 1884.

C: 1904

1904	Number	Branches	A Capital & Reserves £'000	B Note Circulation £'000	C Deposits £'000	A/(A+B+C) EQUITY RATIO %
BANK OF ENGLAND						
(September 21)	1	11	17,553	27,835	49,204	18.6
LONDON BANKS						
Private	*					
Joint Stock	14	85	13,065	nil	71,211	15.5
LONDON AND PROVINCIAL BANKS						
Joint Stock	12	2,721	41,718	nil	362,414	10.3
PROVINCIAL BANKS						
Private:	35		2,045a		14,372a	na
Issuing.....	18	136		160		na
Non-issuing..	17	60		nil		na
Joint Stock:	39					
Issuing.....	21b	667	11,585	517	68,342	14.4
Non-issuing..	18	941	15,377	nil	82,196	15.8

* The difficulty of distinguishing true banking firms from a large group of miscellaneous financial houses in London prevents the insertion of an exact figure. It may be taken that the declining trend revealed in earlier tables had still further reduced numbers and strength

a. Figures for 8 banks only: Others did not publish balance sheets.

b. Including Channel Islands and Isle of Man

From: "Economist" Banking Supplement, October 1904, and
"Bankers' Almanac", 1904

D: 1934

1934	Number	Branches	A Capital & Reserves £'000	B Note Circulation £'000	C Deposits £'000	A/(A+B+C) EQUITY RATIO %
BANK OF ENGLAND (September 26)	1	9	18,262	377,028	174,933	3.2
LONDON BANKS						
Private	*					
Joint Stock	3	4	2,593	nil	24,688	9.5
LONDON AND PROVINCIAL BANKS						
Joint Stock	11	9,954	130,014	nil	2,002,630	6.1
PROVINCIAL BANKS						
Private:						
Issuing.....	nil					
Non-issuing..	*					
Joint Stock:						
Issuing.....	1	9	316	85a	3,213	8.7
Non-issuing..	1	164	1,250	nil	17,453	6.7

* Owing to the difficulties of definition no precise number can be inserted, but it may be taken that private banks, in the sense of partnerships performing pure domestic banking functions, had by this time almost completely disappeared.

a. Banks operating in the Isle of Man still retain a local note circulation

From: "Economist" Banking Supplement, May 1935 and "Bankers' Almanac", 1934-35.

ANNEXES TO CHAPTER 4

ANNEX 4.1

ACCOUNTING DEFINITION

A: The Nature of Income

Derived from Hicks (1946) "Value and Capital: An Inquiry into Some Fundamental Principles of Economic Theory".

Commenting on the nature of income, Hicks (1946 p172) notes that, ...

> 'The purpose of income calculations in practical affairs is to give people an indication of the amount which they can consume without impoverishing themselves. Following out this idea, 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. Thus, when a person saves, he plans to be better off in the future; when he lives beyond his income, he plans to be worse off. Remembering that the practical purpose of income is to serve as a guide for prudent conduct, I think it is fairly clear that this is what the central meaning must be.
>
> However, business men and economists alike are usually content to employ one or other

> of a series of approximations to the central meaning.'

Hicks considers a number of approximations,

1). The first approximation is based on the capitalised money value of the individual's prospective receipts,

> '...the maximum amount which can be spent during a period if there is to be an expectation of maintaining intact the capital value of prospective receipts (in money terms). This is the definition which most people do implicitly use in their private affairs; but it is far from being in all circumstances a good approximation to the central concept.'

2). The second defines income as the maximum amount the individual can spend this week, and still expect to be able to spend the same amount in each ensuing week.

Hicks comments that,

> 'So long as the rate of interest is not expected to change, this definition comes to the same thing as the first; but when the rate of interest is expected to change, they cease to be identical. Income No 2 is then a closer approximation to the central concept than Income No 1 is.'

3). By introducing the factor that prices are expected to change, Hicks defines income as,

> '...as the maximum amount of money which the individual can spend this week, and still expect to be able to spend the same amount in real terms in each ensuing week.'

Hicks points out the indeterminateness is compounded by the meaning of 'in real terms' (what is the appropriate index-number of prices to take).

Also, he notes the problem of durable consumption goods; savings is the difference between income and consumption, not between income and expenditure. Income is not the maximum amount the individual can spend while expecting to be as well off as before at the end of the week; it is the maximum amount he can consume. It is only if the acquisition of new consumption goods just matches the using up of old ones that consumption and spending can be equated, and the definition can proceed as before. Problems emerge if they do not match, and there stands the problem of knowing if they do indeed match. (If there is a perfect second-hand market for the goods in question, then market value can be assessed for them with precision, corresponding to each particular degree of wear, and the value-loss due to consumption can be exactly measured).

Hicks acknowledges that ultimately the analysis returns to the central criterion that a person's income is what he can consume during the week and still expect to be as well off at the end of the week as he was at the beginning. Consideration of the approximations to the criterion show how very complex it is.

B: Income Measurement and Presentation

The problem of income measurement and presentation has been influenced by the emergence of inflation in recent decades. The following emphasises UK developments.

Income Measurement

Some 6 methods of income measurement have been devised, and each falls into either of two categories: viz
a. historical cost; historical cost and current purchasing power (CPP) adjusted historical cost bases, and
b. current value; replacement cost, net realisable value, net present value, and value to the firm systems.

Under the widely used historical cost method, assets are carried in the balance sheet on the basis of actual or allocated costs at the date of acquisition, and limited to those items expected, with a high degree of probability, to produce future benefits. Post acquisition changes in asset valuation are not recognised unless there is a permanent diminution in value or, until they are realised. While said to have the advantage of objectivity, in practical application this method often requires considerable discretion to be exercised in the allocation of income and expenditure over time and between capital and revenue accounts.

In practice some firms revalue various fixed assets upwards from time to time but also are expected to reduce the figure of current assets to net realisable value if this has fallen below original cost. Profit equals the net difference between the realised revenues and the expired historical cost of inputs (essentially expenses) valued at acquisition prices.

Due to the method's limitations during inflationary times, a practice of substituting current market valuation figures in place of historical cost for fixed assets has developed. Also, the need to supplement historical cost figures in order to deal with changes in the purchasing power of money has been recognised by the Institute of Chartered Accountants.

Capital Maintenance:

The Institute of Chartered Accountants in England and Wales comments (Corporate Report 1975, p66) that financial statements should,

> '... be concerned with disclosing the amount and sources of capital employed and the appropriate analysis of its disposition. Measurement of capital employed is not without considerable difficulty, but insofar as it can be achieved, it contributes, by the calculation of return on capital, to an evaluation of the efficient use of resources and may also enable economic comparisons to be made.'

Whittington (1984) notes two major, broadly defined approaches to the concept of capital maintenance in periods of changing prices. These are the physical capital maintenance (specific prices) and financial capital maintenance (general price index), which may also be described, respectively, as the 'entity approach' and the 'proprietary approach'. The former is concerned with the maintenance of the specific business entity, and thus the specific prices of the assets held by the entity; the latter is concerned with the maintenance of the

proprietors' wealth and views capital as a fund belonging to them and to be maintained relative to a general index (which is reasoned to be of greater relevance to their spending habits). Also, he notes, ...

> 'Entity capital can be defined as all of the long-term capital of the business (ie loan capital in addition to the proprietors' net worth) and proprietary capital can be defined as that attributable to proprietors' net worth irrespective of the method of measurement.'

Whittington also notes that Hicks (1974) classified accountants as fundists for their view of capital as a fund rather than as a stock of physical assets (ie Hicks distinguishes between 'materialist' and 'fundist' views of capital).

Recent Developments:

Recently, the UK Accounting Standards Board (April 1991) issued an exposure draft on the 'Presentation of Financial Information' which comments that, ..

> 'In assessing the financial performance of an enterprise during a period, all changes in equity, (net assets) of the enterprise from transactions and other events need to be considered. The total of such changes, excluding those resulting from investments by and distributions to equity owners, are referred to as comprehensive income.

> Profit of a period is a component of comprehensive income having the same broad elements of income and expenses but excluding items falling into three classes; a. certain unrealised gains and losses, b. certain currency differences, and c. prior period adjustments. Profits focus on what the enterprise has received or reasonably expects to receive for its output (income) and what it sacrifices to produce and distribute that output (expenses). It should be noted that gains realised in a period but recognised in previous periods are not components of comprehensive income.

The coincident issue of the exposure draft 'Presentation of Financial Statements' uses the term "comprehensive income" to refer to all changes in a period to the net assets of an enterprise excluding those resulting from investments by and distributions to equity owners. They note views differ on the most appropriate expression for this purpose, ...

> 'Some prefer "the total of net gains or losses recognised" on the basis that income generally connotes results reported in the profit and loss account rather than changes to net assets that also result from gains and losses recognised in reserves. Some would prefer the term "comprehensive net income", since "income" alone often refers to a gross revenue item rather than a net profit or gain.'

C: Equity Components

Equity components may be viewed in terms of an accounting/legal framework and focus on the obligations and rights of company membership, some of which may be set by the company. The following is based in large part on Mayson & French (1987) and in the main reflects the UK framework. The characteristic framework noted in Chapter 4 places the various classes of share noted below in a wider, universal context.

Members:

As noted by Mayson & French (1987) membership of a company limited by shares is based on an undertaking to contribute capital to the company, but once the agreed amount has been paid neither the company nor its creditors may demand further contribution. Profits may be shared among the members; also if the company is wound up when solvent, contributed capital is returned to members (but nothing is returned if insolvent). Apart from sharing in profits, members normally jointly control company affairs via meetings to determine policy and appoint directors to manage the company's affairs. A member contributing more capital than another will want a proportionally greater share in profit distribution and a greater influence in company affairs (via more votes at company meetings). Shares represent a unit of account for measuring a member's interest in his/her company.

Share Capital:

Authorised Share Capital defines the maximum number of shares that can be issued by a corporation while paid-up share capital is the amount actually contributed to its share

capital (not including share premium) and may be distinguished from called-up share capital which is the amount actually contributed to share capital plus amounts presently due to be contributed by members (eg via calls on partly paid shares).

Share Capital may be issued fully paid, or partly paid which reflects an amount outstanding on the shares' par value which the corporation may call when required; Jones & Bellringer (1984). Issued shares, ie those held by shareholders, are entered in the books at par value, any excess on issue being entered into a share premium account (or capital surplus account in USA). The share premium account is a capital reserve and cannot be distributed to members, although it may be capitalised and form the basis of a scrip issue; Greener (1971).

Classes of Share:

A company may have different classes of members. Shares of one class may have a nominal value different to that of shares of another class, but within a class all shares have the same nominal value. Recently it was legally decided that the nominal value of different classes may be in different currencies (Re Scandinavian Bank Group plc (1987) 2 WLR 752).

The terms 'member' and 'shareholder' are synonymous, apart from unusual situations; viz in principle classes of members not required to contribute capital but with voting rights could be established; also in some companies a special class (usually comprising one member only) is created to veto any changes in the company's constitution.

Contribution to the capital of the company confers benefits on the member: major rights include voting rights, right to return of contributed capital if the company is wound up (subject to availability after creditors claims), and right to participate when the company makes a distribution of property to its members - ie participation in surplus on winding up (after the claims of creditors and contributed capital are met) and otherwise while the firm is in existence the annual or more frequent distribution of profit dividend.

Ordinary Shares:

Mayson & French (1987) note that members with 'typical' rights are called ordinary members and their shares are called ordinary shares. These 'typical' rights of a member include, ..

i). A dividend of profit which may be of any size recommended by directors and approved by the members.
ii). the amount of surplus assets to be distributed to a member on winding-up is proportional to the nominal value of the shares he holds.
iii). On a poll each member has one vote for each share held.

Preference Shares:

A company may create a class of membership with rights in some way preferential to those of its ordinary members. Such a class of members is said to hold preference shares; these may be viewed as the traditional hybrid capital item. Preference shares are usually advantaged by entitlement to an annual

dividend of a fixed amount per share paid in priority to any dividend payment to other members. Also, they are usually advantaged in repayment of capital, on winding up, in priority to other members.

Other particular classes include deferred shares, also called 'founder shares', which are restricted in that no dividend can be paid for a financial year unless ordinary shareholders are paid a ceratin amount for that year. Non-voting ordinary shares are like ordinary shares but lack the right to vote. The Companies Act (1985 s.744) refers to an equity shareholder as a member holding shares with no prior limitation as to the amount he may receive in distribution (ie annual dividend of profit or surplus assets on winding-up).

Minority Interests:

Minority shareholders are persons holding shares in a company which is a subsidiary company, though they themselves are not the holding company, nor nominees of it. Minority interests are common in a group holding company's equity accounts.

Reserves:

These may be broadly categorised as either capital or general. Capital reserves are funds which belong to the shareholders but may not be distributed, eg share premium account, or in the directors' opinion are not available for distribution. General reserves represent profits accruing to the owners of the bank but not distributed to them for reasons of management policy; (Greener (1971). Note also 'secret' or 'hidden' reserves.

D: Bank Accounting Policies

i. Provisions

Deferred taxation arises where a tax liability is expected to arise in the foreseeable future. This item includes short term timing differences which may arise from certain types of interest and other timing differences, eg tax authorities treat bank interest on a paid and received basis while the bank accounts use an accrual basis; these differences normally reverse in the following period. Ernst & Whinney (1986) point out that the two principal countries which adopt a deferred tax policy are the USA and the UK; the main difference between the two is that in the USA deferred tax is built on all timing differences, while in the UK deferred tax is provided for only if the directors believe a taxation liability will materialise in the future.

Loan loss provisions are traditionally separated into specific and general components. Specific provisions relate to particular loans that have been identified as bad or doubtful. The provision is generally ascertained by reviewing the loan portfolio and facilitates a write down of the particular loans to their estimated realisable value. General provisions relate to loan loss risks that have not been separately identified at the balance date but can reasonably be expected to exist. Loan loss provisions reflect loan portfolio quality and may represent a significant tax allowance as well as providing the first line of defence against loss.

A number of methods exist for the determination of the size of general provisions. The methods range from those fixed by regulation to those calculated at managements' discretion.

In many countries a general provision up to a percentage of loans, etc. is allowed as tax deductible and will generally be the minimum figure provided for by banks, although they may set aside additional amounts. In Japan, Germany and Spain, the amounts to be provided are set by regulation.

General provisions are not tax deductible in the UK, and are consequently set at the discretion of management. In the USA identified bad debts are charged-off. Additionally, a provision for loan losses is maintained part of which is tax deductible; banks are required to divide the reserve into allocated and unallocated parts. The allocated parts covers loans regarded as doubtful, while the unallocated part represents a general provision.

In terms of balance sheet presentation, treatment of provisions for bad and doubtful debts varies among countries. Some offset both specific and general provisions against the appropriate assets while others require the deduction of the specific provision from the asset with the general provision included on the liability side. Another method involves the representation of both specific and general provisions on the liability side with assets shown at their gross value.

While the responsibility for determining an appropriate level of provisions is generally acknowledged to rest primarily with the management of the bank and their auditors, the supervisors' role is primarily to ensure that a bank's approach to provisioning policy takes the due care and diligence required for a prudent and realistic assessment of the quality of the portfolio. Also, supervisors may desire a certain consistency of approach amongst financial institutions subject to their jurisdiction, though it is recognised that

the individual position of a bank is determined by a host of specific factors which make comparisons extremely difficult and that no absolute standards of credit and country risk exist for a very large portion of loan portfolios. Nevertheless, the OECD points out that supervisors are in a position to make a judgement about the approach to provisioning of an individual bank relative to those applied by others and this can be used as a test for steering bank policies in the direction of prudence; OECD (1985).

ii. Hidden or Secret Reserves:

The maintenance of hidden (or secret) reserves is a matter tied up with the broader issue of bank disclosure. Traditionally, banks have tended to be secretive by nature and conservative in their accounting policies. In practice they preferred to disclose minimal information in the belief that this helped maintain confidence about the ability of banks to withstand a crisis, particularly among depositors. This policy received official endorsement in most countries where laws allowed banks to refrain from issuing sensitive information likely to affect their attraction as a depository institution; Ernst & Whinney (1986).

A move to greater disclosure of bank accounting information was initiated in the USA over two decades ago and has since developed in some national attitudes. Nevertheless, some countries continue to follow a 'secrecy' policy. At the conservative extreme, banks in Germany and Switzerland still are permitted to maintain a policy of withholding certain accounting information.

In order to pre-empt and avoid imminent legislation, clearing banks in the UK undertook to make greater disclosure vis a vis hidden reserves in 1969. UK banks exempt from full disclosure are permitted to maintain inner reserves but the fact has to be indicated on the balance sheet.

Bank management traditionally argued that it could utilise its hidden reserves to, 1) absorb undisclosed losses, 2) increase disclosed reserves, and 3) present a smooth trend of profits; Brown, Mallet, Taylor (1983)

Provision management represents an area which may give rise to hidden reserve creation. Revell (1986) notes that where the amount of a provision, even if shown in aggregate in the operating account, is a matter of judgement rather than a clear cut case, hidden reserves may be created by over-provisioning. Also, hidden reserves may be created by failing to reverse a provision when the need for it has passed.

The scope for hidden reserve creation from asset undervaluation is significant. Longer-term assets are rarely required to be recorded at current market values. Consequently bank premises and real property held for investment purposes have provided a popular source of hidden reserve creation, in a British context; Revell (1986).

iii. Off-Balance Sheet:

Typical off-balance sheet items include acceptances, endorsements, guarantees and performance bonds. Also back to back lending may be off balance sheet if the two sides of the transaction can justifiably be set off and excluded from the

balance sheet. Recent years have seen a significant increase in these shadow commitments and contingencies.

Off-balance sheet liabilities may be activated 'on' by some future event and inevitably involve in the acquisition of assets of matched value; but the risk remains that either the asset may not materialise or be of lesser value than its matched liability claim.

The recent growth of securitisation and the associated underwriting guarantees indicates that the potential risk from this source may be increasing. Banks in the UK and USA generally provide adequate accounting details and additional accounting information to support both the balance sheet and profit and loss account.

Commitments and Contingencies:

Commitments and contingencies may represent a significant portion of the liability side of the bank balance sheet, and/or be located off-balance sheet. Their growth in recent years reflects the increasingly important provision of financial services, ie fee based income, as opposed to traditional financial intermediation which is reflected in deposit and loan accounts.

Commitments are exemplified by undrawn facilities, underwriting commitments and forward purchases and sales of foreign currencies and securities. They involve a bank committing itself to a future transaction which normally involves the bank acquiring an asset; there exists a risk that the asset may not materialise and that it may be worth less than its cost to the bank. Forward purchases and sales of

foreign currency may be particularly significant for a bank (and sometimes in excess of total balance sheet liabilities/assets). Also, the underwriting of financial instrument issues is increasingly significant for banks in the current era of 'securitisation'.

Contingencies arise when a bank has underwritten the obligations of a third party. A future event may trigger an immediate loss, or result in the bank acquiring an asset that may not realise its face value (unlike a commitment which involves only the latter risk). Contingencies are exemplified by acceptances, endorsements, guarantees, tender and performance bonds (which are forms of guarantees), indemnities, and the issue and confirmation of documentary credits.

iv. Intangible Assets:

Cooke (1985) identifies inherent goodwill and purchased goodwill. The former is difficult to value due to its subjectivity and consequently difficult for an auditor to verify and thereby ignored by accountants. The latter is verifiable and accounted for on purchase.

The main problems surrounding goodwill concern its recognition, amortisation and disclosure. Cooke notes that while (UK) accountants acknowledge that goodwill exists in most businesses, its valuation presents insurmountable problems. Moreover any value placed on inherent goodwill is subjective and difficult to verify with the consequence the easy option is to ignore it.

In contrast, goodwill arising as a result of a purchase transaction must be recognised in the accounts. Cooke notes the argument that for the sake of consistency with inherent goodwill purchased goodwill should preferably be written-off against reserves in the year of acquisition, but otherwise amortised over its useful life. Ernst & Whinney (1986) note that banks, almost without exception, are required either to write off goodwill in the year of acquisition or to amortise it over a period of years. Some countries specify a fixed period varying from 5-40 years while others require it to be written off over its economic life.

v. Window Dressing:

Window dressing, involves the cosmetic arrangement of a bank's balance sheet. Ernst & Whinney (1986 pxv) define 'window dressing' as the, ...

> ' ... entering into of transactions before the accounting date, and which mature immediately after it, the substance of which primarily to alter the appearance of the balance sheet'.

Similarly, Brown, Mallet & Taylor (1983) describe 'window dressing' as, ...

> 'Transactions entered into by management that have a proper legal form but which are either transient in nature or have no corresponding substance. The purpose of these transactions is usually to arrange

affairs so that the balance sheet of the concern gives a misleading or unrepresentative impression of its financial position'.

E: Capital Structure Change

1. Forms of Change

In an Accounting sense, capital structure change may be broadly categorised according to whether it directly influences the asset side of the balance sheet or not. A further basic distinction may be drawn between purely liability side change in terms of those which are internal to the equity accounts or not.

Another way of viewing capital structure change, in basic accounting terms, is by the impact on the amount of capital; ie some transactions change the capital level while others do not.

Firms increase their capital by issuing securities in exchange for cash or some other asset (eg shares in another company in a takeover); reduction of capital level may also be achieved, eg by the firm's purchase back of its own shares (this is relatively rare in the UK where cumbersome legal clearance is required).

The "liability side only" capital changes do not, in the accounting sense, change the amount of capital. More particularly these involve, ...

CAPITAL CHANGE

		CAPITAL LEVEL CHANGE	NO CAPITAL LEVEL CHANGE
LIABILITY SIDE ONLY	INTERNAL EQUITY ACCOUNTS ONLY	X	Stock Splits Stock Dividends *
	INCLUDES EXTERNAL to EQUITY ACCOUNTS	X	"Pure" Leverage
LIABILITY & ASSET SIDES		eg Security Issue for Cash	X

* In the UK terminology Share Splits, & Bonus, or Scrip Issues.

Internal Equity Account Changes:

(i). Share Splits (Stock Splits in US)

A restructuring of the capital stock account by changing the number of shares representing share capital; eg a one for one split doubles the number of shares held by an existing shareholder.

(ii). Bonus or Scrip Issues (Stock Dividends in US)

A transfer of funds within the equity accounts, ie from shareholder reserve accounts to the share capital account;

this is accompanied by an issue of shares to existing shareholders on a pro rata basis to reflect the increased share capital - ie a share split.

External Equity Account Changes:

"Pure" leverage is a generic name for changes which involves the simultaneous issue of one class of liability side security and the retirement of another without any change in the asset structure. This type is exampled by security swaps (ie exchange offers) and conversions;

2. Marketing of Issues

Capital increasing cash issues may be broadly categorised in terms of management's choice of marketing strategy; the choice may carry relative cost ramifications. The market targeted may be the public at large, existing security holders, or a single or select group of purchasers. Further marketing decisions concern the use, or not, of underwriters; the form of underwriting represents another form of distinction.

a. Target Market

A basic distinction may be drawn between public (cash or rights) and private issues. A public offer is made to the public at large; or directly to the firm's existing security holders in what is termed a privileged subscription or rights issue. A direct issue at agreed terms to a single individual or group is known as a private placement.

A share rights issue by a firm involves an offer of shares on a pro rata basis to its own shareholders. A rights issues may be legally endorsed in firm's constitution (ie articles of incorporation) by a requirement that shareholders have a pre-emptive right to subscribe to a new offering. In a rights issue the existing shareholders receive a right to buy additional shares proportional to their holding at a predetermined price; they can either sell, exercise, or do nothing with their rights.

Brealey & Myers (1988 p341) note that there are no strict definitions of a private placement, but the Securities and Exchange Commission (SEC) ... 'has insisted that the security should be sold to no more than a dozen or so knowledgeable investors'. A private placement avoids the costly process of issue registration with the SEC and tends to have lower underwriting costs.

b. Offer Terminology

Seasoned and Unseasoned Offers:

The initial issue of a security, ie one which previously has not been issued to the market, is known as an unseasoned offer. This is a particular form of capital structure change exampled by the public flotation of a company with the first issue of stock. Later additional issues of the same security are known as seasoned issues.

Primary and Secondary Offers:

A further distinction may be drawn between primary and secondary offerings of securities. A primary offer involves the firm's issue of new securities; ie an additional issue - the expansion of an existing issue. This could also represent the initial public offering for a company changing from private to public status. A secondary offering refers to the offer of securities previously issued; eg offer to sell existing shareholding.

c. Underwriting Choice

A firm may structure an offer and then put it out for competitive bid. Otherwise it may choose external assistance by hiring an underwriter to offer the securities for sale to the public. If the firm uses an underwriter, it can negotiate the offering terms with the underwriter, The underwriting contract can be a firm commitment or a best efforts offering; Smith (1986).

As noted by Shimrat (1987), underwriters perform a triple role, -providing advice to the company, buying the issue, and finally reselling it to the public.

In a cash offer the underwriter is paid a spread; ie purchasing the shares below the offering price at which the securities are finally bought by investors. The spread represents payment to the underwriter both for advice and for the role in marketing the issue.

If the issue is considered particularly risky, the underwriter may refuse to enter a fixed commitment and only accept the issue on either a "best efforts" or an "all-or-none" basis. Best efforts means that the underwriter undertakes to sell as

much of the issue as possible but does not guarantee the sale of the issue. All or none means that if the entire issue cannot be sold at the offering price, the deal is called off, and the issuing company receives nothing.

3. Issue Costs

Apart from basic administrative costs and legal fees, other choices in the cash issue offer process may influence costs. Note also that market reaction to an issue may suggest a cost. The cost of underpricing a share issue may be significant; in initial public offerings, the cost of underpricing usually exceeds other issue costs: Brealey & Myers (1988).

a. Administrative Costs

Public issues involve substantial administrative costs. These include several significant factors; ie registration and prospectus costs require legal, accounting and management time, plus services of underwriters and their advisers; also printing, mailing costs etc.

An option is available in US registration procedures. The issuing firm may register the issue with the Securities and Exchange Commission under traditional registration procedures or, if the firm qualifies, file a shelf registration in which the firm registers all securities it intends to sell over the next two years; Smith (1986). Shelf registration may provide a convenient and cheaper means to launch future share issues; Brealey & Myers (1988).

b. Underwriting Costs

In the US context, Smith (1986) comments that the two most frequently employed methods by which public corporations market new securities are rights offerings and firm commitment underwritten offerings. He also notes that Smith (1977) observes out-of-pocket expenses of an equity issue underwritten by an investment banker are from three to 30 times higher than the costs of a non-underwritten rights offering; nevertheless, over 80% of the equity offerings he examines employ underwriters.
Smith (1986) cites the argument that in addition to their marketing function, and due to informational asymmetry, investment bankers perform a potentially valuable monitoring role; eg analogous to that of bond rating agencies or independent auditing firms.

ANNEX 4.2

Risk Frameworks

Revell's Expanded Framework:

Revell (1975 p82) suggested a wider range which included the risks of foreign exchange, inflation, and the loss of confidence by depositors and the general public. He reworked Vojta's (1973a) list adjusting its restrictive definitions and seeking ..'a complete listing of all the possible sources of risk and omitting only those "speculative" risks arising from political decisions and other events that are both unpredictable and outside the control of the credit institution'. The list of types, and sources, of risk includes:-

1) Credit Risk: Default or delay in fulfillment of obligations.

2) Investment Risk: Changes in Interest rates, foreign exchange rates and asset prices.

3) Liquidity Risk: Faulty balance sheet structure; changes in asset prices.

4) Earnings Risk: Changes in interest rates, asset prices and operating expenses.

5) Operating Risk: Operating errors; inefficiency; faulty control procedures.

6) Insured Risk: Excesses on insurance policies; risks not covered.

7) Spillover Risks: Special situations in which any of the main risks identified above may arise. These are "spillover" risks in the sense that the net worth in the balance sheet may be in jeopardy for reasons not apparent on the balance sheet. Revell considers these risks under three headings; a) risks associated with a group form of company organisation, b) "sovereign" risks arising from operations outside the country of incorporation of the credit institution, and c) chains of risk in such cases as inter-bank deposits.

Revell's list omits both fraud risk and fiduciary risk which he considers included as insurable risks. Nevertheless, he allows that the list does not cover excesses on insurance policies and insurable risk that have been omitted.

Gardener's Risk Categories:

Gardener (1981 p71) supplies a more comprehensive list of non-insurable risks, adding in particular, financial risk.

1) Liquidity Risk: The risks entailed in meeting demands for liquidity as they occur.

2) Profit Risk: The risks entailed in inadequate earnings, earnings variability, inflation and growth.

3) Investment Risk: The risks involved in changes in the value of such assets as marketable investments (ie market risk) and fixed assets.

4) Credit Risk: The risks of default by bank borrowers, ie on loans and investments.

5) Risk from Contingent Liabilities: The risk that the bank may be called upon to meet commitments on contingent liabilities, such as guarantees and indemnities.

6) Operating Risks: The risks entailed in operating errors and inefficiencies.

7) Fraud Risks: The risks associated with employee dishonesty, theft, etc.

8) Foreign Exchange Risk: The risks associated with changes in exchange rates for assets and liabilities denominated in foreign currencies.

9) Fiduciary Risk: The risks arising through the improper discharge of fiduciary responsibilities.

10) Financial Risk: The risks entailed in financial structure and dividend policies, together with their possible implications for the bank's cost of funds.

11) Exceptional Risk: Other possible extraordinary risks not covered in other risk categories.

ANNEX 4.3

US Post-1981 Bank Capital Regulatory Regime

Major revisions of the 1981 regime include, as noted by Wall (1989),

A: 1982 (May):

The FED and the OCC announced their criteria for assessing mandatory convertible debt issues; conditions were set in order for its ranking as primary capital.
These included,
- the security must mature in 12 years or less
- the aggregate amount of the mandatory convertibles may not exceed 20% of all other types of primary capital
- the issuer may redeem the securities prior to maturity only with the proceeds from selling common or perpetual preferred stock
- the holder may not accelerate payment except in the event of bankruptcy, insolvency, or reorganisation, and
- the security must be subordinated in right of payment to all senior debt.

The regulators noted that two types of mandatory convertible securities had been issued, namely
i. equity notes; those mandating conversion of the debt to common or perpetual preferred stock, and
ii. equity commitment notes; those that merely obligate the issuer to sell stock in sufficient amount to fund the repayment of the debt. The regulations imposed additional restrictions on both types of mandatory convertible

securities.

B: 1983 (June);

The regulators introduced a 5% primary capital ratio guideline for multinationals, the same as for regional banks, but no total capital ratio requirement or zones of adequacy were established.

C: 1985 (March):

The FDIC adopted the same capital adequacy standards as the FED and the OCC. Also, the FDIC and OCC announced changes in their regulations governing capital definition and ratio standards; a uniform 5.5% primary capital-to-total asset ratio was required of all banking organisations regardless of their size. Also,
- all intangible assets except purchased mortgage servicing rights should be deducted from capital.
- equity committment notes were no longer included as an element of primary capital.
- secondary capital could include only subordinated notes and debentures, and limited life preferred stock up to 50% of primary capital, and
- capital ratios should be calculated using average total assets rather than period-end total assets.

D: 1985 (April):

The FED approved the FDIC and OCC guidelines for member banks while deciding not to impose exactly the same guidelines on bank holding companies.

Changes for bank holding companies included,
- a case by case approach to reviewing intangible assets with particular attention being paid to intangible assets in excess of primary capital.
- equity commitment notes remains an element of primary capital subject to certain conditions, and
- bank holding companies are allowed to use end of period rather than average total assets.

E: 1986 (November):

The FED approved, as an element of primary capital, perpetual debt satisfying certain criteria. Also, the sum of perpetual preferred stock, mandatory convertible debt, and perpetual debt was restricted to one-third of gross primary capital (ie primary capital before subtracting out intangibles).

ANNEX 4.4

BASLE COMMITTEE: 1988 AGREEMENT

International Convergence of Capital
Measurement and Capital Standards

Summary of July 1988 Agreement
SOURCE: Annexes to the Agreement

(A): Definition of Capital Included in Capital Base

(To apply at end-1992; see Table 4.5A in dissertation text for transitional arrangements)

A. Capital Elements:

Tier 1
(a) Paid-up share capital/common stock
(b) Disclosed Reserves
Tier 2
(a) Undisclosed Reserves
(b) Asset Revaluation Reserves
(c) General Provisions/General Loan Loss Reserves
(d) Hybrid (debt/equity) Capita Instruments
(e) Subordinated Term Debt

The sum of Tier 1 and Tier 2 elements will be eligible for inclusion in the capital base, subject to the following limits.

B. Limits and Restrictions:

(i) The total of Tier 2 (supplementary) elements will be limited to a maximum of 100% of the total Tier 1 elements;
(ii) subordinated term debt will be limited to a maximum of 50% of Tier 1 elements;
(iii) where general provisions/general loan loss reserves include amounts reflecting lower valuations of asset or latent but unidentified losses present in the balance sheet, the amount of such provisions or reserves will be limited to a maximum of 1.25 percentage points, or exceptionally and temporarily up to 2.0 percentage points, of risk assets:1.
(iv) asset revaluation reserves which take the form of latent gains on unrealised securities (see below) will be subject to a discount of 55%.

C. Deductions from the Capital Base:

From Tier 1:
Goodwill

From Total Capital:
(i) Investments in unconsolidated banking and financial subsidiary companies
N.B. The presumption is that the framework would be applied on a consolidated basis to banking groups
(ii) Investments in the capital of other banks and financial institutions (at the discretion of national authorities).

D. Definition of Capital Elements:
(i) Tier 1: includes only permanent shareholders' equity (issued and fully paid ordinary shares/common stock and perpetual non-cumulative preference shares) and disclosed

reserves (created or increased by appropriations of retained earnings or other surplus, eg share premiums, retained profit,2 general reserves and legal reserves). In the case of consolidated accounts, this also includes minority interests in the equity of subsidiaries which are less than wholly owned. This basic definition of capital excludes revaluation reserves and cumulative preference shares.
(ii) Tier 2: (a) undisclosed reserves are eligible for inclusion within supplementary elements provided these reserves are accepted by the supervisor. Such reserves consist of that part of the accumulated after-tax surplus of retained profits which banks in some countries may be permitted to maintain as an undisclosed reserve. Apart from the fact that the reserve is not identified in the published balance sheet, it should have the same high quality and character as a disclosed capital reserve; as such, it should not be encumbered by any provision or other known liability but should be freely and immediately available to meet unforseen future losses. This definition of undisclosed reserves excludes hidden values arising from holdings of securities in the balance sheet at below current market prices (see below).

(b) Revaluation reserves arise in two ways. Firstly in some countries, banks (and other commercial companies) are permitted to revalue fixed assets, normally their own premises, from time to time in line with the change in market values. In some of these countries the amount of such revaluations is determined by law. Revaluations of this kind are reflected on the face of the balance sheet as a revaluation reserve.
Secondly, hidden values or "latent" revaluation reserves may be present as a result of long-term holdings of equity securities valued in the balance sheet at the historic cost of acquisition.

Both types of revaluation reserve may be included in Tier 2 provided that the assets are prudently valued, fully reflecting the possibility of price fluctuation and forced sale. In the case of "latent" revaluation reserves a discount of 55% will be applied to the difference between historic cost book value and market value to reflect the potential volatility of this form of unrealised capital and the notional tax charge on it.

(c) General provisions/general loan loss reserves: provisions or loan loss reserves held against the future, presently unidentified losses are freely available to meet losses which subsequently materialise and therefore qualify for inclusion within supplementary elements. Provisions ascribed to impairment of particular assets or known liabilities should be excluded. Furthermore, where general provisions/general loan loss reserves include amounts reflecting lower valuations of assets or latent but unidentified losses already present in the balance sheet, the amount of such provisions or reserves eligible for inclusion will be limited to a maximum of 1.25 percentage points, or exceptionally and temporarily up to 2.0 percentage points.3.

(d) Hybrid (debt/equity) capital instruments. This heading includes a range of instruments which combine characteristics of equity capital and of debt. Their precise specifications differ from country to country, but they should meet the following requirements:

- they are unsecured, subordinated and fully paid-up;
- they are not redeemable at the initiative of the holder or without the prior consent of the supervisory authority;

- they are available to participate in losses without the bank being obliged to cease trading (unlike conventional subordinated debt);
- although the capital instrument may carry an obligation to pay interest that cannot permanently be reduced or waived (unlike dividends on ordinary shareholders' equity), it should allow service obligations to be deferred (as with cumulative preference shares) where the profitability of the bank would not support payment.

Cumulative preference shares, having these characteristics, would be eligible for inclusion in this category. In addition, the following are examples of instruments that may be eligible for inclusion: long-term preferred shares in Canada, titres participatifs and titres subordonnes a duree indeterminee in France, Genussscheine in Germany, perpetual subordinated debt and preference shares in the United Kingdom and mandatory convertible debt instruments in the United States. Debt Capital instruments which do not meet these criteria may be eligible for inclusion in item (e).

(e) Subordinated term debt: includes conventional unsecured subordinated debt capital instruments with a minimum original fixed term to maturity of over five years and limited life redeemable preference shares. During the last five years to maturity, a cumulative discount (or amortisation) factor of 20% per year will be applied to reflect the diminishing value of these instruments as a continuing source of strength. Unlike instruments included in item (d), thee instruments are not normally available to participate in the losses of a bank which continues trading. For this reason these instruments will be limited to a maximum of 50% of Tier 1.

Footnotes:

1. This limit would only apply in the event that no agreement is reached on a consistent basis for including unencumbered provisions or reserves in capital.

2. Including, at national discretion, allocations to or from reserve during the course of the year from current year's retained profit.

3. This limit would apply in the event that no agreement is reached on a consistent basis for including unencumbered provisions or reserves in capital.

(B): Risk Weights by Category of On-Balance-Sheet Asset.

0%

(a) Cash 1
(b) Claims on central governments and central banks denominated in national currency and funded in that currency
(c) Other claims on OECD 2 central-governments 3 and central banks
(d) Claims collateralized by cash or OECD central-government securities3 or guaranteed by OECD central governments4

0, 10, 20 or 50% (at national discretion)

(a) Claims on domestic public-sector entities, excluding central government, and loans guaranteed 4 by such entities

20%

(a) Claims on multilateral development banks (IBRD, IADB, AsDB, AfDB, EIB) 5 and claims guaranteed by, or collateralised by securities issued by such banks 4
(b) Claims on banks incorporated in the OECD and loans guaranteed 4 by OECD incorporated banks
(c) Claims on banks incorporated in countries outside the OECD with a residual maturity of up to one years and loans with a residual maturity of up to one year guaranteed by banks incorporated in countries outside the OECD
(d) Claims on non-domestic OECD public-sector entities, excluding central government, and loans guaranteed 4 by such entities

(e) Cash Items in process of collection

50%

(a) Loans fully secured by mortgage or residential property that is or will be occupied by the borrower or that is rented

100%

(a) Claims on the private sector
(b) Claims on banks incorporated outside the OECD with a residual maturity of over one year
(c) Claims on central governments outside the OECD (unless denominated in national currency - and funded in that currency - see above)
(d) Claims on commercial companies owned by the public sector
(e) Premises, plant and equipment and other fixed assets
(f) Real estate and other investments (including non-consolidated investment participations in other companies)
(g) Capital instruments issued by other banks (unless deducted from capital)
(h) All other assets

Footnotes

1. Includes (at national discretion) gold bullion held in own vaults or on an allocated basis to the extent backed by bullion liabilities.

2. The OECD comprises countries which are full members of the OECD or which have concluded special lending arrangements with

the IMF associated with the Fund's General Arrangements to Borrow.

3. Some member countries intend to apply weights to securities issued by OECD central governments to take account of investment risk. These weights would, for example, be 10% for all securities or 10% for those maturing in up to one year and 20% for those maturing in over one year.

4. Commercial loans partially guaranteed by these bodies will attract equivalent low eights on that part of the loan which is fully covered. Similarly, loans partially collateralised by cash or securities issued by OECD central governments and multinational development banks will attract low weights on that part of the loan which is fully covered.

5. Claims on other multilateral development banks in which G-10 countries are shareholding members may, at national discretion, also attract a 20% weight.

(C): Credit conversion factors for Off-Balance-Sheet Items

The framework takes account of the credit risk on off-balance-sheet exposures by applying credit conversion factors to the different types of off-balance-sheet instrument or transaction. With the exception of foreign exchange and interest rate related contingencies, the credit conversion factors are set out in the table below.
They are derived from the estimated size and likely occurrence of the credit exposure, as well as the relative degree of credit risk as identified in the Committee's paper "The management of banks' off-balance-sheet exposures; a supervisory perspective" issued in March 1986.
The credit conversion factors would be multiplied by the weights applicable to the category of the counterparty for an on-balance-sheet transaction.

Instruments	Credit conversion factors
1. Direct credit substitutes, eg general guarantees of indebtedness (including standby letters of credit serving as financial guarantees for loans and securities) and acceptances (including endorsements with the character of acceptances)	100%
2. Certain transaction-related contingent items (eg performance bonds, bid bonds, warranties and standby letters of credit related to particular transactions)	50%

3. Short-term self-liquidating trade-related contingencies (such as documentary credits collateralised by the underlying shipments)	20%
4. Sale and repurchase agreements and asset sales with recoursel, where the credit risk remains with the bank	100%
5. Forward asset purchases, forward forward deposits and partly-paid shares and securities, 1 which represent commitments with certain drawdown	100%
6. Note issuance facilities and revolving underwriting facilities	50%
7. Other commitments (eg formal standby facilities and credit lines) with an original2 maturity of over one year.	50%
8. Similar commitments with an original2 maturity of up to one year, or which can be unconditionally cancelled at any time	0%

(N.B. Member countries will have some limited discretion to allocate particular instruments into items 1 to 8 above according to the characteristics of the instrument in the national market)

Foreign exchange and interest rate related contingencies

The treatment of foreign exchange and interest rate related items need special attention because banks are not exposed to

credit risk for the full face value of their contracts, but only to the potential cost of replacing the cash flow (on contracts showing positive value) if the counterparty defaults. The credit equivalent amounts will depend inter alia on the maturity of the contract and on the volatility of the rates underlying that type of instrument.

Despite the wide range of different instruments in the market, the theoretical basis for assessing the credit risk on all of them has been the same. It has consisted of an analysis of the behaviour of matched pairs of swaps under different volatility assumptions. Since exchange rate contracts involve an exchange of principal on maturity, as well as being generally more volatile, higher conversion factors are proposed for those instruments which feature exchange rate risk. Interest rate contracts 3 are defined to include single-currency interest rate swaps, basis swaps, forward rate agreements, interest rate futures, interest rate options purchased and similar instruments. Exchange rate contracts 3 include cross-currency interest rate swaps, forward foreign exchange contracts, currency futures, currency options purchased and similar instruments. Exchange rate contracts with an original maturity of 14 calendar days or less are excluded.

A majority of G-10 supervisory authorities are of the view that the best way to assess the credit risk on these items is to ask banks to calculate the current replacement cost by marking contracts to market, thus capturing the current exposure without any need for estimation, and then adding a factor (the "add-on") to reflect the potential future exposure over the remaining life of the contract. It has been agreed that, in order to calculate the credit equivalent amount of its off-balance-sheet interest rate and foreign exchange rate instruments under this

current exposure method, a bank would sum:

- the total replacement cost (obtained by "marking to market") of all its contracts with positive value and
- an amount for potential future credit exposure calculated on the basis of the total notional principal amount of its book, split by residual maturity as follows:

Residual Maturity	Interest Rate Contracts	Exchange Rate Contracts
Less than one year	nil	1.0%
One Year and over	0.5%	5.0%

No potential credit exposure would be calculated for single currency floating/floating interest rate swaps; the credit exposure on these contracts would be evaluated solely on the basis of their market-to-market value.

A few G-10 supervisors believe that this two-step approach, incorporating a "market to market" element, is not consistent with the remainder of the capital framework. They favour a simpler method whereby the potential credit exposure is estimated against each type of contract and a notional capital weight allotted, no matter what the market value of the contract might be at a particular reporting date. It has therefore been agreed supervisory authorities should have discretion 4 to apply the alternative method of calculation described below, in which credit conversion factors are derived without reference to the current market price of the instruments. In deciding on what those notional credit conversion factors should be, it has been agreed that a slightly more cautious bias is justified since the current

exposure is not being calculated on a regular basis.

In order to arrive at the credit equivalent amount using this original exposure method, a bank would simply apply one of the following tow sets of conversion factors to the notional principal amounts of each instrument according to the nature of the instrument and its maturity:

Maturity 5	Interest Rate Contracts	Exchange Rate Contracts
Less than one year	0.5%	2.0%
One year and less than two years	1.0%	5.0% (ie 2%+3%)
For each additional year	1.0%	3.0%

It is emphasised that the above conversion factors, as well as the "add-ons" for the current exposure method, should be regarded as provisional and may be subject to amendment as a result of changes in the volatility of exchange rates and interest rates.

Careful consideration has been given to the arguments put forward for recognising netting, i.e. for weighting the net rather than the gross claims arising out of swaps and similar contracts with the same counterparties. The criterion on which a decision has been based is the status of a netting contract under national bankruptcy regulations. If a liquidator of a failed counterparty has (or may have) the right to unbundle

the netted contracts, demanding performance on those contracts favourable to his client and defaulting on unfavourable contracts, there is no reduction in counterparty risk. Accordingly, it has been agreed that:

- banks may net contracts subject to novation,6 since it appears that counterparty risk is genuinely reduced by the substitution of a novated contract which legally extinguishes the previous obligation. However, since under some national bankruptcy laws liquidators may have the right to unbundle transactions undertaken within a given period under a charge of fraudulent preference, supervisory authorities will have national discretion to require a phase-in period before a novation agreement can be recognised in the weighting framework;
- banks may not for the time being net contracts subject to close-out clauses 7. The effectiveness of such agreements in an insolvency has not yet been tested in the courts, nor has it been possible top obtain satisfactory legal opinion that liquidators would not be able to overturn them. However, the Committee does not wish to discourage market participants from employing clauses which might well afford protection in certain circumstances in some national jurisdictions and would be prepared to reverse its conclusions if subsequent decisions in the courts support the integrity of close-out netting agreements 8. In any event, the Committee will continue its work to assess the acceptability of various forms of netting.

Once the bank has calculated the credit equivalent amounts, whether according to the current or the original exposure method, they are to be weighted according to the category of the counterparty in the same way as in the main framework, including concessionary weighting in respect of exposures backed by eligible guarantees and collateral. In addition,

since most counterparties in these markets, particularly for long-term contracts, tend to be first class names, it has been agreed that a 50% weight will be applied in respect of counterparties which would otherwise attract a 100% weight9. However, the Committee will keep a close eye on the credit quality of participants in these markets and reserves the right to raise the weights if average credit quality deteriorates or if loss experience increases.

Footnotes

1. These items are to be weighted according to the type of asset and not according to the type of counterparty with whom the transaction has been entered into. Reverse repos (i.e. purchase and resale agreements - where the bank is the receiver of the asset) are to be treated as collateralised loans, reflecting the economic reality of the transaction. The risk is therefore to be measured as an exposure on the counterparty. Where the asset temporarily acquired is a security which attracts a preferential risk weighting, this would be recognised as collateral and the risk weighting would be reduced accordingly.

2. In order to facilitate data collection, during the transitional period up to end-1992, but not beyond, national supervisory authorities will have discretion to apply residual maturity as a basis for measuring commitments.

3. Instruments traded on exchanges may be excluded where they are subject to daily margining requirements. Options purchased over the counter are included with the same conversion factors as other instruments, but this decision might be reviewed in the light of future experience.

4. Some national authorities may permit individual banks to choose which method to adopt, it being understood that once a bank had chosen to apply the current exposure method, it would not be allowed to switch back to the original exposure method.

5. For interest rate contracts, there is national discretion as to whether the conversion factors are to based on original or residual maturity. For exchange rate contracts, the conversion factors are to be calculated according to the original maturity of the instrument.

6. Netting by novation as defined in this context is a bilateral contract between two counterparties under which any obligation to each other to deliver a given currency on a given date is automatically amalgamated with all other obligations for the same currency and value date, legally substituting one single net amount for the previous gross obligations.

7. Close-out as defined in this context refers to a bilateral contract which provides that, if one of the counterparties is wound up, the outstanding obligations between the two are accelerated and netted to determine the counterparty's net exposure.

8. The other principal form of netting, payments netting, which is designed to reduce the counterparty risk arising out of daily settlements, will not be recognised in the capital framework since the counterparty's gross obligations are not in any way affected.

9. Some member countries reserve the right to apply the full 100% weight.

ANNEX 4.5

BANK CAPITAL STRUCTURE: MODELS AND EVIDENCE

A: Early Evidence on Relationship between Bank Capital Structure and Value (Cost of Capital)

Orgler & Wolkowitz (1976) note a body of empirical studies directed to relationship between leverage and variable such as stock prices, price-earnings ratios, and interest on long term debt. They comment that results obtained on the relationship between the cost of capital and leverage (as well as other variables) are more suggestive than conclusive.

a. Durand (1957);

Bank share prices are regressed against two sets of independent variables; firstly book value per share, dividends per share and earnings per share, and secondly the first set were augmented with total capital, assets to capital and assets to capital squared.

The data set considered 1,170 banks over 8 years, 1946-53. The banks were categorised by one of 6 locational classifications, and consequently for regression there were 48 cross section (6 categories by 8 years).

The dependent variable's (bank stock prices) variations went largely unexplained both on group to group and year to year variations. Of the two sources of variation intergroup variation was observed to be more substantial than interyear

variation.

Of the independent variables, only dividends per share and earnings per share provided any systematic explanation for the observed values of the share prices. On the basis of that result, the study emphasised dividends. Also it considered the influence of earnings per share growth on stock prices but found no discernible relationship.

b. Van Horne & Helwig (1966):

In a study directed at 118 small banks (total deposits less than $10m) located in Michigan at the 1964 year end. Analysing the cross sectional data by contingency tables - more direct but less rigorous method of relating variables than regression as it only tests for association between variables. A number of variables are related to two price ratio variables; ie. price per share divided by book value per share, and price per share divided by earnings per share. One of the leverage variables, total capital to total deposits appeared to have a mildly negative relationship with to the price of equity. This and other results led the authors to conclude '... it would appear that traditional security analysis is not followed altogether by investors in small bank stocks'. The most important variable appeared to be dividends per share.

c. Magen (1971)

Magen considered if leverage influences the price of bank equity. In a study of the 50 largest (by assets in 1965)

commercial banks over 1962-66 the author used time series and cross sectional analysis. The variables employed were defined in various ways. The dependent variable, a ratio of earnings to price per share (defined in three ways) was considered in relation mainly to leverage (defined in four ways) as well as payout ratios, growth (in earnings and bank size) and earnings stability (ie risk).

Results on the leverage relationship are interesting but inconclusive. There was no unequivocal support for the hypothesis that the price of equity is influenced by leverage, although some erratic evidence of influence suggests that under certain circumstances leverage may have some effect on prices. Again, dividends and payout ratios were found to be the most statistically significant variables.

d. Jacobs, Beighley & Boyd (1975):

The authors sampled 100 of the 150 largest bank holding companies for 1970-73 using the market price of equity as the dependent variable they regressed it with earnings per share, growth in earnings per share, total assets, and leverage measured in four ways (for the consolidated position of the holding company, for the parent company, for the banking subsidiaries, and for the non-bank subsidiaries). Leverage, although it did not consistent and significantly relate to the price of equity, it did so more frequently than in previous studies. As measured for the consolidated bank and subsidiaries, leverage had a statistically significant relation to price in 1972 and 1973. For the banking affiliates alone, the measure of leverage proved significant for both 1970 and 1973.

Nevertheless, Humphrey & Talley (1975) reworked the Jacobs et al procedure and found the results to be dependent on the technical issues of model specification.

e. Peltzman (1970)

Peltzman applies a simple capital investment model, such as might be applied in general industry, to explain investment in commercial banking. His model is tested empirically to determine whether,

1. can any substantial part of the variation in capital investment in banking be explained by his bank capital investment model.

2. Are expected profits better represented by current profits or stock prices in the model

3. Has formal government regulation of capital investment had any substantial effect on bank capital investment; is there substitution of deposit insurance for capital?

The dependent variable, the percentage change in bank capital, is regressed against six variables (the expected rate of return on capital in banking, rate of return on alternative uses for bank capital, default risk of bank portfolios, capital deposits ratio, expected annual rate of growth of bank deposits, and percentage change in bank capital desired by regulators).

The empirical study regresses the annual change (in percent) of bank capital against independent variables (non-regulatory) which included proxies for expected profits, with equivalent success; the proxies used were stock prices to book value (lagged one period), and net income to total capital (lagged one period). The result appeared positive and was highly significant in explaining variation in capital investment. Orgler & Wolkowitz (1976 p110) criticise the state by state aggregation of data for the study which is directed at disaggregated banking units.

The behaviour of the non-regulatory variables in his estimates of the model conform to prior expectations, and the model can explain a substantial portion of the (inter-state) variation in capital investment, Thus whatever its functional characteristics, investment in banking can be treated usefully much like investment in any industry.

Also, a major purpose of this treatment was to determine whether stock prices or current profits were the better proxy for expected profits. To this end, market value-book value indexes were constructed for each of the 49 states in the sample and were entered along with and in place of the current rate of return as an independent variable in the regressions. But is was impossible to choose one measure of expected profits over another - both have significant positive coefficients in their respective regressions, and both regressions give almost the same overall fit to the data.

Orgler & Wolkowitz (1976) also comment that Peltzman's result complements the previous studies directed at the cost of capital in banking which showed the effect of leverage on stock prices and P/E ratios - while Peltzman evaluates the effect of price and earnings on capital formation.

B: Models of General Market Imperfections

Apart from those models emphasising regulatory constraints, a number involve the exploitation of various market imperfections to yield optimal capital structures.

(i). Pringle (1974) uses the capital asset pricing model of Sharpe/Lintner/Mossin modified to relax the assumption of equal borrowing and lending rates. He demonstrates that the optimal capital position depends on the relative degree of imperfection in the borrowing and capital markets; generally, the optimal level of capital is greater, the greater the imperfections in the borrowing market and the smaller the imperfections in the capital market. As to the maturity structure of liabilities, Pringle notes that cyclical variations in the excess components of return and cost are particularly important to the capital decision because of the long maturity of capital claims and the resulting infeasibility of varying capital up and down in response to cyclical changes.

(ii). Taggart & Greenbaum (1978) show that the optimal capital structure varies with the regulatory setting (viz a required reserve ratio) and develop their model to reflect a revenue from loans and the provisions of transaction services (such as cheque clearing and book-keeping) from which the bank must repay deposits with interest and meet the cost of producing transaction services. In this model the bank must choose a capital structure which, within the constraint of the balance sheet identity, determines the volume of loans, and maximises the net present value of shareholders' equity.

(iii). Orgler & Taggart (1983) consider the determination of bank capital structure in the light of corporate capital structure development in the recognition of taxation, and the costs of both bankruptcy and agency. They approach taxation, as in the Miller (1977) model, with banks paying corporate taxes and investors' return from equity exempt from personal tax; the return on deposits comprises an explicit interest, taxable for investors, and an untaxed service flow.

In considering the deposit demand curve, the model focuses on the trade-off for investors between equity and deposits, while the deposit supply curve represents the return on deposits necessary to induce the bank to substitute deposits for equity, with a slope reflecting the marginal cost of producing services per dollar of deposits.

Without the deposit services and reserve requirements, the model would be identical to Miller's. The introduction of the reserve requirement acts as a tax on deposit issuance and reduces the equilibrium bank leverage, while services affect both the level and slope of both the demand and supply curve. On the supply side, the costs of producing deposit services are specific to individual banks and thus, apart from the case of constant returns to scale - Baltensperger (1980) considers bank capital structure and the scale of operations, the industry equilibrium also implies an equilibrium output of deposits for each bank. More particularly, if marginal costs turn up at lower degrees of leverage for small banks, then smaller banks will tend to be less highly levered than large ones.

Orgler & Taggart also maintain that even in the absence of taxes the deposit supply curve will dictate equilibrium bank leverage. They suggest this may explain the relatively high

commercial bank leverage at the beginning of the century (circa 20% 1900-1915) and the imposition of corporate taxes, and perhaps other factors, tended to raise equilibrium leverage as trends indicate.

Orgler & Taggart extend their model to other liabilities issued by banks offering a variety of combinations of services, fee arrangements and explicit interest, noting in terms of overall demand for deposits that deposit tailoring tends to flatten the demand curve and the flatter the curve the greater the equilibrium level of leverage for banks in aggregate. On the supply side, the variety of interest payment and service packages offered would be determined by regulatory restriction and the technological feasibility of increasing differentiation - and on the basis that extant restrictions may constrain banks to operate at a point below the supply curve, they expect restriction removal to increase equilibrium bank leverage.

The introduction of bankruptcy and agency costs imparts a further downward slope to the deposit supply curve and, other things being equal, reduces equilibrium bank leverage.

(iv). Diamond (1984) develops a theory of financial intermediation based on minimising the cost of monitoring information which is useful for resolving incentive problems between borrowers and lenders.

Diamond's model reasons that an intermediary such as a bank is delegated the task of costly monitoring of loan contracts written with firms which borrow from it. The bank has a gross cost advantage in collecting this information because the alternative is either duplication of effort if each lender monitors directly, or a free rider problem in which case no

lender monitors.

Diamond concludes that diversification within the intermediary is the key to understanding why there is a benefit from delegating monitoring to an intermediary which is not monitored by its depositors. His model allows a positive role for financial intermediaries; they allow better contracts to be used and allow Pareto superior allocations. Also, the delegated monitoring role predicts well-diversified intermediaries with a capital structure which is mainly debt (deposits) and, despite the high leverage, a low probability of default.

ANNEX 4.6

The Development and Variety of Bank Asset Management Techniques

Source: Vlachakis (1988)

The use of operations research (OR) methods, initially developed for military needs in the late 1940's to early 1950's, later spread to business, and were in use by US banks by the early 1960's. Previously, Cohen & Hammer (1967, p149) note that the techniques used were,

> '.....nothing more than a cataloguing of traditional rules of thumb, tempered by the non-operational observation that such rules must be continually modified by ill-specified quantities of "management judgement".'

The pooled funds approach was a popular technique in which loans and investments were made from a common pool of funds without calculating the cost or velocity of each particular fund category and therefore differences in liquidity requirements and profitability between the various sources of funds were not taken into account.

This was refined by the technique of asset allocation which allowed recognition of differences, including liquidity needs, between the various funds categories. This technique allocated funds to assets in a way which matched the velocity of the source of funds to the maturity of the assets. For instance, relatively stable funds (time deposits, for example) can be invested in longer term assets while funds obtained through current accounts which are more volatile are invested in

shorter term assets. Although this technique was an important improvement over the pooled funds approach it was criticised along a number of dimensions by Cohen & Hammer (1967 p149).

> '..... the belief that available funds should be used to support assets appropriate to the velocity of these funds mistakenly overlook the important difference between the volatility of any particular dollar of deposit and minimum amounts and stability of these deposit balances. In addition by sole attention of velocity as the main criterion for earmarking funds, Asset Allocation implicitly assumes that sources of funds are determined independently of their uses. Thus, the dynamic feedback links which characterize current loan decisions and future deposit flows are ignored.'

More sophisticated 'asset management' techniques were introduced in the early 1960's; linear programming models, in various forms, provided a major tool. These techniques offer a basis for discussing and testing alternative policy options. The models can isolate the most important variables and save banks' executives precious time.

Particular models identified by Vlachakis (1988) include,

i. An intertemporal (dynamic) linear programming model in which various types of assets, deposits and capital emerged from a breakdown of the portfolio into a joint distribution of class and maturity; this was used by large US banks as a tool of determining optimal asset allocation and the profitability

of various sources of funds: Cohen & Hammer (1972).

ii. Also, Walker (1972) presented a recursive programming model as a tool of bank asset management. In a recursive model an optimal solution for each year is derived by using as known the model's parameters and data for the particular period as well as the optimal allocations in the previous period. The difference between a recursive and a dynamic model is as Walker (1972) points out, ... 'The solution to a dynamic problem must be optimal for the sequence as a whole, but this solution is not necessarily a series of successive optima as are the recursive optima.'

iii. Fortson & Dince (1977) present a goal programming model. In contrast to conventional linear programming where it is assumed that the bank's management has to choose one among the various goals facing it as its objective to be maximized and treat the remaining goals as constraints, goal programming is a specialised form of linear programming that distinguishes goals from constraints. So, in a goal programming model,.....

> 'Management must decide upon its goals and a satisfactory level of performance for each goal. thus, rather than attempting to find an optimum solution, the goal programming algorithm attempts to find a solution that is satisfactory in terms of the goals and does not violate the environmental constraints.'

They are using a model where they minimize the objective function, which represents the penalties (costs) associated with deviations from each particular goal, subject to a set of 'environmental' constraints.

iv. The other major way of looking at the problem of a managing a bank's portfolio is traditional portfolio theory. In portfolio models the emphasis is on the combination of risk and returns for a particular allocation of funds that satisfies liquidity needs while bank asset management models, Walker (1972, p2056)...

> '...must provide for control of liquidity, returns and risks in addition to allowing for bank growth, satisfying stockholders' demands and meeting legal requirements on bank operating procedures.'

Portfolio models use as objective function a utility function that embodies a degree of risk aversion of the financial institution, while linear programming models usually have a risk neutral objective function and the introduction of risk is achieved through the imposed constraints.

One major empirical application of portfolio theory to the London Clearing Banks is found in Parkin, Gray & Barret (1970).
The main objective of this paper as well as others in this area is to explain portfolio behaviour for monetary policy reasons rather than present a normative framework for bank management.

ANNEXES TO CHAPTER 5

ANNEX 5.1

US Bank Capital Issue Announcement Effects

From Keeley (1989): Stock Price Effects of Bank Holding Company Securities Issuance.

A: AR results by security type issued
B: AR results pre and post 1981.
C: B: by capital adequacy/inadequacy.
D: Percent Change in Capital/Asset Ratio

A:

ARs by Security Type: 1975-1986
(Average, two-day prediction errors)

	AR	Number	Negative
Common Stock	- .015*** (-4.10)	24	75%
Convertible Debt	- .0021 (-0.10)	6	43%
Mandatory Conv. Debt	- .0074* (-1.67)	22	73%
Multiple Simultaneous Issue			
- Debt/ Common Stock	- .031*** (-2.70)	2	100%
- Debt/ Preferred Stock	- .0072 (-1.06)	5	80%
Preferred Stock			
- Limited Life	- .00081 (-0.91)	9	44%
- Perpetual	.011** (2.29)	21	43%
- Convertible	- .020 (-1.31)	3	67%
Straight Debt X	- .00012 (-0.02)	63	50%

SOURCE: Keeley (1989)

AR = Average two-day prediction errors for the day preceding and the day of the announcement. Prediction errors are actual residual returns, not percentage returns.

Number = Number of Events (Total 155)
Negative = Percent Negative
X = Includes both shelf and non-shelf registration, and subordinated and unsubordinated debt. However, none of the ARs is statistically significant nor are there any significant differences among these categories.
Z score in parenthesis,
*** significantly different from zero at 1% level,
** significantly different from zero at 5% level,
* significantly different from zero at 10% level,

B:

ARs pre and post December 1981

Average 2-day Prediction Errors (APE), Before and After the December 1981 Change in Bank Capital Regulation.

	Pre	Post	Absolute Difference
Common Stock	-.026***	-.0079	.018***
Convertible Debt	-.0047	.0032	.079
Mandatory Conv. Debt	-	-.0074*	-
Preferred Stock - Limited Life	-.000059	-.0014	.0013
- Perpetual	-	-.011**	-
- Convertible	.0015	-.064	.065
Straight Debt	-.0062	.0016	.0076

Significantly different from zero, at level of 1% (***), 5% (**), and 10% (*)

C:

Common Stock ARs, by Regime, by Capital Adequacy Status

Average Abnormal Returns Associated with Common Stock Issues: by Regulatory Regime and, by Capital 'Deficiency' and 'Sufficiency' Status.

Period	Capital Deficient	Capital Sufficient	Absolute Difference
pre 1981	-.033*** (-4.43)	-.012* (-1.70)	.021*** (2.73)
post 1981	-.020*** (-2.90)	.015 (1.27)	.035*** (4.17)
Difference	.013 (1.53)	.027*** 2.97)	.014 (1.44)

SOURCE: Keeley (1989),
Abnormal Returns are two-day prediction errors.
Z score in parenthesis,
*** significantly different from zero at 1% level,
** significantly different from zero at 5% level,
* significantly different from zero at 10% level,

D:

Percent Change in Capital/Asset Ratio

Relationship between ARs by Capital Sufficiency/Deficiency, and the Percentage Change in Capital/Asset Ratio due to common stock issuance

	1975-86	1975-81	1981-86
Capital Deficient::			
n	16	6	10
R2	-.067	.58	.018
Intercept	-.025**	-.069***	-.0079
	(.010)	(0.15)	(.0098)
% Change in C/A Ratio	.029	.48**	-.12
	(.12)	(.17)	(.11)
Capital Sufficient::			
n	8	3	5
R2	.37	.44	.87
Intercept	-.051*	-.057	-.063**
	(.022)	(.028)	(.014)
% Change in C/A Ratio	.42*	.34	.66**
	(.19)	(.21)	(.13)

SOURCE: Keeley (1989)
Generalised Least Squares estimates
*** Significantly different from zero at the 1% level.
** Significantly different from zero at the 5% level.
* Significantly different from zero at the 10% level.

ANNEXES TO CHAPTER 6

ANNEX 6.1

EVENT DATE AND ISSUE DETAILS

EVENT	SECURITY Loan Stock=1 Ord Share=2‡	MATURITY Dated=1 Undated=2	INTEREST CHARGE Fixed=1 Floating=2	COINCIDENT EVENT‡‡ NO=1 YES=2
B030282	1	1	1	1
B070385	2			2
B070488	2			1
B201082	1	1	1	1
B201187	1	1	1	1
B260483	1	1	1	1
L010388	1	1	1	2
L011282	1	1	1	1
L270784	1	1	2	1
L290688	1	1	2	1
M030489	4			1
M031279	1	1	2	1
M070787	2			2
M080682	1	1	1	1
M090486	1	1	2	1
M091080	1	1	1	2
M100781	1	1	2	1
M101075	1	1	2	1
M160176	1	1	2	1
M201186	1	2	2	1
M260178	2			2
M280275	2			2
M290678	1	1	2	1
M290783	2			1
N060679	1	1	2	1
N090981	1	1	1	1
N140586	2			1
N190784	2			1
N270776	2			1
N310888	3			1
R140185	2			1
R141288	1	2	2	1
R181083	1	1	1	2
S090579	2			1
S140988	2			1
S141277	1	1	1	1
S151084	1	2	2	2
S180778	1	1	2	1
S200585	1	2	2	1
S220982	1	1	1	1
S250276	2			1
S300383	2			1

‡ by Rights Issue; Ord Share Public Offer Overseas=3; Preference Share=4

‡‡ Coincident announcement and/or non-general purpose for issue

EVENT = BANK + EVENT DATE

BANK= B(BARCLAYS), L(LLOYDS), M(MIDLAND), N(NATIONAL WESTMINSTER), R(ROYAL BANK OF SCOTLAND), S(STANDARD CHARTERED)

EVENT DATE = ANNOUNCEMENT ORIGIN DAY (DAY:MONTH:YEAR)

ANNEX 6.2

UK BANK EVENT DATES AND ABNORMAL RETURN MEASURMENTS

EVENT	DAY	$\bar{R}_m$	$\sum(R_{m1}-R_m)^2$	Rjt	Rmt	aj	bj	St Error	V_j^2	aj+bjRmt	AR_{je}	Sjt	SAR_{je}	$SAR_{je}/\sqrt{2}$
B030282	0	0.001284	0.004745	0.021842	0.013042	0.000252	1.26082	0.009423	0.000088	0.016696	0.005146	0.009636	0.534058	0.377636
B030282	1	0.001284	0.004745	0.006392	-0.00424	0.000252	1.26082	0.009423	0.000088	-0.00509	0.011487	0.009531	1.205195	0.852202
B201082	0	0.001862	0.005041	-0.01201	-0.00697	-0.00166	1.16958	0.01449	0.000209	-0.00983	-0.00218	0.014721	-0.14825	-0.10482
B201082	1	0.001862	0.005041	0.007284	0.002863	-0.00166	1.16958	0.01449	0.000209	0.001679	0.005604	0.014611	0.383585	0.271235
B260483	0	0.001163	0.004058	0.006183	0.000865	0.001471	1.34627	0.01433	0.000205	0.002636	0.003546	0.014449	0.245457	0.173565
B260423	1	0.001163	0.004058	0.010313	0.004481	0.001471	1.34627	0.01433	0.000205	0.007505	0.002807	0.014468	0.194070	0.137228
B070385	0	0.002025	0.004485	0.003435	0.000532	0.001405	0.99478	0.008725	0.000076	0.001935	0.001500	0.008799	0.170526	0.120580
B070385	1	0.002025	0.004485	0.008538	-0.00030	0.001405	0.99478	0.008725	0.000076	0.001100	0.007438	0.008802	0.844948	0.597468
B201187	0	-0.00399	0.030970	0.014027	-0.00709	0.000744	1.11651	0.0141	0.000198	-0.00718	0.021208	0.014219	1.491544	1.054821
B201187	1	-0.00399	0.030970	0.016170	0.013907	0.000744	1.11651	0.0141	0.000198	0.016272	-0.00010	0.014289	-0.00714	-0.00505
B070488	0	0.001520	0.006530	-0.10228	0.008888	0.000426	1.13688	0.01314	0.000172	0.010532	-0.11281	0.013303	-8.48062	-5.99670
B070482	1	0.001520	0.006530	-0.00929	0.009429	0.000426	1.13688	0.01314	0.000172	0.011147	-0.02044	0.013311	-1.53599	-1.08610
L011282	0	0.002695	0.006560	0.052180	0.018938	-0.00196	1.14538	0.0152	0.000231	0.019724	0.032456	0.015626	2.077004	1.468664
L011282	1	0.002695	0.006560	0.024721	0.005411	-0.00196	1.14538	0.0152	0.000231	0.004230	0.020490	0.015334	1.336219	0.944849
L270784	0	-0.00089	0.005531	-0.01602	-0.00354	-0.00131	1.10313	0.01102	0.000121	-0.00523	-0.01079	0.011118	-0.97092	-0.68655
L270784	1	-0.00089	0.005531	0.016289	0.001151	-0.00131	1.10313	0.01102	0.000121	-0.00004	0.016338	0.011115	1.469850	1.039341
L010388	0	0.002555	0.012051	0.047637	0.006783	-0.00058	1.20658	0.02497	0.000623	0.007600	0.040036	0.025195	1.589037	1.123619
L010388	1	0.002555	0.012051	0.006975	0.012841	-0.00058	1.20658	0.02497	0.000623	0.014909	-0.00793	0.025285	-0.31378	-0.22188
L290688	0	0.000038	0.003408	0.003193	-0.00010	0.001746	0.99395	0.01698	0.000288	0.001642	0.001550	0.017120	0.090575	0.064046
L290688	1	0.000038	0.003408	0.002218	0.002195	0.001746	0.99395	0.01698	0.000288	0.003928	-0.00171	0.017132	-0.09981	-0.07057
M280275	0	0.005218	0.048774	0.081578	0.025383	0.001468	1.06336	0.02865	0.000820	0.028460	0.053118	0.029005	1.831291	1.294918
M280275	1	0.005218	0.048774	-0.02640	-0.00941	0.001468	1.06336	0.02865	0.000820	-0.00853	-0.01786	0.028950	-0.61705	-0.43632
M101075	0	-0.00064	0.017694	0.018273	0.005172	0.000515	1.33955	0.01816	0.000329	0.007444	0.010829	0.018327	0.590864	0.417804
M101075	1	-0.00064	0.017694	-0.01076	-0.00494	0.000515	1.33955	0.01816	0.000329	-0.00610	-0.00466	0.018320	-0.25450	-0.17996
M160176	0	0.000928	0.006661	0.020224	0.001242	-0.00064	1.36646	0.01083	0.000117	0.001050	0.019174	0.010919	1.755898	1.241607
M160176	1	0.000928	0.006661	-0.00987	-0.01234	-0.00064	1.36646	0.01083	0.000117	-0.01751	0.007638	0.011061	0.690545	0.488289
M260178	0	-0.00073	0.006203	-0.05919	-0.01124	0.001399	0.87564	0.01171	0.000137	-0.00844	-0.04975	0.011910	-4.17759	-2.95400
M260178	1	-0.00073	0.006203	-0.02687	-0.00535	0.001399	0.87564	0.01171	0.000137	-0.00328	-0.02358	0.011827	-1.99451	-1.41033
M290678	0	0.001608	0.003609	0.005862	-0.00023	-0.00103	1.25643	0.009046	0.000081	-0.00133	0.007197	0.009125	0.788696	0.557692
M290678	1	0.001608	0.003609	0.005828	0.010407	-0.00103	1.25643	0.009046	0.000081	0.012042	-0.00621	0.009216	-0.67426	-0.47677
M031279	0	-0.00141	0.004276	0.006094	-0.00518	-0.00126	0.91753	0.01148	0.000131	-0.00802	0.012121	0.011594	1.045454	0.739247
M031279	1	-0.00141	0.004276	0.009116	0.009866	-0.00126	0.91753	0.01148	0.000131	0.007786	0.001330	0.011743	0.113261	0.080087
M091080	0	0.001539	0.003351	-0.00884	-0.00747	-0.00165	0.71872	0.01627	0.000264	-0.00702	-0.00181	0.016599	-0.10959	-0.07749
M091080	1	0.001539	0.003351	0.008921	-0.01069	-0.00165	0.71872	0.01627	0.000264	-0.00933	0.018257	0.016761	1.089283	0.770239
M100781	0	0.000451	0.004836	0.030943	0.011484	0.000381	1.2367	0.01588	0.000252	0.014584	0.016358	0.016208	1.009253	0.713650
M100781	1	0.000451	0.004836	0.006002	0.010550	0.000381	1.2367	0.01588	0.000252	0.013429	-0.00742	0.016176	-0.45906	-0.32460
M080682	0	0.000676	0.004133	0.041705	0.005069	-0.00117	1.10469	0.0132	0.000174	0.004426	0.037279	0.013340	2.794573	1.976062
M080682	1	0.000676	0.004133	0.014250	-0.00542	-0.00117	1.10469	0.0132	0.000174	-0.00716	0.021418	0.013368	1.602154	1.132894
M290783	0	0.001247	0.002860	0.004522	-0.01121	0.002144	1.39656	0.01014	0.000102	-0.01352	0.018046	0.010493	1.719713	1.216021
M290783	1	0.001247	0.002860	0	-0.00665	0.002144	1.39656	0.01014	0.000102	-0.00715	0.007156	0.010333	0.692561	0.489714

continued

EVENT	DAY	$\overline{Rm}$	$\Sigma(Rmi-Rm)^2$	Rjt	Rmt	aj	bj	St Error	Vj^2	aj+bjRmt	ARjc	Sjt	$SAR_{jc}/\sqrt{2}$
M090486	0	0.002837	0.002834	0	-0.00851	-0.00131	1.18685	0.02226	0.000495	-0.01142	0.011427	0.022941	0.498131	0.352232
M090486	1	0.002837	0.002834	0.014181	0.013840	-0.00131	1.18685	0.02226	0.000495	0.015107	-0.00092	0.022911	-0.04040	-0.02857
M201186	0	0.000252	0.003788	-0.00361	0.002630	-0.00088	0.64004	0.009940	0.000098	0.000803	-0.00441	0.010030	-0.44051	-0.31149
M201186	1	0.000252	0.003788	-0.00359	0.008969	-0.00088	0.64004	0.009940	0.000098	0.004860	-0.00845	0.010121	-0.83537	-0.59070
M070787	0	0.001983	0.004614	0	0.004883	-0.00293	1.20621	0.01639	0.000268	0.002954	-0.00295	0.016540	-0.17863	-0.12631
M070787	1	0.001983	0.004614	-0.03074	-0.00192	-0.00293	1.20621	0.01639	0.000268	-0.00526	-0.02548	0.016552	-1.53978	-1.08879
M030489	0	0.002961	0.002963	0.004509	0.000334	-0.00194	1.27592	0.008588	0.000073	-0.00151	0.006023	0.008669	0.694798	0.491296
M030489	1	0.002961	0.002963	0.002228	0.001449	-0.00194	1.27592	0.008588	0.000073	-0.00009	0.002320	0.008662	0.267920	0.189448
N270776	0	-0.00132	0.007143	-0.03143	-0.00376	0.000141	1.45595	0.0124	0.000153	-0.00533	-0.02610	0.012508	-2.08700	-1.47573
N270776	1	-0.00132	0.007143	0.009329	0.005011	0.000141	1.45595	0.0124	0.000153	0.007437	0.001891	0.012537	0.150891	0.106696
N190578	0	-0.00035	0.004161	-0.04572	-0.01568	0.000910	0.93853	0.01102	0.000121	-0.01381	-0.03191	0.011415	-2.79562	-1.97680
N190578	1	-0.00035	0.004161	-0.00736	-0.00601	0.000910	0.93853	0.01102	0.000121	-0.00473	-0.00262	0.011153	-0.23568	-0.16665
N060679	0	0.003691	0.006728	0.020194	0.013339	-0.00172	1.69878	0.01185	0.000140	0.020939	-0.00074	0.012029	-0.06187	-0.04375
N060679	1	0.003691	0.006728	0	-0.00290	-0.00172	1.69878	0.01185	0.000140	-0.00665	0.006656	0.011986	0.555342	0.392686
N090981	0	0.000869	0.003076	-0.00247	-0.00726	0.000958	1.17726	0.01472	0.000216	-0.00759	0.005118	0.014998	0.341276	0.241318
N090981	1	0.000869	0.003076	0.002482	-0.00055	0.000958	1.17726	0.01472	0.000216	0.000301	0.002180	0.014846	0.146896	0.103871
N190784	0	-0.00112	0.005397	-0.05046	-0.00499	-0.00184	0.86336	0.01134	0.000128	-0.00616	-0.04429	0.011449	-3.86875	-2.73562
N190784	1	-0.00112	0.005397	0.011673	0.007855	-0.00184	0.86336	0.01134	0.000128	0.004933	0.006739	0.011517	0.585165	0.413774
N140586	0	0.003153	0.003579	-0.09939	-0.01339	0.001480	0.86246	0.0174	0.000302	-0.01007	-0.08932	0.018192	-4.90983	-3.47177
N140586	1	0.003153	0.003579	-0.02596	-0.00846	0.001480	0.86246	0.0174	0.000302	-0.00582	-0.02014	0.017867	-1.12726	-0.79709
N310888	0	0.001170	0.001984	-0.00189	0.000109	-0.00074	1.14647	0.01027	0.000105	-0.00062	-0.00127	0.010358	-0.12276	-0.08681
N310888	1	0.001170	0.001984	-0.00569	-0.01399	-0.00074	1.14647	0.01027	0.000105	-0.01679	0.011098	0.010929	1.015424	0.718013
R181083	0	-0.00037	0.003606	0.016729	0.005179	0.001636	0.59551	0.01181	0.000139	0.004721	0.012007	0.011958	1.004143	0.710036
R181083	1	-0.00037	0.003606	-0.00822	0.004803	0.001636	0.59551	0.01181	0.000139	0.004497	-0.01272	0.011951	-1.06465	-0.75282
R140185	0	0.001654	0.002965	-0.08201	-0.01973	-0.00110	1.0222	0.01048	0.000109	-0.02127	-0.06674	0.011340	-5.88526	-4.16151
R140185	1	0.001654	0.002965	-0.00873	0.007794	-0.00110	1.0222	0.01048	0.000109	0.006865	-0.01559	0.010632	-1.46685	-1.03722
R141288	0	-0.00007	0.002841	0.005917	0.000121	-0.00005	0.91002	0.009648	0.000093	0.000056	0.005860	0.009728	0.602407	0.425966
R141288	1	-0.00007	0.002841	0.008823	0.004322	-0.00005	0.91002	0.009648	0.000093	0.003879	0.004943	0.009761	0.506464	0.358124
S250276	0	0.001522	0.004882	-0.02298	0.003506	-0.00152	0.81847	0.008777	0.000077	0.001344	-0.02433	0.008853	-2.74827	-1.94332
S250276	1	0.001522	0.004882	-0.02352	0.004856	-0.00152	0.81847	0.008777	0.000077	0.002449	-0.02597	0.008860	-2.93205	-2.07327
S141277	0	0.000795	0.008832	-0.01228	-0.00979	0.000817	1.15022	0.01278	0.000163	-0.01044	-0.00183	0.012966	-0.14141	-0.09999
S141277	1	0.000795	0.008832	-0.01239	0.001152	0.000817	1.15022	0.01278	0.000163	0.002142	-0.01453	0.012886	-1.12783	-0.79749
S180778	0	0.000734	0.003576	-0.01500	-0.01063	-0.00003	0.73956	0.008688	0.000075	-0.00789	-0.00711	0.008915	-0.79777	-0.56411
S180778	1	0.000734	0.003576	-0.00510	-0.00751	-0.00003	0.73956	0.008688	0.000075	-0.00559	0.000485	0.008842	0.054851	0.038785
S090579	0	0.003062	0.005791	-0.05264	-0.01925	-0.00063	0.6502	0.01195	0.000142	-0.01315	-0.03948	0.012548	-3.14653	-2.22493
S090579	1	0.003062	0.005791	0.009941	-0.01109	-0.00063	0.6502	0.01195	0.000142	-0.00785	0.017792	0.012252	1.452139	1.026817
S220982	0	0.000270	0.004333	0.013259	0.013712	-0.00210	1.25455	0.01183	0.000139	0.015097	-0.00183	0.012170	-0.15103	-0.10679
S220982	1	0.000270	0.004333	-0.01308	-0.00211	-0.00210	1.25455	0.01183	0.000139	-0.00475	-0.00833	0.011935	-0.69801	-0.49357
S300383	0	0.001423	0.003635	-0.04772	-0.00602	0.002567	0.9065	0.01431	0.000204	-0.00289	-0.04483	0.014536	-3.08405	-2.18075
S300383	1	0.001423	0.003635	-0.00436	0.010548	0.002567	0.9065	0.01431	0.000204	0.012129	-0.01649	0.014590	-1.13023	-0.79919
S151084	0	0.001312	0.004362	0	0.003307	0.000660	0.59823	0.01381	0.000190	0.002638	-0.00263	0.013930	-0.18943	-0.13395
S151084	1	0.001312	0.004362	-0.01026	-0.01531	0.000660	0.59823	0.01381	0.000190	-0.00850	-0.00176	0.014352	-0.12288	-0.08689
S200585	0	0.000438	0.001991	0.031974	0.002774	-0.00142	0.38225	0.01409	0.000198	-0.00036	0.032337	0.014226	2.273132	1.607347
S200585	1	0.000438	0.001991	-0.00411	0.003501	-0.00142	0.38225	0.01409	0.000198	-0.00008	-0.00403	0.014239	-0.28320	-0.20025
S140988	0	0.000557	0.002055	0.050191	0.004227	0.001623	0.49652	0.01389	0.000192	0.003723	0.046468	0.014050	3.307272	2.338594
S140988	1	0.000557	0.002055	0.029894	0.002372	0.001623	0.49652	0.01389	0.000192	0.002802	0.027092	0.014016	1.932940	1.366795

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ANNEX 6.3

AVERAGE TWO-DAY ABNORMAL RETURNS (AAR) 1975-1989,
BY SECURITY TYPE (x)

EVENT	AAR	Z	Number of Events
Ordinary Shares (a)	-0.03421	-7.22344 ###	14
Ordinary Share (b)	0.009826	0.631203	1
Preference Share	0.008344	0.680745	1
Loan Stock	0.010811	2.646952 ##	26
			42

(x) All issue announcement observations including those with coincident announcements or issues for non-general purpose.
(a) by Rights Issue
(b) by Public Offer (overseas)

------"t" test
Significantly different from zero at 1% level
Significantly different from zero at 5% level
Significantly different from zero at 10% level

ANNEX 6.4A

ALL OBSERVATIONS

EVENT	2 Day AR	2 Day SAR $/\sqrt{2}$	SECURITY	MATURITY	INTEREST CHARGE	COINCIDENT EVENT
B030282	0.016633	1.229838	1	1	1	1
B201082	0.003422	0.166405	1	1	1	1
B201187	0.021106	1.049630	1	1	1	1
B260483	0.006354	0.310793	1	1	1	1
L010388	0.032102	0.901737	1	1	1	2
L011282	0.052946	2.413514	1	1	1	1
L270784	0.005543	0.352789	1	1	2	1
L290688	-0.00015	-0.00653	1	1	2	1
M031279	0.013451	0.819335	1	1	2	1
M080682	0.058698	3.108956	1	1	1	1
M090486	0.010502	0.323658	1	1	2	1
M091080	0.016438	0.692743	1	1	1	2
M100781	0.008932	0.389045	1	1	2	1
M101075	0.006166	0.237843	1	1	2	1
M160176	0.026812	1.729897	1	1	2	1
M201186	-0.01287	-0.90219	1	2	2	1
M290678	0.000982	0.080917	1	1	2	1
N060679	0.005912	0.348936	1	1	2	1
N090981	0.007299	0.345190	1	1	1	1
R141286	0.010804	0.784090	1	2	2	1
R181083	-0.00071	-0.04278	1	1	1	2
S141277	-0.01636	-0.89749	1	1	1	1
S151084	-0.00440	-0.22084	1	2	2	2
S180778	-0.00662	-0.52532	1	1	2	1
S200585	0.028304	1.407089	1	2	2	1
S220982	-0.01016	-0.60036	1	1	1	1
B070385	0.008938	0.718049	2			2
B070488	-0.13326	-7.08281	2			1
M070787	-0.02844	-1.21510	2			2
M260178	-0.07334	-4.36434	2			2
M280275	0.035254	0.858591	2			2
M290783	0.025202	1.705736	2			1
N140586	-0.10946	-4.26887	2			1
N190784	-0.03755	-2.32184	2			1
N270776	-0.02421	-1.36903	2			1
R140185	-0.08233	-5.19873	2			1
S090579	-0.02169	-1.19811	2			1
S140988	0.073560	3.705390	2			1
S250276	-0.05031	-4.01660	2			1
S300383	-0.06132	-2.97994	2			1
N310888	0.009826	0.631203	3			1
M030489	0.008344	0.680745	4			1

SECURITY (1)=26	Σ = 0.281097	Σ = 13.49686	
	AAR= 0.010811	AISAR= 0.519110	Z= 2.646952
SECURITY (2)=14	Σ = -0.47899	Σ = -27.0276	
	AAR= -0.03421	AISAR= -1.93054	Z= -7.22344
SECURITY (3)=1	Σ = 0.009826	Σ = 0.631203	
	AAR= 0.009826	AISAR= 0.631203	Z= 0.631203
SECURITY (4)=1	Σ = 0.008344	Σ = 0.680745	
	AAR= 0.008344	AISAR= 0.680745	Z= 0.680745

ANNEX 6.4B

EXCLUDES EVENTS WITH COINCIDENT ANNOUNCEMENT

EVENT	2 Day AR	2 Day SAR /√2	SECURITY	MATURITY	INTEREST CHARGE	COINCIDENT EVENT
B030282	0.016633	1.229838	1	1	1	1
B201082	0.003422	0.166405	1	1	1	1
B201187	0.021106	1.049630	1	1	1	1
B260483	0.006354	0.310793	1	1	1	1
L011282	0.052946	2.413514	1	1	1	1
L270784	0.005543	0.352789	1	1	2	1
L290688	-0.00015	-0.00653	1	1	2	1
M031279	0.013451	0.819335	1	1	2	1
M080682	0.058698	3.108956	1	1	1	1
M090486	0.010502	0.323658	1	1	2	1
M100781	0.008932	0.389045	1	1	2	1
M101075	0.006166	0.237843	1	1	2	1
M160176	0.026812	1.729897	1	1	2	1
M2011B6	-0.01287	-0.90219	1	2	2	1
M290678	0.000982	0.080917	1	1	2	1
N060679	0.005912	0.348936	1	1	2	1
N090981	0.007299	0.345190	1	1	1	1
R141288	0.010804	0.784090	1	2	2	1
S141277	-0.01636	-0.89749	1	1	1	1
S180778	-0.00662	-0.52532	1	1	2	1
S200585	0.028304	1.407089	1	2	2	1
S220982	-0.01016	-0.60036	1	1	1	1
B070488	-0.13326	-7.08281	2			1
M290783	0.025202	1.705736	2			1
N140586	-0.10946	-4.26887	2			1
N190784	-0.03755	-2.32184	2			1
N270776	-0.02421	-1.34903	2			1
R140185	-0.08233	-5.19873	2			1
S090579	-0.02169	-1.19811	2			1
S140988	0.073560	3.705390	2			1
S250276	-0.05031	-4.01660	2			1
S300383	-0.06132	-2.97994	2			1
N310888	0.009826	0.631203	3			1
M030489	0.008344	0.680745	4			1

SECURITY (1)=22	ξ = 0.237675	Ξ = 12.16601	
	AAR= 0.010803	AISAR= 0.553000	I= 2.593803
SECURITY (2)=10	ξ = -0.42139	Ξ = -23.0248	
	AAR= -0.04213	AISAR= -2.30248	I= -7.28109
SECURITY (3)=1	ξ = 0.009826	Ξ = 0.631203	
	AAR= 0.009826	AISAR= 0.631203	I= 0.631203
SECURITY (4)=1	ξ = 0.008344	Ξ = 0.680745	
	AAR= 0.008344	AISAR= 0.680745	I= 0.680745

ANNEX 6.4C

LOANS: DATED-UNDATED

EVENT	2 Day AR	2 Day SAR $\sqrt{2}$	SECURITY	MATURITY	INTEREST CHARGE	COINCIDENT EVENT
B030282	0.016633	1.229838	1	1	1	1
B201082	0.003422	0.166405	1	1	1	1
B201187	0.021106	1.049630	1	1	1	1
B260483	0.006754	0.310793	1	1	1	1
L011282	0.052946	2.413514	1	1	1	1
L270784	0.005543	0.352789	1	1	2	1
L290688	-0.00015	-0.00653	1	1	2	1
M031279	0.013451	0.819335	1	1	2	1
M080682	0.058698	3.108956	1	1	1	1
M090486	0.010502	0.323658	1	1	2	1
M100781	0.008932	0.389045	1	1	2	1
M101075	0.006166	0.237843	1	1	2	1
M160176	0.026812	1.729897	1	1	2	1
M290678	0.000982	0.080917	1	1	2	1
N060679	0.005912	0.348936	1	1	2	1
N090981	0.007299	0.345190	1	1	1	1
S141277	-0.01636	-0.89749	1	1	1	1
S180778	-0.00662	-0.52532	1	1	2	1
S220982	-0.01016	-0.60036	1	1	1	1
M201186	-0.01287	-0.90219	1	2	2	1
R141288	0.010804	0.784090	1	2	2	1
S200525	0.028304	1.407089	1	2	2	1

LOANS

DATED (1)=19 Σ = 0.211440 Σ = 10.87703
AAR= 0.011128 AISAR= 0.572475 Z= 2.495361

UNDATED (2)=3 Σ = 0.026235 Σ = 1.288985
AAR= 0.008745 AISAR= 0.429661 Z= 0.744196

ANNEX 6.4D

LOANS: FIXED (1) or FLOATING (2) INTEREST CHARGE

EVENT	2 Day AR	2 Day SAR $/\sqrt{2}$	SECURITY	MATURITY	INTEREST CHARGE	COINCIDENT EVENT
B030282	0.016633	1.229838	1	1	1	1
B201082	0.003422	0.166405	1	1	1	1
B201187	0.021106	1.049630	1	1	1	1
B260483	0.006354	0.310793	1	1	1	1
L011282	0.052946	2.413514	1	1	1	1
M080682	0.058698	3.108956	1	1	1	1
N090981	0.007299	0.345190	1	1	1	1
S141277	-0.01636	-0.89749	1	1	1	1
S220982	-0.01016	-0.60036	1	1	1	1
L270784	0.005543	0.352789	1	1	2	1
L290688	-0.00015	-0.00653	1	1	2	1
M031279	0.013451	0.819335	1	1	2	1
M090486	0.010502	0.323658	1	1	2	1
M100781	0.008932	0.389045	1	1	2	1
M101075	0.006166	0.237843	1	1	2	1
M160176	0.026812	1.729897	1	1	2	1
M201186	-0.01287	-0.90219	1	2	2	1
M290678	0.000982	0.080917	1	1	2	1
N060679	0.005912	0.348936	1	1	2	1
R141288	0.010804	0.784090	1	2	2	1
S180778	-0.00662	-0.52532	1	1	2	1
S200585	0.028304	1.407089	1	2	2	1

FIXED (1)=9 ξ = 0.139924 Σ = 7.126468
AAR= 0.015547 AISAR= 0.791829 Z= 2.375489

FLOATING (2)=13 ξ = 0.097751 Σ = 5.039548
AAR= 0.007519 AISAR= 0.387657 Z= 1.397719

ANNEX 6.4E

ORDINARY AND LOAN STOCK EVENTS by PERIODS

EVENT	2 Day AR	2 Day SAR / 2	SECURITY	MATURITY	INTEREST CHARGE	COINCIDENT EVENT
M101075	0.006166	0.237843	1	1	2	1
M160176	0.026912	1.729897	1	1	2	1
S141277	-0.01636	-0.89749	1	1	1	1
M290678	0.000982	0.080917	1	1	2	1
S180778	-0.00662	-0.52532	1	1	2	1
M031279	0.013451	0.819335	1	1	2	1
N060679	0.005912	0.348936	1	1	2	1
M100781	0.009932	0.389045	1	1	2	1
N090981	0.007299	0.345190	1	1	1	1
B030282	0.016633	1.229838	1	1	1	1
B201082	0.003422	0.166405	1	1	1	1
L011282	0.052946	2.413514	1	1	1	1
M080682	0.058698	3.108956	1	1	1	1
S220982	-0.01016	-0.60036	1	1	1	1
B260483	0.006354	0.310793	1	1	1	1
L270784	0.005543	0.352789	1	1	2	1
S200585	0.028304	1.407089	1	2	2	1
M090486	0.010502	0.323658	1	1	2	1
M201186	-0.01267	-0.90219	1	2	2	1
B2011B7	0.021106	1.049630	1	1	1	1
L290688	-0.00015	-0.00652	1	1	2	1
R141288	0.010894	0.784090	1	2	2	1
N270776	-0.02421	-1.36903	2			1
S250276	-0.05031	-4.01660	2			1
S090579	-0.02169	-1.19811	2			1
M290783	0.025203	1.705736	2			1
S300383	-0.06132	-2.97994	2			1
N190784	-0.03755	-2.32184	2			1
R140185	-0.08233	-5.19873	2			1
N140586	-0.10946	-4.26887	2			1
B070488	-0.13326	-7.08281	2			1
S140988	0.073560	3.705390	2			1
N310888	0.009826	0.631203	3			1
M030489	0.008344	0.680745	4			1

continued

continued

ANNEX 6.4E

ORDINARY AND LOAN STOCK EVENTS by PERIODS

	2 Day AR	2 Day SAR $/\sqrt{2}$	
Pre 1979			
1975-78			
(1)=5	Σ = 0.010967	Σ = 0.625835	
	AAR= 0.002193	AISAR= 0.125167	I= 0.279882
(2)=2	Σ = -0.07452	Σ = -5.38563	
	AAR= -0.03726	AISAR= -2.69281	I= -3.80822
Post 1979			
1980-86 (no events in 1981)			
(1)=12	Σ = 0.175593	Σ = 8.544721	
	AAR= 0.014632	AISAR= 0.712060	I= 2.466648
(2)=5	Σ = -0.26547	Σ = -13.0636	
	AAR= -0.05309	AISAR= -2.61273	I= -5.84225
Pre 1987			
1975-86			
(1)=19	Σ = 0.205924	Σ = 10.33882	
	AAR= 0.010838	AISAR= 0.544148	I= 2.371889
(2)=8	Σ = -0.36169	Σ = -19.6474	
	AAR= -0.04521	AISAR= -2.45592	I= -6.94641
Post 1987			
1988			
(1)=2	Σ = 0.010644	Σ = 0.777557	
	AAR= 0.005322	AISAR= 0.388778	I= 0.549816
(2)=2	Σ = -0.05970	Σ = -3.37742	
	AAR= -0.02985	AISAR= -1.68871	I= -2.38819

ANNEXES TO CHAPTER 7

ANNEX 7

REGRESSION RESULTS

t = the statistic for testing the hypothesis that there is no linear relationship between the dependent variable and the independent variable (ie that the slope of the population regression line is zero) The t statistic and its two-tailed observed significance are shown in the Tables. A small significance supports the hypothesis of a linear relationship.

R2 = Coeficient of Multiple Determination; the proportion of the total variation in Y "explained" by the multiple regression of Y on the independent or explanatory variables; ie a measure of the "goodness of fit" of the model.

adj R2 = adjusted R2; takes into consideration the reduction in the degrees of freedom as additional or independent variables are added to the regression.

F = The overall significance of the regression can be tested with the ratio of the explained to the unexplained variance. This follows an F distribution. If the calculated F ratio exceeds the tabular value of F (at the specified level of significance and degrees of freedom) the hypothesis is accepted that the regression parameters are not all equal to zero and that R2 is significantly different from zero.

DUBIN WATSON = To check the validity of the assumption of a log-linear approximation for the relationship between P (price) and the capital ratio within the range of sample data, a Durbin-Watson statistic (d) is applied to the cross-sectional residuals ranked according capital ratio values. The hypothesis of auto-correlation (at the .01 level of significance) is coded

"r" = rejected (ie d>dU)
"a" = accepted (ie d<dL)
"i" = inconclusive (ie dL<d<dU)

For the US bank exercises the statistic rejects autocorrelation in all years except 1986 (when it was inconclusive) for both the equity capital (Table 7.C) and and Primary Capital (Table 7.D) exercises.

Durbin-Watson statistic significance tables were unavailable for the UK exercises which had only 6 observations.

TABLE 7.A
6 MAJOR UK BANKS

6 Cases — EDR = (Ordinary Capital + Reserves)/Total Net Assets

STAGE ONE — Ei = d0 + d1Di + d2(EDRi)i + d3Si + vi

YEAR	d0	d1	d2	d3	R2	adj R2
	t	t	t	t	F	sig F
	sig t	sig t	sig t	sig t		
1978	-89.96	5.83	1066.57	0.00	0.98	0.96
	-1.38	4.46	1.37	2.06	38.75	0.03
	0.30	0.05	0.30	0.18		
1979	-104.646	5.59508	1178.741	0.001708	0.98442	0.96105
	-3.324	6.909	3.35	5.472	42.12169	0.0233
	0.0798	0.0203	0.0787	0.0318		
1980	-26.8859	3.98476	320.5616	0.000664	0.99836	0.99591
	-0.859	6.487	0.892	2.696	406.3549	0.0025
	0.4907	0.0229	0.4665	0.1144		
1981	-99.9446	4.82471	1303.695	0.000977	0.98237	0.95592
	-2.171	7.826	2.314	2.483	37.14279	0.0263
	0.1621	0.0159	0.1467	0.1311		
1982	-67.1746	3.69202	830.8828	0.000672	0.96419	0.91048
	-1.418	5.204	1.502	1.857	17.95075	0.0532
	0.2918	0.035	0.2719	0.2077		
1983	-94.5954	3.46451	1253.155	0.000699	0.94022	0.85056
	-1.305	3.562	1.32	1.63	10.48585	0.0883
	0.3218	0.0706	0.3015	0.2446		
1984	-127.528	2.93359	2266.785	0.000664	0.98762	0.96905
	-6.132	12.183	6.496	5.873	53.18995	0.0185
	0.0256	0.0067	0.0229	0.0278		
1985	-63.4043	3.03338	1031.947	0.000370	0.96562	0.91406
	-2.043	6.977	2.249	2.125	18.7263	0.0511
	0.1778	0.0199	0.1535	0.1675		
1986	13.60163	2.31276	-209.658	0.000279	0.98508	0.96271
	0.596	6.975	-0.576	3.369	44.02775	0.0223
	0.6115	0.0199	0.6228	0.078		
1987	Insufficient Observations: Regression Skipped					
1988	-46.8226	3.40004	891.6912	0.000055	0.97575	0.93937
	-0.437	4.907	0.495	0.341	26.82406	0.0362
	0.7048	0.0391	0.6696	0.6429		
1989	Insufficient Observations: Regression Skipped					
1990	Insufficient Observations: Regression Skipped					

STAGE TWO — lnPi = a0 + a1lnEi + a2ln(PDRi)i + a3ln(EDR + a4lnSi + ui

a0	a1	a2	a3	a4	R2	adj R
t	t	t	t	t	F	sig
sig t	sig t	sig t	sig t	sig t	Durbin Watson	
1.51	1.09	-0.72	-1.66	-0.65	0.95	0.5
0.37	4.36	-0.87	-1.31	-1.51	34.75	0.1
0.6718	0.1436	0.5449	0.4.6	0.3066	2.99782	
2.34763	1.20795	-0.31709	-1.25083	-0.62134	0.99979	0.9989
8.641	16.057	-1.59	-6.641	-5.63	1207.536	0.021
0.0733	0.0396	0.3573	0.0951	0.1119	3.57337	
2.4934	1.36502	-0.67223	-0.75019	-0.58486	0.98676	0.9484
2.502	2.137	-1.041	-1.165	-1.238	27.9893	0.151
0.242	0.2787	0.4871	0.4515	0.4227	2.69835	
5.10168	0.95547	0.97664	0.41561	-0.08527	0.99649	0.9824
4.519	9.912	1.756	0.524	-0.346	71.05697	0.085
0.1367	0.064	0.3296	0.6926	0.7877	2.2179	
0.45643	1.11259	0.27133	0.19644	0.13297	0.98757	0.90787
0.34	5.75	0.308	0.157	0.288	19.86793	0.1665
0.7914	0.1096	0.81	0.9007	0.8217	1.89569	
-0.15149	1.11842	-0.18277	-1.23049	-0.24922	0.9973	0.9865
-0.184	-1.631	-0.538	-1.631	-1.227	92.37048	0.0779
0.8842	0.3502	0.686	0.3502	0.4354	2.98385	
0.58844	0.8004	-0.55686	-3.62828	-0.85073	0.99905	0.99526
-1	25.195	-4.476	-9.456	-9.819	263.5556	0.0462
0.4999	0.0253	0.1399	0.0671	0.0646	2.88536	
2.06632	0.7525	0.26295	-0.02482	0.09062	0.97857	0.89283
1.21	5.151	0.518	-0.032	0.417	11.41318	0.218
0.4396	0.1221	0.6956	0.9799	0.7483	3.07357	
5.06356	1.12754	0.42714	0.31	-0.20211	1	0.99999
144.777	296.134	37.569	37.29	-40.498	106953.9	0.0023
0.0044	0.0021	0.0169	0.0171	0.0157	2.93082	
Insufficient Observations: Regression Skipped						
0.23899	0.75204	0.14458	-0.8426	0.005889	0.99918	0.9959
0.201	14.83	1.123	-2.276	0.234	304.7452	0.0429
0.8739	0.0429	0.4631	0.2636	0.8539	3.69074	
Insufficient Observations: Regression Skipped						
Insufficient Observations: Regression Skipped						

TABLE 7.B

US BANKS 1983-1987

(IBCA BANKS WITH COMPATIBLE DATASTREAM EQUITY CAPITAL)

Legend: 1 = Compatible 2 = Non-Compatible

BANK NAME	1983	1984	1985	1986	1987
AFFILIATED BANKSHARES	1	2	1	1	1
AMERITRUST CORP	1	1	2	1	1
AMSOUTH BANCORPORATION	1	1	1	2	1
BANKAMERICA CORP	1	1	1	1	1
BARNETT BANKS, INC	2	2	2	2	1
BAYBANKS, INC	1	1	1	1	1
BANK OF NEW YORK, INC	1	1	1	1	1
BANK OF BOSTON CORP	1	1	1	1	1
BANK OF NEW ENGLAND CORP	2	2	2	2	1
BANK SOUTH CORP	2	2	2	2	1
BANCORP HAWAII, INC	1	1	1	1	1
BOATMEN'S BANCSHARES, INC	2	2	2	1	1
BANKERS TRUST NEW YORK	1	1	1	1	1
COMMERCE BANCSHARES, INC	1	1	1	1	1
CITICORP	1	1	1	1	1
CHEMICAL NEW YORK CORP	1	1	1	1	1
CONTINENTAL ILLINOIS CORP	1	1	1	1	1
CHASE MANHATTAN CORP	1	1	1	1	1
COMERICA, INC	1	1	1	1	1
COLORADO NAT'L BANKSHARES	1	2	1	1	1
CRESTAR FINANCIAL CORP	1	1	1	2	1
CORESTATES FINANCIAL CORP	2	2	2	1	1
CITIZENS & SOUTHERN CORP	NA	NA	NA	NA	NA
CENTERRE BANCORP	NA	NA	NA	NA	NA
DEPOSIT GUARANTY	1	1	1	2	1
DOMINION BANKSHARES CORP	2	2	2	2	1
FIRST ALABAMA BANCSHARES	NA	NA	NA	NA	NA
FIRST OF AMERICA BANK CORP	NA	NA	NA	NA	NA
FIRST AMERICAN CORP	NA	NA	NA	NA	NA
FIRST BANK SYSTEM, INC	1	1	1	1	1
FIRST CITY BANCORP OF TEXAS	1	1	1	1	2
FIRST COMMERCE CORP	1	2	1	1	1
FIRST EMPIRE STATE CORP	2	2	2	2	1
FIRST FIDELITY BANCORP	2	1	1	2	1
FIRST FLORIDA BANKS	1	1	1	1	1
FIFTH THIRD BANCORP	1	2	2	2	1
FIRST KENTUCKY NATIONAL	NA	NA	NA	NA	NA
FIRST MARYLAND BANCORP	NA	NA	NA	NA	NA
FIRST NATIONAL CINCINNATI C	1	1	2	1	1
FIRST CHICAGO CORP	NA	NA	NA	NA	NA
FLORIDA NATIONAL BANKS	NA	NA	NA	NA	NA
FLEET/NORSTAR FINANCIAL	2	2	2	2	1
FIRST REPUBLICBANK	1	1	1	1	1
FIRST SECURITY CORP	1	1	1	1	1
FIRST TENNESSEE NATIONAL	1	1	1	2	1
FIRST UNION CORP	2	2	2	1	1

BANK NAME	1983	1984	1985	1986	1987
FIRST VIRGINIA BANKS	2	2	2	2	1
FIRST WACHOVIA CORP	2	2	1	1	1
FIRST WISCONSIN CORP	1	2	1	1	1
HUNTINGTON BANCSHARES	2	2	2	2	1
HIBERNIA CORPORATION	1	2	1	1	1
HORIZON BANCORP	NA	NA	NA	NA	NA
FIRST INTERSTATE BANCORP	1	1	1	1	1
INDIANA NATIONAL	2	2	2	1	1
INDEPENDENCE BANCORP, INC	NA	NA	NA	NA	NA
J.P. MORGAN & COMPANY	1	1	1	1	1
KEYCORP	1	1	1	2	1
MCORP	1	1	1	1	1
MERCHANTS NATIONAL CORP	1	1	2	2	1
MELLON BANK CORP	1	1	1	1	1
MOORE FINANCIAL GROUP, INC	1	1	1	1	1
MANUFACTURERS HANOVER	1	1	1	1	1
MIDLANTIC CORPORATION	2	2	2	1	1
MARINE MIDLAND BANKS, INC	NA	NA	NA	NA	NA
MNC FINANCIAL CORP	2	2	2	2	1
MICHIGAN NATIONAL CORP	1	1	1	1	1
MANUFACTURERS NATIONAL	1	1	1	2	1
MERCANTILE BANKSHARES CORP	NA	NA	NA	NA	NA
MERIDIAN BANCORP, INC	1	1	2	2	2
MARSHALL & ILSLEY CORP	NA	NA	NA	NA	NA
MERCANTILE BANCORPORATION	1	1	1	2	1
NBD BANCORP, INC	1	1	1	2	1
NCNB CORP	2	2	1	1	1
NATIONAL CITY CORP	1	1	1	1	1
NORWEST CORP	1	1	1	1	1
NORTHERN TRUST CORP	1	1	1	1	1
OLD KENT FINANCIAL CORP	1	2	2	1	1
BANC ONE CORP	1	2	2	1	1
PNC FINANCIAL CORP	2	2	2	2	1
RIGGS NATIONAL CORP	1	1	1	1	1
REPUBLIC NEW YORK CORP	1	1	1	1	1
SIGNET BANKING CORPORATION	2	2	1	1	1
SOUTH CAROLINA NATIONAL	1	1	1	1	1
SUNWEST FINANCIAL SERVICES	1	1	1	1	1
SHAWMUT NATIONAL CORP	2	2	2	2	1
SOCIETY CORPORATION	1	1	1	1	1
SOUTHTRUST CORP	1	1	2	2	1
SOVRAN FINANCIAL CORP	2	2	2	2	1
SECURITY PACIFIC CORP	2	2	2	2	1
SOUTHEAST BANKING CORP	1	1	1	1	1
STATE STREET BOSTON CORP	1	1	1	1	1
SUNTRUST BANKS, INC	2	2	2	1	1
TEXAS AMERICAN BANKSHARES	1	2	1	1	1
UNITED BANKS OF COLORADO	1	1	1	2	1
UNITED JERSEY BANKS	1	1	2	2	1
UNITED MISSOURI BANCSHARES	1	1	1	1	1
U.S. BANCORP	2	2	2	2	1
U.S. TRUST CORP	1	1	1	1	1
IRVING BANK CORP	NA	NA	NA	NA	NA
VALLEY NATIONAL CORP	1	1	1	2	1

BANK NAME	1983	1984	1985	1986	1987
WELLS FARGO & CO	1	1	1	1	1
WILMINGTON TRUST COMPANY	NA	NA	NA	NA	NA
ZIONS BANCORPORATION	1	1	1	1	1

* compatible if IBCA equity capital is +or- 1% of Datastream equity capital
NA = No Datastream Data

TABLE 7.C
USA BANKS

RISK RATIO = EQR = (Ordinary Capital + Reserves)/Total Net Assets

STAGE ONE — $E_i = d0 + d1D_i + d2(EQR)_i + d3S_i + v_i$

YEAR (Cases)	d0 t sig t	d1 t sig t	d2 t sig t	d3 t sig t	R2 F	adj R2 sig F
1983 (58)	0.89157 1.73 0.0893	2.53755 14.432 0	-9.78762 -1.339 0.1863	-0.00000 -0.699 0.4873	0.85539 106.471	0.84735 0
1984 (52)	1.27364 2.036 0.0472	2.09884 11.747 0	-8.24812 -0.844 0.4028	-0.00000 -1.116 0.2699	0.79875 63.50372	0.78617 0
1985 (56)	0.87935 1.136 0.2614	2.33013 12.012 0	-6.2052 -0.482 0.6319	0.000007 1.591 0.1178	0.80165 70.05329	0.7902 0
1986 (52)	0.96747 0.893 0.3763	2.21049 9.596 0	-7.06721 -0.423 0.6741	0.000010 2.052 0.0457	0.75034 48.0912	0.73475 0
1987 (66)	-2.22536 -1.846 0.0696	1.71351 4.247 0.0001	51.93262 3.321 0.0015	-0.00003 -3.132 0.0023	0.34668 11.06364	0.31716 0

STAGE TWO — $\ln P_i = a0 + a1\ln E_i + a2\ln(EQR)_i + a3\ln(EQR)^2_i + a4\ln S_i + u_i$

YEAR (Cases)	a0 t sig t	a1 t sig t	a2 t sig t	a3 t sig t	a4 t sig t	R2 F Durbin Watson	adj sig
1983 (58)	2.92796 8.616 0	1.01035 14.918 0	-0.40904 -4.773 0	0.37837 2.501 0.0155	-0.0344 -1.197 0.2365	0.85317 76.98999 2.31245	0.842 r
1984 (52)	2.07371 6.379 0	1.11046 16.386 0	-0.53337 -8.404 0	0.2462 1.786 0.0807	-0.00967 -0.384 0.703	0.88471 88.25048 1.85727	0.874 r
1985 (56)	3.50787 6.997 0	0.89901 10.973 0	-0.49038 -7.061 0	0.22569 1.055 0.2964	-0.11511 -3.188 0.0025	0.75431 38.37691 1.74196	0.734 r
1986 (52)	5.05186 6.555 0	1.48658 7.098 0	-0.15985 -1.56 0.1255	1.75727 3.287 0.0019	-0.15812 -1.421 0.162	0.58222 16.37492 1.46544	0.5466 i
1987 (66)	-0.15387 -0.121 0.9072	0.6454 5.786 0	0.04863 1.474 0.1459	-0.20353 -0.761 0.4494	0.24868 4.657 0	0.40842 10.1832 1.69374	0.3683 r

TABLE 7.D
USA BANKS

RISK RATIO = PCR% = Primary Capital/Total Gross Assets

(% Primary capital defined by IBCA)
Gross Total Assets = Total Assets + Loan Loss Reserves

STAGE ONE $Ei = d0 + d1Di + d2(PCR)i + d3Si + vi$

YEAR (Cases)	d0 t sig t	d1 t sig t	d2 t sig t	d3 t sig t	R2 F	adj R2 sig F
1983	0.87011	2.56263	-8.64343	-0.00000	0.85422	0.84612
(58)	1.524	14.809	-1.158	-0.538	105.4708	0
	0.1333	0	0.2518	0.593		
1984	1.26646	2.09947	-8.18924	-0.00000	0.79869	0.78611
(52)	2.026	11.741	-0.833	-1.114	63.47922	0
	0.0484	0	0.4091	0.2709		
1985	0.85366	2.33017	-5.81782	0.000007	0.80157	0.79012
(56)	1.105	12.005	-0.449	1.605	70.01808	0
	0.2741	0	0.6552	0.1147		
1986	0.88634	2.2133	-5.81886	0.000010	0.75005	0.73443
(52)	0.82	9.595	-0.346	2.083	48.01307	0
	0.4163	0	0.7307	0.0426		
1987	-2.28193	1.72299	53.09193	-0.00003	0.35476	0.32354
(66)	-1.908	4.292	3.392	-3.14	11.36299	0
	0.061	0.0001	0.0012	0.0026		

STAGE TWO $\ln Pi = a0 + a1\ln Ei + a2\ln(PCR)i + a3\ln(PCR)i + a4\ln Si + ui$

	a0 t sig t	a1 t sig t	a2 t sig t	a3 t sig t	a4 t sig t	R2 F Durbin Watson	adj R2 sig F
1983	2.82025	0.99116	-0.39639	0.27886	-0.0562	0.85114	0.83991
(58)	6.918	14.866	-4.621	1.663	-2.131	75.76175	0
	0	0	0	0.1023	0.0378	2.43317 r	
1984	2.07346	1.11051	-0.53335	0.24579	-0.00956	0.88474	0.87472
(52)	6.366	16.389	-8.405	1.782	-0.379	88.27866	0
	0	0	0	0.0813	0.7062	1.82972 r	
1985	3.47809	0.89821	-0.48963	0.21227	-0.11569	0.75413	0.73446
(56)	6.931	10.967	-7.05	0.991	-3.191	38.33902	0
	0	0	0	0.3263	0.0025	1.70018 r	
1986	7.95003	1.48269	-0.15789	1.71538	-0.15759	0.58613	0.55091
(52)	6.547	7.137	-1.546	3.229	-1.416	16.64058	0
	0	0	0.1284	0.0023	0.1635	1.49789 i	
1987	-0.15337	0.63847	0.04974	-0.21628	0.2449	0.40529	0.36497
(66)	-0.18	5.745	1.491	-0.807	4.587	10.05207	0
	0.8577	0	0.1412	0.423	0	1.92675 r	

TABLE 7.D (Continued)

Observations categorised into one of two groups:
D = Group of observations with PCR equal to or greater Regulatory Standard
U = Group of observations with PCR less than Regulatory Standard
Regulatory Standard assumed, 5.0% in 1983, 1984; 5.5% in 1985, 1986, 1987

STAGE ONE $Ei = d0 + d1Di + d2(EQR)i + d3Si + vi$

STAGE TWO $\ln Pi = a0 + a1\ln Ei + a2\ln(POR)i + a3\ln(EQR)i + a4\ln Si + ui$

YEAR (Cases)	d0 t sig t	d1 t sig t	d2 t sig t	d3 t sig t	R2 F	adj R2 sig F
1983-D (56)	0.84073 1.455 0.1516	2.63464 12.54 0	-8.5357 -1.145 0.2576	-0.00000 -1.314 0.1946	0.81331 75.51461	0.80254 0
1983-U	No Regression Possible					
(2)						
1984-D (30)	2.01791 3.03 0.0055	1.80294 5.557 0	-16.7577 -1.798 0.0839	0.000001 0.246 0.8073	0.61748 13.98992	0.57334 0
1984-U (22)	1.00504 0.307 0.762	2.20154 8.16 0	-6.85648 -0.101 0.9205	-0.00000 -0.571 0.5753	0.80972 25.53201	0.778 0

YEAR (Cases)	a0 t sig t	a1 t sig t	a2 t sig t	a3 t sig t	a4 t sig t	R2 F Durbin Watson	adj R2 sig F
1983-D (56)	2.69858 6.331 0	0.99128 14.523 0	-0.39195 -4.552 0	0.27728 1.64 0.1072	-0.04171 -1.516 0.1357	0.84585 69.95915 2.38921 r	0.83375 0
1983-U	No Regression Possible						
(2)							
1984-D (30)	4.49485 9.034 0	1.86898 12.8 0	-0.91203 -8.405 0	1.26277 6 0	-0.08898 -2.958 0.0067	0.87801 44.98417 1.88636 r	0.85849 0
1984-U (22)	2.76427 2.934 0.0097	0.93516 12.029 0	-0.45611 -5.328 0.0001	0.54478 1.476 0.1595	0.04595 1.136 0.2726	0.94287 66.01369 2.2688 r	0.92859 0

TABLE 7.0 (Continued)

YEAR (Cases)	d0 t sig t	d1 t sig t	d2 t sig t	d3 t sig t	R2 F	adj R2 sig F	a0 t sig t	a1 t sig t	a2 t sig t	a3 t sig t	a4 t sig t	R2 F Durbin Watson	adj R2 sig F
1983-D	0.61908	1.44944	6.73578	0.000019	0.32306	0.19613	2.99853	1.10055	-0.28403	-0.07701	-0.14699	0.58318	0.47203
(20)	0.238	2.069	0.18	1.382	2.54521	0.0926	2.086	4.251	-2.939	-0.136	-1.959	5.2467	0.0076
	0.8147	0.0551	0.8596	0.186			0.3545	0.0007	0.0102	0.8937	0.069	2.52385	r
1985-D	0.5889	2.43224	-0.71177	0.000005	0.87054	0.8584	2.21446	1.00723	-0.87585	-0.14399	-0.15669	0.90242	0.88941
(36)	0.511	12.631	-0.031	1.079	71.72594	0	2.976	14.883	-10.077	-0.483	-4.593	69.36262	0
	0.6127	0	0.9756	0.2885			0.0057	0	0	0.6326	0.0001	2.00793	r
1986-D	2.17407	2.00205	-23.9907	0.000019	0.59728	0.54694	4.39184	0.99908	-0.2662	0.46595	-0.11817	0.78277	0.74499
(28)	1.223	4.434	-0.939	1.853	11.86472	0.0001	3.658	7.425	-4.016	1.1	-2.303	20.71932	0
	0.2331	0.0002	0.3571	0.0762			0.0013	0	0.0005	0.2826	0.0307	2.05878	r
1986-D	1.75363	2.29052	-25.7801	0.000008	0.75766	0.72131	17.79853	1.34843	-0.16673	5.49064	0.03137	0.67924	0.61171
(24)	0.575	6.938	-0.425	1.054	20.84337	0	4.301	3.341	-0.949	3.276	0.115	10.05866	0.0002
	0.5714	0	0.6757	0.3044			0.0002	0.0034	0.3544	0.004	0.9096	1.87382	r
1987-D	0.17768	2.19202	11.09355	-0.00003	0.41023	0.37092	1.70586	0.885	-0.08464	0.57143	0.23253	0.62167	0.58564
(49)	0.135	5.499	0.614	-2.534	10.43378	0	2.191	7.79	-1.188	2.021	4.82	17.25364	0
	0.8929	0	0.5426	0.0148			0.0341	0	0.2417	0.0497	0	2.0111	r
1987-D	-4.03818	0.82836	95.85016	-0.00001	0.24912	0.07583	-3.04449	0.12502	0.02035	-1.60073	0.14289	0.20657	-0.05791
(17)	-0.914	0.905	1.165	-0.942	1.43764	0.277	-0.711	1.12	0.329	-1.138	1.087	0.78104	0.5587
	0.3775	0.4353	0.265	0.3636			0.4907	0.2847	0.7477	0.2775	0.2986	2.80318	r

TABLE 7.E
USA BANKS

RISK RATIO = BASLE 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

STAGE ONE $Ei = d0 + d1Di + d2(RWC)i + d3Si + vi$

STAGE TWO $\ln Pi = a0 + a1\ln Ei + a2\ln(POR)i + a3\ln(RWC) + a4\ln Si + ui$

YEAR (Cases)	d0 t sig t	d1 t sig t	d2 t sig t	d3 t sig t	R2 F	adj R2 sig F	a0 t sig t	a1 t sig t	a2 t sig t	a3 t sig t	a4 t sig t	R2 F Durbin Watson	adj R sig.
1989	3.3506	-1.56527	0.18874	-0.00004	0.13418	0.02595	6.21265	-0.28764	0.05827	0.57173	-0.38803	0.62648	0.4604
(28)	0.625	-0.954	0.451	-0.894	1.23975	0.3172	2.193	-1.841	0.73	1.403	-1.716	3.77374	0.045
	0.538	0.3496	0.6559	0.38			0.056	0.0988	0.4839	0.1941	0.1203	2.09806	r
1989-O	10.60935	-1.85826	-0.26515	-0.00007	0.21295	0.08868	10.52052	-0.14274	0.26234	-0.96661	-0.42727	0.52502	0.352
(23)	1.531	-1.032	-0.525	-1.516	1.71359	0.1981	3.18	-1.796	2.838	-1.791	-1.946	3.03972	0.064
	0.1423	0.3152	0.6054	0.146			0.0088	0.1	0.0161	0.1009	0.0776	2.77861	r
1989-U	-31.1733	-6.45644	4.57328	0.000222	0.90513	0.62052	Insufficient data; Regression Skipped						
(5)	-1.835	-2.42	1.801	1.948	3.18028	0.3859							
	0.3176	0.2494	0.3227	0.3019									

Observations categorised into one of two groups:
O = Group of observations with RWCR equal to or greater than 8.0%
U = Group of observations with RWCR less than 8.0%

ANNEXES TO CHAPTER 8

ANNEX 8.1

Industrial Predictive Models and Predictor Variables.

The earlier studies of capital issue type decision may be strongly criticised in terms of methodological integrity; see Marsh (1982). Statistical qualifications are often perfunctory or ignored; matters of goodness of fit (R2), statistical significance, and problems of multicollinearity are not generally well attended. A certain degree of data mining is used in achieving final variable selection; at the extreme Baxter & Cragg (1970) considered some 90 variables before selecting the final 11.

This makes result interpretation difficult without evidence of model stability and predictive power. Martin & Scott (1974), who refined their 6 variables from 23 which displayed the best predictive accuracy when applied to the hold-out sample, claim a 75% correct classification rate on the sample and 77% on a hold-out sample.

Baxter & Cragg (1970) found that, conforming with capital structure theory, the most consistent variables are the measure of firm size and of financial leverage, with the relationships being direct and inverse, respectively, with the probability of a debt issue. That is, small firms and highly levered firms are more likely to issue equity. Baxter & Cragg also found that
- firms raising large sums in relative terms favoured debt, and
- firms with high ratios of market capitalisation to total assets favoured equity.

Taub (1975) finds a significant direct relationship between firm size and the likelihood of having more equity. The size results and a cost of equity measure are the only variables with any consistent statistically significant explanatory power. Taub's principal net contribution is that managers may consider the relative cost of capital before selecting the specific financing instrument they prefer to issue.

Martin & Scott (1974) find that size (total assets) contributes most in differentiation between the groups. This is followed closely by the P/E ratio, and the current assets to total assets relative ratio. Generally, firms with larger assets bases (size) and smaller debt (ie debt to total assets) ratios tend to issue debt rather than equity. Also, the debt issuing group was characterised by lower P/E ratios than the equity issuing group.
Martin & Scott also found that high payout, low profitability and a high proportion of fixed assets all tended to indicate a debt issue.

Generally these studies show that firms more likely to issue equity were characterised by small size, high gearing, and a high P/E ratio. Martin & Scott believed the P/E variable may reflect that debt selling firms (with a lower P/E) believed their common stock prices are depressed relative to that of bonds; Marsh (1982) believes it may reflect a timing factor. Evidence for coverage ratios and risk was weak, conflicting and nowhere significant.

Marsh (1982) uses logit and probit analysis to select the "best" variables to distinguish between firms issuing straight debt or common stock securities. Marsh is explicit and careful in development of his variables and in applying his model to

the hold-out sample; a classification ability of 75% is recorded.
The final model used by Marsh has 8 variables; two measuring deviations from the long and short term debt targets, three proxies for these targets (viz company size, the percentage of fixed assets, and bankruptcy risk), and three market condition and timing variables (equity and bond market conditions and firm specific timing considerations).

The results of his study show that firms are more likely to issue debt if they are , 1) below their long-term debt ratio, and 2) above their short-term target debt ratio.

Companies more likely to issue equity are 1) small in size, 2) holders of small amounts of fixed assets, and 3) have a high risk of bankruptcy. Also, equity issues are more likely to follow a period of strong performance by the firm's common stock. Marsh also concludes that the choice of the security issued is very much dependent on the expected conditions of the capital markets at the time of the issue. The timing and market condition variables have the strongest statistical significance of any of the 8. Marsh provides variables based on both capital structure theory and evidence.

Schadler (1987) uses an MDA model to predict three types of security issue; debt, convertible debt and common stock. The model achieves an average correct classification of 56%. Schadler selects 9 variables, some of which are similar to those utilised by Marsh. In terms of target leverage four variables are used; long term, and short term leverage are calculated in terms of historical averages of 5 years, excluding the most recent year; relative deviation from each measure is then calculated in terms of the most recent years leverage measure; Marsh only used the deviations. Measures of

firm size, fixed asset financing, and financial distress risk, the three measures Marsh termed proxies for the target debt ratio, also are considered. Also in the realm of Marsh's market and timing considerations, Schadler uses equity market conditions (not security specific performance) and debt market conditions (an indicator of interest cost levels).

Significantly for the purposes of the predictability hypothesis, the recent studies provide support for the ability of investors to form reasonably reliable probability estimates of the type of security a firm is likely to issue.

ANNEX 8.2A

PREDICTOR (INDEPENDENT) VARIABLES

		Market Based Variables::	
V1	EMC	Equity Market Conditions	Cumulative Market Returns FT All Share Index (from days -60 to -2 relative to Announcement 0 day)
V2	STDMC	ST Debt Market Conditions	3 month UK Treasury Bill discount (middle rate,; monthly data. Ratio of average of preceding 12 months (bar last) over last.
V3	LTDMC	LT Debt Market Conditions	Gross redemption yields on UK Govt 2½ years securities: quarterly data. Ratio of average of preceding eight quarters over current quarter.
		Deviation from Target Leverage::	
V4	WCR	Wide Capital Ratio	(Ord. Share Capital + Reserves + Minorities + Pref. Cap. + Loans) / Total Asse
V5	AWCR	Average Wide Capital Ratio	V4 (WCR) averaged over last four years.
V6	DWCR	Deviation of Wide Capital Ratio	Ratio of AWCR (V5, for the last year bar one, over WCR (V4) for last year.
V7	NCR	Narrow Capital Ratio	(Ordinary Share Capital + Reserves + Minorities)/ Total Assets
V8	ANCR	Average Narrow Capital Ratio	V7 (NCR) averaged over last four years.
V9	DNCR	Deviation of Narrow Capital Ratio	Ratio of ANCR (V8) for the last year bar one, over NCR (V7) for last year.
		Proxies for Target Leverage::	
V10	SIZE	Size (ln Total Assets)	Natural log of Total Assets.
V11	RC	Revenue Concentration	370 / (370 + 375 + 380)
V12	NIM	Net Interest Margin	(370 - 385 - 387 - 388) / 360
V13	OE	Operating Efficiency	(390 + 395) / (400 + 390 + 395)
V14	LV	Loan Volume	(70 + 75 + 50 + 55 + 85 + 105) / 180 or A1 / 180
V15	ROA	Return on Assets	Ordinary earnings / Total Assets
V16	SDROA	Standard Deviation of ROA (V15)	Standard deviation of ROA (V15) over last 5 years.
V17	RE	Retained Earnings	Retained Earnings / Total Assets
V18	LQ	Liquidity	Liquid Assets/ Total Assets = (5 + 10 + 20 + 25 + 30 + 35 +40 + 45) / 180
V19	GIM	Gross Interest Margin	360 / 345
		Regulatory Pressure Factors::	
V20	FCR	Free Capital Ratio	Bank of England ratio as published in each bank's annual report.
V21	MCRI	Minimum Capital Standard Imposition	Dummy variable; 1 = prior to 1987; 2 = 1987 and later.

UK BALANCE SHEET & INCOME STATEMENT: ACCOUNT ITEMS AND CODES

SOURCE: IBCA

BALANCE SHEET -				
ASSETS::				
Notes in Circulation	5	I		
Cash & Bullion	10	I		
Due from Banks	15	I	Assets of Securities Dealing Activities	270
Money at Call & Short Notice	20	I	Amounts due from Brokers, Dealers & Customers	272
Treasury Bills	25	I	Other Debtors	274
Bank CDs	30	I	Securities purchased under agreement to resell	276
Special Deposits at BofE	35	I	Cash deposited against stock loans	278
Govt. Listed Securities	40	I	Other Securities Balances	280
Deposits at Banks, Discount Houses & Local Author	45	I	Other Assets	282
Loans to Banks	50	I	TOTAL SECURITIES DEALING ASSETS	290
Loans to Local Authorities	55	I		
Local Authorities Listed Securities/Dealing Asset	60	I	Liabilities of Securities Dealing Activities	292
Trade Bills Discounted	65	I	Amounts Due to Brokers, Dealers & Customers	294
Loans to Customers (<1 year)	70	I	Other Creditors	295
Hire Purchase Loans	75	I	Securities Sold under Agreements to Repurchase	296
Loans to Customers (>1 year)	80	I	Loans Secured Against Stock Deposited	298
Leased Assets	85	I	Other Securities Balances	300
Investments: Quoted	95	I	Other Liabilities	302
Investments: Unquoted (Inv. Properties)	100	I	TOTAL SECURITIES DEALING LIABILITIES	310
Advances to Subsids & Fellow Subsids	105	I		
Associated Investments	110	I	NET INVESTMENT IN SECURITIES DEALING ACTIVITIES	320
Trade Investments	115	I		
Other Equity Investments	120	I		
Accounts Receivable	125	I		
Fixed Assets	130	I	INCOME STATEMENT -	
Goodwilll	135	I		
TOTAL ASSETS	180	I	Interest Received	360
		I	Interest Paid	365
		I	Net Interest Revenue	370
		I	Other Operating Income	375
LIABILITIES::		I	Other Income (incl share of Assoc)	380
Notes in Circulation	185	I	Specific Loan Loss Provisions	385
Demand Deposits	187	I	General Loan Loss Provisions	387
Savings Deposits	188	I	Exceptional Loan Loss Provisions for Soverign Risks	388
Time Deposits or Current & Demand Deposits if no	190	I	Personnel Expenses	390
Due to Fellow Subsids	195	I	Other Overheads	395
Banks CDs	200	I	Pre-Tax Profit	400
Other Short-Term Borrowing	205	I	Taxes	405
Taxation	210	I	Profit after Taxes	410
Accounts Payable	215	I	Dividends	415
Loan Loss Reserve (Specific)	220	I	Charge-Offs	420
Dividends	225	I	Profit Attributable to Minorities	425
Deferred Taxation	230	I	Extra-ordinary Income	430
Loan Capital	235	I	Contingent Liabilities	435
Minority Interests	240	I	Confirmed Credits	440
Subordinated Loans	245	I	Recoveries of Advances Previously Written-off	445
Loan Loss Reserve (General)	250	I	Acceptances	450
Reserves	255	I		455
Share Capital	260	I	Average Assets	500
Near Equity	265	I	Average Equity	505

BANK B.ZZ
---- SUMMARY STATISTICS ----
SOURCE: IBCA

BALANCE SHEET		INCOME STATEMENT	
ASSETS::			
A1. LOANS		Interest Received	360
Customer Loans	70	Interest Paid	365
Consumer Loans	75	Net Interest Revenue	370
Loans to Banks	80-85	Other Operating Income	375
Long-term Loans		Other Income	380
(a) Leased Assets	85	Provisions	
(b) Other	80	- exceptional, for Sov. Risks	385
Other	105	- Other Loan Losses	385+387
		Personnel Expenses	390
A2. OTHER EARNING ASSETS		Other Overheads	395
Deposits with Banks	20+30+35+45	Pre-Tax Profit	400
Short-term Investments	25+45	Taxes	405
Other Investments	40+60+95+100+320	Net Income	410
Equity Investments	110+115+120		
A3. TOTAL EARNING ASSETS	A1 + A2		
A3. FIXED ASSETS	130		
A4. NON-EARNING ASSETS			
Cash and Due from Banks	5+10+15		
Other	125+135		
TOTAL ASSETS	180 = A1+A2+A3+A4		
LIABILITIES::			
L1. DEPOSITS			
Demand	187		
Savings	188		
Time	190		
L2. BORROWINGS			
Short-term	200+205		
Long-term	235+245		
L3. OTHER (non-interest bearing)	185+195+210+215+225+230		
L4. LOAN LOSS RESERVES	220+250		
L5. RISK CAPITAL			
Equity	240+255+260		
Near Equity (assessed by IBCA)	265		
TOTAL LIABILITIES & RISK CAPITAL	L1+L2+L3+L5 (excludes L4)		

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