Shipping Finance

+Approach to the Hellenic market.

Dissertation

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The present text is an effort to print down the latest developments in ship financing as it mainly occurs in Piraeus Greece. Chapters 1 and 2 display some of the market's driving forces and developments useful to the first-time reader whereas in the last sections a survey on the Greek bank market is being presented. The survey has been conducted in the summer of 2003 with the participation of major Piraeus banks.

Thanks for their participation:

FORTIS BANK
CITY BANK
PIRAEUS BANK
ALPHA BANK
CREDIT AGRICOLE INDOSUEZ (LYONNAIS)
LAIKI BANK
ABN-AMRO
EUROBANK
National Bank of Greece

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1 Introduction

1.1 Introduction

During the pre-world war II period, private equity was the major source for the finance of vessel acquisitions.

The high risk of the shipping industry reflected on fluctuating earnings and asset values, discouraged finance institutions from claiming a portion of the pie.

Significant developments in bank shipping finance occurred the subsequent decades. The world economy growth together with the need for larger cargo capacities elevated the amount of requisite capital investment to levels beyond the ability of private equity finance.

Bank shipping finance began to grow in importance in the 1960's with owners in possession of oil charters from major oil companies of sufficient duration to cover a substantial part of the repayment period.

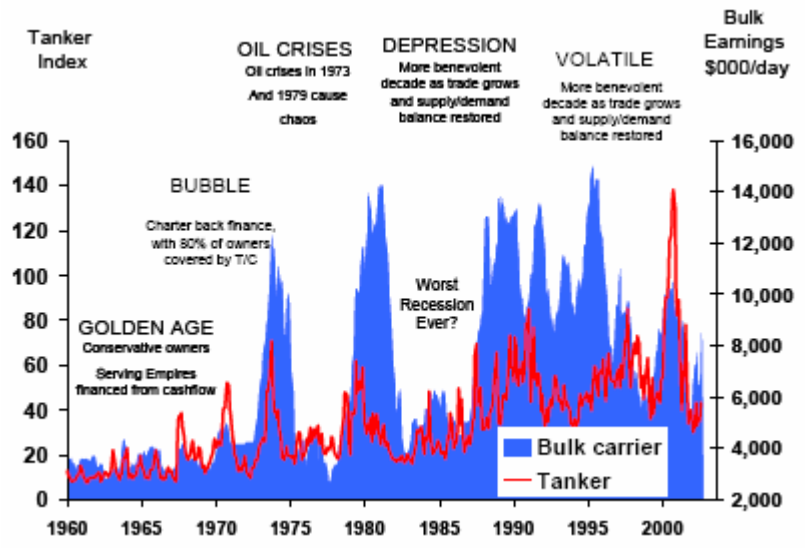


Figure 1: Changes in shipping commercial climate
Source: M.Stopford, 2002

To date, with an estimated requirement[1] of $207 billion over the six years 2002-2007 [M. Stopford, 2002], owners have a hard-time satisfying the industry's appetite. The reason for this is that we are going through a convalescence period.

Ship financing has always evolved in consonance with the commercial market's trends. As illustrated in Figure 1, about shipping industry, bankers and owners have had to deal with many changes in the commercial environment over the last 50 years. There has been a 'Golden Age' of growth in the 1960's; a 'bubble' in the

[1] The greatest funding demand of $ 41 billion is expected from Container shipping, whereas Tankers and Bulkers will require $34 and $33 billion respectively. The rest of the total shipping demand is predicted to be absorbed from Cruisers, Gas Transports, Passenger transports and so on.

1970's followed by an oil crisis and a deep recession in the 1980's. Finally the 1990's were extremely volatile though less life threatening. [M. Stopford, 2002] Perhaps the most interesting point is that with each of these commercial developments, the characteristics of finance changed. Figure 2 is enlightening.

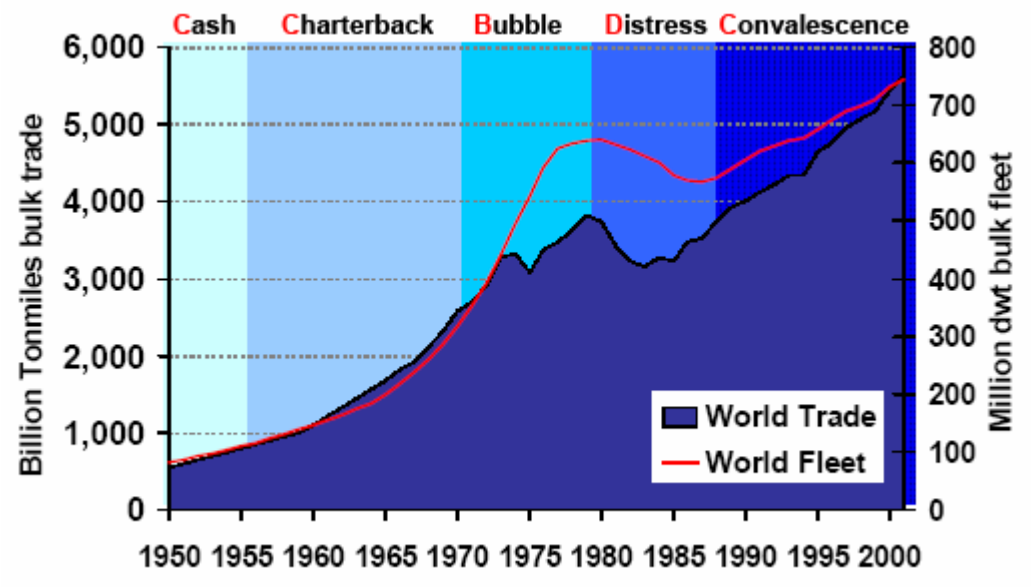


Figure 2: Five phases of ship finance

Source: M.Stopford, 2002

The above graph, illustrates the world Demand for cargo ships and the world Supply, which is the world fleet size. What is interesting is the evolution of finance.

Cash: In the 1950's debt was regarded as a sign of weakness so the established Greek families along with European ship-owners, stuck firmly to a policy based on retained earnings. There was no real need to borrow, as cash was plenty; the only problem was finding profitable investments.

Charter back: As the European and Japanese economies started to expand in the 1950's and 1960's, trade grew rapidly and it was then that cash would not work. Large corporations with growing cargo volumes desperately needed bigger ships and were willing to give long-term charters to get them. Independent owners used these charters as security to finance new buildings, which they registered under low-cost flags of convenience. Bankers, who now had access to the

expanding Eurodollar[1] market, were happy to offer very high advances against the security of a time-charter and the mortgage of a ship.

By the end of the 1960's about 80% of the independent tanker fleet was on time charter and highly leveraged. [M. Stopford, 2002]

Bubble: As trade grew faster in the late 1960's owners found time charters restrictive and started ordering ships on their own account to enjoy the profits of spot market booms. Unfortunately, bankers considered ship mortgages to be sufficient collateral and disregarded time charters. It was this change in banking strategy that broke the link between Supply and Demand. The effect was disastrous and according to Dr Martin Stopford, we are still living the consequences 25 years later. Figure 3 shows orders escalating to 120 m. dwt in 1973 – a genuine bubble. The combination of over-production and collapsing demand

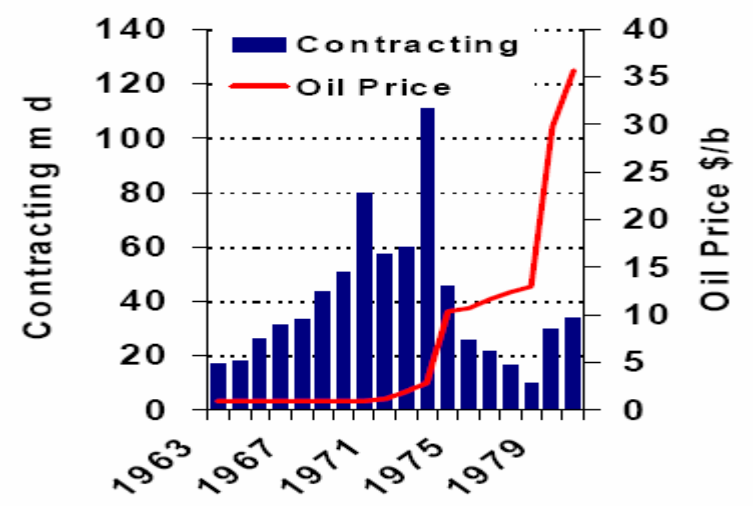


Figure 3: Tanker ordering bubble and oil prices
Source: M.Stopford, 2002

Distress: In 1980's the way the world banking community thinks about shipping risk, changed completely. A visible indicator of the crisis was the volume of modern tankers in lay up representing 25% of the fleet in 1984. [Figure 4]

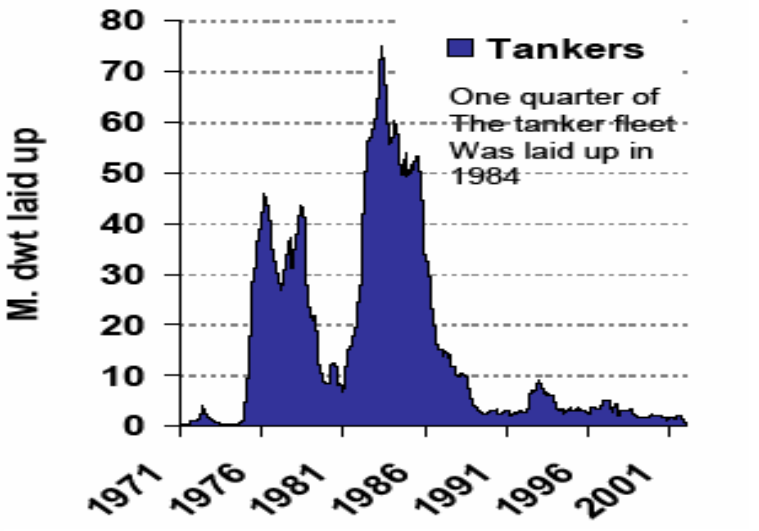


Figure 4: Unprecedented tanker surplus
Source: M.Stopford, 2002

Lack of prudence in the 70's expressed its consequences in the 1980's:

[1] A deposit that is made either in an US or foreign bank or branch located anywhere outside of the USA is called Eurodollar deposit as long as it is denominated in US dollars.

- During the four years 1983 to 1987 borrowers defaulted on $10 billion worth of shipping loans.
- The amount written-off the books by commercial banks and leasing companies because of defaults by shipping companies during this period was between $3 billion and $4 billion.
- Experienced ship financial institutions wrote-off 1-5% of total commitments each year and others as much as 10%. Several banks disposed of their whole portfolio and dissolved all links with shipping finance.
- Three Japanese banks wrote-off $700 million loans to a single shipping company.

As these events unfolded, banking officers faced problems for which a career in commercial banking could hardly have prepared them. Bankers were educated in the risks of financing ships in the most dramatic way possible…

Convalescence: It is how the following period is known. In the 1990's bankers and owners had to practice 'rehabilitation'. No one knew where needs for new investment would be satisfied from. Alternative techniques were 'taken out of the cupboard, dusted off and put into practice'.

Ship funds, IPOs, Bonds, Leasing schemes, private placements, venture capital and shipbuilding credit accounted for more than 60% of the capital raised to finance 90's investments.

In fact, through the 90's a much sophisticated group of bankers has emerged from the ship finance business, all having tremendous experience of the years behind them.

Out of the methods used in the 90's some were a success others failed. It is now that the shock's impact has faded and the finance landscape is blooming again, that investment is showing its new face. The old family-owned shipping company is leaving a new breed of managers to continue its path. On the other hand, bankers equipped with credit risk awareness and modern theory models are here to do business in a much more complicated framework.

It is the above status that makes a study in Shipping Finance and the qualification criteria imposed by Financial Institutions, so up-to-date.

1.2 Credit institutions

1.2.1 The need for regulation

A loan agreement is the important link between the bank and the borrower (ship-owner). Sometimes it is very difficult to come into an agreement satisfactory to both loan officers and borrowers. Both parties have different points of view and opposite interests. In general an owner would like to see from the side of the bank:

- a minimal equity contribution, so if the project goes right, he will make a very high return on the investment,
- a minimum collateral recourse to himself or to investors, which minimises losses if the project goes wrong,
- a maximum loan period to match the life of the asset, moratoriums, balloon and bullet terms,
- cheap finance in terms of interest,
- fast response time, advises and other financial products from the bank and
- minimal documentation.

On the other hand the banker would like to get:

- a substantial equity contribution,
- maximum collateral and recourse to beneficial owners,
- a minimum loan period,
- expensive finance,
- large time intervals between decisions and proposals,
- provision of any kind of financial product and service and
- maximum documentation to cover against every eventuality.

All these are valid, under the assumption that the borrower has the expected credibility and proven ability and capability to run the business, and that the project is sensible.

In the past many banks tried to categorise, standardise and 'homogenise' their requirements and offers. Most of the efforts were actually a set of criteria for accepting the project as potential proposal, and a set of criteria-biases for the borrower and the company. The process may have not been as successful as it

was supposed to be by minimising the workload of the banker, but it established some market standards. Almost every bank publishes a respectable booklet regarding its credit offers and policy.

1.2.2 Credit policy

The commercial banks' loan policies as a whole, contain a uniformity regarding their strategic approach. Different factors affect the activity of the individual bank though. It should be noted that all financial institutions generally tend to specialize on specific types of loans and markets operating a structured loan portfolio, developing their experience and confidence in their ability to manage credit risk. Some principal factors that make loan officers react differently facing the same loan opportunities are explained here:

Banks' **credit policies** are not the same, neither is their stance against credit risk. Some banks, while defending their shareholders' best interests, are more conservative than others.

Loan practices may vary for a number of reasons:

- **Legal regulations** banks may be subjected to. For example, the amount of loan to be granted to a shipping company is limited, depending on debt-equity ratios such as the ratio of deposits to the total loans at the time being.
- The **portfolio proportion** that has already been allocated to shipping loans. When many ship-owners have been offered credit, the bank may choose to save loan power to support the existing loans in case it is required in a distress or a low market.

  Not all banks are loyal to their clients up to the same extent. Some, once they have granted a loan, will intensively support the project both in good and in bad times.
- Of major importance is the **human factor**. Shipping loan appraisal is performed by humans not machines. Thus, the greater part is based on personal judgment. No loan officer predicts future developments 100% accurately. So, people with different experience come up with different evaluations against specific requests.

In order to achieve a more unbiased stance, credit institutions assemble the pursuits and the requirements regarding finance in an issue called 'credit policy' booklet.

Credit policy is the entirety of regulations, of organizational and economical nature, that administer a credit institution for the achievement of the greater possible financial outcome, for both private and social benefit. A credit policy should be characterized by three general principles. [J.E. Velentzas, 1998]

These are:

i) **The principle of liquidity.** Liquidity is a major issue concerning banks. It is the ability of the institution to respond to its due obligations at a certain time. Credit institutions do not pursue to attain such liquidity adequate for the entirety of their liabilities because achieving that would mean leaving all deposits intact.

Although all investments are based on the depositors' capital, the credit institution may, by no means, delay the fulfilment of a due obligation or pay part of a claim.

ii) **The principle of security.** This is established over a list of measures and guarantees that secure the return of the amount of credit provided increased by the revenue (interest) to the bank.

The requisite securities may be personal, therefore depend on the creditor's solvency and financial status. The securities may also be based on property pledge or mortgage.

To implement the principle of security, banks, should seek to distribute their services to many creditors and avoid granting great loans to few corporations. The economic collapse of such a loan would stagger the status of the institution that provides the credit.

The principle of security on behalf of the credit institution requires full awareness of the operations and credibility of the potential debtors. To attain such information the bank has an *ad hoc* service assigned with the task. Commercial and economical information is of utmost importance.

The elaboration of data includes a systematic analysis of economic developments in the country, which is the centre of the institution's activities, as these may affect significant sections of the business.

iii) **The principle of efficiency.** This principle is connected to the economic foundation of every human activity, which is 'the achievement of the greater possible outcome, sacrificing the less, utilizing the appropriate combination of resources available'.

Efficiency is adjacent to safety and liquidity. Actually, the need to preserve liquidity implies *limitation* of revenue and hence of the possible efficiency. Still, pursuit of *greater* revenue enhances the liquidity inadequacy risk. It is also known that debtors are willing to pay more when security offered by the project is low, while in another case, credit is quite un-**interest**-ing.

A credit institution's efficiency is affected by the cost of capital and the revenue from creditors. The amount of capital deposited at the Central Bank is key element to the institution's efficiency[1].

In detail, a credit policy booklet quotes extensively on the following key points:

Tenor: the length of the loan. On types of loan such as balloon payment, not all instalments have the same size. If all were equal then perhaps an 8-year loan would be fully repaid at, let's say 10 years. It is said then that the 8-year loan has a 10-year *profile*. This is called 'amortization'.

The reference on the maximum acceptable period of the loan may be stated with any of the following expressions:

- Maximum loan repayment.
- Maximum age of ship at the end of the loan.
- Maximum loan profile.

The reference may alternatively have to do with the 3rd special hull survey – it is another way of implying a 15-year-old ship.

Gearing: is the ratio of the loan to the asset value. Varies from 40-80% depending on the ship type, employment, collateral, age, competition from other banks and general lending policy.

One typical general-intentions list which is rather optimistic is displayed here:

Newbuildings 80%
2nd hand 70%
Special 75%
Passenger ships
    New ones 75%
    Over aged 50%

[1] See chapter 2.2.1 on Commercial bank loans

Repayment schedule: usually equal instalments over the period of the loan. In the London or the Eurodollar market, instalments are usually every three or six months.

Currency: most commercial banks lend in U.S. dollars or other major currencies. This presents the borrower with currency risk. A prudent choice is that the loan be issued in the same currency with the expected cash flow.

Interest rates: most financing by commercial banks is done on a floating rate basis. They lend at a spread over the rate at which they borrow, six month LIBOR[1] being the most common. Typical spreads range from 0.5% to 2.5% over LIBOR (EURIBOR with the new monetary system) according to the standing of the borrower etc.

Fees: where a standby period is involved, the bank will customarily charge the creditor a commitment fee; there is also arrangement for a front end fee.

Syndication of shipping loans: may be used to spread the risk of a large loan among several participating banks.

Security: the security sought against the loan may include the following:

Employment, First Mortgage, Second Mortgage, Assignment of Income, Assignment of the Insurance, Personal or Corporate Guarantees and Security Maintenance clauses.

It should be noted that the greatest of all securities is the expected cash flow. If the ship brings money to the owners they will be able to repay the outstanding loan as fast as planned and the investment will have yielded a hundred per cent.

[1] Banks may not always be in a position to meet all financial needs at a certain time, this leading them to borrow from other providers of capital. This market among banks is called Interbank market and as in any loan there's a charge for it. The interest at issue here is named EURIBOR or LIBOR depending on whether the market is that of the European Economic Community or that of London and it is a floating value charged among banks. LIBOR (London Interbank Offered Rate) indicates an average cost of capital for the bank. It is the interest over which the bank is willing to hold deposits and is technically about 1/10 or 1/8 greater than the actual bank's cost of capital.

The commercial bank to enhance security on its risk management basis acquires information and monitors the following:

- Evaluation of the market prospects
- Operational plan of the shipping company
- Credit policy adjustments to better suit the current pursuits.
- Competition quality of services
- Relationship banking
- Portfolio distribution and allocation
- Minimum acceptable yield

CASH FLOW SCHEDULE $ SHIPPING BANK SHIPOWNER:……..

DATE PREPARED……BY……

							NET INCOME						
VESSEL TYPE	YEAR BUILT	DWT	CHARTERER	RATE	EXPIRY	DAILY OP/EX							
TOTALS													
Income calculated as follows:				LESS DEBT SERVICE									
SHIPS up to 10 years old - 11-5 months				CASH CUSHION									
SHIPS over 10 years old - 10 months				CUMULATIVE CUSHION									

Figure 5: Example of cash flow monitor

Source: P.C.Cheng, 1979

SHIPPING BANK

Owing Co……. Managing Co……..…..……
Ship's name……. built……dwt……flag……s/s……..

Crew …….officers ……men		
1 Daily Wages		
2 Overtime		
3 Victualling		
4 N.A.T. & bonuses		
5 Repatriation, Medication etc.		
Total	$	$
Insurance		
1 Hull & Machinery @ .....% p.a.		
2 Freight		
3 Excess Hull Value		
4 P & I Club		
5 Off - hire ……days		
6 Mortgagee's Interest		
7 War Risks		
8 Other		
Total	$	$
Repairs & Maintenance		
1 Lubes @ …..tons/day x …..per ton		
2 Stores (deck/engine/cabin)		
3 Maintenance		
4 Repairs		
Total	$	$
Daily Accruals		
1 Special Survey Reserve		
2 Annual Drydocking Reserve		
3 P & I Club Back Call		
4 Contingencies		
Total	$	$
Total Daily Ship Operating Expences		$
Office Administration Cost per Vessel	$	
Total Daily Operating Expences		$

Statistics

1 Average Annual Increase of Daily Operational Expences over last 5 years ……. % p.a.
2 Monthly Operational Expences per dwt $.....per dwt/month

Figure 6: Example of expenses monitor

Source: P.C.Cheng, 1979

Economic intelligence is however, often inadequate and unreliable. Information on shipping companies is not easily gathered because of some particular characteristics of the shipping market:

- Apart from the tonnage taxes, shipping is subjected to no other tax regulations.
- It has multinational activity.
- Every ship company has a variety of options regarding regulations. Tax havens and flags of convenience help creating a vague landscape.
- Most shipping companies are family owned.
- There is a tendency to preserve commercial relations through secrecy.

This is why a list of information is inquired along with the loan request.

The purpose of a typical inquiry is to indicate the fleet status of the lending company, based on commonly acceptable evaluations and the total of its liabilities which may extend to the amortization of other loans if any and so on. Liquidity status and fleet employment are also required in case of loan appraisal.

It is also common practice that the credit policy has special reference on unacceptable guarantees and terms. Such clauses may state the unwillingness of the institution to take part into loans based on multiple ship guarantees, especially where financially unstable companies are involved. Possible such clauses are stated here:

Cross collateralization loans and loans involving multiple currencies is strongly recommended into credit policy booklets, that they are to be avoided. Loans that hold increased risk are also those related to the financing of newbuildings in shipyards other than those of the traditional ship building countries.

A credit provider may also prefer to avoid refinancing a project that was first assigned to another bank due to reasonable suspicion. It must be stressed at this point that refinancing of that type, is a competition-motivated practice.

Covenants: the documentation of the financial agreement will generally include a range of covenants, some of which may be major issues in the negotiation. These covenants may include the provision of regular financial information, maintenance of working capital and net worth, and a minimum value clause which

requires additional collateral to be provided in case the value of the asset falls below a certain multiple of the amount owed.

Documentation: the whole arrangement is spelled out in detail according to an instructed format.

A credit policy may also suggest a loan request format, guiding the applicant to present oneself focusing on elements important to the bank. A typical format would comprise the following eight chapters:

i) Historical analysis

ii) Familiarization with the group

iii) Financial analysis

iv) Cash flow

v) Loan analysis

vi) Fleet structure

vii) Outlook for market segment banks collateral trades

viii) Downside risk analysis

Finally, a credit policy booklet may indicate the loan appraisal process. The most common sequence after the loan application has been filed, is the financial analysis –verification of the data provided, the market surveillance and evaluation performed by the bank's shipping department that consecutively, brings it in the bank's administration to grant it.

1.3 Risk

1.3.1 Forms of risk

Each enterprise is above all, exposed to risk as its operations unfold in an unstable background dominated by figures and fragile economic calculations. To minimize the potential disastrous effects, enterprises develop risk-managing branches that evaluate possible investments and advise the head departments.

At the very least, the company should understand the risks it is running and how they fit into the "risk package" it represents to shareholders. Many organizations are paying insurance premiums to cover the loss of, say, a $50 million building in a fire, while, at the same time, corporations leave financial risks worth hundreds of million of capital uncovered. Alternatively, corporations hedge every risk through the capital markets, spending money on risk management commissions. Techniques and tools for the measurement and reporting of risk have proliferated in recent years. Value-at-risk (V@R), capital-at-risk (C@R), risk-adjusted-capital-at-risk (RaCaR), risk-adjusted-return-on-risk-adjustedcapital (RaRoRaC)—the list goes on. But it's only sensible to invest in an understanding of risk if the corporation believes it can use this understanding to improve its performance for investors.

For an efficient risk management, a comprehensive approach must be adopted to enable the risk manager achieve the desired outcome. This is why risk has been divided into 4 fractions named after the sector they affect. They are listed below and are brought together by the departments that asses, measure and manage the total risk to which an enterprise is exposed to.

- **Credit risk**[1] the risk that a counterparty might become unable, or less likely, to fulfil its contractual obligations.
- **Business risk** the risk that change in the variables of a business plan will destroy that plan's viability, including quantifiable risks such as business cycle or demand estimation risk, and unquantifiable risks such as step changes in competitor behaviour or technology.

[1] Credit risk is also defined as the risk of losses resulting from failure by a corporation's counterparties (customers) to meet their obligations to the corporation.

- **Market risk** the risk to a financial position from changes in market factors such as interest rates, foreign currency value, and/or prices of commodities or equity.
- **Operational risk** the risk of loss due to physical catastrophe, technical failure and human error in the operations of a firm including fraud, failure of management and process errors.

But general definitions are less useful when a manager or regulator tries to do something about enterprise-wide risk - such as improve risk controls across the board, or reserve capital against it. Digging deeper into the former definitions of risk one can better understand the usability of the above terminology.

Operational risk.

Counting something, or controlling it, means putting a line around it. Soon, regulators and RAROC (Risk Adjusted Return On Capital) analysts will need to decide whether to include, say, strategic business risks or reputational risk in their allocation of regulatory and enterprise-wide capital.

Yet managers too, will need to know whether their assessment of operational risk in a business line should include, for example, the risk of a trader misunderstanding a sophisticated financial model. Some experts are sure that model risk should be included; while others are sure it forms a more natural component of market risk. Operational risk definition holds some key problem areas.

Reputational risk

It's been said that a bank's reputation is its most valuable asset. But most institutions do not include reputational or brand exposure as a component of their operational risk assessments. And banking industry representatives say they do not want reputational risk to be taken into account in any regulatory capital set aside to cover operational risk. Practitioners argue that reputational damage is a source of leverage for other risk sources rather than being a risk source itself, and that it's impossible to put a figure on the riskiness of a reputation.

Model risk

Model risk is the risk arising out of the wrong selection, application, or implementation of a model. To the extent that a bank knowingly and properly assumes the risk of applying a proprietary model up to a given level of exposure, managing model risk is the primary concern of business lines and the market or credit risk management team. To the extent that a model is deliberately or foolishly misapplied, implemented with the wrong data feeds, or relied upon in a way that falls short of best practice, risk

managing model risk additionally becomes the concern of operational risk and audit teams. But the line between these two sets of risks is hard to draw.

Extreme credit/market risks

Some practitioners, looking through the history of major market and credit losses, have begun to wonder whether all major losses that come as a surprise to the stakeholders in a firm are, in essence, operational risks. According to this logic, if the institution has lost more money than it intended to put at risk then necessarily something has gone wrong in risk reporting and corporate governance. If the most important lessons that can be learned from the failure lie in these areas, rather than in the measuring or interaction of a credit or market risk, then the failure might best be treated as a failure in operational or enterprise-wide risk management.

Business risk

Many institutions argue that this risk is quite distinct from operational risk in terms of identification and risk management - and that managing it forms a core competence of senior executives. Banks are fiercely resisting the idea that they should reserve regulatory capital against business strategic risk in addition to the capital they might have to reserve for core operational risks.

To solve issues arising from the above misinterpretations, the Basle Committee has defined **operational risk** as '**the risk that deficiencies in information systems or internal controls will result in unexpected loss. The risk is associated with human error, systems failure and inadequate procedures or controls**'. [*Basle Committee on banking supervision's risk management group discussion paper revised version April 2000 page 3*]

Business risk.

From the perspective of a financial institution, the problem of business risk management falls into two parts.

The most complicated of these is how a financial institution approaches its own business risks. In particular, would it be prudent for a bank and its stakeholders to attempt to manage some business risks as part of its formal risk management process or do decisions of this kind yield more if left to business instinct alone? The answer to this lies more in the severity of the risk than in the nature of the risk. So if the destructive capacity of business or strategic risks increases, institutions will find themselves under pressure to explain how their approach to business risk "fits" with their management of other key risks such as credit, market and operational risk.

The second part of the problem is wider. Should a corporation of any kind use risk transfer and financing tools to manage business risks that lie outside the tra-

ditional insurance, market and credit risk management markets? It's an important question because if the answer is yes, it will open up many new, risk management markets and expose some institutions to new kinds of risk portfolios.

If it makes sense to manage actively such business risks - demand fluctuations, new product launches, brand valuations, asset prices, residual assets and liabilities, patent risks, political and weather risks, and so on - where should the "risk management" stop and plain old management start? An analogy with how the reinsurance industry thinks through the sharing of risks might help sort out this conceptual tangle.

Credit risk –Enhancement of management.

It may be the most important risk that finance intermediaries have to manage. Credit risk management's importance is reflected in the incentives given to Financial Institutions, in the new Capital Accord, to reduce their regulatory capital - and save money - by improving their credit management practices.

'Inadequate credit risk management is still the biggest source of serious banking problems according to the Basle Committee - the international banking supervisory body' [abstract from article in E-Risk web portal].

Of course it is not only banks that are subjected to credit risk. As it will be presented in the following chapters, the role of banks has been adapted to meet current trends and requirements. A bank is a major investor that invests in loans, and its activities focus on the capital markets. Risk-free investments are more and more, hard to find and therefore investors must learn not only to live with risk but tame it as well. Various instruments have appeared for that reason, each one contributing a different membership value of credit risk to the total investor's portfolio. Bonds, credit derivatives, collateralised debt obligations and other innovative instruments are sources of credit risk, expose investors and must be effectively managed. It is interesting to comprehend that Financial Institutions isolate and 'package' portions of credit risk and transfer it to other investors who are willing to buy exposure to credit risk (!). This trend is further discussed in the following chapter 2.1 on modern portfolio theory.

Credit risk includes all claims on companies, institutions and individuals. The claims can be linked to loans and currency contracts, but may also represent conditional claims such as guarantees and derivatives. Settlement risk associated with foreign exchange and securities-trading is also classified as credit risk. The quantification of credit risk involves dividing credit commitments into categories

based on expected default frequency. In addition, there may be a separate category for credits which are already classified as problem commitments.

In an institution's credit approval model, the classification of commitments is based on both financial factors such as accounting data and non-financial factors such as managerial aspects. It is essential to estimate exposure, for example the size of the claim at the time of a potential default and how much would be repaid to the bank. Among other things, the loss ratio will depend on the collateral provided. The expected loss for each commitment is calculated as the product of the expected default frequency, exposure at default and the loss ratio. Figures for all commitments add up to normalised losses for the portfolio.

Market risk.

Boundaries between risk categories are blurred. A loss due to widening credit spreads may reasonably be called a market loss or a credit loss, so market risk and credit risk overlap. An important but somewhat ambiguous distinguish is that between **market risk** and **business risk**. Market risk is exposure to the uncertain market value of a portfolio. A trader holds a portfolio of commodity forwards[1]. The trader knows what its market value is today, but is uncertain as to its market value a week from today therefore faces market risk. Business risk is exposure to uncertainty in economic value that cannot be marked 'to-market'. The distinction between market risk and business risk parallels the distinction between market-value accounting and book-value accounting. Suppose a New England electricity wholesaler is long a forward contract for on-peak electricity delivered over the next 3 months. There is an active forward market for such electricity, so the contract can be marked to market daily. Daily profits and losses on the contract reflect market risk. Suppose the firm also owns a power plant with an expected useful life of 30 years. Power plants change hands infrequently, and electricity forward curves don't exist out to 30 years. The plant cannot be marked to market on a regular basis. In the absence of market values, market risk is not a meaningful notion. Uncertainty in the economic value of the power plant represents business risk

Market risk stems from the fact that there are economy-wide perils which threaten all businesses. That is why stocks for example, have a tendency of moving together. For a reasonably well-diversified portfolio, it is market risk that matters.

[1] See page 38 on derivatives

Figure 7 illustrates the merits of diversification; A well diversified portfolio of stocks for example, introduces exposure to risk that is brought down to the stock market risk whereas a portfolio of poorer diversification bears larger risk exposure.

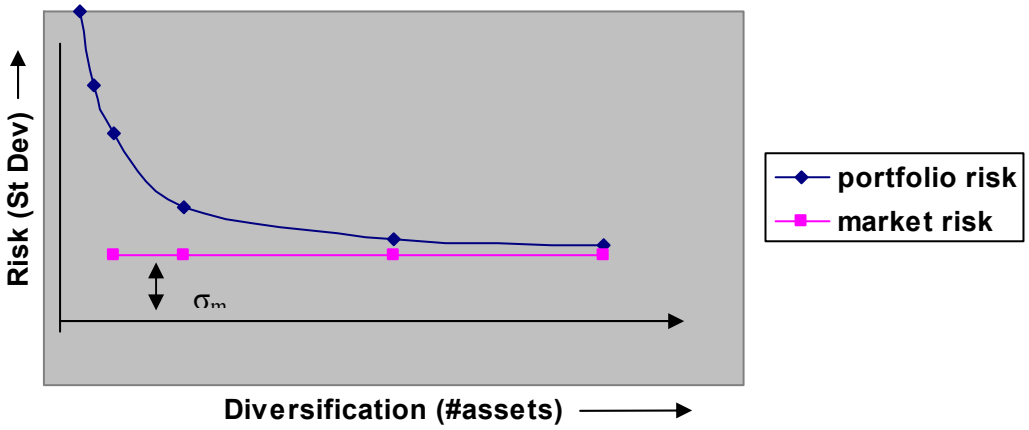


Figure 7: Effect of portfolio diversification (β=1)

The relative position of portfolio curve and market curve however is not apparent and may vary, depending on the correlation between the performance of the assets and the standard deviation of the market. The measurement of the relative position of the two curves has been made possible through the implementation of what is known as the *beta* (β) factor. Beta[1] describes the sensitivity of an instrument or portfolio to broad market movements and has been employed primarily in the equity markets. The formula for β is the following where $cov(Z_p,Z_m)$ is the covariance between the portfolio (or instrument) return and the market return, and σ^2_m is the variance of the market's return (its volatility squared).

$$\frac{\mathrm{cov}(Z_p, Z_m)}{\sigma_m^2}$$

While beta factors and are out of this textbook's objectives, it is useful to stress that industry sectors are assigned beta values that imply the underlying risk. In these terms, a beta above 1 stands for more risky than the stock market

[1] William Sharpe (1964) first used the notion in his landmark paper introducing the capital asset pricing model (CAPM). The name "beta" was applied later.

whereas a beta value below 1 indicates a safer investment. Needless to say, shipping has a beta above 1.

Market risk is managed with a short-term focus. Long-term losses are avoided by avoiding losses from one day to the next. On a tactical level, traders and portfolio managers employ a variety of risk metrics —duration and convexity, the beta, etc.—to assess their exposures. These allow them to identify and reduce any exposures they might consider excessive. On a more strategic level, organizations manage market risk by applying risk limits to traders' or portfolio managers' activities. Increasingly, value-at-risk (V@R[1]) is being used to define and monitor these limits

[1] V@R on a portfolio, is the maximum loss one might expect over a given holding or horizon period, at a given level of confidence (probability)

1.3.2 Risk models potential

Risk models promise to completely alter the way business is done today. Potential uses in the shipping industry, concern banks, ship-owners and freight traders.

A shipping bank may determine credit terms such as loan spreads and pick the right covenants. Even more, the estimation of risk promotes the cross-selling of loans, the derivatives[1] market and generally hedge proposals.

Risk models are of key-importance to ship-owners as well. Fundamental investment decisions are simplified up to a substantial extent; choosing the market, the charter (SPOT or time-charter) and the finance options (high-yield bond or bank debt) have proxy values that simplify the decisions.

Even freight traders need to assess and monitor risks to evaluate the performance of the market.

1.3.3 Risk calculation: 20 years of development

Credit risk measurement has evolved dramatically over the last 20 years in response to a number of forces that have made its measurement more important than ever before as it was discussed in the introduction. Among these forces have been:

- A worldwide structural increase in the number of bankruptcies.
- A trend towards disintermediation by the highest quality and largest borrowers.
- More competitive margins on loans.
- A declining value of real assets (and thus collateral) in many markets.
- A dramatic growth of off-balance sheet instruments with inherent default risk exposure, including credit risk derivatives.

Academics and practitioners alike have responded by: (i) developing new and more sophisticated credit-scoring/early-warning systems, (ii) moved away from only analysing the credit risk of individual loans and securities towards developing measures of credit concentration risk (such as the measurement of portfolio risk of fixed income securities), where the assessment of credit risk plays a central role, (iii) developing new models to price credit risk (such as the risk adjusted return on capital RAROC) and iv) developing models to measure better the credit risk of off-balance sheet instruments.

[1] See relevant information on page 38.

This chapter presents the key developments in credit risk measurement over the past two decades as they have been quoted in the *Journal of Banking & Finance.*

Expert systems and subjective analysis

20 years ago most Financial Institutions (FIs) relied exclusively on subjective analysis or the so-called banker 'expert' systems to assess the credit risk on corporate loans. Essentially, bankers only used information on various borrower characteristics to come up with a subjective judgment whether to approve the loan or not, based on the key points of credit -dominantly referred to as the C's of credit.

According to a paper published in 1995 on the context of the institutional investor's rating of LDC[1] indebtedness (based on banker's subjective ratings), bankers tend to be overly pessimistic about the credit risk of LDCs and multivariate credit-scoring systems (see below) tend to outperform such expert systems. Not surprisingly, FIs have moved away from subjective expert systems over the past 20 years towards more objective methods.

Accounting based credit scoring systems

In univariate accounting based credit scoring systems, the FI decision maker compares various key accounting ratios of potential borrowers with industry or group norms. Conversely, in a multivariate model key accounting variables are combined and weighed to produce a credit risk score or a probability of default measure. Where that score is assigned a value above a certain benchmark the loan is rejected or subjected to increased scrutiny. In terms of sheer number of articles and tests, models in this area have dominated the credit risk measurement literature in scholarly journals. Moreover, models have been globally developed in more than 25 countries. There are 4 methodological approaches to develop a multivariate credit scoring system.

i. Linear probability model
ii. Logit model
iii. Probit model
iv. Discriminant analysis model

Discriminant analysis followed by logit analysis claim the largest percentage of articles published in the *Journal of Banking & Finance*.

[1] LDC: Less Developed Countries

The determination of a linear function, of both accounting and market variables, which distinguishes the potential borrowers into two categories Repayment and non-Repayment, is the foundation of discriminant analysis. This requires an analysis of a set of variables to maximize the between group variance while minimizing the within group variance among these variables. In a similar way, logit analysis, based on a set of accounting variables calculates the probability of a borrower default assuming that this probability is logistically distributed i.e. the cumulative probability of default takes a logistic functional form and is, by definition, constrained to fall between 0 and 1. In 1977 a famous discriminant model was first presented the ZETA® which is still used nowadays.

Both logit and discriminant methods have been used to predict bank defaults in the 1975-1976 period and both models came to similar predictions to failure identification. The economic condition of Credit Institutions was later on attempted to be quantified using logit model along with factor analysis calculating a probability of becoming problem banks. It is of interest to say that the factors identified by the logit model were similar to the CAMEL rating components used by bank examiners. Another use of the logit model was to verify that corporate bankruptcy is better predicted by accounting ratios relative to the industry than simple firm specific accounting ratios. In general, models correlating industry characteristics work better that unadjusted models. Discriminant analysis models based on relative accounting ratios provide similar findings. A logit model has been also used to identify the set of variables that contribute to the most accurate prediction on a loan moving towards a default situation. This model was based on a Markov model of default probabilities.

Nevertheless as noted earlier, most multivariate accounting credit scoring models are based on discriminant analysis. Altman et al (1977) studied the performance of a 7-variable model, one of the variables being market value of equity. This model known as ZETA® followed the 5-variable model presented in 1968. Scott (1981) compared a variety of these empirical models with a theoretically sound approach. He came to the conclusion that the ZETA® most closely approaches his theoretical bankruptcy construct.

Newer models

While multivariate accounting based credit scoring models proved to be accurate in different time periods, and different countries they have been subjected to three criticisms.

- These models may fail to pick up subtle and fast-moving changes in borrower conditions, for example those that would be reflected in capital market data and values because they are predominantly based on book value accounting data (which in turn is measured at discrete intervals).
- The world is inherently non-linear, therefore linear discriminant analysis and the linear probability models may fail to forecast as accurately as those that relax the underlying assumption of linearity among explanatory variables.
- Models described so far, have been developed through practice in a trial and error base leaving no room for theoretical background. Therefore, new approaches of an explanatory nature have been presented as an alternative to traditional bankruptcy models.

A first class of such models with a solid theoretical background, is the 'risk of ruin' models. The concept is that quite simply, a corporation defaults when the market (liquidation) value of its assets (A) falls below its short-term debt obligations (B). As it it was recognised in 1981, the risk of ruin model is similar to the option pricing model (OPM) (Black & Scholes (1973), Merton (1974) and Hull & White (1995)). In the model of Black-Scholes-Merton[1] the probability of a company to default depends on the market value of its assets (A) relative to its outstanding debt (short term) (B) and the volatility of the market value of the company's assets (σ_A).

The ideas of the risk of ruin/OPM models gained increased credence in the commercial area. KMV (1993) and Kealhoffer (1996) models are quite modern examples of such logic. In KMV, basic inputs are (A) and (σ_A) which must be specified in advance. The underlying constructs are two theoretical relationships. First is the OPM model where the value of equity can be viewed as a call option on the value of the company's assets. Second is the theoretical link between the observable volatility of the equity's value and the value of the company's assets which cannot be monitored. Regarding publicly traded companies, both (A) and

[1] In the early 1970s, Fischer Black, Myron Scholes and Robert Merton made major breakthrough in the pricing of stock options by developing what has become known as as the Black-Scholes (Merton) model. The model has had a huge influence on the way that traders price and hedge options. In 1997, the importance of the model was recognized and was awarded the Nobel prize for economics.

(σ_A) can be measured due to data adequacy. Moreover, once values are imputed to (*A*) and (*B*) –which are the short-term debt outstanding and a calculated value for the diffusion of asset values overtime (σ_A), an Expected Default Frequency (EDF) can be calculated for each borrowing firm. That is, default occurs in a future period when the value of the company's assets falls below short-term debt outstanding. The normalized area of the future distribution of asset values that falls below (*B*) is calculated. In actual practice, KMV uses an empirically based 'distance from default' measure based on how many standard deviations (*A*) values are currently above (*B*) and what percent of firms actually went bankrupt within one year with (*A*) values that many standard deviations above (*B*).

The objections regarding OPM type of models are i) whether the volatility of a firm's stock price could be considered an accurate indicator for the variability of asset values and ii) the efficacy of using a comparable or proxy analysis necessary for non-publicly traded equity companies.

A second newer class of models with a powerful explanatory background comprises all those that seek to impute implied probabilities of default from the term structure of yield spreads between default free and risky corporate securities. These models derive implied forward rates on risk free and risky bonds and use these rates to extract the market's expectation of default at different times in the future. Fundamental assumptions are: i) that the expectations of the interest rate theory hold, ii) the transactions cost is small, iii) calls, sinking fund and other option features are absent and iv) discount bond yield curves exist or can be extracted from coupon bearing yield curves[1]. However, not all of these assumptions are acceptable.

One third approach based on the capital market is the 'mortality rate' model. These mortality/default risk models seek to derive actuarial-type probabilities of default from past data on bond defaults by credit grade and years to maturity. All rating agencies like Moody's (1990) and Standard & Poor's (1991) have adopted and modified this approach. The mortality-rate models are now routinely used in the structured financial analysis that agencies apply on firms in order to classify them. Provided there is adequate data on default loans, these models can be extended to analyze the risk of loans. It has been calculated that in order to achieve stable estimations, 20,000-30,000 entries would be required. Very few financing institutions come even remotely close to approaching this number of potential borrowers. This may be enough to explain the initiative of banks in the USA to

[1] For yield curve explanation, see [J.Hull, 2000]

develop a common database of historic mortality loss rates on loans (a project of Robert Morris Associates, Philadelphia PA).

A fourth newer approach comprises a neural network analysis on the credit risk classification issue. There is a correlation between this method and the non-linear discriminant analysis on that they both make the assumption that variables entering the bankruptcy prediction function are linearly and independently related. Neural network application on credit risk, investigates potential 'hidden' correlations among prediction variables, which are then added, as extra explanatory variables, in the non-linear predictive function. Commercial rating models based on neural networks are also available.

The weak spot however, of the latter approach is located on the ad hoc theoretical foundation and the 'fishing expedition' nature by which the correlations among the explanatory variables are identified. Altman et al. (1994) conclude that this method does not improve the past, linear discriminant structures.

Measures of the credit risk of off-balance sheet instruments

Concerns regarding default risk properties have aroused along with the expansion of off-balance sheet instruments. Such instruments are swaps, options, forwards, futures, etc. in financial institutions' portfolios as well as credit risk derivatives (default insurance) and are considered a most profound development over the past 20 years. These concerns have been reflected in the risk-based capital ratios finally imposed by the Bank for International Settlements in 1992, requiring banks to hold capital reserves to cover both the current and future replacement costs of such instruments, should default occur.

The probability of default on off-balance sheet instruments issued by a counter-party may, in principle, be calculated using the formerly presented methods as in the on-balance sheet loans, since in both occasions the necessary condition is financial distress.

There are differences on bank loans and off-balance sheet instruments however. Even if financial distress occurs, the counter-party shall see to fulfil the in-the-money contracts. Therefore losses on defaulted contracts can be offset by contracts that are in-the-money to the defaulting counter-party. Still, the major difference is that for any given probability of default, the loss from a loan is far greater than the inherent loss of an interest rate swap of the same notional principal size for example, where the loss is confined to the present value difference between the fixed and expected future cash flows on the swap.

1.3.4 Problems with models

If regulatory risk management fulfils its objectives there will be no systemic failures, but the converse is not true; absence of systemic failures does not mean that the system works. Should senior management discover that the risk model is faulty, it may be too late to do anything about it.

However sophisticated have the various methods evolved, they are still empirical instruments used to assist the loan officer and by no means substitute an *ad hoc* analysis department, the need for which is imperative to a bank. Even well-performing models should only help the manager and underwriters to be consistent in their evaluations and also provide a framework for discussing the merits of a transaction. The design of a risk model is inevitably based on a mixture of objective observations and subjective opinions that is, the quality of the model is based on the skill of the modeller. Therefore, there's no such thing as a perfect model.

Evidence of risk model limitations, leads to the suspicion that these models may be acting like placebos, and not as scientifically valid ways of preventing major institutional and systemic crashes.

Most risk models make the explicit assumption that market data follows a stochastic process that depends only on past observations of market variables. While this assumption facilitates modelling, it is based upon a faulty hypothesis [J.Danielsson, 2002]. Another translation of the same hypothesis is that market participants, act random and their actions cannot affect the market. Accepting however that there are measures common to many investors that can influence their behaviour, it becomes inappropriate to assume that market prices follow a stochastic process. In a time of crisis when most market participants execute similar strategies, risk models may amplify the reactions of the market, not to mention alter the statistical properties of market data.

It might be no coincidence that the past few years following the implementation of risk models, have been the most volatile of the post-war era. After all users with different views of what constitutes risk, require different forecasts.

Tests on risk models provided results that are less than encouraging [J.Danielsson 2002]. When evaluating the output of risk models, there are five key considerations.

- **Robustness.** It is the ability of a model to remain accurate across different assets –within the same asset class-, different time horizons and risk levels. Test results have been disappointing.

Accuracy of a model is measured using the concept of *violation ratio*. The ideal model has a violation ratio equal to 1. A model with a ratio under 1 over-forecasts risk and conversely a ratio over 1 under-forecasts risk. While 'close to 1' is questionable, the range of '0.8-1.2' is a reasonable expectation. Based on this criterion, the results were depressing, as violation ratios ranged from 0.37 to 2.18.

- **Volatility of risk forecasts.** Risk forecasts, should not fluctuate from one period to the next. This issue is not documented in most of the published comparative tests of models. [J.Danielsson 2002]

  If a V@R[1] number routinely changes by a factor of 50 per cent from one day to the next, it may be hard to sell the concept of risk modelling within the firm. According to the same source, many firms employ *ad hoc* procedures to smooth risk forecasts.

- **Model estimation horizon.** It is the amount of historical data used to specify a model.

  Regulators often suggest a horizon of some 250 trading days for market risk modelling and most supervisors do not allow longer estimation horizons. The reason for this is may be either because older data is not available or it is ir-relevant due to structural market changes or because long-term risk dynamics are so complicated that they cannot be modelled. Indeed the introduction of a new instrument such as the Euro, makes old data inapplicable for modelling. Such incidents prove models to be completely fragile. As far as long-term risk dynamics are concerned, ignoring them in risk forecasts is wrong as it is easy to demonstrate both their existence and their importance. Notwithstanding, explaining the dynamics of long term volatility is out of the intention of this text.

- **Holding period.** It is clearly riskier to hold a particular market exposure for 10 days than it is to hold it for 1 day. Risk models calculate risk in terms of a specified holding period (time horizon).

  For example, V@R calculated with a one-day holding period will give management some idea of how much they are likely to lose from a particular exposure (position) over one trading day assuming they hold the position throughout the day. Apparently this introduces some limitations. Things get worse when a 10-day V@R is attempted. If 250 trading days –one year of

[1] V@R on a portfolio, is the maximum loss one might expect over a given holding or horizon period, at a given level of confidence (probability)

data, are required to produce a daily V@R, an estimation horizon of 10 years should be integrated, to come up with a V@R of the same statistical accuracy. This is impossible for reasons indicated earlier in the estimation horizon paragraph. To overcome this problem the Basle committee on bank supervision, in [Overview of the amendment to the Capital Accord to Incorporate Market risk, 1996] recommended a scaling law to convert daily V@R into 10-day ones. According to the rule, a daily V@R is multiplied by the square root of 10 to provide the 10-day V@R (!). Such a concept could be valid under three assumptions, worth pointing out.

- Returns must be normally distributed
- Volatility must be independent over time
- Volatility must be identical across all time periods

Needless to say, all three of these assumptions are violated in reality.

- **Correlation risk.** As it will be further discussed in chapter 2.1 on modern portfolio theory, the total amount of risk in a portfolio depends on the likelihood of several things going wrong at the same time.

  Correlations appear to be much lower if they are estimated at a time when financial markets are rapidly climbing. In periods of rapid decline, correlations are close to 100 % existent. Most risk models do not take this into consideration and their correlation estimates are based on normal market conditions.

In conclusion, risk models should be cautiously operated. Up to the extent that they are relied upon, managers should invest time into understanding the assumptions surrounding each particular model. As said before, for each purpose individual models must be engineered so one should never expect a universal easy-to-use risk model.

2 Contemporary developments

2.1 Modern portfolio theory

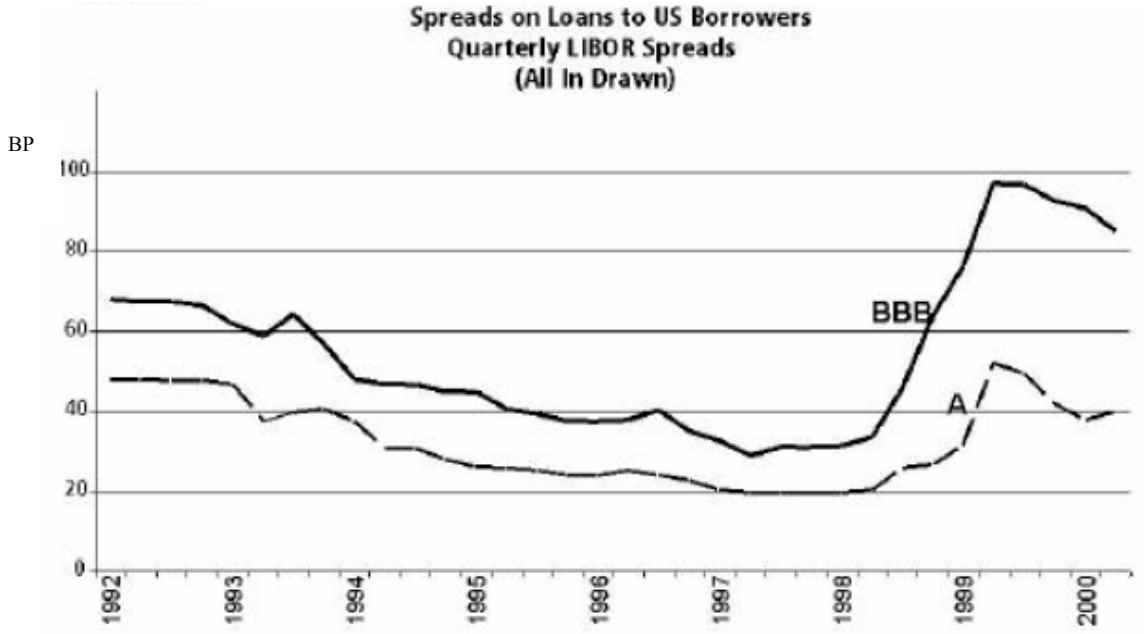


Figure 8: Spreads on loans to US borrowers quarterly LIBOR spreads
Source: Ch.W. Smithson and G. Hayt, 2001

Lending is undergoing serious review and credit portfolio is managed differently nowadays. The 'efficient portfolio' concept has emerged and Financial Institutions have adopted an investor approach. Banks have experienced declining margins on loans and have found it therefore, to be increasingly difficult to earn an economic return on high-grade corporate loans. [Figure 8]

As investors in loans, banks must earn a sufficient high economic return on the capital that supports the loan portfolio. If not, the bank should shift the capital to some other business.

Having in mind that a loan is an asset for the borrower, F.I.s are willing to adopt an asset-manager behavior, maximizing the risk adjusted return to the loan portfolio by actually buying or selling credit exposure. It may therefore be supported that the principles of Modern Portfolio Theory (MPT[1]) may be applied to credit portfolios as well.

[1] **Modern portfolio theory** (MPT) —or **portfolio theory**— was introduced by Harry Markowitz with his paper "Portfolio Selection" which appeared in the 1952 *Journal of Finance*. Thirty-eight years later,

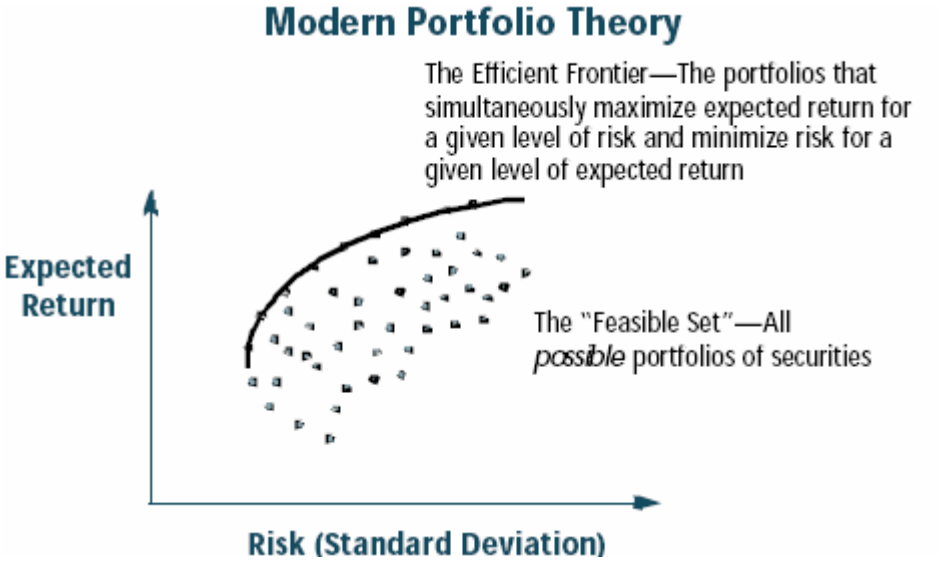


Figure 9: Modern portfolio theory

Source: Ch.W. Smithson and G. Hayt, 2001

The main issue in MPT is the aspect of *correlation*. Combining the assets (loans) in a portfolio, the investor can end up with a risk that is lower than the weighted average of the risks of the individual assets. The implication of this is of course, dramatic; an investor can increase expected return without increasing risk overall. There are however difficulties in applying MPT to credit portfolios, that escape the purpose of the essay and shall not be analyzed here.

Tools for reshaping credit portfolios

What are the variables that affect the overall performance of a credit portfolio? No evaluation tool, pricing model, or credit risk measurement of any kind would be useful if the credit manager could not act on it.

Managers have four tools at their disposal (listed in order of when they became available):

1. Management of new business and renewals of existing business
2. Loan syndication and trading
3. Securitizations (first securitization of a portfolio in 1988)
4. Credit derivatives (first total return swap in 1991)

he shared a Nobel Prize with Merton Miller and William Sharpe for what has become a broad theory for portfolio selection.

Rutter associates, a New York-based risk management consultancy, carried out a survey of loan originators and investors in loans, the fall of 2000. As part of that survey, investors in credit assets (credit portfolio managers) were asked to rank the four tools in order of importance. According to that survey as published in the RMA Journal May 2001, the respondents ranked management of new business and renewals of existing business as the most important tool, followed by credit derivatives. The complete ranking is:

1. **Management of new business and renewals of existing business**
   This is where credit models can be useful. A manager can determine which assets the portfolio has too many of and which it has too few of. Assets charged a pricing relative to the risk contributed to the portfolio are welcome. It is as simple as that. Evaluation of whether relationship-driven revenues are sufficient to overcome inadequate pricing on a given transaction, is even possible.

2. **Credit derivatives**
   In addition to issuing debt securities, companies enter into a variety of *side bets*, known as derivative instruments[1]. These do not raise new capital but they do change the risks a company is exposed to.
   Derivatives are contracts with values that are derived from the performance of underlying financial instruments, interest rates, commodity prices, currency exchange rates or other indices. Such a contract links its owner with the risks and rewards stemming from the performance of assets without actually owning the assets. What is introduced here, with the implementation of credit derivatives, is the *trade of risk.*

   Just like assets are secured by insurance companies, financial deals and agreement terms are hedged using derivatives.

[1] The four major types of derivatives are *Traded Options*, *Futures*, *Forwards* and *Swaps*.
Options: An option offers its owner the right but not the obligation to buy or sell an asset in the future at a price agreed upon today.
Futures: It is a contract of an order to buy or sell an asset or commodity, placed in advance of the delivery date not paid until that date. In other words it is a contract of future fulfilment.
Forwards: These are tailor-made futures not traded on exchanges; a corporation that wishes to buy foreign equipment after some time but is worried about interest rates performance may lock-in the interest rate by buying a forward rate agreement (FRA) from a bank.
Swaps: It is the ultimate risk diversification and managing tool; an officer managing a portfolio exposed to interest rates, may arrange to exchange the obligation stemming from the ownership of these assets with another risk, based on assets exposed to the movement of NASDAQ for example, without actually gaining the ownership of these assets. This way one gains access to the risks accompanying other businesses.
For more information on derivatives, see [J.Hull, 2000]

3. Loan sales and trading

Financial Institutions may also act as traders and hence, trade their assets. With loans being their assets, banks have developed a loan market known as 'secondary market'. It is clearly indicated in Figure 11 that this is a growing market. What really must be stressed out is the participation of institutional investors. Insurance companies and pension funds buy exposure to credit risks in the secondary market. [Figure 12] It is now important to point out the institutional investors' appetite for credit risk that is demonstrated by growing participation in the primary market as well. [Figure 10]

4. Securitizations

It is the process of converting bank assets into securities that are backed by the assets' performance. In short, this technique requires the creation of a legal entity [Special Purpose Vehicle (SPV)] which holds the underlying assets. The balance sheet of this SPV includes a pool of loans or bonds in the asset area and securities of varied payment priority as liabilities. In the end, it is the difference of the weighted average coupon of the assets and the weighted average coupon of the liabilities that represents the arbitrage. This concept gets more complicated when the actual debt obligations (bank loans or bonds) are not actually transferred into the balance sheet of the SPV but the inherent risk, through a credit derivative. It is the higher credit quality of the subsequent securities that makes such an instrument attractive.

This policy is named Collateralised Debt Obligation (CDO) and as shown in Figure 13 it enjoys an increasing interest. Bank-issued CDOs are structured and rated based on the cash flow generated by the asset (collateral). Alternatively, CDOs may be rated on the basis of the market value of the collateral. If for example the market value of the asset falls below a certain threshold, the structure will be unwound and investors will be paid from the proceeds.

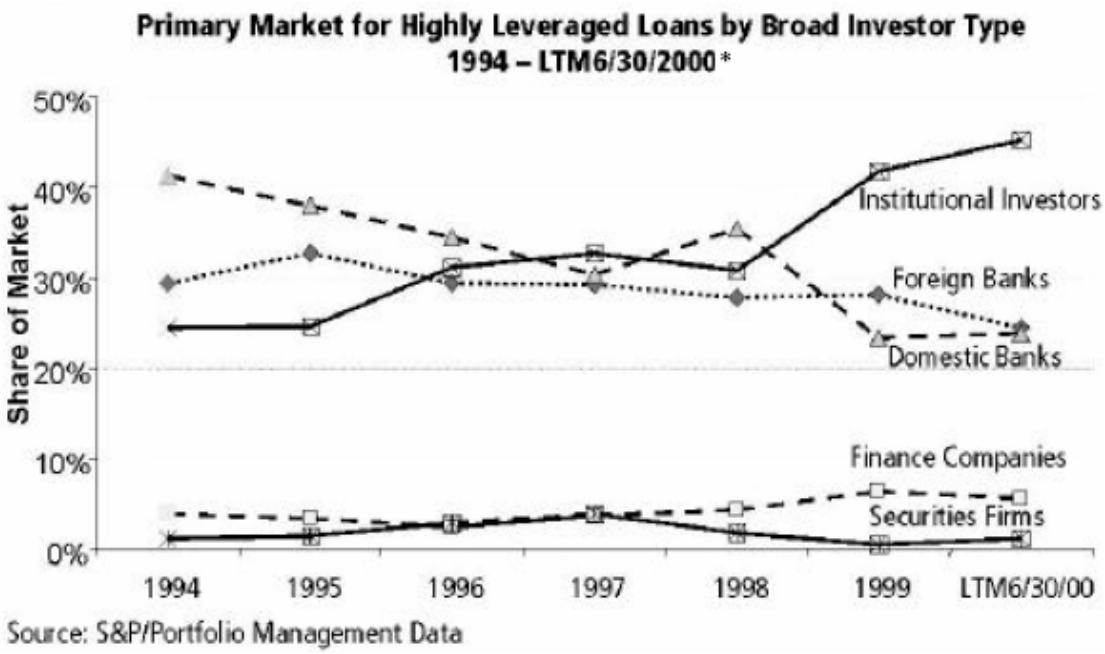


Figure 10: Primary market for highly leveraged loans by broad investor type

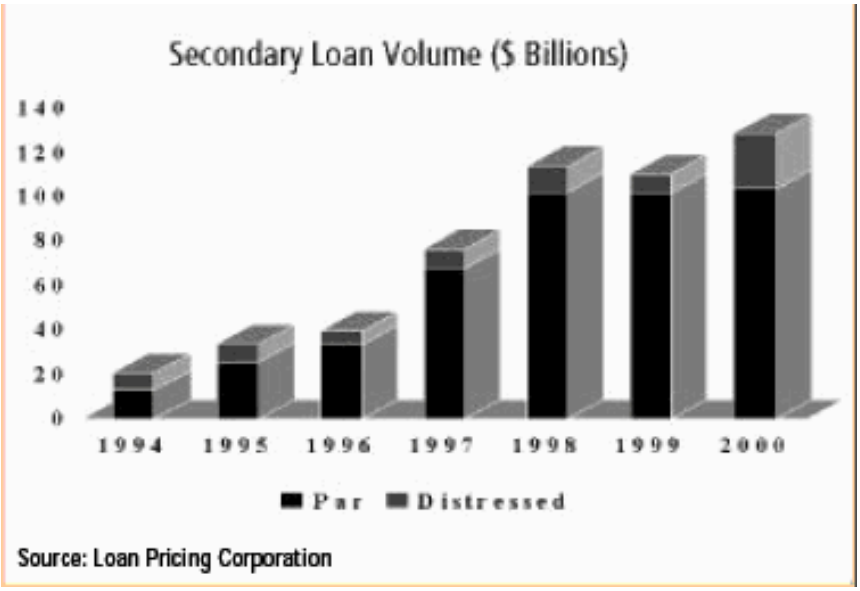


Figure 11: Secondary loan market volume

Source: Ch.W. Smithson and G. Hayt, 2001

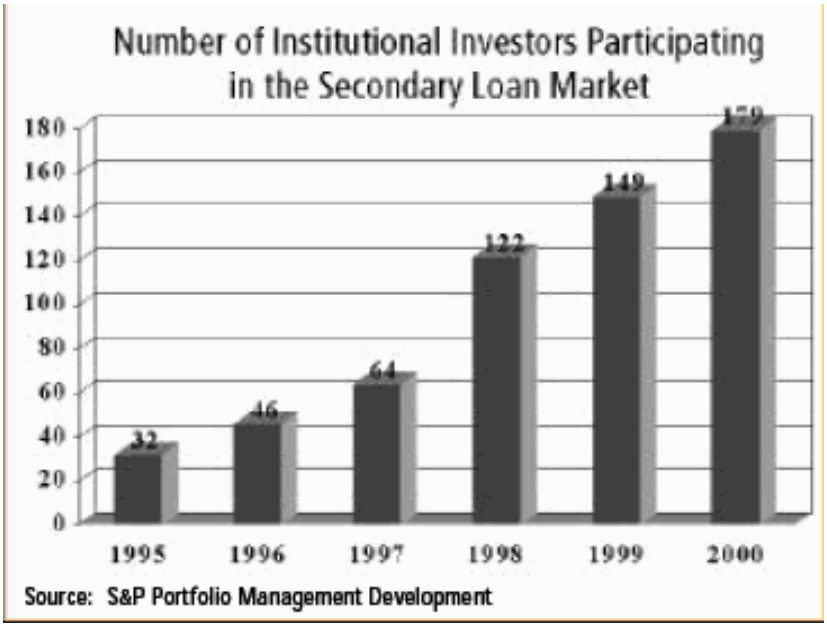


Figure 12: Institutionals in the Secondary market

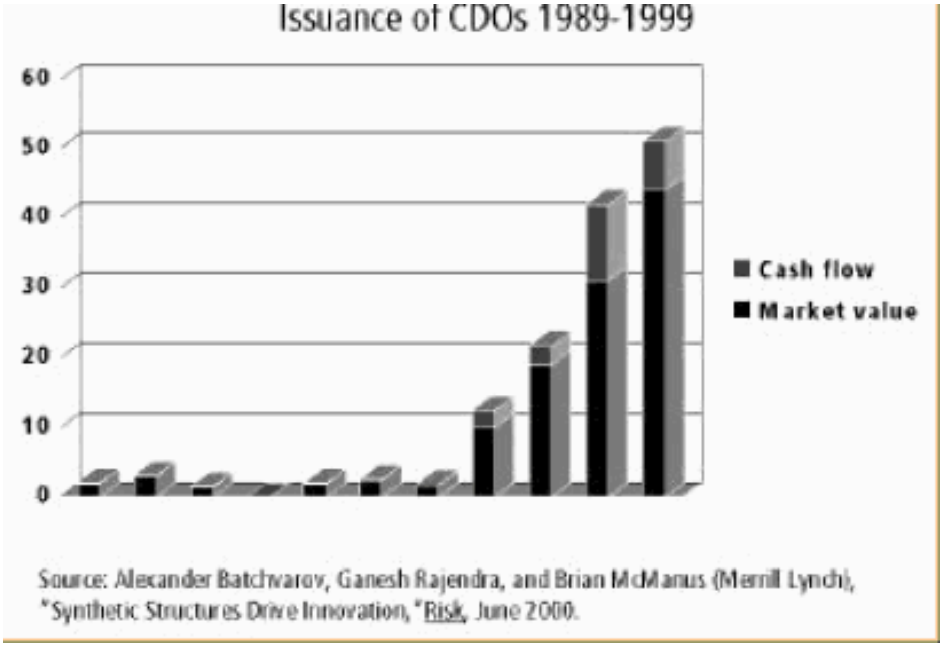


Figure 13: Issuance of CDOs

Source: Ch.W. Smithson and G. Hayt, 2001

2.2 Sources of finance

Corporations raise capital in two principal ways; by issuing equity or by issuing debt. Issuing equity involves issuing common or preferred stocks[1]. As it will be seen later on, debt securities offer greater diversity.

The amounts required by the shipping industry are vast and both bankers and entrepreneurs need to be accurate with their decisions. Here is an indicative list of ship prices published in Greek newspapers October 2002:

• VLCC Tanker	$65 million
• SuezMAX Tanker	$65 million
• Aframax Tanker	$36 million
• PanaMAX Tanker	$30 million
• CapeSIZE Bulker	$35 million
• PanaMAX Bulker	$21 million
• HandyMAX Bulker	$19 million
• HandYsize Bulker	$15 million

Figure 14: Indicative list of ship prices

Below is a summary table of the sources of finance for a shipping company.

	FINANCE CATEGORY	TYPE OF FINANCE	TYPICAL FEATURES
	EQUITY	OWNER EQUITY	finance provided by owner from own funds and retained earnings
		LIMITED PARTNERSHIP	funds provided by partners
		SHIP FUND	shares in company bought privately by individuals or listed on stock exchange
		PUBLIC OFFERING	shares sold by subscription on public stock exchange
commercial banks involved	MEZZANINE FINANCE	PRIVATE PLACEMENT	debt with high interest rate and possibly equity rights
	SENIOR DEBT	BOND ISSUE	security issued in the capital market
		COMMERCIAL BANK LOAN	loan provided by bank. Large loans may be syndicated between several banks
		SHIPYARD CREDIT	loan provided by government or agency to assist domestic shipyards
		PRIVATE PLACEMENT	debt finance arranged privately with pension fund, insurance company etc
	LEASE	FINANCE LEASE	long term tax effective finance based on sale of ship to company which uses depreciation benefits. May be leveraged
		OPERATING LEASE	

source: Martin Stopford, 1997

[1] See chapter on equity.

Through the years, venture capital is raised conscripting a variety of methods and tools. Finance is an industry and as such, has to adapt and evolve following the market over all. The products for this industry are intended to bring money in, plus eliminate competition so they need to integrate the market trend being up to date and flexible. This is why new methods of financing or raising capital make their appearance every now and then.

Among traditional financial instruments are classified loans, subsidies or credits, equities and stock markets. Nevertheless newer, innovative methods have been developed and are stated here. Leasing, mezzanine finance, offshore companies, securitization, venture capitals, maritime joint ventures, options are some of a variety of instruments to raise capital.

The simplest and most important source of finance is the stock and is discussed at a chapter later on. The second source is debt; indebted companies promise to make regular interest payments in addition to repaying the principal – the initial capital borrowed. Notwithstanding, should the value of the company's assets become less than the value of the debt, stockholders have the right to default if they are willing to hand over the corporation to the lenders. For the administration of such handovers there is a bankruptcy court.

Lenders are not regarded as proprietors of the company. The firm's payments of interest are regarded as a cost and are deducted from taxable income. Thus, interest is paid from before-tax income, whereas dividends on common and preferred stock are paid from after-tax income. This can be interpreted as that the governments provide tax subsidy on the use of debt, which they do not provide on equity. [Brealey & Myers (2000), p. 394]

Large firms typically issue many different securities. The following table illustrates some of the debt securities on Mobil Corporation's balance sheet at the end of 1996 and 1997 (figures in $million)

DEBT SECURITY	1996	1997
$6^{1/2}$ % notes 1997	148	-
$6^{3/8}$ % notes 1998	200	200
$7^{1/4}$ % notes 1999	162	148
$8^{3/8}$ % notes 2001	200	180
$8^{5/8}$ % notes 2006	250	250
$8^{5/8}$ % debentures 2021	250	250
$7^{5/8}$ % debentures 2033	240	216
7% debentures 2032	250	164
$8^{1/8}$% Canadian dollar Eurobonds 1998[a]	110	-
9% ECU Eurobonds 1997[b]	148	-
$9^{5/8}$% sterling Eurobonds 1999	187	182
Variable rate notes 1999	110	-
Japanese yen loans 2003-2005	388	347
Variable rate project financing 1998	105	52
Industrial revenue bonds 1998-2030	491	484
Other foreign currencies due 1997-2030	1090	764
Other long term debt	660	716
Capital leases	247	335
Commercial paper [c]	1634	1097
Bank and other short term loans	894	1168

Source: Brealey & Myers, 2000

[a] Swapped into 7% U.S. dollar debt
[b] The ECU was a basket of European currencies. With the formation of the single European currency in 1999 1ECU became 1 euro.
[c] Large companies often raise short-term debt by selling loans known as commercial paper.

2.2.1 Commercial bank loans

Few expansion financings do not involve bank loans and that is because a bank loan is a rather cheap and direct way to obtain money.

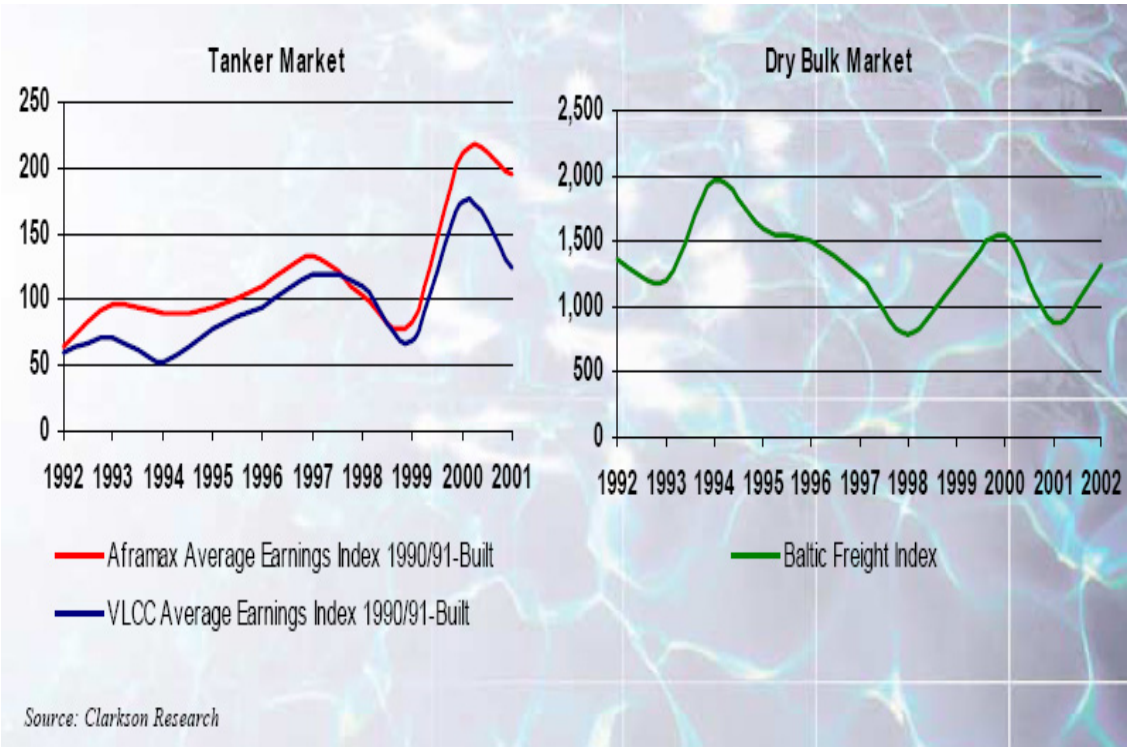


Figure 15: Shipping, a volatile market

Source: FORTIS Bank

Shipping is a capital intensive industry where vast amounts are required to back up acquisitions. Financial Institutions, in order to preserve liquidity at high levels and achieve minimization of credit risk through diversification, often consolidate. Groups of maybe 5 banks syndicate and with one of them operating as the arranger, issue (syndicated) loans divided into smaller packages.

Notwithstanding the various methods of finance, it is made clear from the diagrams displayed in Figure 16 that commercial bank debt is by far the most preferable method for financing ship acquisitions.

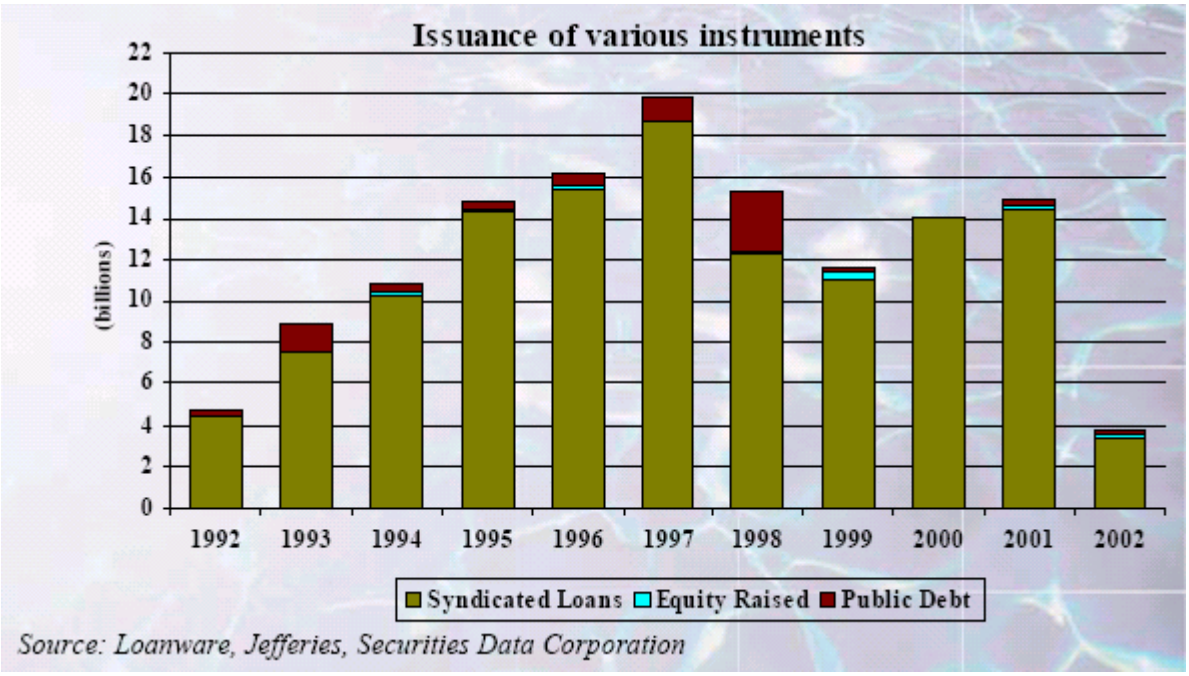


Figure 16: Issuance of various instruments

Source: FORTIS Bank

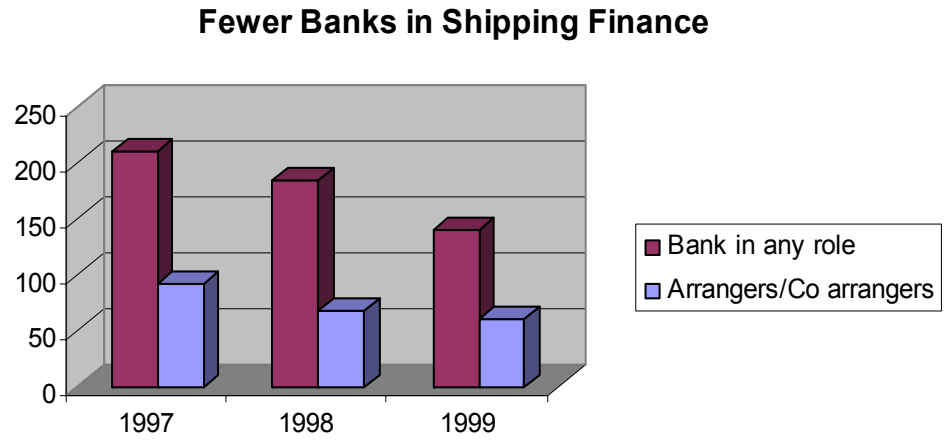


Figure 17: Number of banks in shipping finance

Source: Capital DATA Loanware

However, shipping banks become less and the capacity for shipping deals in the market shrinks. Moreover, core relationship banks tend to form 'club' of Lead Arrangers. Perhaps the most critical effect stemming from this is the extinction of aggressive competition between banks.

The shipping industry has always been considered as a risk-laden business therefore financiers insist on securities. Primarily it was also considered as the protection of the bank, but it is also an instrument for making owners more careful and prudent. The most well known security is considered the first mortgage. A banker during the '60s would be happy if he provided only 60% of the value of the asset under a first mortgage. However the crisis in the '70s not only contributed in the collapse of shipping finance institutions, but also put the bank in the owner's shoes, because mortgaged vessels were transferred to the bank, and at least before selling them, the bank carried all the liabilities of the ship-owner. Along with the crisis, the whole financial market grew to maturity and more sophisticated approaches were used.

Consequently, there is a set of securities an owner shall include in his business plan, which the bank will thoroughly examine. Yet not all the owners shall provide the same securities, and not even are these requirements set for all projects. A usual set can be the following one:

Employment: the bank requires or demands or seeks for a long-term employment of the vessel. A contract of affreightment, a long lasting bareboat chartering, a secured employment in general is very important for the banker, since it is possible to predict the income of the vessel during the first years, when the repayments are considerably higher. Especially when the market is weak or there are signs that the market will sink, such a security can be a crucial factor.

First Mortgage: the first mortgage is a form of negative security. Practically means that the bank, the lender (mortgagee) has priority in a claims sequence and that he can take possession of the asset, if the borrower (mortgagor) fails to fulfil his pre-agreed financial obligations. The mortgagee can either, manage and operate the asset on his account until the loan amounts are repaid or, sell the asset to recover outstanding payments.

Second mortgage: it is an additional mortgage on the asset, given to the lender, who provides financing, apart from the primary one. It is not a desired security for the bank, but if there is an assured employment included in the plan, then it can be an invaluable tool for the ship-owner to improve his financial strength.

Assignment of Income: it is an agreement, where the borrower assigns to the lender a portion of the revenue. In the case that the vessel has time charter agreement, then a specific percentage of the hire may be deposited directly on an account of bank by the charter.

Assignment of the Insurance: it is an agreement, where in case of loss or damage the insurance company and the P&I club will cover all remaining payments. This agreement is more complicated, since the underwriting of the risk costs in premiums and involves third parties.

Corporate or personal guarantees: this is an agreement, where the lender demands guarantees from the owning company or the owner himself. In the case of a very rich owner, this agreement may be very important for both parties, since the owner is binding the plan with his belongings and reputation and the bank assures the personal interest and prudent management of the owner.

Security Maintenance clauses: there are some clauses in the agreement, which protect the bank, in the case, where the remaining value of the asset is less than the outstanding loan. Most commonly, such clauses include also personal or corporate guarantees.

Of course there are many more securities, clauses and forms depending strongly on the project and the reputation of the borrower. In most cases though, securities can be categorised as above.

Capital Adequacy Requirements –Basel Accord

In 1988 the Bank for International Settlements imposed a new regulatory framework on financial institutions. The reason for this is, simply put, to reduce the risk of bank insolvency. This is known as Capital Adequacy Requirements.

The 1988 Accord known as Basel I, suggested that international banks should maintain adequate capitals to cover credit risks and become cautious towards risky lending, although not all individual corporate loans withhold the same potential danger.

In order to 'align regulatory capital requirements more closely with underlying risks' the Basel Committee conducted an amendment to the regulations, referred

to as Basel II. In this contemporary Accord the assessment of risk is now an option. More explicitly, there are two options provided; corporate borrowers may be rated regarding their creditworthiness by independent agencies, or by internal institutional mechanisms. The driving ambition here is to make the regulations, risk sensitive.

However reasonable may such a demand sound, it will cause a lot of trouble after its implementation especially where shipping is concerned. The relevant increase of the cost of certain types of loans is likely to prove a disaster. Shipping loans will have to be placed in risky categories thus making such loans more expensive and for certain ship-owners even more expensive.

As a result, greater selectivity of borrowers and a reduction in lending capacity are inevitable. It is anticipated therefore that there will be further amendments following Basel II before such regulations are implemented.

The imposition of the Basel Accord shall be interpreted in practice by the 'Capital Adequacy Indemnity' clause also known as 'Increased Cost' clause, accompanying the loan agreement. The purpose of that clause is to cover a situation where there is change in the regulatory requirements affecting a lender following signature of the loan agreement contract. Such a change may increase the cost of making or maintaining the loan and directly affects the lender. A change in the creditworthiness of the borrower will therefore alter the rate of return of the loan.

In general, the increased costs clause covers changes in taxation and changes to capital adequacy requirements. It is evident that any unexpected cost stemming from increase in capital adequacy requirements could swallow the bank's margin.

Should the loan agreement follow the Loan Market Association recommended form, the lender is entitled to make a claim for the additional cost as a result on the new Accord, if such additional costs result from a change in the law or regulations, during the loan period. It is reasonable to assume that the loan agreement will enable the bank to recover any such increased costs.

But what about the bank's intention not to jeopardize the relationship with its key-customers?

Finally, some technicalities are displayed here for consideration.

In the case where an increase in the cost of a loan occurs due to a change in a borrower's risk weighting, a claim is unarguable as the Loan Market Association's

standard loan agreement does not seem to cover such case. A change in rating does not fall into any of the definitions 'change in law' or 'change in regulations'. A lender may actually not wish to make a demand on the borrower under this clause because such a claim could possibly endanger the relationship with the customer. In a case of loan syndication, consensus is more difficult to achieve on that matter.

Finally, as the allocation of a risk rating to the borrower will result on the imposed margin, what happens in the case where syndicate members come up with different judgments on the borrower's creditworthiness?

2.2.2 Equity

Equity is the most important source of finance. In the memorandum of association, a company divides its capital into shares, bearing an equal face or par value. These shares are distributed amongst the investors or share holders. Shares are certificates of ownership and can be traded. Shares are also referred to as stocks. The retained earnings at a profitable year's end are delivered to the stockholders according to their equity participation that is, the number of stocks at their possession. This profit is named dividend. It is up to the company's managing board to decide whether to distribute dividends or withhold retained earnings, to finance expansion.

There are two types of stocks; common and preferred. Capital stock which provides a specific dividend that is paid before any dividends are paid to common stock holders, and which takes precedence over common stock in the event of liquidation. Like common stock, preferred stocks represent partial ownership in a company, although preferred stock shareholders do not enjoy the voting rights of common stockholders. Also unlike common stock, a preferred stock pays a fixed dividend that does not fluctuate, although the company does not have to pay this dividend if it lacks the financial ability to do so. The main benefit to owning preferred stock is that the investor has a greater claim on the company's assets than common stockholders. Preferred shareholders always receive their dividends first and, in the event the company goes bankrupt, preferred shareholders are paid-off before common stockholders. In general, there are four different types of preferred stock: cumulative preferred, non-cumulative, participating, and convertible. They are also called 'preference shares'.

To increase its equity capital in the form of capital surplus, a company can issue shares and sell them to the public. New issued shares are sold at a price that almost always exceeds par value. The difference is entered in the company's accounts as additional paid-in capital or capital surplus.

Stock pricing is out of this textbook's intentions however it must be stressed that the Book value of a stock does not equal its Market value.

Private equity

Unquestionably, it is the most direct type of capital. Although larger profit is made with better leverage -that is, small equity participation in a project- the role of equity should not be disregarded. As in each case of financing scheme, there is potential opportunity here too. In the graph below, the value of 5-year old tankers is shown fluctuating in -a few years- time.

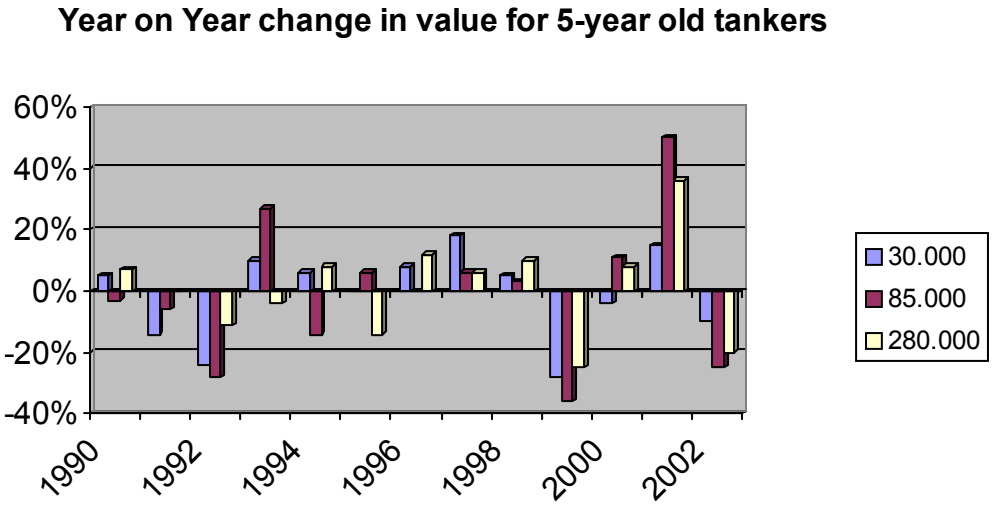


Figure 18: Change in value for 5-year old tankers 1990 - 2002

Source: A.M.A.

It must be clear that along with the volatility of the values in assets opportunity for profit (or loss) is inherent. The American Marine Advisors point out that a disciplined private equity placement should be able to earn a decent 20% annual return. [A.M.A. June 2002] The advantages in exploiting (private) equity capital should be kept in mind whenever a finance scheme is being conducted. Among them are that it is much easier to achieve goal alignment when depending on direct equity. Moreover, it is definitely more liquid than most public stocks or bonds.

However, the property of an enterprise should be cautiously manipulated leaving no room for misplacements. Investing private equity must be a decision taken in an opportunistic market condition and based onto a solidly managed, detailed business plan. Care must also be paid into the development of a potential exit strategy and the ability to use leverage.

Private placement

Still, the concept behind private equity funding is to raise money by issuing shares, to be traded in a private market. Here too, common as well as preferred stocks may be issued. It is useful to see the advantages and disadvantages of private placement against the public distribution of shares.

Overview of the pros & cons of Private placement

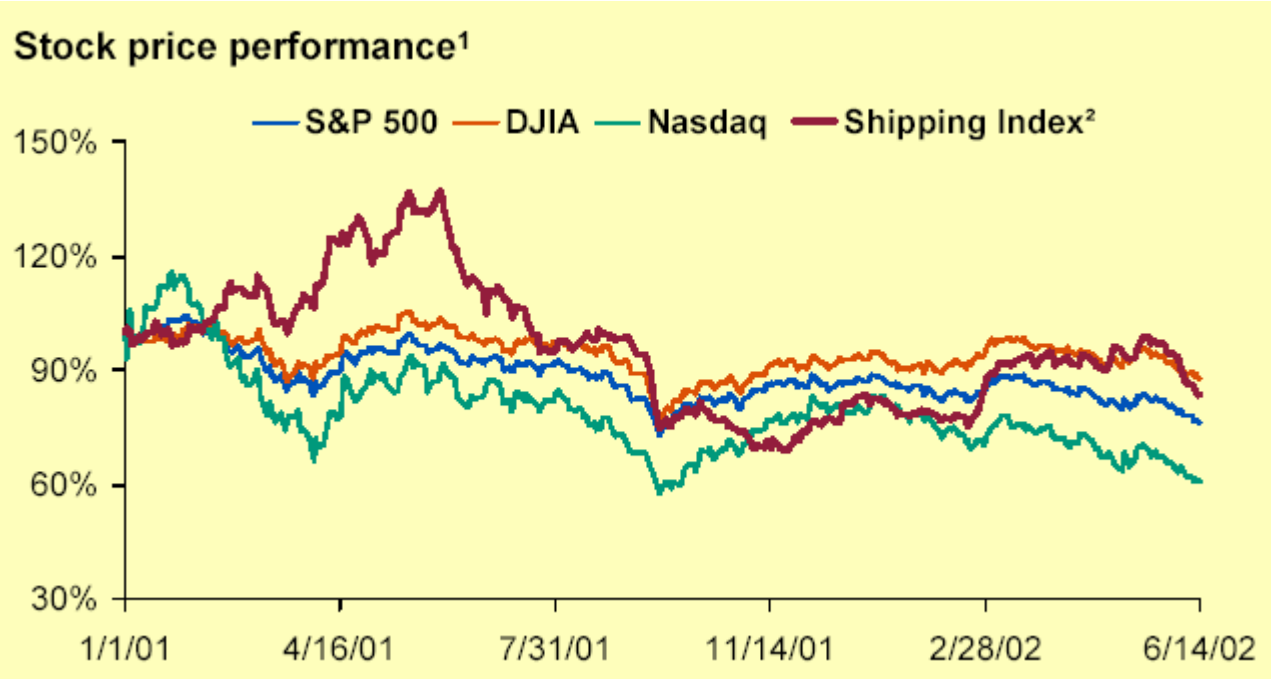
Advantages

- ✓ Private equity funding provides the ease of partnering with people who know about the industry –not bankers or investors/stockholders.
- ✓ The regulatory framework is less strict than in the case of public placement, where the company must fulfill certain criteria.
- ✓ Company's inner information is not spread at large.
- ✓ The brokerage commission and underwriting fees necessary for the registering and selling of the stock, are considerably less.

Disadvantages

- × Usually it is more difficult to obtain high amounts of money privately, as it is publicly.
- × Large investors may monitor the company's performance more than the public and achieve voting control.
- × Investors cannot easily resell their securities.

Public offering



1 Factset as of 6/14/2002

2 Index includes: FRO, GMR, NAT, OMM, OSG, SJH, TK, TNP, VLCC

Figure 19: Stock exchange indices performance

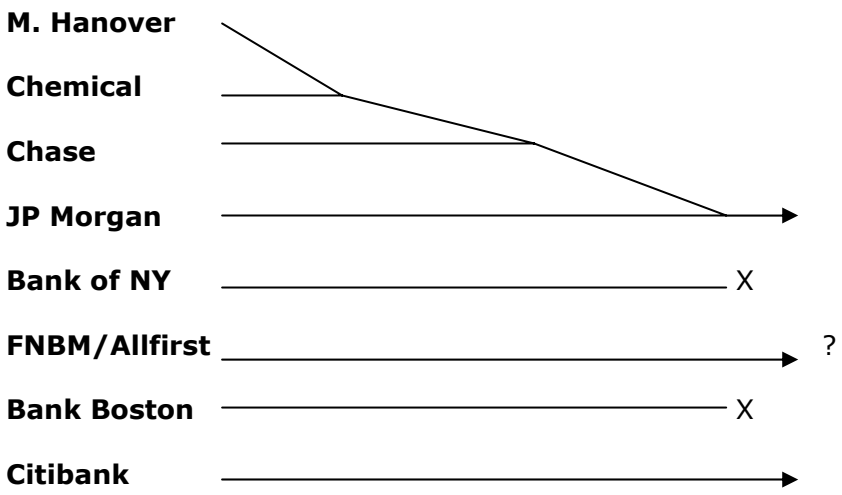
Source: JP Morgan

International capital markets assist industry to raise equity capital to finance expansion. Nevertheless shipping, being traditional and old fashioned, has not so far exploited the dynamics provided by the stock markets up to the extent that it is possible. Oslo, New York, Tokyo and London hold major capital markets where shipping issues are traded. Until recently, the listing in the Athens Stock Exchange of shipping companies other than the few Greek passenger-transporting was forbidden. Now however, a new form of legal entity has been introduced that enables such a listing, indirectly. Shipping companies' stocks may be traded through a special type of holding company developed for this reason.

Inevitably, the role of the Stock Exchanges will become more substantial as banks regroup changing the scenery. Mergers or exits out of the shipping industry, weaken the aggressive competition amongst the remaining banks. Following is the activity of major U.S. banks:

Banks disappearing…

(U.S. environment)

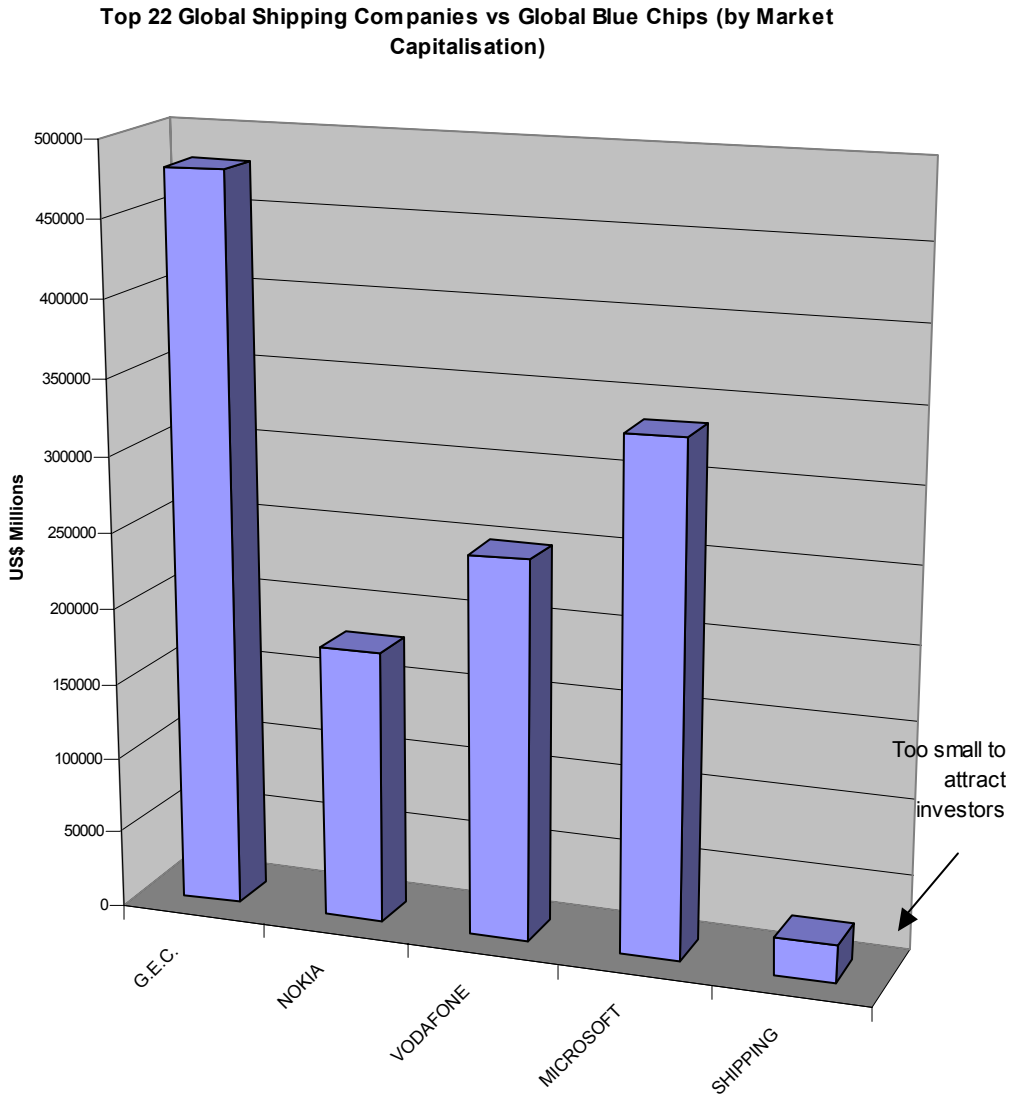


Source: A.M.A.

In January 2004 the merger between Bank One Corp and JP Morgan Chase, was agreed launching the former's assets to $1.1 trillion. Bank One Corp was the sixth wealthiest bank in the U.S.

Due to conservatism the shipping company of today is hardly distinguishable from its predecessor of 100 years ago in culture, business practice and technology. However, the landscape around shipping has changed dramatically in the last 100 years with an accelerating pace towards the end of the millennium and shipping has failed to adapt. In the process, most shipping companies have become weak if not obsolete competitors placing themselves below investment grade by most institutional investors.

Capital markets have historically not featured in business as they do today; for the masses, investment has tended to be unsophisticated. But even though, shipping company public offerings are addressed to and powered by, institutional investors as shipping is too small to attract the public.



Source: N.T.U.A. seminar notes

As political and economic globalization forces are bringing down the national barriers that were prevalent in the old days, in every field of industry global operators are emerging. Their activities transcend the borders of any country. The turnover and capitalization of these multinationals match the size of the economy of several countries. The growth of such companies has been financed with funds raised from institutional investors in the capital markets.

Shipping industry is going through competitive upheavals which imply that the traditional 'private family-owned small shipping company' and the associated network of shipbrokers and agents will become totally extinct. In their place will emerge 'direct e-commerce based large Public Listed Companies' with global scale

of operations and clientele. Along with that there will be a sharp separation of management and ownership.

Information technology, globalization and capital markets are creating new competitive conditions. It is now time to focus on how the capital markets change the rules of the game.

The value of a listed company (PLC) comprises two elements: the value of its assets and the trust granted to its management. Since the value of assets is liable to the cyclical forces that drive all industry competitors, a PLC can differentiate itself by claiming trust to its managerial capacity. Management efficiency is measured by the ability to deliver a higher return on capital employed compared to the competition. Institutional investors will reward companies managed efficiently with a share price which is at premium to asset value.

Capital markets provide 'scale', quickly and efficiently in a way that private capital can't. A PLC focused and specialised will be popular among the institutional investors. Once specialization efficiencies have been developed, the market forces will push towards deploying these efficiencies over an even larger asset base. Such a public company will be led to takeover its competitors and increase its market share thus adding the economy of scale benefits to the specialisation efficiencies already created.

This generates a powerful virtuous circle. Specialisation makes acceptable to institutional investors which creates avenue to pursue bigger scale in the chosen field, leading further specialisation and economy of scale efficiency, resulting in healthier returns for investors who are therefore happy to finance another expansion stage. As the company grows the story gets better and better and support from institutional investors solidifies as the share price gets even higher.

In the previous years, flexibility for aggressive balance sheet management was absent. The amount of equity funding available for expansion was a fixed constant rather than a decision variable for management. Strengthening the value of the business by shopping for the cheapest source of equity was not an option. Aggressive policy is famous with investors who favour mergers and acquisitions. Consolidation is normally led by the better managed companies. Once their efficiency is recognised their share prices move up. There comes a stage when the share is turned into acquisition currency by management. The higher the share price, the bigger the urge to issue more shares, raise capital and buy out competitors. Companies with the highest rated share prices are untouchable;

they are too expensive for any strategic investor to buy though they remain cheap for institutional investors.

Private company management is totally different than running a PLC. Below appear the methods of satisfying investors' demands in a private vs. a public company.

Investor demands	Private investor solution	Institutional investor solution
High return	Buy/sell ships	Scale/focus/specialization
Low risk (diversification)	Invest in various ships	Invest in various shares
Liquidity	Trade ships	Trade shares
Stay in management	Control	No conflicts of interest / No dominant shareholder

It can be easily seen that these are two completely different worlds.

- ***Liquidity***

In private companies flexibility to speculate is generated by trading the assets. The problem in doing so appears because by selling its assets, at a peak of the cycle, the company is shrinking forgoing this way some economy of scale. Along with that, the management is disrupted and destabilised away from a long term consolidation and specialization path.

In a PLC there is no such dilemma. Instead of management selling the assets, investors sell the ticket to the asset which is the share itself. What investors gain, is that management does not get disrupted, economy of scale is not sacrificed and the share price will maintain its long term trajectory after the short term market cycle plays itself out.

- ***Diversification***

Another classic dilemma private companies face, is the pursuit of diversification which is a legitimate demand of any investor. Because private companies

won't buy into 'somebody else's company', they tend to diversify by setting up new businesses themselves. They do that with buying different types of ships, each considered as a different business because it operates in a different market. This is not only poor diversification but it also destabilises managers once again from a completely focused, specialization pursuing business plan.

Once again the PLC solution is to trade paper instead of hardware. Investors diversify by buying many different shares in several fully focused and specialised companies. This way they get the best of two worlds; efficient diversification and high returns from each individual investment.

- ***Scale and control***

Control issues may slow down the growth and the exploit of economy of scale of private mentality companies. A true PLC has no such dilemmas. They use their high rated share price as their takeover defence and indeed acquisition currency.

Next is a list of technicalities for a quick review.

Public Listing

For	Against
Source of equity capital for • fleet expansion • debt refinancing	**Disclosure requirements** • shareholder identity • material contracts • company's activities closely scrutinized by analysts and investors
Liquidity premium for • shareholders • personnel (Stock Option Plans, etc) • acquisitions & strategic alliances (stock swaps, etc)	**Cost and effort** • admission and listing fees • financial &legal due diligence • burden on management time
Corporate awareness vs. • authorities • financial institutions • public • customers	**Dilution from capital increase**
Shareholder base expansion • institutional investors • retail	**Company's market value depends on external factors as well** (e.g. the particular market conditions)

Source: ALPHA Finance

2.2.3 Leasing

Economists consider leasing as the 3rd most important source of finance. [P.Stokes (1992) p. 128-137]

It is a 100% financing method, which is strong relief to a ship-owner, especially on high ship-price times. Traditional finance, scarcely does it cover 80% of the project, requires mortgages over more than one ship and a neat long-term charter as an indicator of a secure cash flow. This scheme does not require additional guarantees (mortgages over ships).

In financial leasing the provider of capital (the lessor) purchases the asset to be leased back to the entrepreneur (the lessee) who operates it. With the financier being the legal owner of the asset, leasing requires less collateral compared to a bank loan.

Tax allowances are significant and for many, the most important aspect in a lease scheme. A ship-owner repaying a loan is taxed on the premium and allowed for in the interest charged by the bank. Conversely, the lease payments are normally allowable in full, for tax purposes. [C.Grammenos, E.Xilas p.14-8] Evenmore, the asset does not appear in the balance sheet of the ship-owner.[1] The lessor likewise enjoys tax allowance merits from depreciating expensive assets such as ships.[2]

In any occasion where proprietorship is demanded -such as confiscation- based on the first preferred mortgage, intensive care of law details and a lot of time delay shall be needed. In a leasing scheme, the ship is always the bank's asset, which makes the repossession smoother than mortgage enforcement.

Another major advantage is the lease period. The lessor aims to depreciate the total of the asset's value thus making the leasing scheme having 10-15 years duration. After that, the asset falls over to the lessee's ownership fully depreciated with no tax weights attached.

There are three matters to consider though. The revenue risk (will the lessor be fully paid for the asset he has purchased?), operating risk (who will pay if it breaks down?) and the residual value risk (who will benefit if it goes up in price?)

[1] UK and other accounting standards require that assets financially leased must be included in the lessee's balance sheet as assets at historical cost and depreciated annually. The full lease payment is, however tax-allowable and replaces the depreciation allowance.
[2] The amount of annual depreciation is tax deductible. This way equal amounts of the financier's earnings escape tax.

To make the above matters more clear, two types of Leasing schemes have been developed; Financial and Operational. They are based much on the same concept except for slight differences.

In a **Financial** leasing, the transaction covers the asset's economic life. The lessee then, purchases the asset at the end of the agreement at a nominal price fully depreciated and consequently acquires the residual value risk. Specific type of financial leasing is the *sale and leaseback* transaction. It is when the owner of an asset sales it to a leasing company only to rent it back under the rules of a lease agreement. In shipping, a financial leasing is known as a *bareboat charter*.

An **Operational** leasing, is considered to be more flexible. The lessor is required to maintain the equipment leased, resuming the maintenance costs which may be negotiated in a separate contract. This type of lease may not contain full amortization of the asset cost because the lessee preserves the right to cancel the agreement and return the asset before the stipulated expiry date. 'The shorter term structure of operational leases, results in the lessor assuming the residual value risk' [C.Grammenos, E.Xilas p.14-5]

Nevertheless ownership retention from the part of the lessor brings in potential dangers. Supposing there's a claim from a third party for damages or –even worse- for environmental pollution; the financier is exposed to the statutory and common law liabilities arising from that claim. Moreover being the legal operator of the asset, the lessee may involve it in liabilities that rank in priority over the ownership claim of the lessor, such as maritime liens.[1]

Overview of the pros & cons of Leasing

Advantages for the Lessor

- ✓ Tax allowance based on 'big ticket' depreciation
- ✓ Stable stream of repayments and return on investment
- ✓ Direct ownership of the asset – no mortgage enforcement

Disadvantages for the Lessor

- × Exposure to third-party claims
- × Operator may involve the asset in first-priority liabilities

[1] A maritime lien is a claim against a ship for non-payment of goods or services supplied to a ship. The lien arises the moment the work is completed or the goods are supplied. A lien becomes delinquent when the request for payment is delayed or denied. Should the collection of payment fail, the lien 'follows' the ship until it is sold or financed in and then the claim is fulfilled. Unlike land liens, maritime liens have first priority among other claims (e.g. statutes establishing mortgages)

Advantages for the Lessee

- ✓ 100% financing
- ✓ exposure is known and stable
- ✓ Off-balance sheet. Good for companies with high gearing and narrow borrowing limits

Disadvantages for the Lessee

- × Ownership forfeit
- × Not applicable in all cases

Different opportunities for tax-evasive financing schemes have been developed in countries where tax regulations have allowed it. The key-jurisdictions around the globe on that matter are United Kingdom, Japan, Germany, Norway and the United States. The former have all evolved particular tax-based finance methods that have contributed vastly in the capital needs of the shipping industry. A review on the different characteristics of these methods follows. In all cases, the fundamental driving force behind these investment schemes is the sheltering of the personal tax liabilities of individual investors.

Germany Overview

The KG market.

The German tax system is deemed to be one of the most complicated and regulated systems in the world. Germans pay 53% income tax, 9% church tax deductible at source on behalf of the churches and even pay 5.5% solidarity contribution, which is a result of the unification of Germany. There's a 'tax-payer memorial' day which is the day up to which, on average, tax-payers have worked solely to pay their contribution to the Inland Revenue. For 2000 that day was June 3rd.

Based on this scenario, Germans are looking for losses which they can set off against other types of personal income. This is made feasible by the German Limited Partnership (KG) system which is a Limited Liability Partnership. Such an entity must have at least one general partner that is fully liable to the entity's obligations. However the general partner in a KG may be a GmbH[1] the shares of

[1] GmbH is the most widespread corporate form of Limited Liability Company in the Federal Republic of Germany.

which can be held by the limited partners thus retaining complete control over the partnership management.

Any income, be it positive or negative, may be directly transferred to the respective Limited Partners[1]. The Limited Partnership therefore creates an initial loss which the Partners welcome. For example a DEM100.000 investment share, will account for a DEM 52.000 tax return. Hence, a share of DEM100.000 in a ship may be purchased while the actual invested capital amounts to DEM48.000 after tax.

A moderate 6% p.a. return on fund investment is thus, taking off at 12% return after tax for the individual shareholders through their tax savings. These tax savings are generated through an accelerated depreciation system that allows KG partners to write down a maximum of 20% p.a. This is rapid depreciation compared to the normal straight line depreciation.

Of course the Limited Partners have demands on the projects they uphold. Asset acquisition is achieved through a bank loan. Since the KG Partnerships long for banking support to finance ship acquisitions they need to show healthy and attractive plans.

Focus on the advantages however; KG financing is a 100% (leasing) finance scheme that provides ship-owners with liquid funds and improves the relation between equity capital and liabilities but with the same rate of equity. Needless to say a sounder financial status leads to more ready available funds.[2] Moreover, KG structures as Dr. Peter's GmbH & Co KG, offer a purchase option after the contract period of 10-12 years. Should market price exceed the option price, there's an additional benefit as the asset may be transferred into the balance sheet of the entrepreneur (lessee) company fully depreciated at bargain price. In another case the option is simply not executed and the KG resumes the residual value risk. Finally, selling a ship to a lessor, immediately releases equity capital for new projects.

Next is an example of KG finance model, schematically presented.

[1] It is important to note that German statutory rules dictate that losses realized by the Partnership may only be utilized by an individual partner for income tax purposes, to the extent that these losses do not exceed proportionate liable capital. However, disposal of partnership interests accruing from direct ownership brings in various tax exemptions and allowances.
[2] High leveraged companies are less likely to be granted a loan.

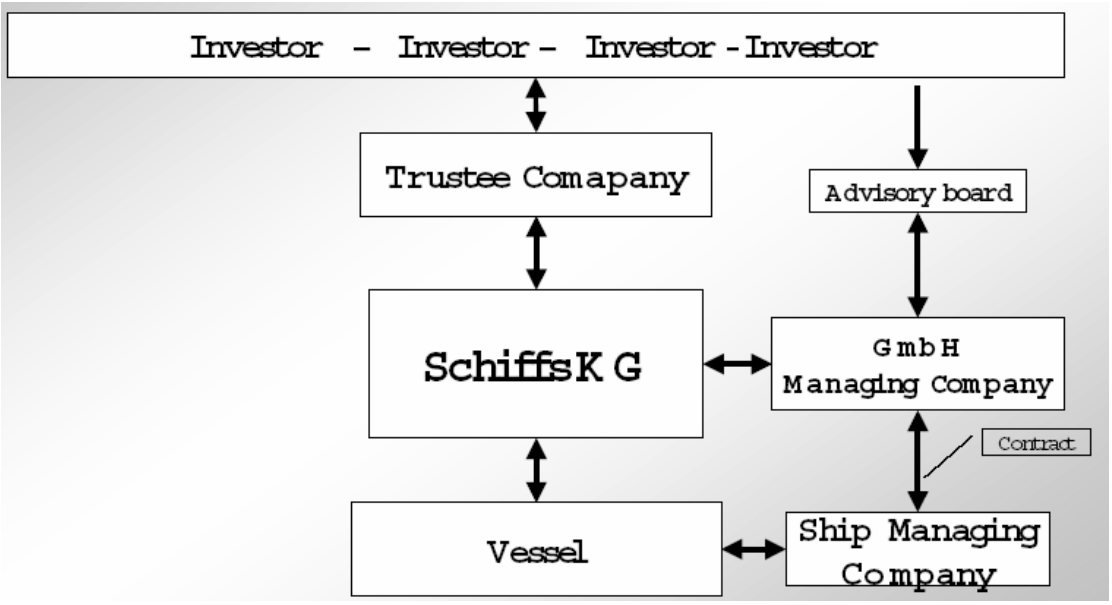


Figure 20: German KG partnership example

SOURCE: FORTIS Bank

A trustee company is a mitigating party. Its role is to establish a communication framework between the private investor and the KG management, organize the annual shareholder meetings and see that the share capital of the KG is used in accordance with the investment plan.

On a first look KG may appear more expensive than traditional debt financing. Indeed a 100% bank loan with an interest rate of 8.65%[1] for a $100 million project, leading to a debt of $50 million in 12 years produces an annuity of $919.600 whereas a BB-rated project 100% financed by KG structure with a buy-out (call) option price of $50 million in 12 years time, demands an annuity of $1.013.000.

It is important however to consider asset market value scenarios at the date of 'maturity' which is the 12 years contract tenor, when the option price offered or the total debt outstanding, both equal $50 million.

Market value of the asset above $50 million**.** The indebted company may sell the asset, fully meet its debt obligation and benefit from the difference. The lessee company can too execute its option and act likewise. In respect to the difference in annuity payments the result favours bank financing.

Market value of the asset below $50 million. The indebted company may either sell the asset at once only to bring in the amount of the difference, or continue operating the vessel with an earning potential less than its cost of $50 mil-

[1] It is the weighted average of a marginal rate of 1% for the first 60% of the project, 1.5% for the next 20% and 2.5% for the last 20% added to a 7.25% LIBOR.

lion whereas the lessee company shall either not exercise its option dismissing the residual value risk, or buy the asset at the market price and operate a vessel at its cost. The KG partnership is very well likely to sell the asset at the -lower than option- market price as they have made the most of their loss long before and they are hence keen to make cash quickly. After all, the Partnership does not want to operate the lessee's ship for life; Limited Partners are not true ship-owners devoted to the cause.

Candidate projects for German KG financing involve Containers, Bulk carriers and double-hull Tankers, mostly new buildings or 4 year-old vessels at most, with a minimum of a 5 year charter secured. German investors expect a minimum of 9% return on their investment after tax.

As a conclusion, German KG-System will continue to be an important source of international ship financing, although it is Deutche Bank's declaration that there's a trend in tax regulations to make such methods less attractive by push-ing depreciation rules, tax rates and making qualification requirements onerous, to vanquish future arbitrage margins.

Norway Overview

The K/S market.

The *kommandittselskap* abbreviated K/S partnership is a standard form of Norwegian limited company. Similar to the German KG structure, it is another tax-deferral vehicle employed to finance ship acquisitions and in its heyday, in the late 1980's concentrated about $3 billion of investor equity. [M.Stopford p. 207] The attraction of the K/S partnership to a Norwegian investor paying an ex-ceptionally high marginal rate of tax are that he achieves the same tax benefits as would apply to direct ownership of an asset while having only limited liability. [P.Stokes, (1992) p. 224]

By that time, partnerships were not taxed as entities but taxation was as-sessed at the level of the individual partners. 'The combination of high marginal tax rates and the ability of individual investors to take maximum advantage of tax depreciation flowing through from the partnerships was a strong stimulus to the expansion of the market'. [P.Stokes, (1992)]

These partnerships consist of one or more limited partners and at least one general partner. General partners have unlimited liability whereas the limited partner's liability is limited to an amount fixed by the partnership agreement.

Nevertheless, the partners may be both individuals and legal entities therefore in practice the general partner is a private limited company with the minimum permitted share capital -to preserve liabilities limitation.

A ship acquisition project was carried through in the following manner. To obtain the tax advantages the partnership's equity capital should equal 70% of the project's cost of which the general partner provided 10%. At least another 20% should be committed at the day of incorporation by the equity partners and another 20% would be available within two years. The rest was only called if needed. As a rule 80% of the project's cost was provided through a bank loan and the remaining 20% from the committed capital. [M.Stopford p. 208]

For tax purposes, the equity capital could be depreciated in an accelerated depreciation basis of 25% p.a. The K/S shares could be sold and there was a market in Norway established by brokers for that reason. [P.Stokes p. 103]

The 1990 K/S market is accused of leading to an inflation of ship prices in the 2nd hand market. The effect of this was investors having paid too much for lesser value ships which turned out to be laid-up for long off-hire periods. A Norwegian government tax reform in 1992 decisively reduced the previous generous opportunities for depreciation of assets and tax deferrals for capital gains. This had an adverse effect for equity financing of shipping, both for new projects and for the private market for trading in K/S shares 2nd hand. It involved the lowering of taxation rates and the reduction of tax depreciation benefits. Until then, every item of the result of the K/S was incorporated into the tax return of the partner who could depreciate according to the requirements of his personal tax situation. 'The purchase price of 2nd hand K/S shares was the basis for depreciation'. [P.Stokes p. 103] The tax reform introduced the taxation of the K/S as an entity and the net taxable result to be distributed to the partners in proportion to their equity participation. The purchaser of K/S shares therefore only 'inherits' the written-down value of assets held by the K/S. [P.Stokes, 1992] It was the end of what is known to be the 'asset play'.

Today, K/S deals still exist in Norway and aspire to attract investors for ownership and operation of ships in international traffic. In 1996 another shipping tax reform was introduced which allows a Norwegian corporation on certain organisational conditions, to avoid income tax on retained shipping earnings and instead be subject to a more modest annual tonnage tax. A Norwegian corporation within this shipping taxation scheme may have its relevant equity investments in ships through shares in limited (or general) partnerships formed for the purpose of owning ships or leasing ships.

Addressed to the 2nd hand tonnage market, with no age restriction however, K/S offers a tax transparent joint venture form of legal vehicle. Advantages, flexible structures and put/call options are offered to those who choose this form of special purpose vehicle who according to NRP -a ship owning Norwegian limited company, may be private companies, shipping companies and off-shore investors. Present K/S may deliver a 15-25% p.a. return. A corporation that assigns ship ownership into a K/S structure also dispenses the residual value risk.

The transaction involves a bareboat charter from the K/S to the entrepreneur corporation (lessee). This contract has 5-15 yrs validity at the end of which, the managing corporation is given an option to transfer the asset into its balance sheet. This is particularly good news[1] should the market value of the asset exceeds the option price contract. In any other case, the option is not executed and the K/S equity investors withhold the residual value risk.

Japan Overview

The JLL-JOL market.

First, some general information about the Japanese taxation system must be given.

Japan has national taxes and local ones levied by prefectures and municipalities. There is an 'income' and a 'corporate' national tax. In addition to that, there are three local taxes; 'prefectural inhabitant', 'municipal inhabitant' and an 'enterprise' tax. What is interesting is that both domestic and foreign corporations pay corporate, prefectural inhabitant, municipal inhabitant and enterprise taxes based on income that derives from sources in Japan. Furthermore there's a value added 'consumption' tax of a total effective rate of 5% charged on all domestic and import transactions required even in the case of companies reporting operating losses.

Until 1998 Japan had developed a Cross Border Leasing (CBL) market known as Japanese Leveraged[2] Leasing (JLL). A brief description of the key characteristics of JLL follows.

A CBL is a mechanism which permits investors in country *A* to own assets used in country *B*, lease them to a corporation in country *B* and receive tax benefits under the laws of their home country *A*. This mechanism is allowed in home country *A* because it usually involves assets purchased from that country –in the

[1] See the corresponding context on German KG option, where a numerical example is analysed.
[2] In a leveraged lease the lessor has employed both debt and equity capital to finance the asset cost.

case of JLL however, there is no such obligation. The level of cash benefit will vary as a result of many factors such as interest rate differentials, duration of the lease, asset type, tax laws faced by the investor/lessor in country *A* and initial transaction costs. After transaction expenses, a usual net benefit from CBLs can range from 1.5-5.0% of the cost of the asset being leased. Due to the complexity of the transaction, it usually requires assets of minimal value of $20 million. JLL demands that the lessee has not assumed formal title to the property prior to execution of the transaction. On this term the lessee may be needed to have established temporary 'warehousing' arrangements through the manufacturer. 'Warehousing' simply refers to having title to equipment received from the manufacturer and entering revenue service, held by a third party until lease transaction is completed. This explicitly excludes *sale and lease-back* deals. The purpose of such a requirement is the protection of Japanese lessors' tax benefits.

In the case where a tax-haven entity acts as a lessor there are two advantages under the Japanese law.

1. In a JLL withholding tax liabilities may be avoided. This goal however may be achieved without the tax-haven entity, in the case where a Japanese bank operates a branch in the country of the lessee. In such an occasion tax liabilities are not withheld simply by placing the borrowing required for the debt portion of the lease to the branch of the Japanese bank.
2. A special purpose entity is able to issue securities without being subject to Japanese security laws which would otherwise demand the issuer to have been in existence for several years prior to the transaction. Notwithstanding, defeasance[1] structures can be created through banks which eliminate the need to issue securities for JLLs.

Under trade agreements most European countries enjoy greater flexibility regarding withholding tax constraints and inherently reducing the need for special entities domiciled in tax-havens.

Changes introduced in October 1998 made JLLs much less appealing to investors. These changes applied the straight-line depreciation method and equated the tax depreciation life with the lease term rather than the statutory tax life of the asset. As a result investors can no longer benefit from the double-declining balance method of depreciation and can no longer realise exaggerated tax losses in a short period of time.

[1] Defease means to bank sufficient proceeds from the transaction to cover lease and loan requirements.

Since that time, Japanese business has evolved a new market, the Japanese Operating Lease (JOL).

A bankruptcy-remote special purpose company (SPC) acts as lessor, acquiring title to the asset and leasing it to the lessee on operating lease terms. SPCs are usually Japanese limited companies but recently a number of transactions have featured Cayman special purpose companies, which establish branch offices in Japan. The equity investors contribute part of the asset cost and the balance of the purchase price is funded by a loan. As security, the lender will normally take a first priority mortgage together with a security assignment of the lease. The lender may also take a charge over the SPC's bank account. Lease rentals will amortise part of the loan and may give the investors some income, but the JOL structure will normally require the asset to be sold at the end of the lease term to repay the balance of the debt and to give the equity investors a return on their investment.

According to the Japanese tax authorities, there is a clear requirement for the lessor (and therefore investors) to be fully exposed to changes in asset value if a lease is to qualify as a JOL and thus exposed to residual value risk. The latter risk may be reduced by means of longer-term leases. These, increase the overall amount of rent paid by the lessee and permit a greater level of debt repayment and dividends to the investors to be paid out of the lease rentals. This in turn reduces the reliance placed on the residual value. However, a Japanese tax ruling in December 1998 stipulated that if a lessee pays more than 90% of the acquisition cost of an asset during the lease term, then what would otherwise be considered an operating lease will be treated as a finance lease. In Leasing Law Review (2000) it is stated 'While JOL structures have not and perhaps never will reach the same level of activity as the JLL, the JOL market does appear to be establishing itself'.

Up to now, JOL transactions regard aircraft rather than ship acquisitions.

U.S.A. Overview

'Pickle' leasing market.

Following the 1986 Tax Simplification Act and the simultaneous disaster of Safe Harbor lease, the U.S. leasing market features what is widely known as the 'Pickle-leasing structure'. This U.S. leasing is a *sale and lease-back* scheme. The assets involved, belong to tax-exempt entities that cannot in ordinary circumstances, benefit from depreciation on their capital assets.

Characteristic of a 'Pickle' lease is that the initial term must be for at most 80% of the asset's useful life -there may be an optional second term however. Asset's depreciation is straight line and the lease payments, except owing to inflation adjustment, must not be altered in anyway. That is, the payments can not be accelerated. Finally, the asset at the end of the period must be salable at a market price to any willing buyer. Actually, these leases are escorted by an early buy-out option which precedes the lease termination by up to 10 months.

Similar to CBLs, a 'Pickle' lease is leveraged with a usual rate of equity participation at about 25%. This scheme features, low risk, stability of payments over the long term and a taxable income that must be sheltered. The lessee company realizes a net present value benefit of about 2.5 - 4.5% of the transaction size.

'Pickle' leasing transaction steps:

1. The U.S. investors secure a loan of about 75% of the asset value and combine it with equity funds to purchase the asset from its operator.
2. The lessee then deposits sufficient capital into a defeasance account in a financial institution referred to as 'trustee bank' to secure the transaction funding.
3. The trustee bank makes periodic payments to the investors that see that the initial loan is repaid.

Due to straight line depreciation of assets allowed for this type of leasing the assets involved tend to be of longer life and include rail equipment (30yrs) and buildings (40 yrs). The last decade, according to Deutche bank very few shipping transactions have been reported.

U.K. Overview

The most popular market.

Most of Piraeus banks that establish leasing deals choose this jurisdiction for their activity. These banks may not be interested to act as lessors notwithstanding, they point English institutions that do. These institutions are usually banks and not some special partnership form, enjoying depreciation merits and subject to strict UK tax regulations of course.

The UK leasing market has been active for more than 30 years, and is more a tax deferral option than tax elimination. English tax regulations are strict as capital allowances are denied to lese schemes that fall into any of the following categories.

1. Defeased lease.
2. Sale and leaseback arrangement.
3. Value of the ship leased more than £40 million.

English regulations allow however tax haven entity-use because corporations in such regimes are not double-taxed. Below are two example UK-lease schemes.

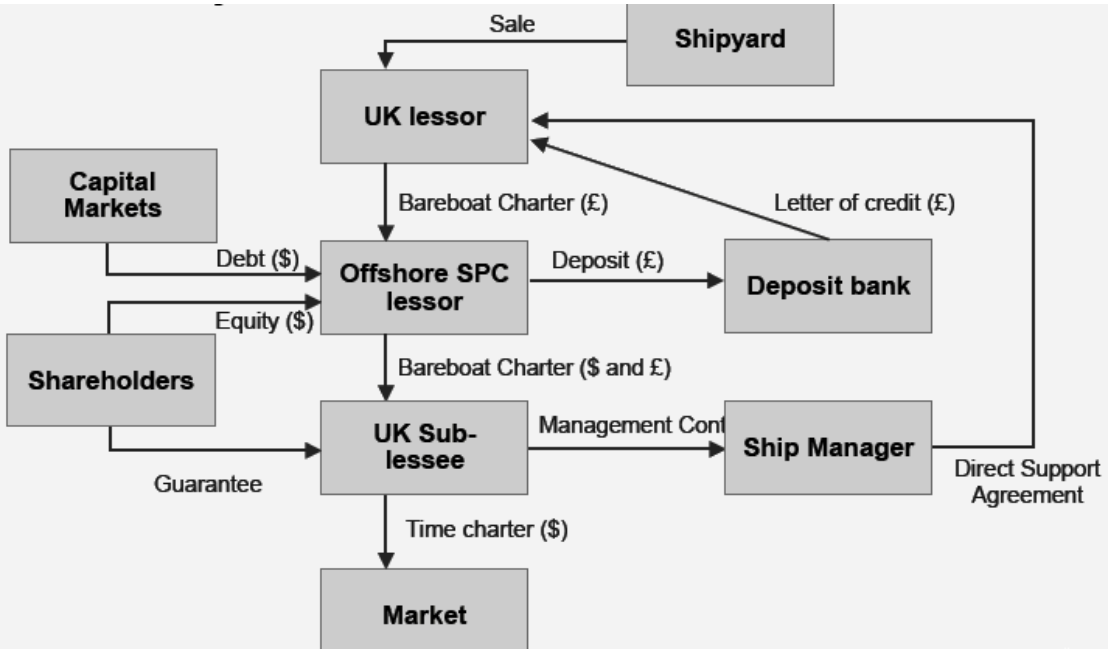


Figure 21: Defeased UK finance lease plus capital markets debt

SOURCE: FORTIS Bank

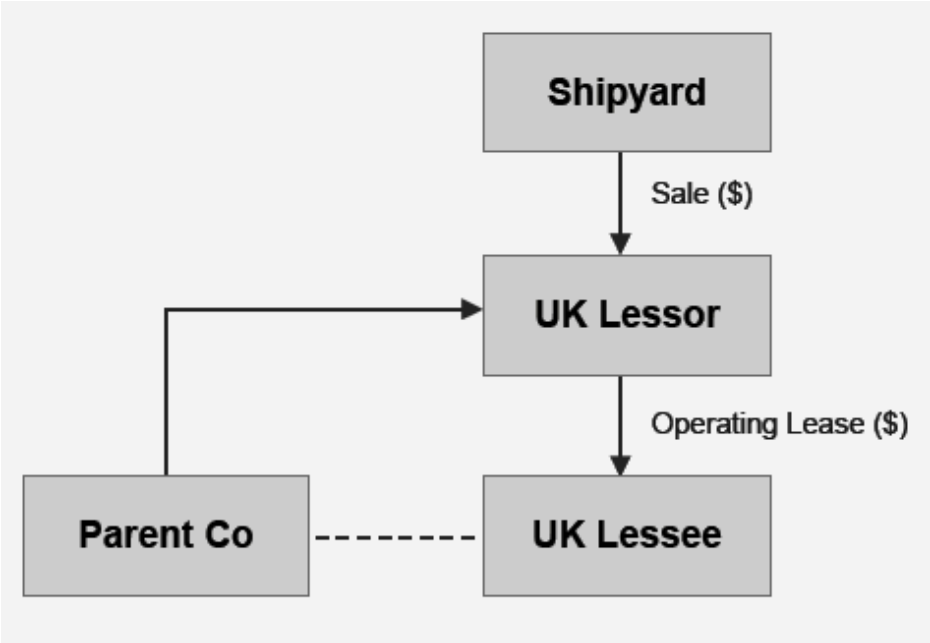


Figure 22: Lessor-funded UK tax-based operating lease

SOURCE: FORTIS Bank

It is interesting to speculate on the future of the UK leasing market, given its historical evolution. [Figure 23]

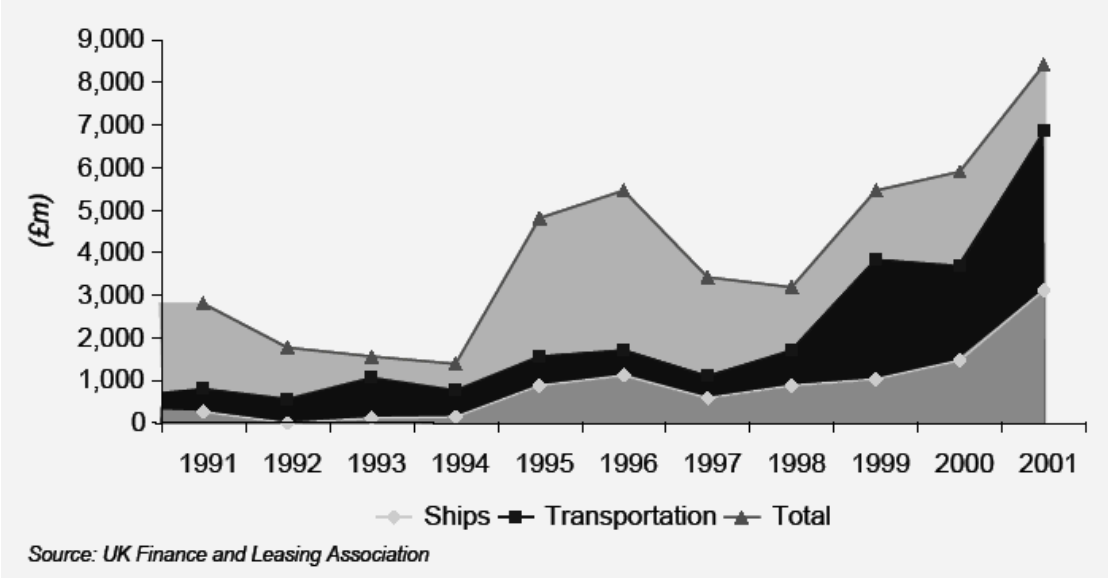


Figure 23: Big ticket leasing volumes

SOURCE: FORTIS Bank

2.2.4 Bonds issuance

Bonds are written-down debt obligations. A bond holder is entitled to receive annual or semi-annual interest payments –also known as coupon payments- until maturity date, when they receive the face value of the bond. An issuer of bonds seeks of cheaper debt finance, compared to a traditional bank loan therefore one is addressed to bond investors which may be individuals or institutional investors.

There are corporate bonds of every conceivable maturity. Walt Disney has issued a 100-year bond. NatWest and several other British banks have issued perpetuities, bonds with no specific maturity date –they may survive forever. At the other extreme we find firms borrowing literally overnight. [Brealy & Myers (2000), p. 394] Moreover, there are bonds based on the royalties of David Bowie and Elton John recordings! Really, there is no limit into people's imagination.

Almost all issued debt obligations are unsecured. Long–term unsecured issues are called 'debentures', whereas shorter-term issues are called 'notes'. Should a bond be secured, the trustee or lender may take possession of relevant assets of the firm. Utility company bonds are usually secured[1]. The most famous secured type of bond is a *mortgage bond*.

Types of bonds

Asset-backed securities: They are bonds that are based on underlying pools of assets. A special purpose trust is set up which takes title to the assets and the cash flows are delivered to the investors in the form of an asset backed security. Residential mortgages to credit card receivables up to music recordings royalties are some of the asset types that can be securitized.

Convertible bonds: Such a bond gives the holder the right to exchange the par amount of the bond for common shares of the issuer at some fixed ratio during a particular period. Their conversion feature, gives them characteristics of equity securities this way extending the fixed income security feature.

[1] Another type of secured debt is the *equipment trust certificate.* Although it is mainly used to finance heavier industries, it may also be used to finance ships. Under this arrangement a trustee obtains formal ownership of the equipment. The company makes a down payment on the cost of the equipment and the balance is provided by a package of equipment trust certificates with different maturities that might typically run from 1 to 15 years. Only when all these debts have finally been paid off does the company become the formal owner of the equipment [Brealy & Myers (2000), p. 716].

Corporate bonds: The creditworthiness of corporate bonds is tied to the business prospects and financial capacity of the issuer. Companies issuing bonds, receive credit rating which is either 'investment grade' or 'below investment grade'.

Eurobonds: Bonds denominated in a currency that is not the currency of the country where the bonds are issued[1] and therefore traded internationally. Such a tactic may be adopted when the issuer speculates that the foreign currency's performance will offer an advantage within the maturity period.

Extendible/Retractable bonds: These are bonds with more than one maturity date. An extendible bond gives its holder the right to extend the initial maturity to a longer maturity date. A retractable bond gives its holder the right to advance the return of principal to an earlier date than maturity. Investors use these bonds to modify the term of their portfolio and take advantage of interest rate movements; when rates are rising, it is good to have retractable bonds whereas when rates fall it is preferred to prolong the term of bonds at the portfolio.

Government bonds: Bonds issued by governments. They withhold minimum credit risk as the issuer will meet its debt obligations even if it involves printing more money. Of course this action causes inflation.

High yield bonds: As mentioned earlier, corporate bonds usually receive a credit rating. High yield bonds are corporate bonds, rated below the 'investment grade' benchmark, that offer a higher coupon to mitigate the risk inherent and consequently attract investors[2]. They are also called 'junk' bonds.

Inflation linked bonds: It is a bond that provides protection against inflation. In most countries, the Consumer Price Index is used as an inflation proxy. As the principal amount increases with inflation, the interest rate is applied to this increased amount. At maturity, the principal is repaid at the inflated amount.

[1] A deposit that is made either in an US or foreign bank or branch located anywhere outside of the USA is called Eurodollar deposit as long as it is denominated in US dollars. The interest rates on Eurodollars, tracks the Federal Funds rate. Foreign banks from around the world can sell their excess reserves held in dollars in the Fed Funds market in the USA. Such transactions are called *Europlacements*. Accordingly, the same terms apply to other currencies as well; for example there is the EuroYen market and so on. The prefix *Euro* stands for the difference in currency and not for the European currency '*Euro*' (€).

[2] These debentures are addressed to institutional rather than individual investors.

Mortgage-backed securities: It is a security that is based on a pool of underlying mortgages. They are usually based on mortgages that are guaranteed by a government agency for payment of principal.

Zero coupon bonds[1]: They are fixed-income securities that are created from the cash flows that make up a normal bond. A normal bond is a debt obligation of the issuer to pay interest semi-annually or annually and the face value at maturity date. The process of 'stripping' a bond involves depositing bonds with a trustee and having the trustee separate it into its individual payment components. This allows the components to be traded as individual securities. The interest payments are known as 'coupons' and the final payment at maturity (face value) is known as 'residual' since it is what is left over after the coupons have been stripped off. Both coupons and the residual are know as 'zero coupons'.

Bond issuances have backed-down however this year according to a research carried out by Dealogic firm. According to the research, the major 15 bond underwriters have been involved in just 26 investment-grade issues during the first two months of 2004, whereas the corresponding number for 2003 is 57. Moreover, during the same period of 2004 the commission fees of investment banks regarding bond issues have reduced by approximately 60% to $64.8 million. Deutche Bank nonetheless, verifies that competition amongst banks is intense and that no matter these facts, bank departments on corporate bonds have a heavy duty.

[1] Also known as 'Strip' bonds.

2.3 Greek Landscape

Shipping represents an important source of Eurodollar capital flow for the Greek government. Various committees have been established to preserve shipping industry's best interests and furthermore there is a ministry devoted to shipping issues. Based on data published by the Greek ministry it is calculated that sea transportation brings in, an average of €7.5 billion annually which is approximately 5% of the country's GDP.

In the Greek environment, several banks focus their activities. Indicative of the potential yield in the Greek shipping industry is that even banks with no actual presence in Piraeus have penetrated into the market. It is seen below that the number of financiers is constantly changing and hence, the total portfolio available too.

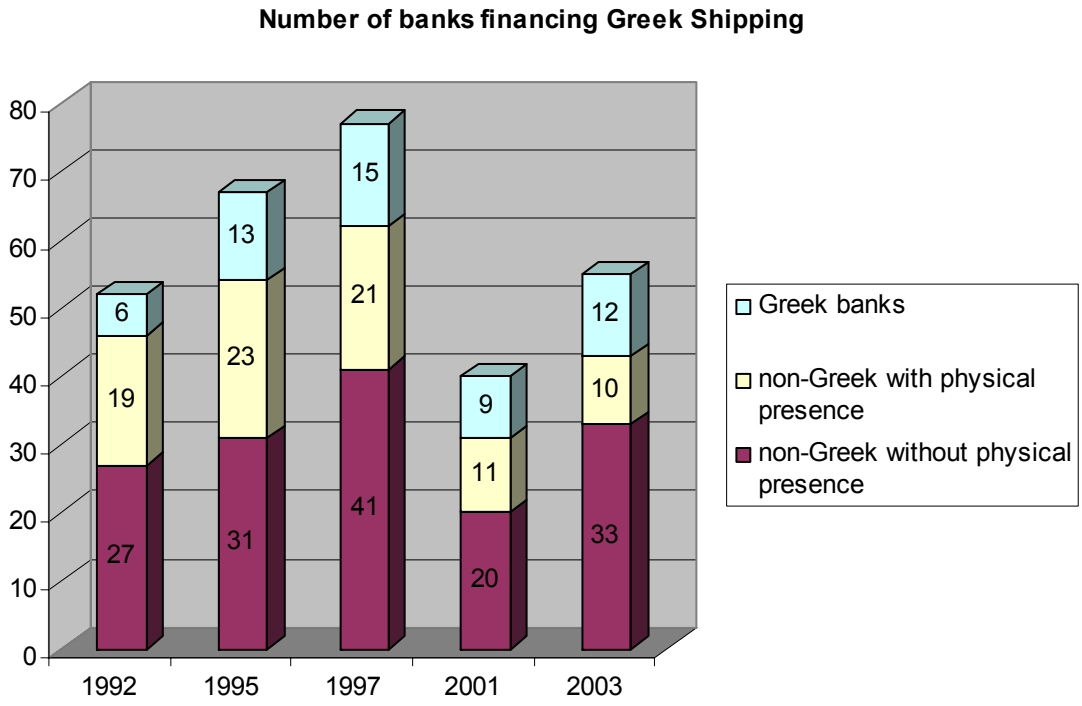


Figure 24: Number of banks financing Greek shipping 1992 - 2003

Source: Petropoulos, 2003.

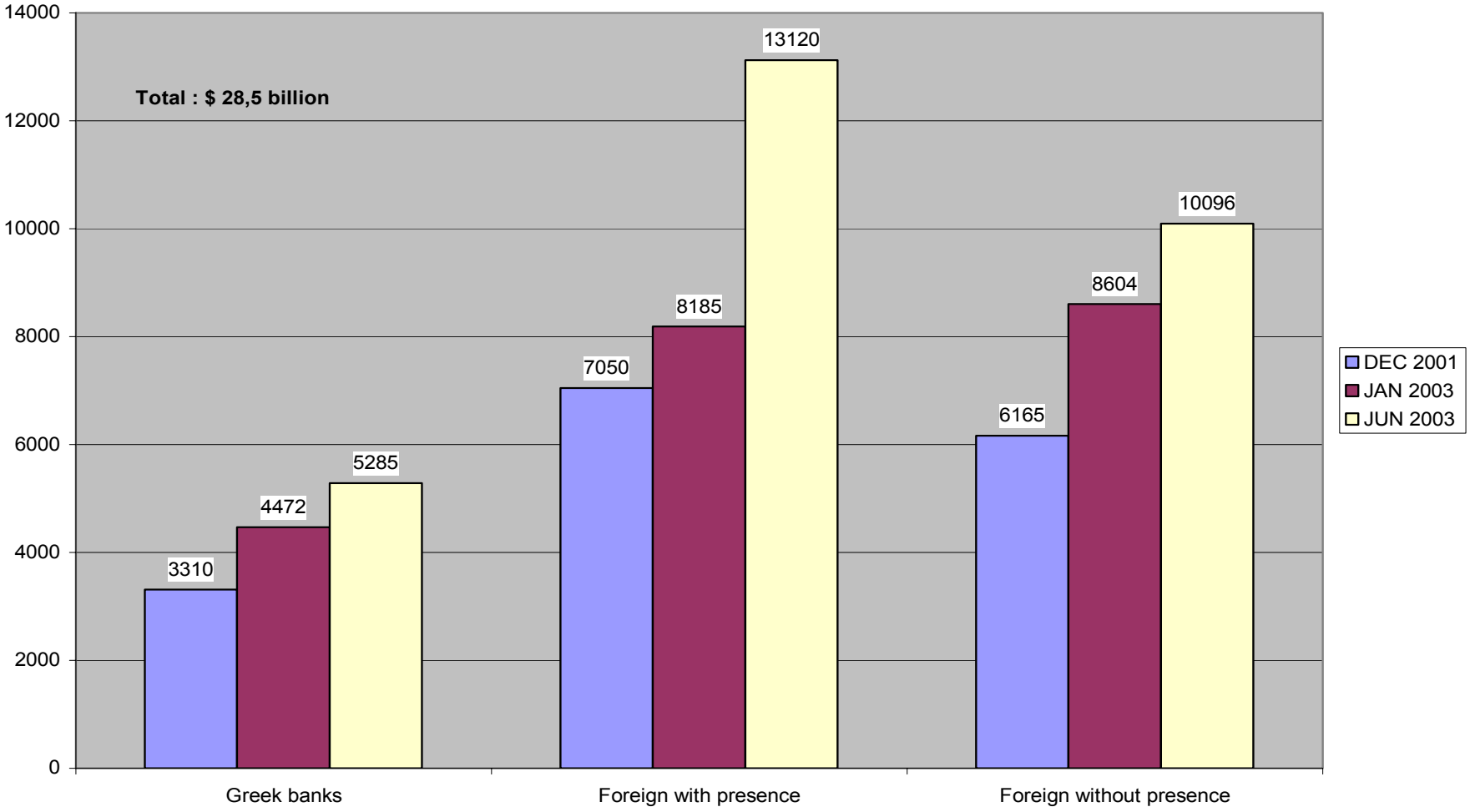


Figure 25: Total of Bank portfolios available to Greek Shipping as of June 2003 ($ million)

Source: Petropoulos, 2003

Recent newspaper articles refer the withdrawal from the Greek market of respectable banks; Bank of New York and Bank of Nova Scotia[1]. French bank Société Générale has withdrawn from shipping.

Below, the names of the banks financing shipping are listed along with the total capital committed into Greek shipping loans at June 2003.

Foreign banks with presence in Greece.

- Royal Bank of Scotland
- Credit Agricole Indosuez
- HSBC
- DVB Nedship
- Citibank
- HVB
- ABN AMRO
- FORTIS
- Credit Lyonnais
- BNP

TOTAL PORTFOLIO:
$13.125 billion

Greek Banks.

- National Bank of Greece
- ALPHA Bank
- Commercial Bank
- PIRAEUS Bank
- EFG Eurobank
- LAIKI Bank
- FBB
- EGNATIA Bank
- Bank of Cyprus
- Agricultural Bank
- Aegean Baltic
- MARFIN Bank

TOTAL PORTFOLIO:
$5.285 billion

Foreign banks with no presence in Greece.

- HSH Nordbank
- Deutsche Schiffsbank
- KFW
- Credit Suisse
- DNB
- Bremer Landesbank
- Bank of Scotland
- Commerzbank
- Vereiss und Westbank
- Nordea
- JP Morgan Chase
- Nord LB
- Bank of New York
- NIB
- Natexis
- ING
- Bank of Ireland
- DB/SHL Shipping

TOTAL PORTFOLIO:
$10.096 billion

Figure 26: Banks financing Greek shipping 2003

SOURCE: T. Petropoulos, 2003.

[1] Agricultural bank along with private investors bought bank of Nova Scotia and formed First Business Bank(FBB)

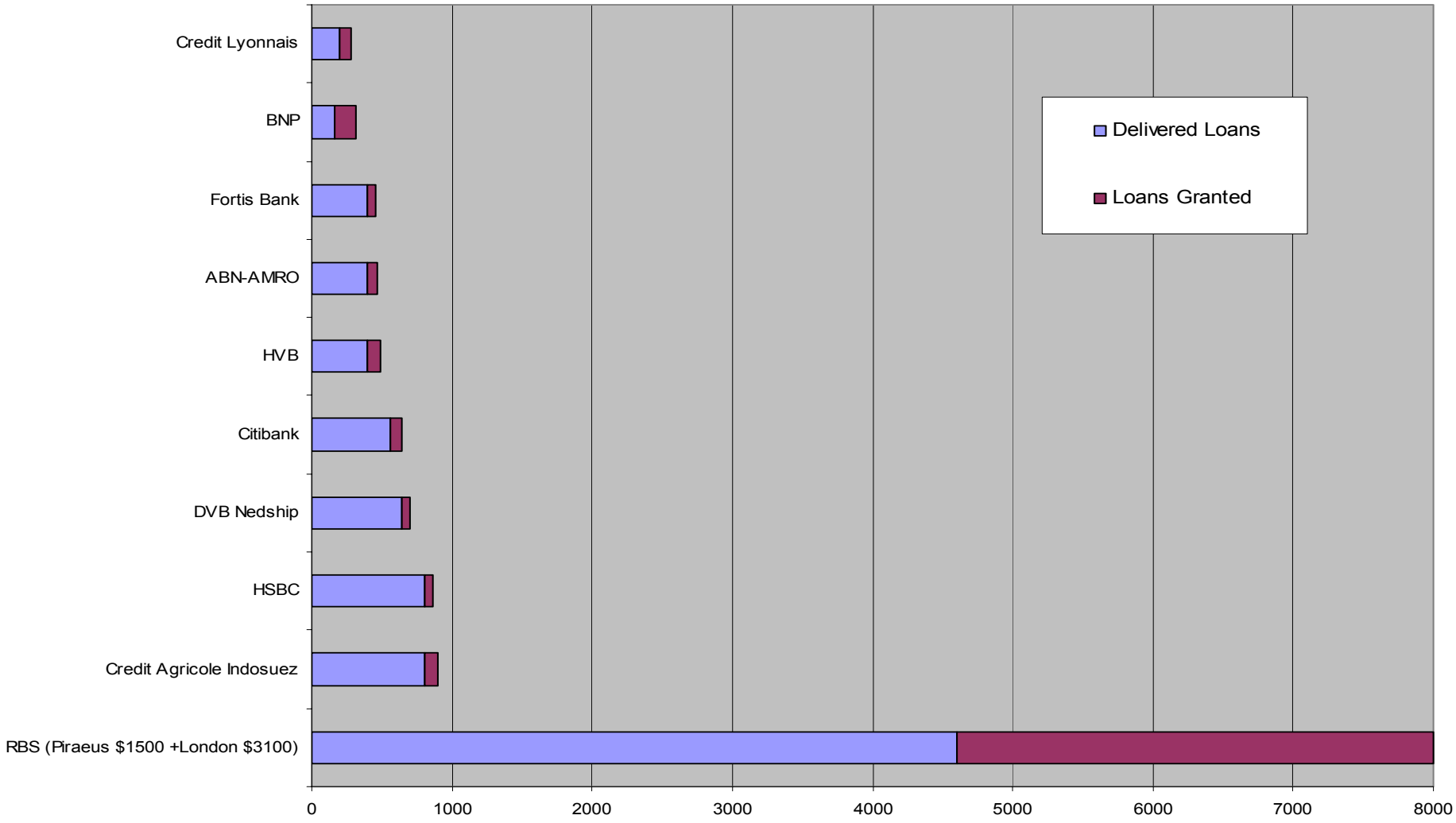


Figure 27: Foreign Banks with Greek presence as of June 2003 ($ millions)

Source: Petropoulos, 2003.

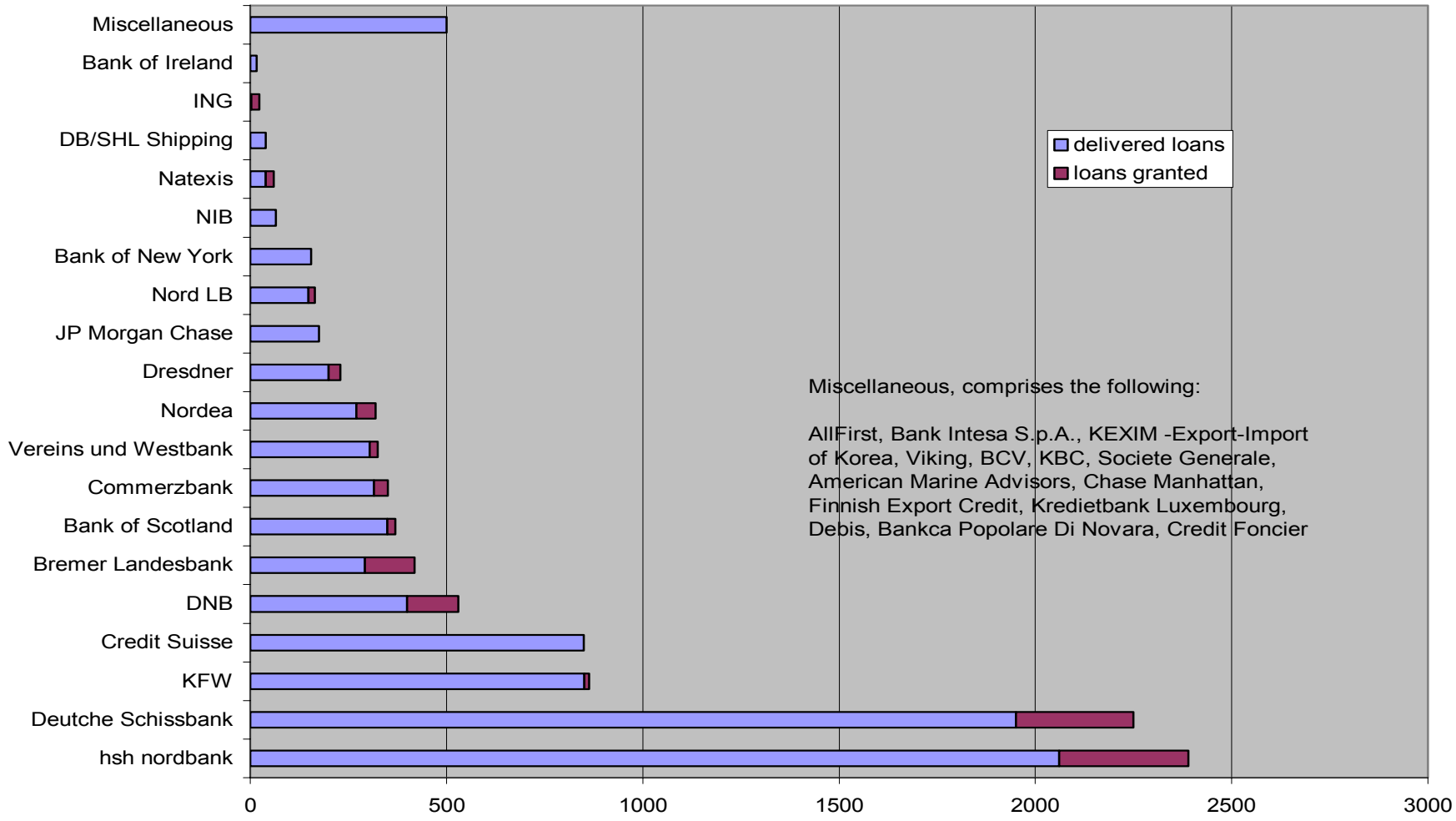


Figure 28: Foreign Banks with no Greek presence as of June 2003 ($ millions)

Source: Petropoulos, 2003.

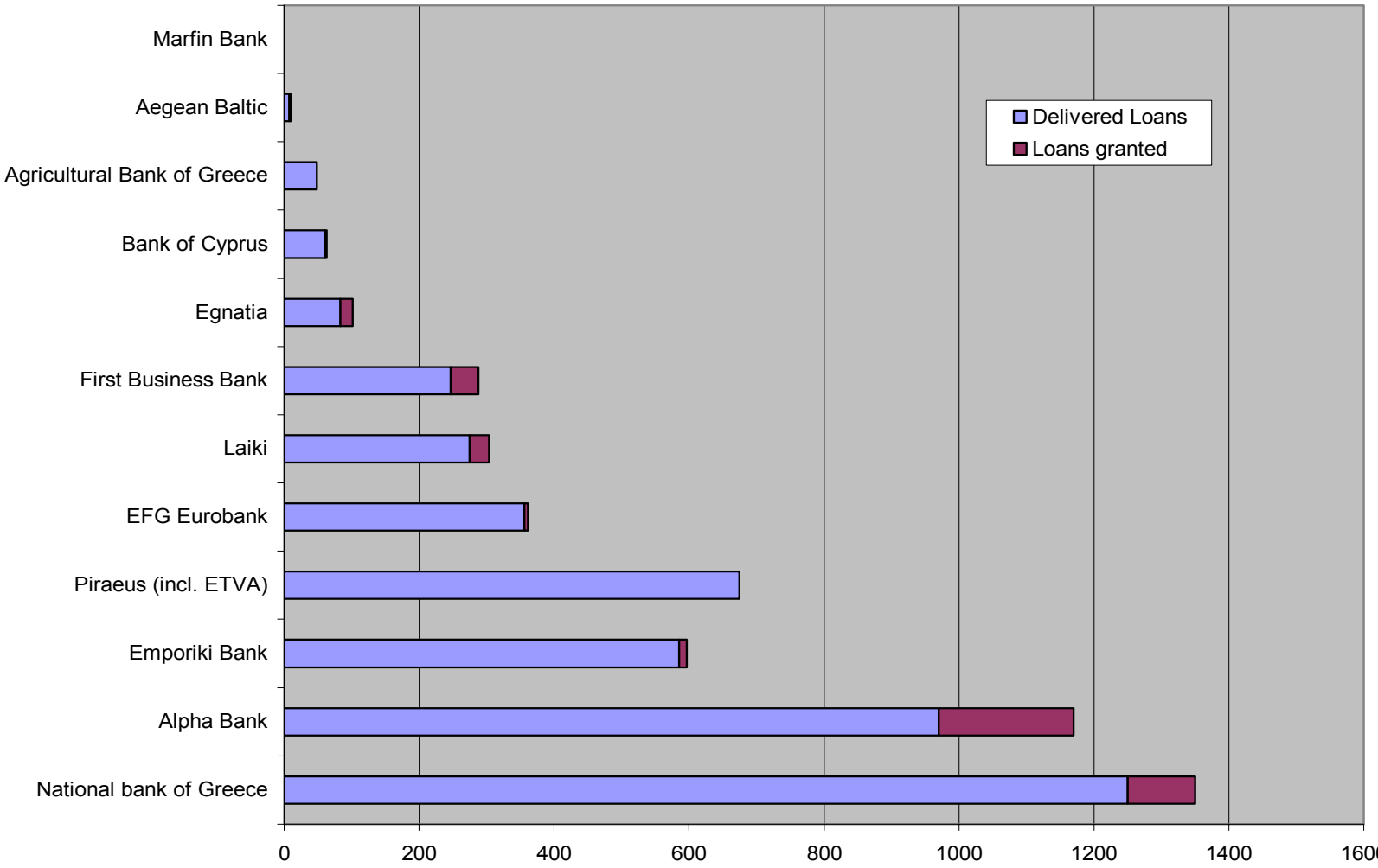


Figure29: Greek Banks as of June 2003 ($ millions)

Source: Petropoulos, 2003.

	December 2001	January 2003	June 2003	Greek Loan Portfolios			% of contri-bution	%Increase of loan port-folio be-tween Jan. and June 2003
	No of Banks		"+/-"	December 2001	January 2003	June 2003		
Foreign Banks with Greek presence	11	10	10	7,05	8,185	13,125	46%	60,35%
Foreign Banks with no Greek presence	20	30	33	6,165	8,604	10,096	35,50%	17,34%
Greek Banks	9	11	12	3,31	4,472	5,285	18,50%	18,20%
Totals	**40**	**51**	**55**	**$16,525**	**$21,261**	**$28,506**	**100%**	**34,00%**

Note: Category A Foreign banks with Greek presence show such a market increase (60.35%) due to the fact that RBS supplied their worldwide figures of Greek shipfinance (those including New York etc, based Greeks)

Figure 30: Overview of the banks financing the Greek fleet

Source: Petropoulos, 2003.

It is reasonable to say that owing to the low rates imposed from Greek banks, the Greek market has a prosperous perspective. (Rates in the following figure are counted in Basis points. Basis points, is another way of referring to interest rate percentages, where 100 basis points stand for 1%).

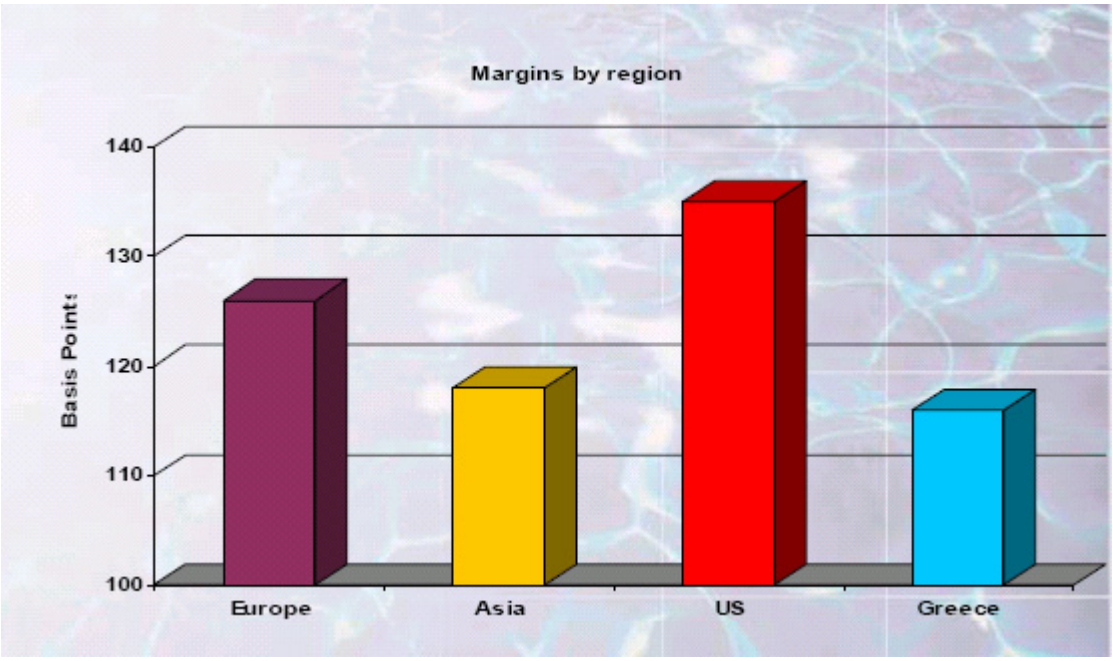


Figure 31: Margins by region

Source: FORTIS Bank

However, due to banks' adaptation to world market trends and regulations, the new borrowers must also evolve some characteristics. As explained previously in the chapter on capital adequacy requirements, target-client lists are likely to be developed. In such lists, only large size groups may enter, of about 15 vessels or more. Projects holding the bankers' interests shall strictly regard young fleets and newbuildings. Loans will be issued for clients with efficient corporate management structures and clear investment plans. Henceforth, future transactions of $5 -10 million shall become extinct along with the small to medium class owners of today [T. Petropoulos, 2001]. The trend that conjectures minor shipping companies to decrease in number is already indicated in the following Figure 32:

Figure 32: Greek shipping companies in operation

Source: FORTIS Bank

So, while analysts estimate that 'the number of Greek shipping companies will decline over the decade from 785 at present, to fewer than 300 by the end of the decade' [T. Petropoulos, 2001], it can be argued that the average owner of tomorrow will differ significantly from today's 5-ships manager.

Nevertheless, the latest Greek activity on newbuilding orders is demonstrating quite a solid demand:

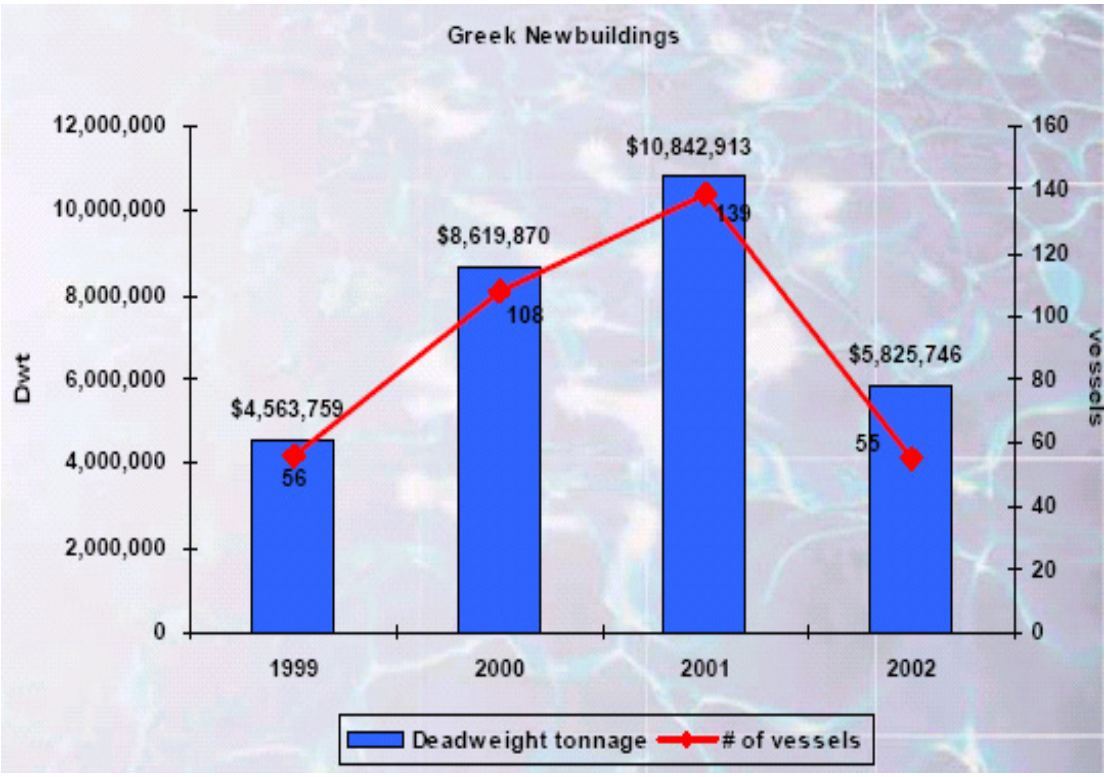


Figure 33: Greek newbuildings 1999 - 2002

Source: FORTIS Bank

On June 2003 Greek ship financing has peaked to $28.5 billion. Based on the Greek newspaper NAFTEMPORIKI in December 2003, the total of Greek orderbook was worth $716 million. Comparing this appetite with the worldwide syndication in Figure 34, it becomes clear that Greek orders claim a great percentage on global fleet renewal:

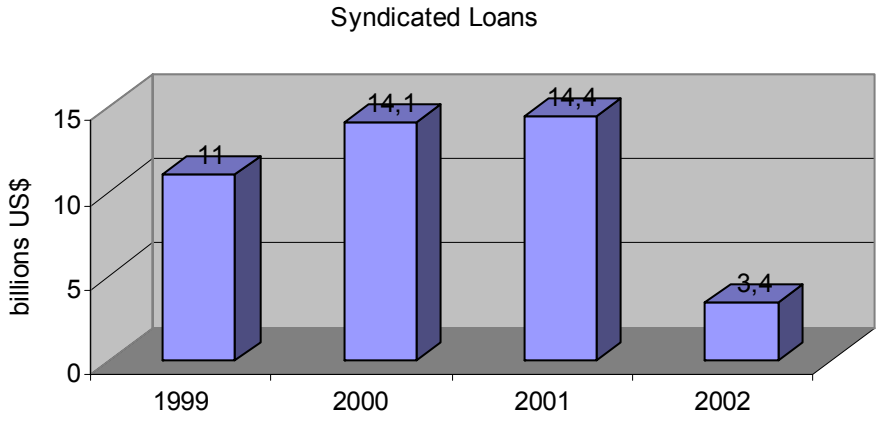


Figure 34: Worldwide loan syndication 1999-2002

Source: FORTIS Bank

Data published by the same source about the status of ship financing up to June 2002 reveal that the amounts provided to Greek entrepreneurs from 49 individual banks, summed to $18.9 billion. Out of these bank loans, 91% concerned ocean-going cargo transports and the rest 9% financed coastal transports (mainly passenger shipping). German institutions were proven major financiers as they provided 29% that is, $5.5 billion. Following the German contribution, is the Hellenic performance that offered $3.8 billion and the English that brought in, $1.9 billion, with percentages 21% and 19% respectively.

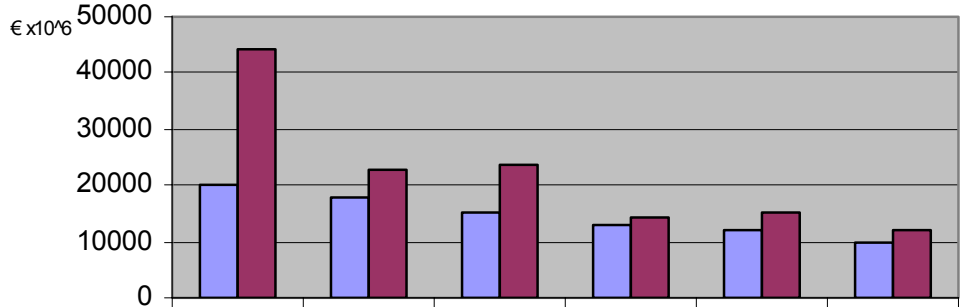
Liquidity deficiency however pushes banks, leasing and insurance companies into forfeiting their portfolios with equity. To settle their liquidity requirements, they arrange major bond issues. The gathered capital is to be lent to their customers. Banks demand capital to satisfy 3 needs:

1. Increased loan demands in a period when revenue income from sources as deposits is low.
2. Need to back-up share capital and bond issuances of their subsidiary insurance and leasing companies.
3. Improvement of creditworthiness; in case this goal cannot be achieved through an increase in revenue, it will be pursued through liquidation of invested equity capital in subsidiaries or other firms.

A brief examination of the 2002-2003 balance sheets of four major Greek banks verifies the following:

- All four banks' equity capital is decreasing
- Deposits are shrinking

All four balance capital has decreased from €115.144.245.000 to €111.246.591.000 accounted in one year. Deducting the 3.1 % inflation this reveals a zero movement/change of the amount. Still, equity capital has been reduced from €8.109.772.000 in June 2002 to €7.464.023.000 in June 2003. This, according to Greek newspapers had an effect of an increase in 3rd party liabilities from €103.136.819 to €107.680.222 that is a 4.4% increase.



	NATIONAL BANK	ALPHA BANK	EUROBANK	ATE	COMMERCIAL	PIRAEUS BANK
LOANS	19887,2	17982,02	15382,41	12837,33	12034,84	10027,44
DEPOSITS	44351,01	22892,97	23623,67	14439,31	15067,24	11847,33

Figure 35: Loans vs. Deposits for Greek banks in 2003

Source: Naftemporiki, 2004

- Agricultural Bank (ATE) 2002 initiated the procedures necessary for the issuance of high yield bonds. By the end of 2002 ATE raised €200 million for 10-year maturity period and a coupon of about 2.1 % above EURIBOR.
- National Bank of Greece (ETHNIKI) In June 2003 NBG raised €300 million issuing debt notes for 10-year maturity period with a spread of about 2.1 %. Newspapers at that time mentioned the NBG stockholders' intention to raise another €1 billion issuing bonds.
- ALPHA Bank The board of directors approved on 27th May 2003 the issuance of bonds. ALPHA issued various bonds with the intention to raise €8 billion. All types of bonds were considered.
- General Bank (Geniki) In June 2003 Geniki considered the raising of €100 million in debt.

Greek Fleet Status

Based on data from the Greek ministry of shipping, Greek fleet occupies the fourth place globally based on the total Gross Registered Tones (GRT). More specifically there are 1529 ships under the Greek flag with a total of 28.678.240 GRT. According to the Bremen Institute of Shipping Economics and Logistics on 2002 Greek fleet occupied the third place globally with a fleet of 43.365.000 tones DWT. It is interesting to note that there is a large portion of Greek-owned ships that are not registered in the Greek ship registry, bear different flags[1] and are therefore NOT taken into account in these statistics.

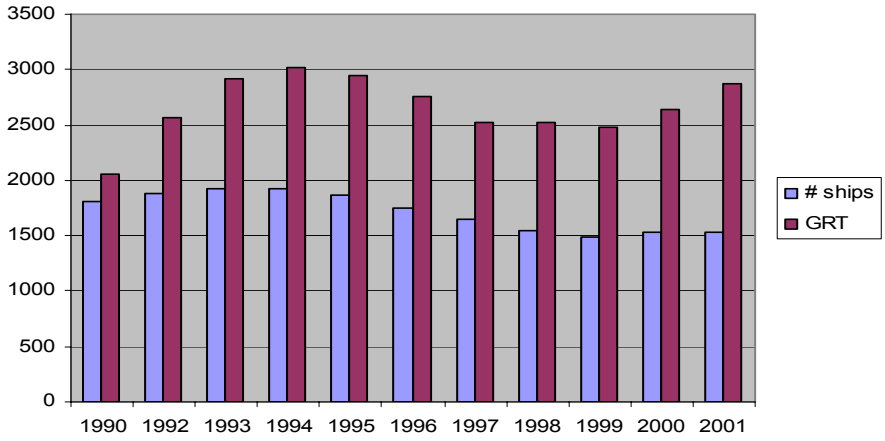


Figure 36: Number of Greek registered ships and corresponding GRT

Source: Ministry of Shipping

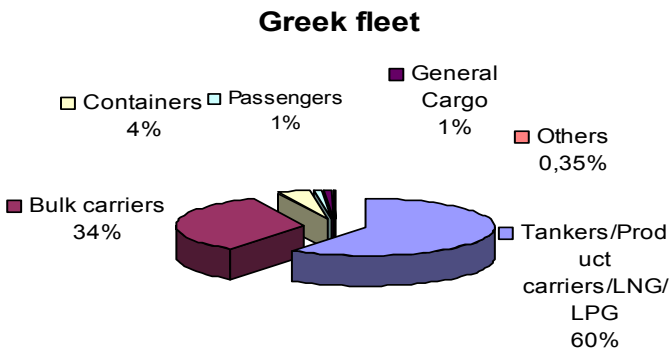


Figure 37: Greek fleet partition

Source: Ministry of Shipping

[1] More on the issue of flags in shipping can be found in the Appendix.

Regarding the total Greek-owned fleet which includes ships of various flags, based on Lloyd's, world fleet statistics 2002, 3480 ships are calculated of 98.195.100 GRT or 164.613.935 DWT capacity which bring Greece to the first position, controlling 17.8% of the global DWT capacity and 40% of the European Union's fleet.

By December 2003, Greek ship-owners have ordered 1730 tonnes DWT tankers worth $716 million. Tanker new-buildings have prevailed in the shipyard order books as the dry cargo market peaks at the moment, making bulk carriers too expensive. Moreover, tanker double-hull regulation enforces fleet renewal. It is interesting to say that according to newspaper articles, modern shipyards consider bulk carriers more expensive to build than other types of cargo ships. In the Appendix the exact Greek transactions are listed.

Here is the full picture of Syndicated Loan transactions of the previous years associated with the respective number of deals:

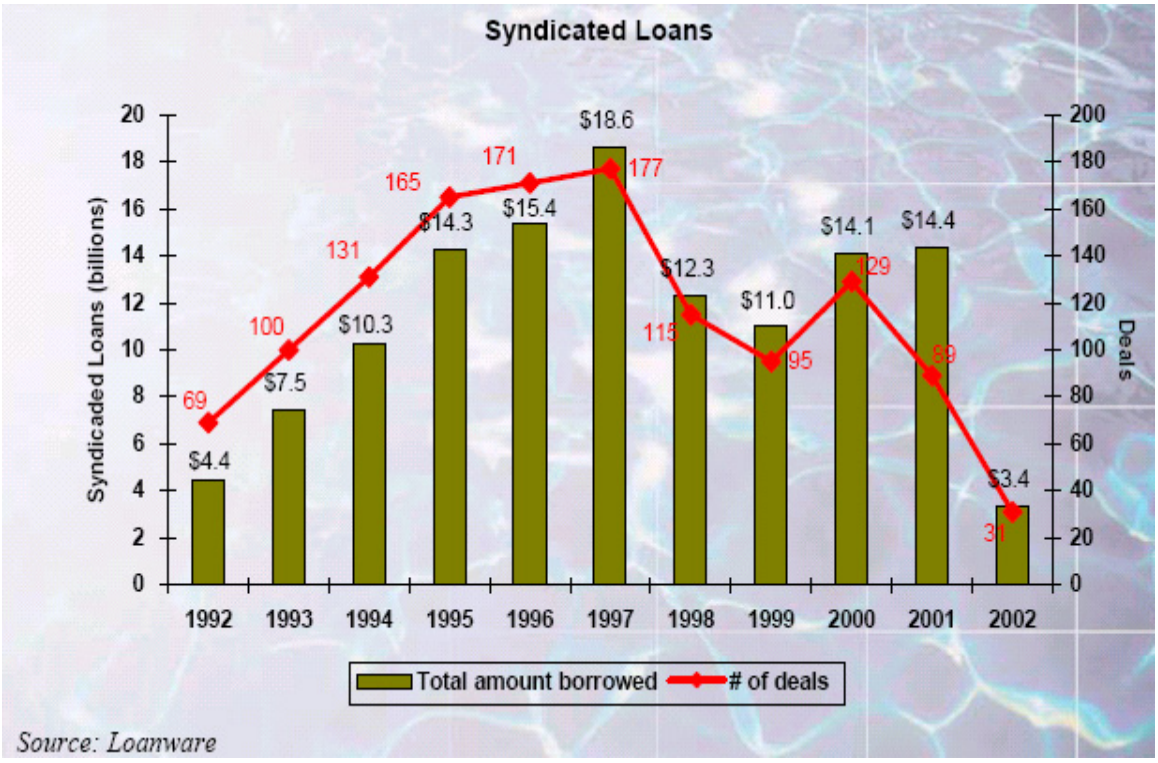


Figure 38: Loan syndication 1992-2002

Source: FORTIS Bank

2.4 Criteria review and classification

Ship financing project appraisal, is a profound task that encounters the uncertainty of the shipping industry and the individuality of each venture. All cases are different and need to be examined individually.

There are however fixed criteria in the credit policies that aim to classify shipping companies according to their credit ability and others to be applied on specific ventures, all aiming to make the investment evaluation feasible.

Commercial loans have the great advantage of flexibility. In theory, there are no restraints of such a loan in respect of the timing of drawdowns and repayments. Banks are after all in business to lend money and provided they can be satisfied that they will be repaid according to an agreed schedule, can be very flexible in agreeing to the arrangements. Therefore, the aspect of securities –or collateral- to be provided to the lender by the borrower is of vital importance.

When extensive loan funding first became common in shipping, the lenders' security requirements were usually satisfied by charges on assets, for example on the ship being financed. Later, particularly after the collapse of the market in the mid 1970s and the consequent collapse of the asset values of ships, it became more usual to examine the 'track record' of the management of the owing company, and the forecasts of the cash flows from which the loan was to be repaid, although a charge on assets was still required [Sloggett, 1998].

At the present time with the bank ship finance a well established source of funding, work has been done on the direction of credit analysis.

Issuing a loan, three key areas should be addressed. First, the protection afforded to the bank's shareholders in securing the repayment of the loan. Then it is the creditworthiness of the customer and finally the bank's ability to successfully conduct the loan to maximize security.

A credit analysis framework has been established on the basis of experience. Text books display a variety of aspects to be considered *credit risk evaluation elements*. Professor C.Th.Grammenos points out the 5 C's of credit[1]: **C**haracter of the owner, managerial **C**apacity, shareholders' **C**apital participation, sufficient **C**ollateral security and the general **C**onditions in key market areas [Grammenos, Xilas].

[1] The concept of the C's of credit are first presented in Cheng P.C., 1979. Initially Cheng pointed out 4 C's, Prof. Grammenos added Conditions thus making them 5.

Securing their financial status, banks look for projects that will remain stable over the full length of the loan. They will examine the performance record of the company, the ship, the owner and the intended employment of the vessel. The reputation of the client, his past record and viability in adverse market conditions will also be taken into account. The borrowing company will be positively evaluated to display a sound financial structure. Leverage ratios indicate the extent to which the company is externally funded while gross profit to interest ratio, shows the level of fixed loan commitments in relation to operating profit. Close attention will be paid to the liquidity situation. In respect to the volatility of the market, great attention should be paid to the estimated cash flow and the planned employment of the vessel.

Marine mortgage has been developed to give the mortgagee the right to require conditional ownership of the vessel if the mortgagor fails to make due repayments. Additional security to make up the cover for the full amount borrowed is usually given in the form of bank guarantees, assignment of charter parties, or mortgages on further vessels or other assets. It should be pointed out that the liability of the borrower to the lender is not in any way restricted to the financed project but it extends over the borrower's whole business. To enable proper financial appraisal the parameters of the loan to be determined are the amount, period, rate of interest, currency and general repayment details [Sloggett, 1998].

As it was discussed in a relative chapter, older literature on credit risk management emphasises the need to incorporate expected credit losses into prices – interest rates. However mark-up pricing of interest rates is not always optimal or possible. When interest rates are increased, credit risk may also rise and net return to the F.I. may fall due to adverse selection and moral hazard problems [Sunders, Stiglitz-Weiss 1981]. Management of credit risks is possible with credit analysis, screening, monitoring, specialisation, and long-term customer relationships. Collateral can serve as an alternative to interest rate increases, because it reduces the incentives for entrepreneurs to select risky projects.

Step 1 in any credit analysis is a look at expected cash flows. Can it be at least speculated that cash flows will be sufficient to repay the loan?

Step 2 in credit analysis is an evaluation of risks.

- The possibility of adverse shocks that negatively affect future cash flows.
- Judgement on 'financial strength', to determine the possibilities of providing a buffer against lower cash flows.

- Evaluate problems associated with moral hazard and asymmetric information.

Approaches to credit analysis can be divided into qualitative methods and quantitative methods.

*** Qualitative credit analysis methods**

Qualitative methods usually result in a simple yes/no decision on a loan application. These methods consist of 'lists' of important elements that must be evaluated during a credit analysis.

Example 1: Quality and morality of management, financial strength of the company (balance sheet, profit and loss accounts), financial developments in the business sector, developments in the national/international economy (business cycle), other: legal framework, strikes, and international aspects.
Example 2: Famous C's-framework. Usual elements:

5 C's	US banking supervision
Character – willingness to repay	C - capital adequacy
Capacity – available cash flows	A - asset quality
Capital - buffer against adverse shocks	M - management quality
Conditions - sensitivity to and likelihood of adverse shocks	E - earnings quality
Collateral - security as backup	L – liquidity

These lists do not normally tell us how the listed elements should be evaluated. Each F.I. will implement its own system.

*** Quantitative credit analysis methods**

Benchmark risk values set a framework where each F.I. attempts to categorise debtors. Risk categories represent quantitative criteria fulfilment or inadequacy from the part of the obligors. It allows FIs to price individual credit risk and to make provisions for expected credit losses. Such methods are based on credit models or on ratings by independent agencies, if applicable.

Credit ratings

They are a special category of judgements on creditworthiness for exchange-listed corporations and authorities usually. Credit ratings are vital to the credit industry because they offer consistent and publicly available credit scores, produced by independent agencies, for either the creditworthiness of a major entity or for a particular debt security or other financial obligation. Ratings help to determine how much companies and governments must pay for credit. Specialised agencies such as Moody's, Standard & Poor's and IBCA-Fitch, study and rate the creditworthiness of corporations, commercial debt (bonds or other issuances); even countries get ratings. At the end of their extensive surveys they inform of their judgements, by assigning special labels, as letters. For example, a triple 'A' stands for highest creditworthiness whereas 'D' is –way- below investment grade. A few remarks on rating agencies follow.

The role of these agencies was about to be enormously upgraded as the Committee on bank supervision planned to turn the credit rating into an obligatory requisition embodied in the amendment of Basle. The concept received its current form[1] when the banking industry argued effectively that the implication of such a demand would make the industry dangerously dependent on the two major rating agencies[2].

The rating concept although it is popular in the US it does not enjoy appreciation in Europe or at least that's what the numbers state: In the U.S. the number of rated companies and corporate bonds is about 3000 whereas the corresponding number for Europe is merely 800, according to information published in the E-Risk portal. Still, the number of ratings in Europe has risen by 115% since 1995. At the beginning of September 1998 Standard & Poor's had public ratings on 34 shipping companies, compared with 16 rated shipping companies at the end of August 1997. The total excludes offshore supply vessel operators, inland barge companies and passenger cruise companies. The increase in rated companies has been in Europe, with the majority in Greece and bond issuers based in the U.S., Argentina and Singapore. [BIMCO Review, 1999]

Although the credit ratings themselves are more or less quantitative, it has remained unclear how exactly S&P, Moody's, etc. obtain their ratings. Up to some extent, credit ratings are qualitative and subjective. Once the agency receives a

[1] See relative chapter on bank loans.
[2] The dominance of Standard & Poor's and Moody's is only challenged by Fitch, formed by the merger of Fitch IBCA and Duff & Phelps in June 2000. In the early 2003, Fitch commenced the acquisition of Thomson BankWatch, the ratings subsidiary of Thomson Financial.

rating request it assigns an analytical team, consisting of analysts with expertise in shipping, which meets with management to review key factors affecting the rating. In advance of the meeting the company should submit background materials, including: audited annual financial statements, interim financial statements, descriptions of operations, information on strategy and financial forecasts. A substantial portion of the data collected is, of course, confidential.

In conducting a shipping company credit analysis, agencies look at a number of different factors which are primarily divided into aspects orientated towards business risks and the remainder relate to financial risk.

Each rating analysis begins with an assessment of the company's industry environment. Industries such as manufacturers of branded consumer products and drug firms are regarded favourably. These industries are distinguished by such traits as low volatility, ability to maintain margins without impairing future prospects, flexibility in the timing of capital outlays and moderate capital intensity. Conversely, industries such as shipping, are considered of having worse-than-average industry characteristics. The shipping industry's risk profile is characterised as being of speculative grade[1] because of its sensitivity to economic factors, high capital intensity and fierce competition between different operators in an international market that is susceptible to volatile price swings.

However, the risk profile varies across different shipping segments. For example, the oil tanker industry (especially the large crude oil tanker industry) has, from a rating point of view, some highly unfavourable fundamentals such as variable demand for oil transportation by sea, high capital costs, a long time lag between contracting and delivery and the long life of the vessels. A modest imbalance between supply and demand tends to have extreme effects on freight rates and vessel prices.

Furthermore, sometimes the industry has been characterised by excessive new-buildings. As vessels have a long life, this has resulted in low freight rates for long periods. The 'asset play' characteristics of much of the industry have also led to reluctance to scrap tonnage that might otherwise be considered uneconomical. The dry bulk segments are viewed as at least as risky as tankers owing to extremely low barriers to entry and the commodity nature of products transported.

On the other hand, the Ro-Ro and ferry sector is an example of a niche within shipping that enjoys relatively better-than-average fundamentals. Historically, it

[1] 'Speculative' grade is synonym to below investment grade.

has not being plagued by material overcapacity, and charter rates have been stable by general shipping standards. However, the largest ferry market, the European market, has started to change because of new fixed links, the planned abolition of duty-free sales and a new regulatory framework.

After the industry risk assessment, agencies evaluate the issuer business risk, in other words the company's position within the industry. Factors considered include among others, the following.

- **Diversification**: when a company participates in more than one business, each segment is separately analysed. The potential benefits of diversification which may not be apparent from the additive approach, are then considered. Most important is a company's ability to manage diverse operations.
- **Fleet**: Number, age, efficiency and type of vessels in relation to current and projected needs and relative to competitors are important variables. These factors largely determine a company's operating cost position. A small fleet of older vessels could be a rating concern as the vessels may develop unexpected problems.
- **Contracts and relationships with customers**: A large number of long-term contracts is a major rating advantage. The customer base could be one indication of the quality of standards.
- **Management**: management is extremely important in the volatile and competitive shipping industry. Evaluating management's strategies is a key objective. The depth and breadth of a company's management also has to be evaluated, especially in the case of companies that are family-controlled.
- **Operations**: in addition to the factors mentioned above, a large number of other variables are analysed, such as safety record, P&I membership, cost control, route structure and vessel utilisation.

The financial analysis includes the following factors:

- **Financial policy**: Agencies attach great importance to management's philosophies and policies involving financial risk.
- **Accounting**: the focus is to determine if the company's ratios understate or overstate the financial performance or position of the company in relation to its competitors.

- **Earning protection**: EBITDA coverage of interest and return on capital.
- **Cash flow**: cash flow analysis is critical in all credit rating decisions. It takes on added importance for speculative-grade issuers. While companies with investment-grade ratings generally have ready access to external cash to cover temporary shortfalls, speculative-grade issuers lack this degree o flexibility and have fewer alternatives to generate cash internally.
- **Capitalisation**: Debt leverage and capital structure.
- **Financial flexibility**: Financing needs and financing sources (ownership and/or affiliation with other companies is one variable, while unencumbered assets are another.

However, scarcely do shipping companies acquire such a rating because the process is exhaustively thorough and expensive up to such an extent, that it is not attempted. It is interesting to point though, that the independent agencies are paid from the entities they rate –a conflict of interest that has to be appropriately managed.

3 Survey conduction

3.1 Questionnaire design

3.1.1 Orientation poles

Financial Institutions function in a competitive environment with their clientele not restricted by the borders of states. This way they are subjected to the same rules of trade that administer all industries worldwide. However, the corresponding product here is money and so 100% of the competition, "provides" substitute products…

In the following pattern, the F.I.s and possible overall strategic goals are schematically displayed. A different 'mixture' of care paid into these goals describes every Institution serving its own needs dictated by perhaps different regulations and generally different conditions. That is, the poles 'max Assurance', 'max Spreading' (Marketing), 'max Quality' along with effort for maximum profit have different membership values for each F.I. This is achieved by developing a Credit Policy capable to bring in the desired returns.

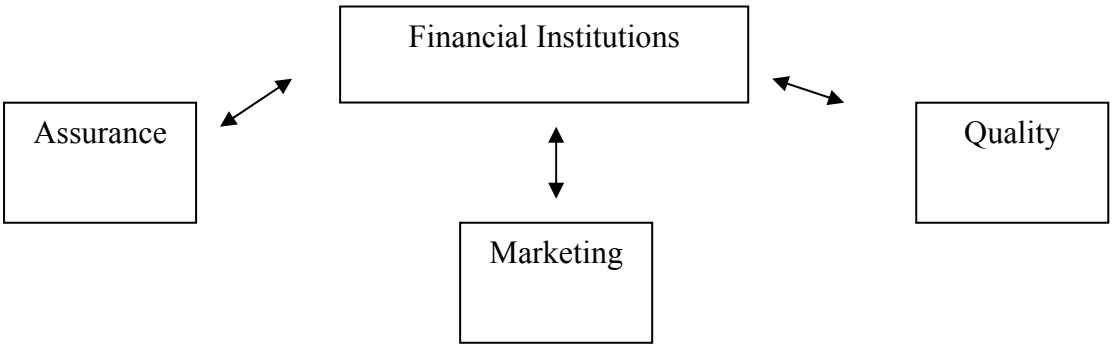


Figure 39: Key points of Financial Institutions' credit policies in the analysis

A bank's policy is well described by the above poles, as they are independent. It can by no means be supported that all three of these goals are challenged equally and each as first priority. The apparent explanation for this is that moving closer to one, increases the distance from the rest. This will be further discussed below.

Evidently, it's in each bank's aspirations to pursuit maximum profit while securing its portfolio, claiming a maximum portion of the market share and investing on quality projects alone. In the same way a ship-owner wishes to purchase fine ships thus getting the benefit for better credit capacity. Factors though, such as liquidity deficiency and opportunity profit, alienate our world from an ideal one where all three of the above goals may be pursued simultaneously.

Quality: The bank adopting this approach into its activities must be emphasizing on ISM matters and the total quality management system ISO 900x. This way, this bank will finance newbuildings erected in traditionally ship-manufacturing countries according to the safety regulations towards the environment and the crew. Approval from a demanding registry and a satisfactory insurance contract are therefore substantial.

Assurance: This approach dictates special care to the basic elements of credit (5C's). Being this way, a perplexed covenant comprising of many clauses including all possible outcome of the project is expected. Furthermore, institutions that have focused into this issue, receive reliable timely updates of the market provided by international independent analysts and may even maintain an ad hoc market analysis department. Unquestionably, such a bank is interested in developing a secure clientele via relationship banking and hesitates to finance in a transactional basis projects that may otherwise be promising.

Marketing: A bank, in order to penetrate into a market apart from possessing a competent portfolio, must also be competitive. It is this bank that will offer different products (mezzanine / leasing /…), flexible payback conditions (large payback period, competitive prices, …), undertake extensive project percentages and participate in as many as possible loans (bank syndication).

- The goal of maximum Spreading (MARKETING) is achieved by making use of all loan opportunities. It is evident that 2nd hand ship acquisition projects may not be turned down. The argument here is that a bank aiming to liven up its growth indices shall necessarily back down on some QUALITY issues.
- A bank near the pole QUALITY evaluates the loan demands and may overrule healthy otherwise, plans. This way, it moves away from MARKETING. Such a bank may in parallel pursue the minimization of credit risk, an additional goal that will take MARKETING even farther.
- A bank aiming to fortify its portfolio with maximum ASSURANCE, seeks to minimize credit risk. Shipping however, is a highly unstable market

where safe investments are rare, not to say absent. Thus, turning down projects not offering a certain extent of ASSURANCE may hold back Spreading and respectable growth rates demonstration.

3.1.2 Picking the topics

Most of the topics in the questionnaire attempt to grant a score to the bank evaluated, which will add up to the total score of the bank in a form that can be compared with those of the others.

The analysis has 4 levels:

- **Level 4.** This level features the registries as they appear in the questionnaire (linguistic form). It is the rawest form of data –the input.
- **Level 3.** At this level, the linguistic registries from the questionnaires are transformed into numerical values.
- **Level 2.** Each feature is assigned to a concept (a pole) describing an institution's orientation and exposure. Level 2 comprises three values.
- **Level 1.** It is the final score. The most elaborate form of data. All three previous partial scores mix up to the final aggregate value.

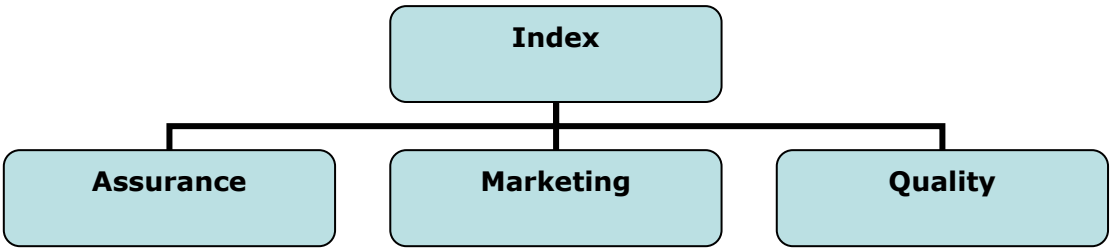


Figure 40: Level 1, 2 data of the survey.

Each F.I. according to the orientation that serves it best, applies different criteria to evaluate finance issues. In an effort to confirm this diversification, the questionnaire is conducted. The topics are first presented next.

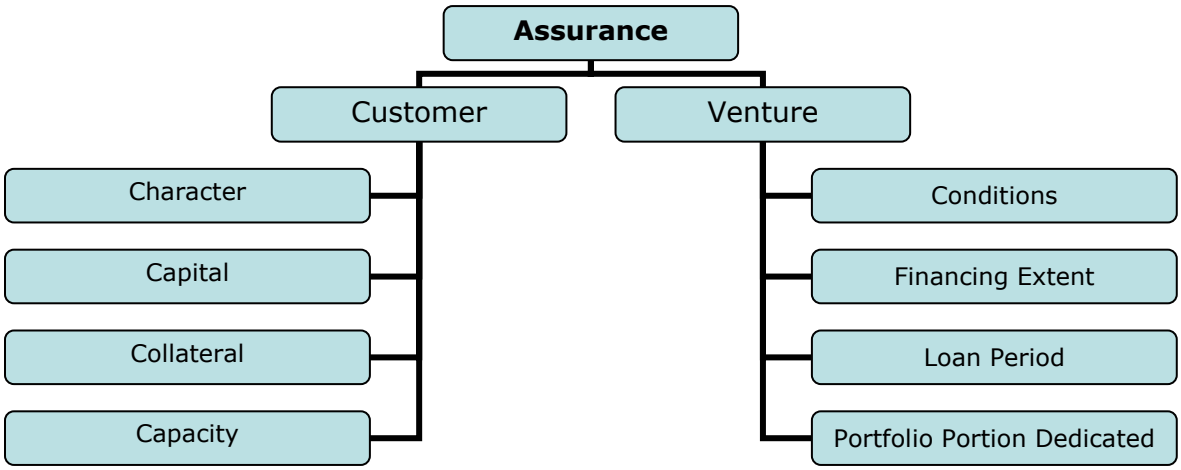


Figure 41: Level 2 (Assurance) and Level 3 analysis -1st branch

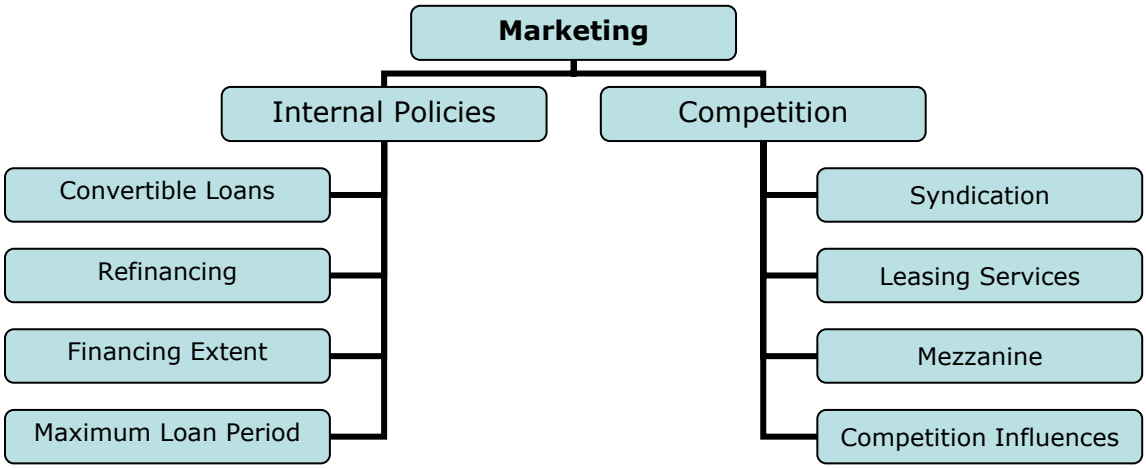


Figure 42: Level 2 (Marketing) and Level 3 analysis -2nd branch

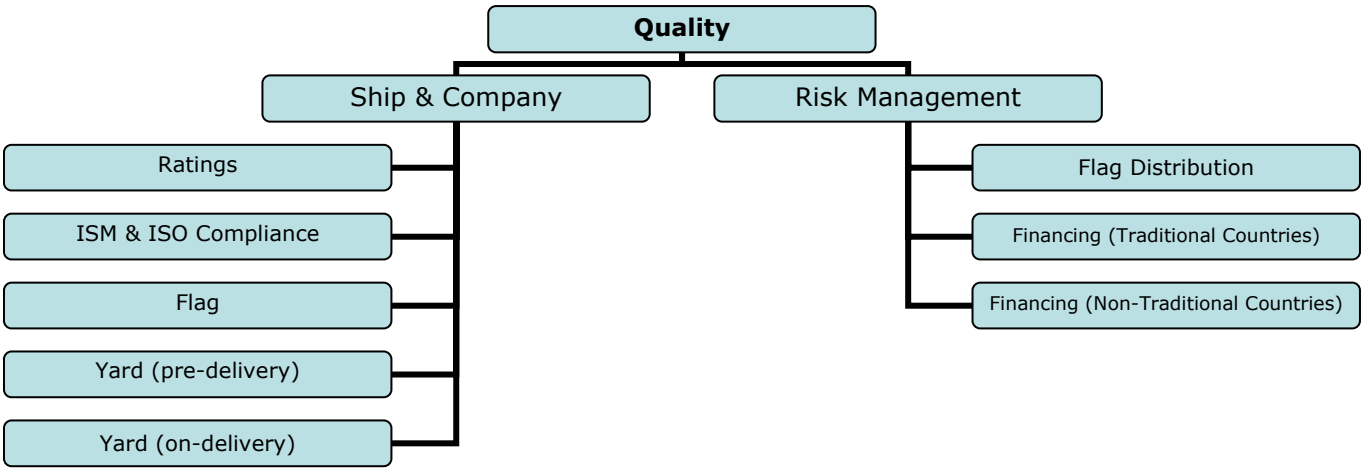


Figure 43: Level 2 (Quality) and Level 3 analysis -3rd branch

Questions to detect ASSURANCE:

1) Which is the portion of the total portfolio dedicated to shipping?

❒	❒	❒	❒	❒
0-5%	10-15%	20-25%	30-35%	>40%

Textbooks refer that substantial risk hedging comes from diversification. This question is to detect the 'prudency' of banks. After all, shipping is volatile.

The options accompanying this question are percentages.
0-5% is a very small percentage. A bank that has its portfolio fragmented is aiming to minimize market risk.

>40% is a really great percent. Such a bank is devoted to shipping.

← + ASSURANCE

2) Evaluating a loan application describe the significance of the following:

a) character and track record of applicant shipowner

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

b) manegerial capacity

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

c) capital –equity participation

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

d) collateral

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

e) conditions of the market from where the cash flow is expected

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

Professor Costas Grammenos, points out the five C's of credit. Which among them holds the focus of the loan officers, though?

The options provided here are importance measures. Apparently, as the importance into the 5C's is growing the credit risk is minimized.

→ + ASSURANCE

3) Up to which extent of a project would you undertake?

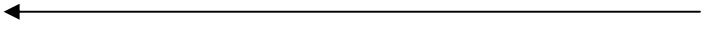
❒	❒	❒	❒	❒
Up to 10%	Up to 30%	Up to 50%	Up to 70%	Up to 90%

It is said that equity participation, reflects the belief of the borrower to the project. Here is a practical measure to ascertain the bank's focus on 'Capital'

A 1-9 scale is evident. Here too, extreme extents are provided:

Up to 10% a bank *desperately* avoiding risk participation.

Up to 90% this bank aims to spread into the market as it disregards a basic index: equity participation (Capital).



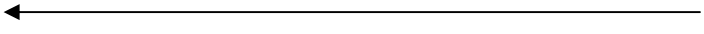
+ ASSURANCE

4) Please, indicate the maximum accepted loan period

❒	❒	❒	❒	❒
1-3 yrs	6-9 yrs	12-15 yrs	18-21 yrs	24-27 yrs

Dr M. Stopford refers to tenor as the first of the key point in a commercial 'term loan' facility.

The concept behind this question is that a bank seeking to be competitive will accept large payback periods whereas a 'play safe' bank won't.



+ ASSURANCE

Questions to detect MARKET PENETRATION:

1) Describe the bank's stance towards syndicated loans

❒	❒	❒	❒	❒
Confronts the Credit Policy	Good to be avoided	Indifferent	Positive, as it spreads credit risk	Arranger of such loans

Banks are generally unwilling to keep a $30-50 million loan in their books. For larger loan the usual practise is to spread the risk by sharing the loan among a syndication of several banks. [Dr. M. Stopford]

A bank seeking to *produce* loans will think high of bank syndication.

→ + SPREADING

2) Should a client of yours suggest that part of his debt to be converted into equity capital of the indebted company thus making you a partner, would you negotiate? (convertible loan)

❒	❒	❒	❒	❒
No, it confronts the Credit Policy	Only at certain occasions (profit-able com-pany, good stock perform-ance)	Indifferent	Yes, it is a security should default occur	Common practice

Corporate stocks are quite often provided to the banks as additional security. Recent newspaper articles refer that 29 Greek PLCs have followed this trend, pledging their stocks, with a range from 2 to 70 % of their issued capital.
Such loans are issued even by the EBRD. ($10 million convertible loan to Bank Post in Romania in 1998 for example)

Obviously a bank willing to *expand*.

→ + SPREADING

3) Up to which extent of a project would you undertake?

❒	❒	❒	❒	❒
Up to 10%	Up to 30%	Up to 50%	Up to 70%	Up to 90%

A 1-9 scale is evident. Here too, extreme extents are provided:

Up to 10% a bank *desperately* avoiding risk participation.

Up to 90% this bank aims to spread into the market as it disregards a basic index: equity participation (Capital).

→ + SPREADING

4) Do you provide finance other than senior debt on a higher interest rate and a corresponding 2nd mortgage (mezzanine finance)?

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes sometimes	Common practice

Textbooks refer to mezzanine as a 'half-way house between debt and equity'. It is a high yielding debt. [Dr. M.Stopford]

Here too, extreme extents are provided:

No, never a bank that may not seek maximum competitiveness.

Common practice it is a leap towards market penetration.

→ + SPREADING

5) Leasing is considered to be a promising method for acquiring and operating a vessel. Do you provide this off-balance sheet financial scheme?

❒yes ❒no

If yes, please express the interest you pay on the following:

- Leasing as a financial instrument

❒	❒	❒	❒	❒
Insignificant	Less significant	Significant	Important	The most important

Leasing is an issue that arouses strong feelings. It is considered either as a non-purpose instrument or as a key element to attract interest on behalf of the ship owning community. Some bankers believe that one cannot attract clients by just providing traditional methods of finance, and that some additional effort is required in order to be competitive. Being so, leasing is regarded as the 3rd most important source of finance. [P.Stokes (1992) p. 128-137]

Not provided	such a bank believes leasing is not a promising or worth considering tool.
The most important	such an answer must act as a bonus as far as market penetration is regarded.

→ + SPREADING

6) Do you refinance loans that have first been issued by the competition?

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

Chapter 1 stressed this situation to be mentioned in the credit policy booklet conducted by each bank.

Apparently, the loan would have been issued in the first place had the chance been given. This way, the bank is interested in extending its current client list.

→ + SPREADING

7) Please, indicate the maximum accepted loan period

❒	❒	❒	❒	❒
1-3 yrs	6-9 yrs	12-15 yrs	18-21 yrs	24-27 yrs

The concept behind this question is that a bank seeking to be competitive will accept large payback periods whereas a 'play safe' bank won't.

→ + SPREADING

8) Indicate the influence of the competition into the development of the interest rates you charge.

❒	❒	❒	❒	❒
None	Practically small	Indifferent	Great	The most important

In this topic the desire for market expansion is implied.

None hopefully this option will not be exercised.

The most important the care for competitiveness is evident.

→ + SPREADING

Questions to detect QUALITY:

1) Which flag is the most common in your portfolio?

❒	❒	❒	❒	❒
Opportunity flags	Rest of the world	Evenly distributed	Greek	European

The options here are arranged following an increasing rate of regulations and obligations demanded by the registries.

→ + QUALITY

2) Describe the participation of rating agencies in your business (Moody's, Standard & Poor's…)

❒	❒	❒	❒	❒
Absolutely none	Rare	Indifferent	Substantial	Total coopera-tion

Few are the shipping companies that have been rated. Those rated to be financially reliable are even fewer. It is not common practice to come up with a bank demanding creditworthiness ratings.

→ + QUALITY

3) Evaluating a loan application describe the significance of the following:

f) flag registry

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

g) shipyard (newbuildings)

pre-delivery

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

on delivery

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

h) ISO compliance

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

The options provided here are importance measures. Apparently, these are direct QUALITY indices.

→ + QUALITY

4) Would you finance a newbuilding that won't be constructed in a traditionally shipbuilding country?

pre-delivery

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

on delivery

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

In chapter 0 discussing banks' credit policies, the issue of building location had come up as a topic to be stated in the credit policy booklet.

There are countries with an established shipbuilding tradition and those are most commonly preferred. A bank with a QUALITY orientation shall care to avoid financing projects carried out in a not fully recognised yard.

← + QUALITY

4 Results

4.1 Introduction

Techniques for cluster analysis seek to separate a set of data points into groups (clusters) of 'similar' points. In practice many different clustering techniques have been developed.

These techniques may be distinguished into 4 groups.

- **Hierarchical techniques**. The classification is not performed in one step, but the classes themselves are subjected to successive selections which partition the set into finer and finer groups.
- **Optimization techniques**. In this case the clusters are formed by the optimization of a clustering criterion.
- **Density techniques**. By searching for regions containing a relatively dense concentration of points, clusters are formed.
- **Clumping techniques**, in which, classes can overlap.

and there are more methodologies.

All the above techniques examine a set of objects in terms of a number of features. Information regarding these features is then used to cluster these parts. Special care must be given into the nature of these features as they may be of quantitative or qualitative, subjective meaning. The methodology must –at least- *aspire* to deal with all types of features in an objective manner. One giant leap towards this direction is the transfer of the features (questionnaire registries) into *a* same unit, eliminating this way a *scaling* problem.

In the present clustering attempt, the response at the questionnaire registries will be numerically translated. For each institution, membership[1] values of the given features are determined. These values are numbers between 0 and 1, indicating the presence of each feature in the institution. Generally the extreme values suggest full presence (1), or total absence (0) of the feature in the bank being evaluated.

The method presented in the next sections, may be applied to the problem of grouping *N* different entities/objects into groups, based on a predetermined set of

[1] These are 'membership' values because they will contribute to the final score.

features. In this context, it will be attempted to group[1] the Financial Institutions that participated in the survey, based on their responses to the questionnaire registries.

The Analytical Hierarchy Process (AHP) is a Multi-Criteria Decision Making/Support (MCDM) method designed to select the best from a number of alternatives evaluated with respect to several criteria. It is taken by carrying out pairwise comparison judgements which are used to develop overall priorities for ranking the alternatives.

Briefly, AHP is based on hierarchies and relative or absolute comparisons of the attributes of the alternatives. The structure of hierarchies permits the decomposition of decision-goals to criteria. This decomposition is a powerful way to help the human mind to cope with complexity and diversity. The decision factors are organized in steps and levels of importance. Further to the advantages of breaking down a decision problem into criteria and sub criteria, hierarchies may take into consideration qualitative properties and factors. Once the hierarchy of a problem is set then the decision maker is concerned with weighting alternatives and criteria. One must first establish priorities for the main criteria judging them for their relative importance and proceed with the alternatives.

The AHP is thoroughly analyzed in academic journals. More on the method can be found in the books of Saaty (Saaty, 1980).

[1] And extrude trends.

4.2 Result evaluation

4.2.1 Reciprocal matrices

The issue of banks clustering is to be approached as a Multi-Criteria Decision Making (MCDM). There will be 10 alternatives (Financial Institutions) that will be evaluated in terms of 3x8=24 criteria.

Discrete problems are commonly analyzed in the following tabular format, where m is the number of alternatives and n is the number of the evaluation criteria. It is interesting to say that in the MCDM terminology, an attribute may also be considered as criterion. If A_i is an alternative, then:

Decision Matrix		Criteria						
		C_1	C_2	C_3	…	C_j	…	C_n
	weights	w_1	w_2	w_3		w_i		w_n
Alternatives	A_1	b_{11}	b_{12}	b_{13}	…	b_{1j}	…	b_{1n}
	A_2	b_{21}	b_{22}	b_{23}	…	b_{2j}	…	b_{2n}
	A_3	b_{32}	b_{32}	B_{33}	…	b_{3j}	…	b_{3n}
	⋮					⋮		
	A_i	b_{i2}	b_{i2}	b_{i3}	…	b_{ij}	…	b_{in}
	⋮					⋮		
	A_m	b_{m2}	b_{m2}	b_{m3}	…	b_{mj}	…	b_{mn}

Table 1: The tabular format of the general MCDM problem

This tabular format implies a single hierarchy and is known as *decision matrix.* In this formulation:

let C_1, C_2, C_3, …, C_n be the decision criteria (questionnaire registries)

let A_1, A_2, A_3, …, A_m be the decision alternatives (F.I.s)

let w_i be the weight of criterion C_i (for i = 1, 2, 3, …, n)

let b_{ij} be the performance of alternative A_i when it is examined in terms of criterion C_j

The meaning of the above formulation is that an MCDM problem with a given decision matrix is an optimization problem for a set of known alternatives and for a set of known criteria. After the matrix has been formed, it is easy to perform the following calculation employing the selected weights:

$$SCORE(A_i) = \sum_{j=1}^{n} w_j b_{ij} \qquad \textbf{Equation 1}$$

To complete the *decision matrix* the b_{ij} attributes must be assigned numerical values. These however in this context, represent the response to each questionnaire registry (criterion) that may be a linguistic value, quantitative or qualitative descriptor. So there is need to fully quantify the questionnaire options to allow the application of Equation 1.

Once the priorities have been arranged, it is possible to develop matrix forms, where pair-wise comparisons may be displayed (**A**). The relative membership of one feature (A_i) over another (A_j), which is called a pair-wise comparison, may be referred to as a_{ij} with a direct reference to the position of the elements in the matrix **A**. For example a_{ij} should indicate the quotient of the importance of member i to the importance of member j. Obviously, $a_{ij} = 1/a_{ji}$ making the matrix a reciprocal one.

As an example on how the scale and pair-wise comparisons work, the quantification of one of the questionnaire registries shall be performed.

An evaluation criterion may be assigned a value from the following set of elements {Insignificant, Significant, Less important, Important, Most important}. For this set of elements the reciprocal matrix **A** would be the following:

	Insignificant	**Significant**	**Less important**	**Important**	**Most important**
Insignificant	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}
Significant	a_{21}	a_{22}	a_{23}	a_{24}	a_{25}
Less important	a_{31}	a_{32}	a_{33}	a_{34}	a_{35}
Important	a_{41}	a_{42}	a_{43}	a_{44}	a_{45}
Most important	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}

The above format eliminates the scaling problem altogether because the a_{ij} attributes, represent fractions of the absolute values of the descriptors to be quantified[1]. Assuming b_i to be the *actual* value of the element i, it is then possible to say that the entry a_{ij} in the reciprocal **A** is equal to the ratio:

$$a_{ij} = b_i / b_j \qquad \textbf{Equation (2)}$$

Value b_s is the numerical translation of element s which may be the linguistic feature. Therefore, estimation of vector **b** containing the absolute values b_i is pursued.

It can be proved that **A** has rank 1 with λ = n its non-zero eigenvalue (of course n = 5 in this example). Then it is:

$$\mathbf{Ax} = n\mathbf{x} \qquad \textbf{Equation (3)}$$

where **x** is an eigenvector.

Rewriting (3) using (2), it is:

$$\sum_{j=1}^{n} a_{ij} b_j = \sum_{j=1}^{n} b_i = n \cdot b_i \quad (i= 1,2,\ldots, n) \qquad \textbf{Equation (4)}$$

[1] The fraction of two measurements is scale-independent. e.g.(1kg/2kg=2.2lb/4.4lb=0.5)

or

$$\mathbf{Ab}=n\mathbf{b} \qquad \textbf{Equation (5)}$$

Equation (5) states that n is an eigenvalue of **A** with **b** as the corresponding eigenvector. The same equation also states that in the consistent case[1], the vector **b** with the membership values of the elements A_1, A_2, …, A_n (alternatives), is the principal right-eigenvector (after normalization) of the matrix **A**.

In the non-consistent case, (which is more common in practice) the pairwise comparisons are not perfect, that is, the entry a_{ij} may deviate from the real ratio denoted in (2). This deviation is incorporated from human misjudgement. In this case, expression $a_{ij} = a_{ik} \cdot a_{kj}$ (i,j,k=1,2,…n) does not stand for all the possible combinations.

Matrix **A** may then be considered as a perturbation of the previous consistent case. When the entries a_{ij} change slightly, then the eigenvalues change in a similar fashion [T.L. Saaty, 1980]. Moreover, the maximum eigenvalue is close to n [2] while the remaining eigenvalues are close to zero. In order to find the membership values in non-consistent cases, one should find an eigenvector that corresponds to the maximum eigenvalue λ_{max}. That is, to find the principal right eigenvector that **b** satisfies:

$$\mathbf{Ab}=\lambda_{max}\mathbf{b} \qquad \textbf{Equation (6)}$$

where $\lambda_{max} \approx n$.

One way to estimate the reciprocal right-eigenvector **b** is by multiplying the entries in each row of matrix **A** together and taking the n^{th} root. Since it is desired that the values add up to 1, the previously found vector must be normalized by the sum of the above values. An also useful way of display is when the greatest of values is assigned to be 1 by definition. It is then that the previously found vector is divided by the highest value in the resultant set.

This theory shall be applied to descriptor 'Insignificant' of the example's matrix **A**, for familiarization of the reader.

Feature 'Insignificant' may be quantified if it is replaced by its *actual* value b_1.

Value b_1 is given from the next equation:

$$b_1 = (a_{11} \cdot a_{12} \cdot a_{13} \cdot a_{14} \cdot a_{15})^{1/5}$$

[1] Where the reciprocal is consistent the following is true: $a_{ij} = a_{ik} \cdot a_{kj}$ (i,j,k=1,2,…n)

[2] Greater than n in fact

The pairwise comparisons are quantified by using the scale depicted in the following table.

Intensity of importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Weak importance of one over the other	Experience and judgment slightly favour one activity over another
5	Essential or strong importance	Experience and judgment strongly favour one activity over another
7	Demonstrated importance	An activity is strongly favoured and its dominance is demonstrated in practice
9	Absolute importance	The evidence favouring one activity over another is of the highest possible order of affirmation
2,4,6,8	Intermediate values between the two adjacent judgments	When compromise is needed

Table 2: The fundamental scale (Saaty, 1980)

A scale suggests the pairwise comparison elements to be assigned values from the listed set. Saaty has presented the fundamental scale (see Table 2). Other researchers have presented other scales as well, but the one of Saaty is widely used in AHP applications. The fundamental scale permits pair-wise comparisons.

Therefore matrix **A** can be:

	Insignificant	**Significant**	**Less important**	**Important**	**Most important**
Insignificant	1	1/3	1/5	1/7	1/9
Significant	3	1	1/3	1/5	1/7
Less important	5	3	1	1/3	1/5
Important	7	5	3	1	1/3
Most important	9	7	5	3	1

Of course the above arrangement assigns a greater value to descriptor 'most important' compared to the others. And explicitly suggests 'Most important' to be assigned a relative weight that is 9 times larger than that of descriptor 'Insignificant'. Had the above numerical expressions be reversely arranged, descriptor 'Insignificant' would be assigned the greatest relative weight.

- Any element i of those listed in **A** has equal weight compared to itself.
- Any element i of those listed in **A**, compared to another element j has a relative weight a_{ij} times the equivalent weight of element j.

Replacing the values of data a_{ij} of the example, it is:

$$b_1 = (1 \cdot 1/3 \cdot 1/5 \cdot 1/7 \cdot 1/9)^{1/5} = 0.254$$

The whole concept becomes more complicated if one is to question the a_{ij} values assignment, in terms of consistency. Indeed, the pairwise comparison approach accepts that humans produce subjective judgments of matters and therefore are not 100% credible. The following section measures this matter as well, introducing a new quantity, the Consistency Ratio.

4.2.2 Analytic hierarchy process

It will now be discussed how to draw conclusions, by mathematically manipulating the entirety of the quantified features using Analytic Hierarchy Process (AHP). Originally the AHP method was created by Thomas L.Saaty and is described in Saaty, T.L. (1980, 1986).

As an output display, this process demonstrates *the decision matrix*, an NxM matrix where M is the number of the alternatives being evaluated, and N the number of features that take part into the final score.[1] The matrix construction and the subsequent manipulation, is likewise to the feature quantification method displayed in the previous section.

The matrix is constructed using the relative importance of the alternatives in terms of each criterion. The vector $\{b_{i1}, b_{i2}, \ldots, b_{iM}\}$ describes the impact of the i^{th} criterion on each of M alternatives. This vector is the principal eigenvector of an MxM reciprocal matrix, which is determined by pair-wise comparisons of the M alternatives with regards to each criterion: N such matrices are constructed.

The entry b_{ij}, in the NxM matrix, represents the relative value of the alternative A_i when it is considered in terms of criterion j.

Not all of the features claim equal importance to the conclusive score though. Thus, the definition of what is called 'a relative weight' is imperative. The importance of each of the features evaluated may only become apparent through a pair-wise comparisons procedure. In a case comprising N features, N(N-1)/2 comparisons are required to yield one more NxN reciprocal matrix.

One more thing that must be noted is that the consistency of the judgments is not obvious and has to be examined. The entries in the MxN matrix are based fully on human judgments over a large scale of matters. Therefore, it is possible to track inconsistencies. This method allows for some level of inconsistency in judgements (that is unavoidable in practice) and provides some measures for limiting that.

Textbooks refer that a measure of the consistency of the entries is the Consistency Ratio (CR). To obtain the CR, first the max eigenvalue λ_{max} is calculated. Then it is possible to estimate the ratio

$$CI = \frac{\lambda_{\max} - n}{n - 1} \qquad \textbf{Equation (7)}$$

[1] Moreover, questionnaire registries that play the part of the features discussed earlier, are distinguished by three major concepts that may possibly define a credit policy and have been presented in section 3.1.1

Then the CI is divided by the Random Consistency index (RC) as given in the following table:

n	1	2	3	4	5	6	7	8	9
Random Consistency Index (RC)	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45

Each RC is the average random consistency index derived from a sample of 500 randomly generated reciprocal matrices with entries from the set: {1/9, 1/8, …,1, 2, …, 8, 9}. If the previous approach yields a CR greater than 0.10 then a re-examination of the pair-wise judgements is recommended until a CR less than or equal to 0.10 is achieved.

Once the MxN matrix is complete the results are N points in an M-dimensional Euclidian space where each feature is a different dimension. But there is a some-what simpler approach, that is, to assign each part its aggregate value v_i. This is the weight associated with each feature multiplied by the membership value of the corresponding feature:

$$v_i = \sum_{j=1}^{M} w_j a_{ij} \qquad \textbf{Equation (8)}$$

It is then possible to apply the 'average distance between groups', derive a dendogram or display the results in any graphic fashion.

4.3 Interpreting the questionnaire

4.3.1 Weights selection

For most mathematical models, the picking of weights set, depends on the judgment of the examiner that operates it. There is no correct judgment as a modeler's conception of matters is subjective. However in this context, any weights set, must comply with the AHP theory to be regarded as credible. For the needs of this textbook two sets of weights have been presented.

- **The neutral set.**

It is mathematically expressed simply: $w_{ij} = w_{ik}$, $\sum_{j=1}^{8} w_{ij} = 1, \;\; i, j, k = 1,2,...,8$

In other words, all $\boldsymbol{w_{ij}}$ factors are set to 1/8=0.125. There is no need to evaluate the consistency of this set, as it is neutral.

- **The biased set.**

It is a set of weights that attempts to amplify the survey's results, to help produce trends. It is being built upon pair-wise comparisons in the same manner that has been used to express the questionnaire registries numerically. These comparisons tables are illustrated and discussed subsequently.

Assurance	PORTFOLIO PORTION DEDICATED	CHARACTER	CAPACITY	CAPITAL	COLLATERAL	CONDITIONS	FINANCING EXTENT	MAX LOAN PERIOD
PORTFOLIO PORTION DEDICATED	1	5	5	5	5	5	7	7
CHARACTER	1/5	1	2	2	2	2	5	5
CAPACITY	1/5	1/2	1	1	1	1	3	3
CAPITAL	1/5	1/2	1	1	1	1	3	3
COLLATERAL	1/5	1/2	1	1	1	1	3	3
CONDITIONS	1/5	1/2	1	1	1	1	3	3
FINANCING EXTENT	1/7	1/5	1/3	1/3	1/3	1/3	1	5
MAX LOAN PERIOD	1/7	1/5	1/3	1/3	1/3	1/3	1/5	1

Marketing

	SYNDICATED LOANS	CONVERTIBLE LOAN	FINANCING EXTENT	MEZZANINE FINANCE	LEASING INTEREST	LOAN REFINANCE	MAX LOAN PERIOD	COMPETITION INFLUENCE
SYNDICATED LOANS	1	3	1	1	1	5	1	1/3
CONVERTIBLE LOAN	1/3	1	1/3	1/3	1/3	1 2/3	1/3	1/9
FINANCING EXTENT	1	3	1	1	1	5	1	1/3
MEZZANINE FINANCE	1	3	1	1	1	5	1	1/3
LEASING INTEREST	1	3	1	1	1	5	1	1/3
LOAN REFINANCE	1/5	3/5	1/5	1/5	1/5	1	1/5	1/15
MAX LOAN PERIOD	1	3	1	1	1	5	1	1/3
COMPETITION INFLUENCE	3	9	3	3	3	15	3	1

Quality

	FLAG DISTRIBUTION IN PORTFOLIO	RATING AGENCIES PARTICIPATION	FLAG	YARD (pre-delivery)	YARD (on delivery)	ISO STANDARDS COMPLIANCE	FINANCING IN NOT TRADITIONAL SHIPBUILDING COUNTRIES (pre-delivery)	FINANCING IN NOT TRADITIONAL SHIPBUILDING COUNTRIES (on-delivery)
FLAG DISTRIBUTION IN PORTFOLIO	1	1	1/3	1/5	1/5	1/5	1/5	1/5
RATING AGENCIES PARTICIPATION	1	1	1/3	1/5	1/5	1/5	1/5	1/5
FLAG	3	3	1	3/5	3/5	3/5	3/5	3/5
YARD (pre-delivery)	5	5	1 2/3	1	1	1	1	1
YARD (on deliv-ery)	5	5	1 2/3	1	1	1	1	1
ISO STANDARDS COMPLIANCE	5	5	1 2/3	1	1	1	1	1
FINANCING IN NOT TRADITIONAL SHIPBUILDING COUNTRIES (pre-delivery)	5	5	1 2/3	1	1	1	1	1
FINANCING IN NOT TRADITIONAL SHIPBUILDING COUNTRIES (on-delivery)	5	5	1 2/3	1	1	1	1	1

1. Assurance criteria.

The corresponding matrix first of all, proposes the following ranking:

PORTFOLIO PORTION DEDICATED	CHARACTER	CAPACITY	CAPITAL	COLLATERAL	CONDITIONS	FINANCING EXTENT	MAX LOAN PERIOD
1	2	2	2	2	2	3	3

Note: In the case of equal values, the corresponding criteria obtain the same priority number, while the following criterion is assigned the priority position it would obtain, had the previous criteria performed different values.

The above ranking is interpreted in the following manner: Investigating the correlation with the pole Assurance, criterion 'Portion of Portfolio dedicated in Shipping' is dominant over the rest. In succession, the -famous- five C's of Credit, are of greater importance compared to criteria 'Financing Extent' and 'Maximum Loan Period' that share equal importance.

The eigenvalues of the proposed matrix are λ_1=8.4479, λ_2=0 thus the credibility index can be calculated employing Equation (7) in the following manner:

$$CI = \frac{\lambda_1 - n}{n-1} \Rightarrow CI = \frac{8.4479 - 8}{8-1} = 0.0639$$

Dividing the CI with the Random Consistency index for an 8x8 matrix which is 1.41, one can calculate the Credibility Ratio (CR) for this set of weights, to be 0.4538 or 4.5%. According to the Analytic Hierarchy Process, a set of pair-wise comparisons may be taken into account if it provides CR that is below 10%.

Next, the vector with the membership values of each criterion is calculated multiplying the entries in each row and taking the 8th root of the product:

4,448	1,729	0,987	0,987	0,987	0,987	0,453	0,303

Finally the weight-set accrues, once the above vector is normalized to add-up to 1.

PORTFOLIO PORTION DEDICATED	CHARACTER	CAPACITY	CAPITAL	COLLATERAL	CONDITIONS	FINANCING EXTENT	MAX LOAN PERIOD
0,40878	0,15894	0,09070	0,09070	0,09070	0,09070	0,04160	0,02782
Weight set for Security criteria							

2. Marketing criteria.

The ranking proposed here is:

SYNDICATED LOANS	CONVERTIBLE LOAN	FINANCING EXTENT	MEZZANINE FINANCE	LEASING INTEREST	LOAN REFINANCE	MAX LOAN PERIOD	COMPETITION INFLUENCE
2	3	2	2	2	4	2	1

This ranking describes criterion 'Competition Influence' as number one proxy of inclination towards pole Marketing. Of equal importance are those criteria that measure the actions that actually make a bank competitive and finally, of lesser correlation to the same pole, are criteria 'Convertible Loans' and 'Loan Refinance'.

The eigenvalues of the proposed matrix are $\lambda_1=8$, $\lambda_2=0$ thus the credibility index equals zero.

Applying the theory in the same manner as with Security criteria, it is:

SYNDICATED LOANS	CONVERTIBLE LOAN	FINANCING EXTENT	MEZZANINE FINANCE	LEASING INTEREST	LOAN REFINANCE	MAX LOAN PERIOD	COMPETITION INFLUENCE
0,11722	0,03907	0,11722	0,11707	0,11707	0,02344	0,11722	0,35166
Weight set for Marketing criteria							

3. Quality criteria.

Last are the criteria pertinent to pole Quality. The proposed ranking is given here:

FLAG DISTRIBUTION IN PORTFOLIO	RATING AGENCIES PARTICIPATION	FLAG	YARD (pre-delivery)	YARD (on delivery)	ISO STANDARDS COMPLIANCE	FINANCING IN NOT TRADITIONAL SHIPBUILDING COUNTRIES (pre-delivery)	FINANCING IN NOT TRADITIONAL SHIPBUILDING COUNTRIES (on-delivery)
3	3	2	1	1	1	1	1

There is no dominant criterion here. The major proxy criteria most correlated to the pole of Quality are 'Financing in not Traditionally Shipbuilding countries', ISO Standards Compliance' and 'Yard'. Of lesser importance to a judgment on Quality are criteria 'Rating agencies participation' and 'Flag distribution'.

From the above matrices, featuring criteria pairwise comparisons, a set of weights is extracted according to the procedure described in 4.4.

The eigenvalues of the proposed matrix are $\lambda_1=8$, $\lambda_2=0$ thus the credibility index equals zero.

Applying the theory in the same manner as with Security criteria, it is:

FLAG DISTRIBUTION IN PORTFOLIO	RATING AGENCIES PARTICIPATION	FLAG	YARD (pre-delivery)	YARD (on delivery)	ISO STANDARDS COMPLIANCE	FINANCING IN NOT TRADITIONAL SHIPBUILDING COUNTRIES (pre-delivery)	FINANCING IN NOT TRADITIONAL SHIPBUILDING COUNTRIES (on-delivery)
0,03333	0,03333	0,10000	0,16666	0,16666	0,16666	0,16666	0,16666
Weight set for Quality criteria							

Investigating weight-sensitivity

Each registry contributes to the final aggregate SCORE by a portion, according to the weight factors selected by the examiner. But it would be interesting to trace the impact that would have to the final SCORE, the changing of the weights attributed to each criterion. That is, which are the most *sensitive* criteria in this field?

First, the SCORE is calculated in the following manner which is a perturbation of Equation 1:

$$SCORE = \sum_{i=1}^{3} W_i \sum_{j=1}^{8} w_{ij} V_{ij} \qquad \textbf{Equation (9)}$$

Where i, stands for the three poles of the classification and j for each of 8 criteria for each pole. The symbol (***W***) is the weight that determines how much the three pole-scores will contribute to the SCORE for each institution and is normally set to 1/3 as there is no reason to amplify the impact of one against the others. However, there's need to bias the set of weights (***w***) that affect the contribution of each criteria to each pole-score as those criteria do not reflect the bank's exposure to the three poles with the same tension.

It is now assumed that the weight $\boldsymbol{w}_{11}$ which is the weight of the 1st criterion of the pole ASSURANCE is altered by a quantity of ***δw*** then the rest weights of the same pole shall be lessened by a quantity of ***δw/7*** because they must add-up to 1. This would have the following effect:

$$\overline{SCORE} = W_1\left[\underline{(w_{11}+\delta w)V_{11} + \left(w_{12} - \frac{\delta w}{7}\right)V_{12} + \ldots + \left(w_{18} - \frac{\delta w}{7}\right)V_{18}}\right] + \sum_{i=2}^{3} W_i \sum_{j=1}^{8} w_{ij} V_{ij} \qquad \textbf{Equation (10)}$$

$$w_{11}V_{11} + \delta w V_{11} + w_{12}V_{12} - \frac{\delta w}{7}V_{12} + \ldots + w_{18}V_{18} - \frac{\delta w}{7}V_{18} = \sum_{j=1}^{8} w_{1j}V_{1j} + \delta w V_{11} - \left(V_{12} + \ldots + V_{18}\right)\frac{\delta w}{7} \qquad \textbf{Equation (11)}$$

Importing Equation (11) into Equation (10), there is:

$$\overline{SCORE} = W_1\left[\sum_{j=1}^{8} w_{1j}V_{1j} + \delta w V_{11} - \left(V_{12} + \ldots + V_{18}\right)\frac{\delta w}{7}\right] + \sum_{i=2}^{3} W_i \sum_{j=1}^{8} w_{ij} V_{ij}$$

$$\overline{SCORE} = W_1 \sum_{j=1}^{8} w_{1j} V_{1j} + W_1 \left[\delta w V_{11} - \left(V_{12} + \ldots + V_{18} \right) \frac{\delta w}{7} \right] + \sum_{i=2}^{3} W_i \sum_{j=1}^{8} w_{ij} V_{ij}$$

$$\overline{SCORE} = \left[W_1 \sum_{j=1}^{8} w_{1j} V_{1j} + \sum_{i=2}^{3} W_i \sum_{j=1}^{8} w_{ij} V_{ij} \right] + W_1 \left[\delta w V_{11} - \left(V_{12} + \ldots + V_{18} \right) \frac{\delta w}{7} \right]$$

$$\overline{SCORE} = \sum_{i=1}^{3} W_i \sum_{j=1}^{8} w_{ij} V_{ij} + W_1 \left[\delta w V_{11} - \left(V_{12} + \ldots + V_{18} \right) \frac{\delta w}{7} \right]$$

$$\overset{(9)}{\Rightarrow} \quad \overline{SCORE} = SCORE + W_1 \left[\delta w V_{11} - \left(V_{12} + \ldots + V_{18} \right) \frac{\delta w}{7} \right]$$

and thereby, a change of ***δw*** to weight ***w_{11}*** will have an effect of δSCORE to the aggregate, where:

$$\delta SCORE = W_1 \left[\delta w V_{11} - \left(V_{12} + \ldots + V_{18} \right) \frac{\delta w}{7} \right] = W_1 \underbrace{\left[V_{11} - \frac{1}{7} \left(V_{12} + V_{13} + \ldots + V_{18} \right) \right]}_{(\boldsymbol{F})} \delta w$$

The latter equation indicates that once the quantity ***δw*** and ***W_1*** representing the pole weights have been decided, it is only the values of the questionnaire registries ***V_{ij}*** involved in factor (***F***), that are responsible for the total effect δSCORE, introduced by the changing of a criterion's weight.

The value of the above calculation for each of the 3x8 combinations, for all banks can be a measure of weight sensitivity because for the same initial ***δw***, the effect to the SCORE is related to the value of factor (***F***).

Example:

This is the table of registries regarding pole ASSURANCE, for BANK 1:

	PORTFOLIO PORTION DEDICATED	CHARACTER	CAPACITY	CAPITAL	COLLATERAL	CONDITIONS	FINANCING EXTENT	MAX LOAN PERIOD
BANK 1	0-5%	Most important	important	important	significant	important	75%	9-12 yrs

Which is firstly, interpreted to the following numerical values $\boldsymbol{V_{11}}$-$\boldsymbol{V_{18}}$:

1,000	1,000	0,517	0,517	0,254	0,517	0,167	0,386

Calculating factor (***F***), supposing a change of $\boldsymbol{\delta w}$ for each of the eight $\boldsymbol{V_{1j}}$ values, it is:

$$\boldsymbol{F_{11}} = \boldsymbol{V_{11}} - 1/7(\boldsymbol{V_{12}}+\boldsymbol{V_{13}}+\boldsymbol{V_{14}}+\boldsymbol{V_{15}}+\boldsymbol{V_{16}}+\boldsymbol{V_{17}}+\boldsymbol{V_{18}})$$

$$= \mathbf{1.000} - 1/7(\mathbf{1.000}+\mathbf{0.517}+\mathbf{0.517}+\mathbf{0.254}+\mathbf{0.517}+\mathbf{0.167}+\mathbf{0.386})$$

$$=\mathbf{0.52}$$

The rest of the ***F*** factors for the 8 criteria are calculated in the same manner.

(***F***) values								
	0,52	0,52	-0,03	-0,03	-0,33	-0,03	-0,43	-0,18

Finally, the absolute values for (***F***) are ranked, keeping in mind that each column is pertinent to the criteria. Therefore, the ranking extracted from BANK 1 set of registries, is as follows:

	PORTFOLIO PORTION DEDICATED	CHARACTER	CAPACITY	CAPITAL	COLLATERAL	CONDITIONS	FINANCING EXTENT	MAX LOAN PERIOD
BANK 1	1	1	6	6	4	6	3	5

Note: In the case of equal values, the corresponding criteria obtain the same priority number, while the following criterion is assigned the priority position it would obtain, had the previous criteria performed different values.

The final step is the calculation of the factor (***F***) and ranking of the absolute values from the matrix containing the mean values of ALL banks' registries. The latter row has been derived from the mean value of the numerical expressions of ALL the respondent banks and is displayed here:

Mean values of ALL bank registries for pole ASSURANCE	0,78	1,00	0,71	0,42	0,47	0,46	0,16	0,42

Using the upper row as V_{ij}, the absolute values of factor (***F***) can be calculated:

(***F***) values:	0,26	0,51	0,18	0,15	0,09	0,10	0,45	0,42

From which the overall rank is extracted:

	PORTFOLIO PORTION DEDICATED	CHARACTER	CAPACITY	CAPITAL	COLLATERAL	CONDITIONS	FINANCING EXTENT	MAX LOAN PERIOD
MEAN VALUE OF BANK REGISTRIES	3	1	4	6	8	7	2	5

The above ranking is interpreted in the following manner:

A change of ***δw*** *in the weight of criterion 'Character' will have a greater effect to the overall score than the equal change* ***δw*** *imposed on the criterion 'Collateral'*

Below is the ranking for the weight sensitivity for the criteria of the next two poles:

	SYNDICATED LOANS	CONVERTIBLE LOAN	FINANCING EXTENT	MEZZANINE FINANCE	LEASING INTEREST	LOAN REFINANCE	MAX LOAN PERIOD	COMPETITION INFLUENCE
MEAN VALUE OF BANK REGISTRIES	2	3	1	5	4	7	6	8

	FLAG DISTRIBUTION IN PORTFOLIO	RATING AGENCIES PARTICIPATION	FLAG	YARD (pre-delivery)	YARD (on delivery)	ISO STANDARDS COMPLIANCE	FINANCING IN NOT TRADITIONALLY SHIPBUILDING COUNTRIES (pre-delivery)	FINANCING IN NOT TRADITIONALLY SHIPBUILDING COUNTRIES (on-delivery)
MEAN VALUE OF BANK REGISTRIES	8	2	5	7	4	6	1	3

4.3.2 Results

Colored results (biased set of weights)

First, the calculations are presented using the biased set of weights. The vector containing the numerical interpretations of the questionnaire registries is multiplied with the set of weights to achieve **Level 2** type of data[1]. These steps are shown here for BANK 1 as an example:

Assurance registries from BANK 1:

1,00	1,00	0,52	0,52	0,25	0,52	0,17	0,39

Assurance weights:

0,408	0,158	0,090	0,090	0,090	0,090	0,041	0,027

- **Assurance** score for BANK 1: 0.75

Marketing registries from BANK 1:

0,25	0,12	0,83	0,52	0,06	0,12	0,61	0,52

Marketing weights:

0,117	0,039	0,117	0,117	0,117	0,023	0,117	0,351

- **Marketing** score for BANK 1: 0.46

Quality registries from BANK 1:

0,34	0,12	0,52	0,52	0,25	0,25	1,00	0,52

Quality weights:

0,033	0,033	0,100	0,166	0,166	0,166	0,166	0,166

- **Quality** score for BANK 1: 0.49

Level 2 score for BANK 1 is the following triplet:

	Assurance	Marketing	Quality
BANK 1	0,75	0,46	0,49

[1] **Level 2** data comprises a score pertinent to each pole. That is, three numbers for each Institution.

The above can be brought to the **Level 1** value which, in this context is the mean value:

- **SCORE**(BANK 1) = 1/3*0.75+1/3*0.46+1/3*0.49 = 0.56

Completing the previous calculations for all participating banks, one may fill the next table:

	Assurance	Marketing	Quality	SCORE
BANK 1	0,75	0,46	0,49	0,56
BANK 2	0,53	0,62	0,44	0,53
BANK 3	0,69	0,46	0,25	0,46
BANK 4	0,56	0,43	0,46	0,48
BANK 5	0,86	0,55	0,49	0,63
BANK 6	0,44	0,59	0,16	0,39
BANK 7	0,67	0,51	0,36	0,51
BANK 8	0,76	0,42	0,40	0,52
BANK 9	0,80	0,32	0,29	0,47
MEAN VALUE	**0,67**	**0,48**	**0,37**	**0,51**

It is clear from the following graphic illustrations of these scores, the explicit inclination towards the pole **Assurance**. These results may be interpreted in the following manner:

Banks in their shipping operations are primarily interested to secure their portfolio. In fact their effort stands for twice their effort towards quality matters. Attempting to claim a wider market share is of lesser importance to them.

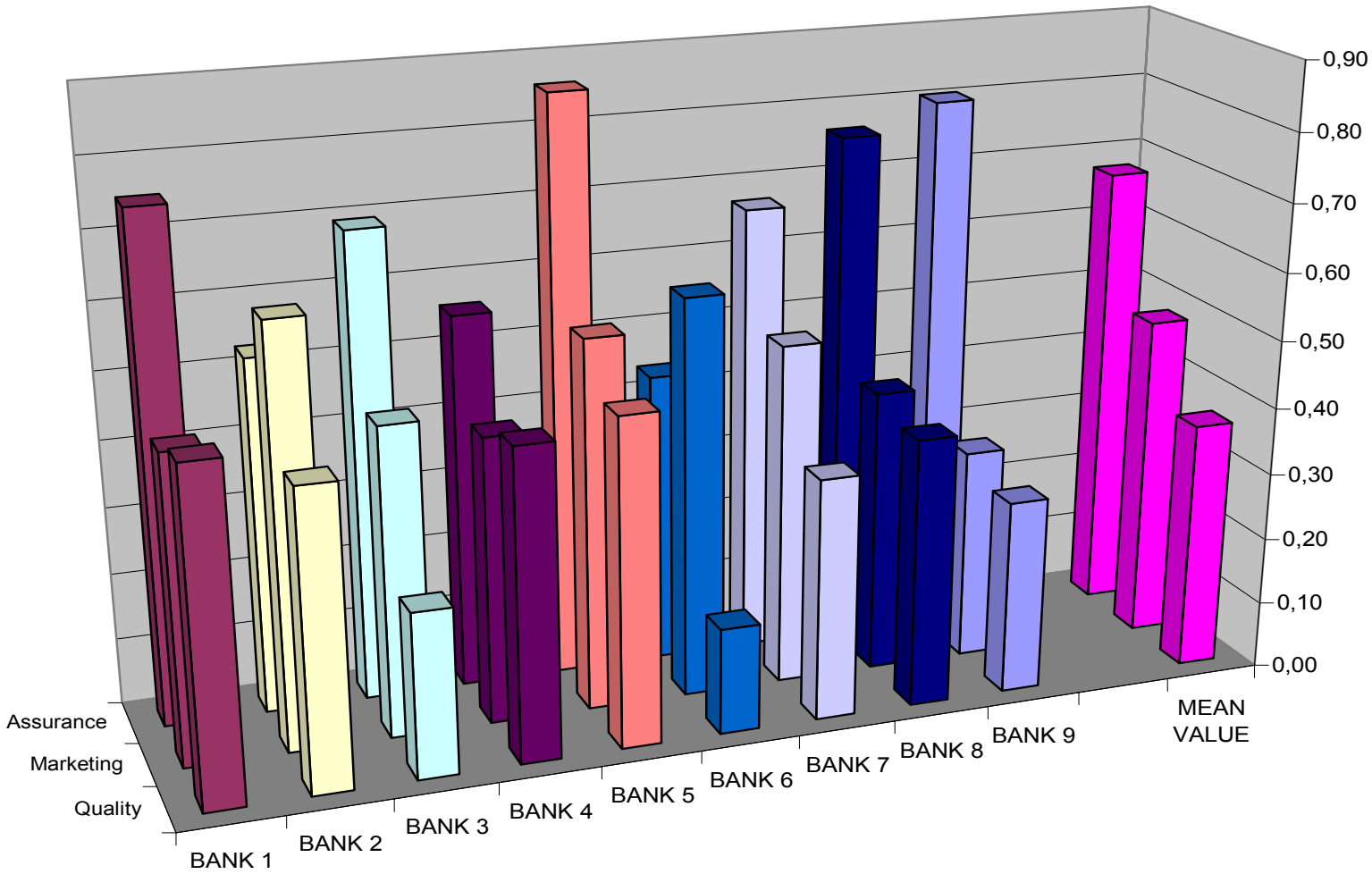


Chart 1: Level 2 Bank Scores with biased weights.

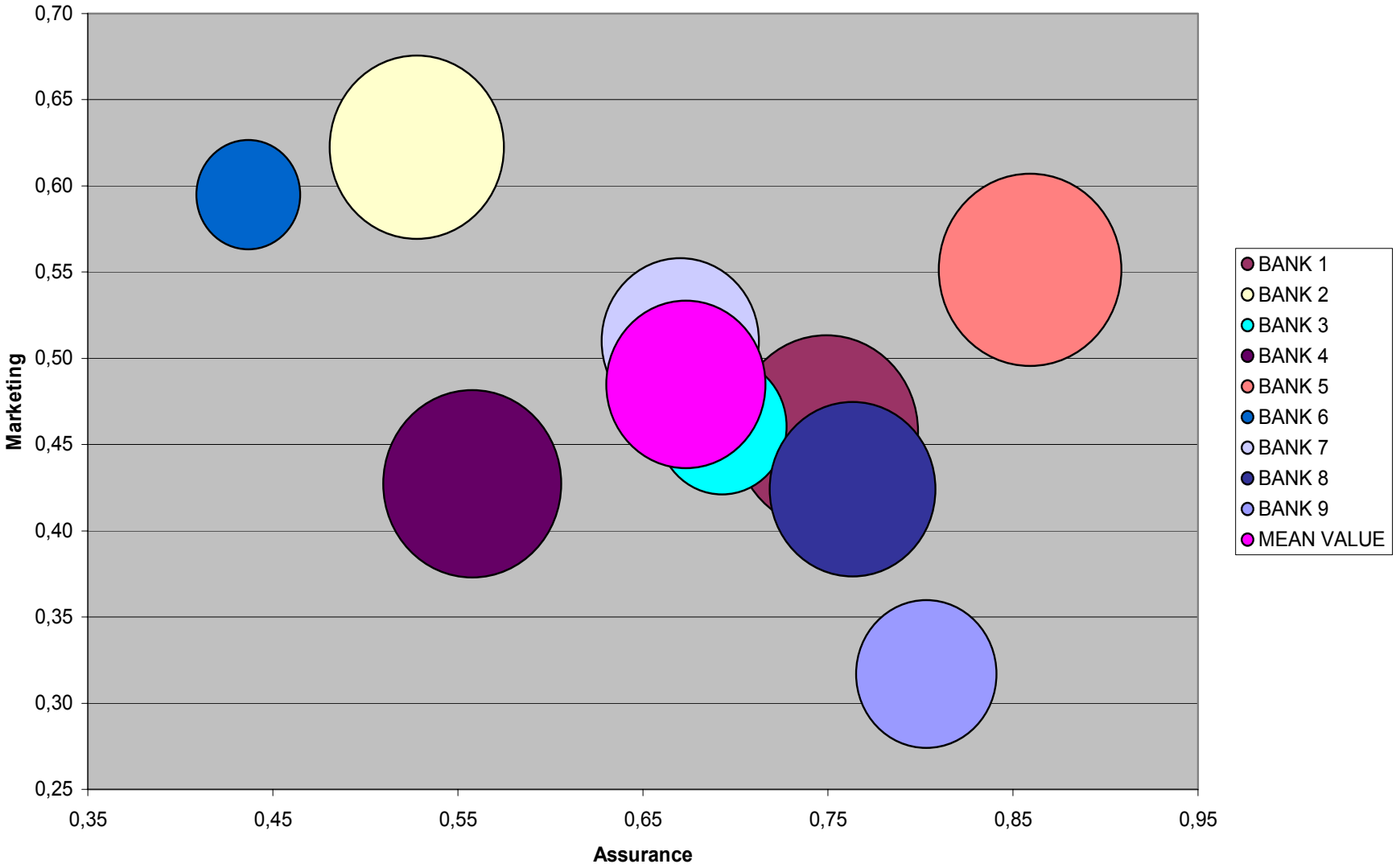


Chart 2: Banks clustering with biased weights.

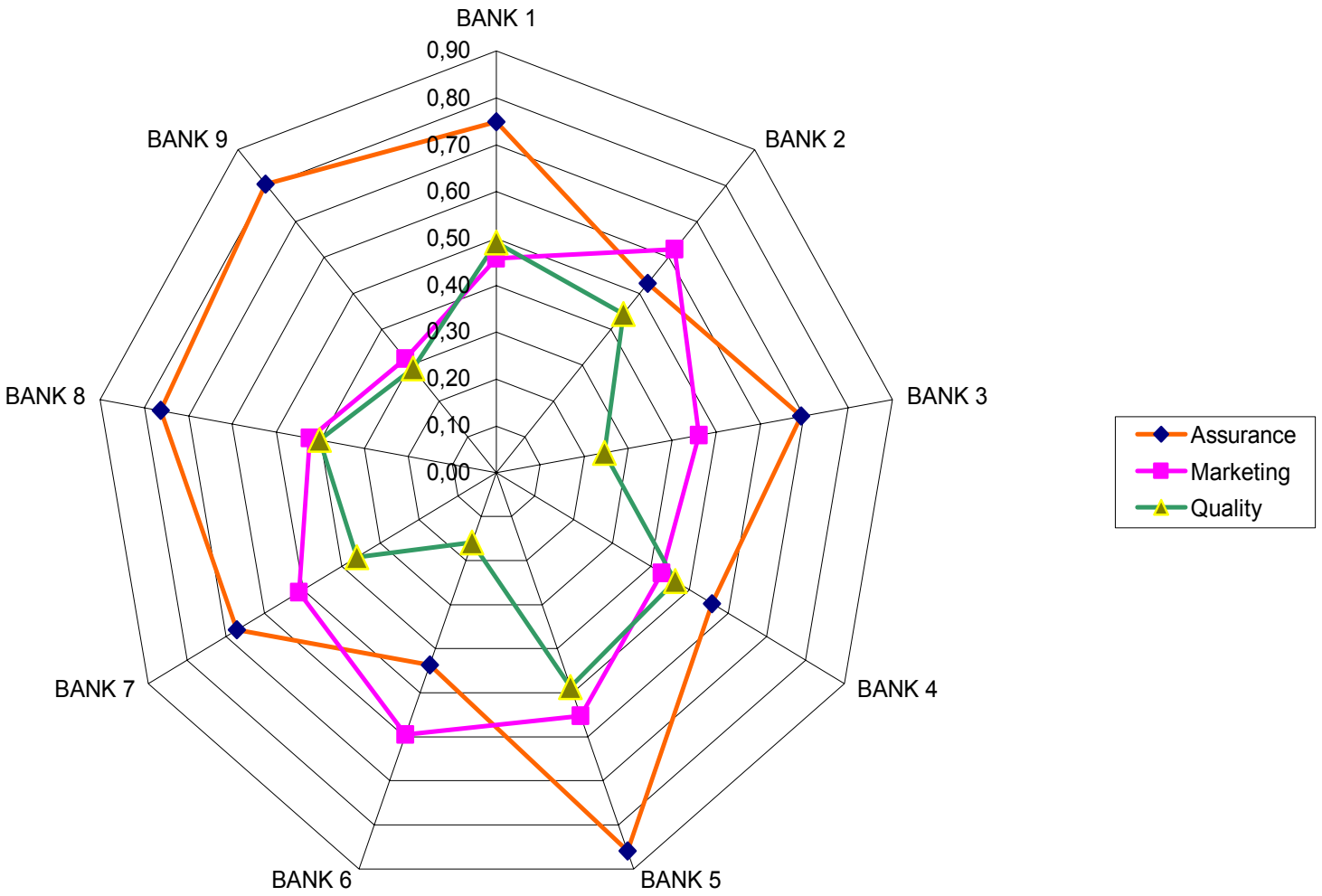


Chart 3: Radar diagram with biased weights.

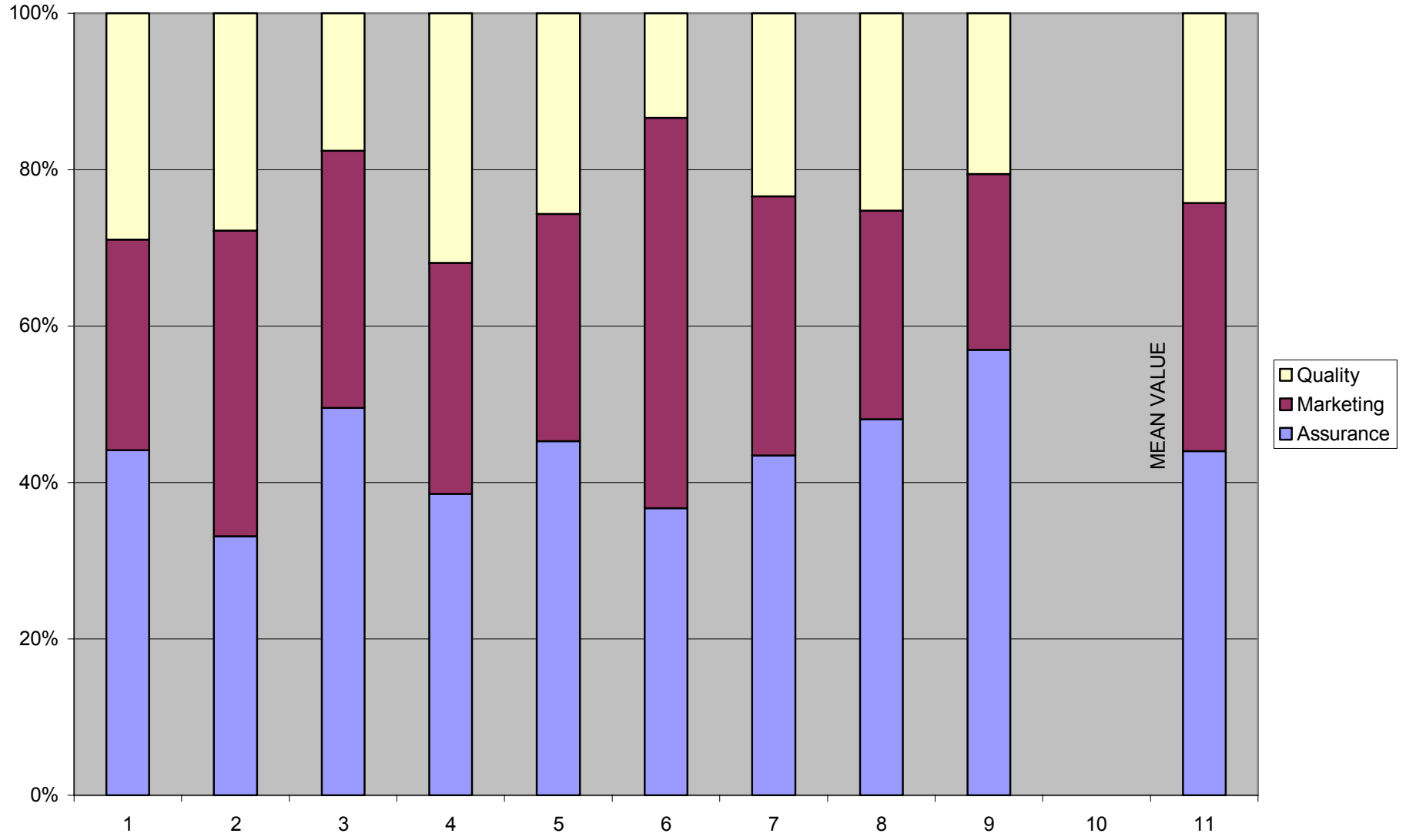


Chart 4: Credit policy percentages with biased weights.

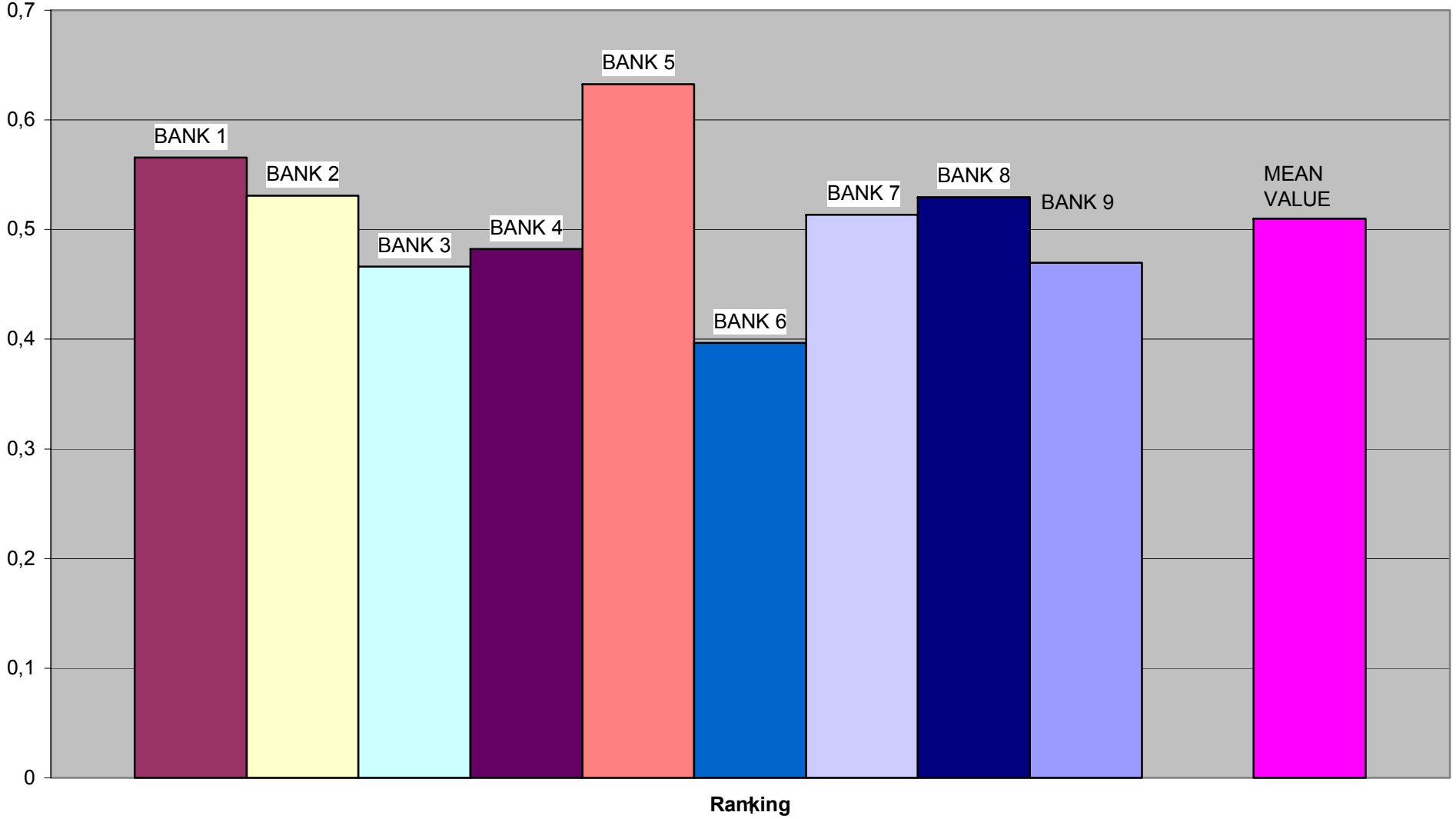


Chart 5: Ranking with biased weights.

Grayscale results (neutral set of weights)

Completing the exact same computations with the neutral set of weights, that is w_{ij}= 0.125 for all criteria, one gets the following table for **Level 2** type of data.

	Assurance	Spreading	Quality	SCORE
BANK 1	0,54	0,38	0,44	0,45
BANK 2	0,45	0,63	0,36	0,47
BANK 3	0,57	0,42	0,22	0,40
BANK 4	0,51	0,38	0,38	0,42
BANK 5	0,69	0,48	0,49	0,55
BANK 6	0,42	0,56	0,23	0,40
BANK 7	0,43	0,43	0,29	0,38
BANK 8	0,68	0,34	0,33	0,44
BANK 9	0,65	0,36	0,25	0,42
MEAN VALUE	**0,55**	**0,44**	**0,33**	**0,44**

Still, the results give an obvious precedence to Security matters relatively to the other two poles of the research. The diagrams bear however, substantial differences.

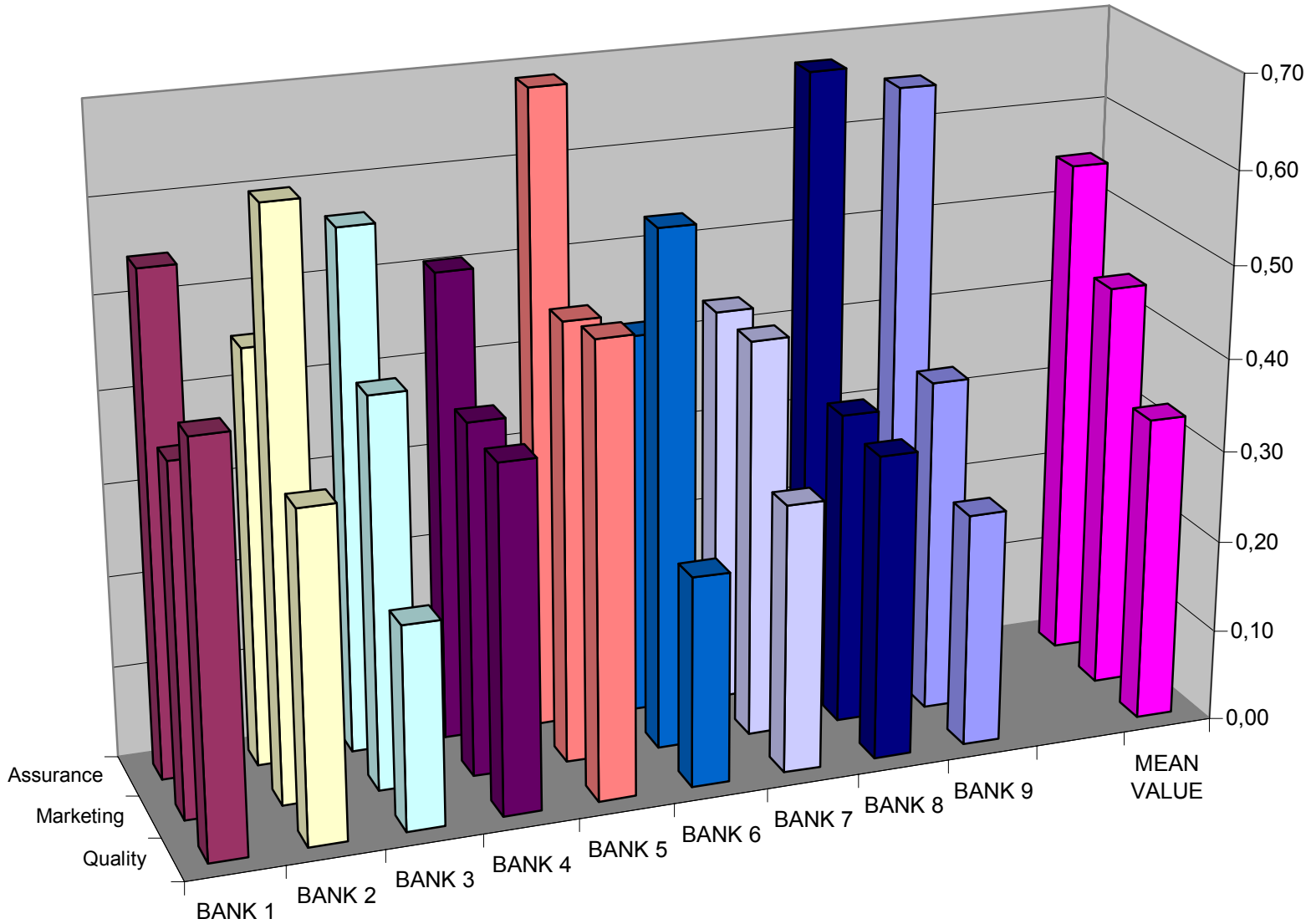


Chart 6: Bank scores with unbiased weights.

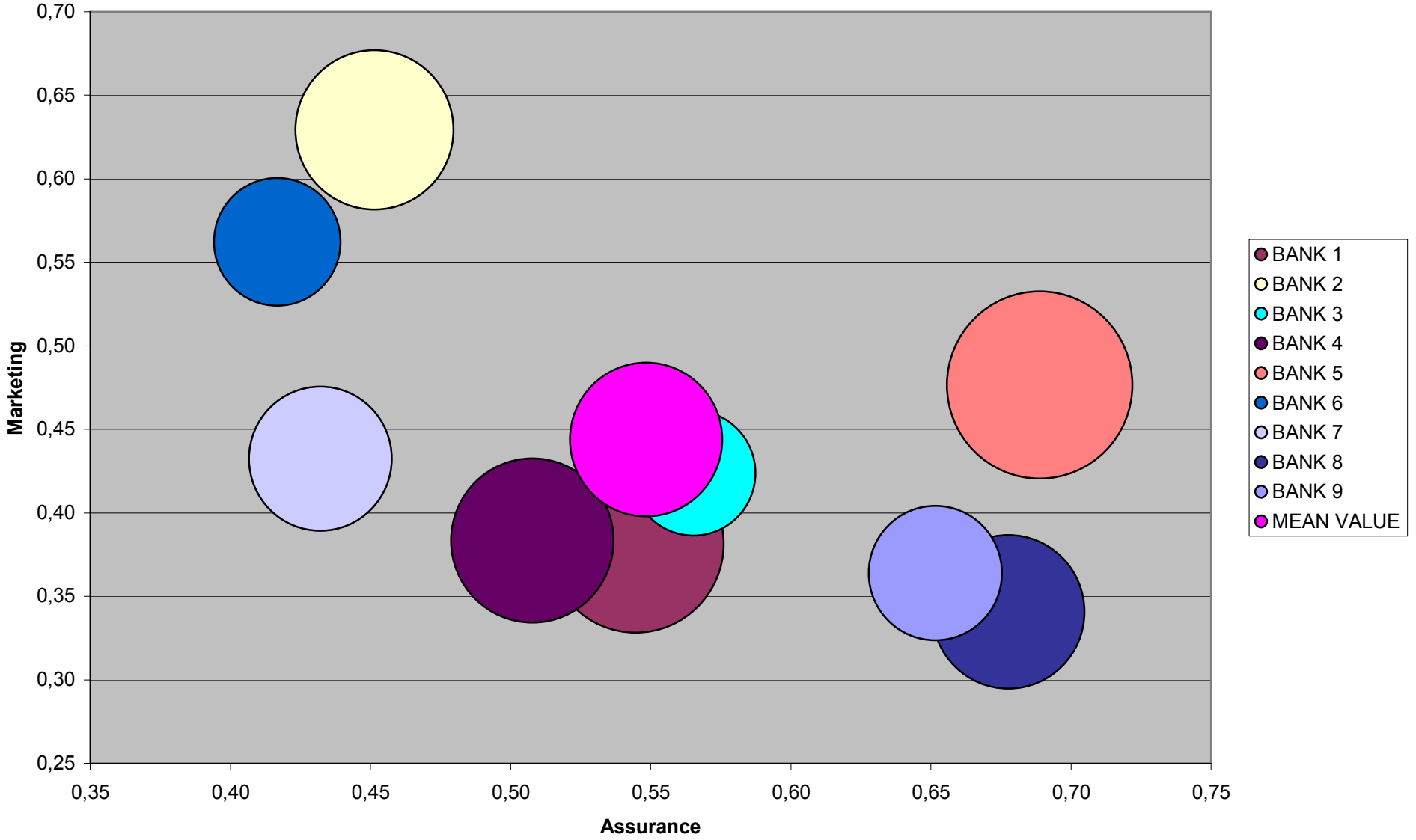


Chart 7: Banks clustering with unbiased weights.

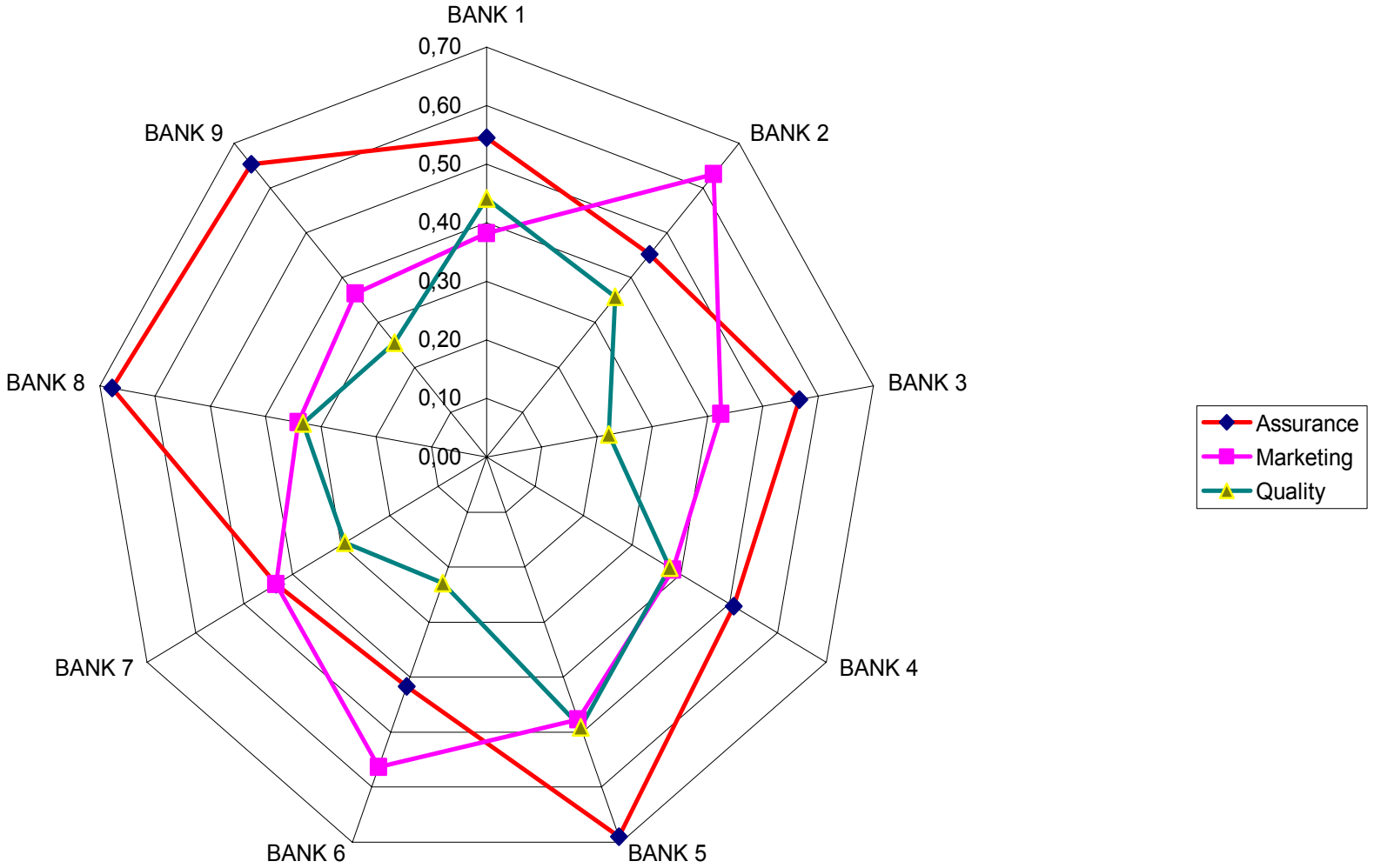


Chart 8: Radar diagram unbiased weights.

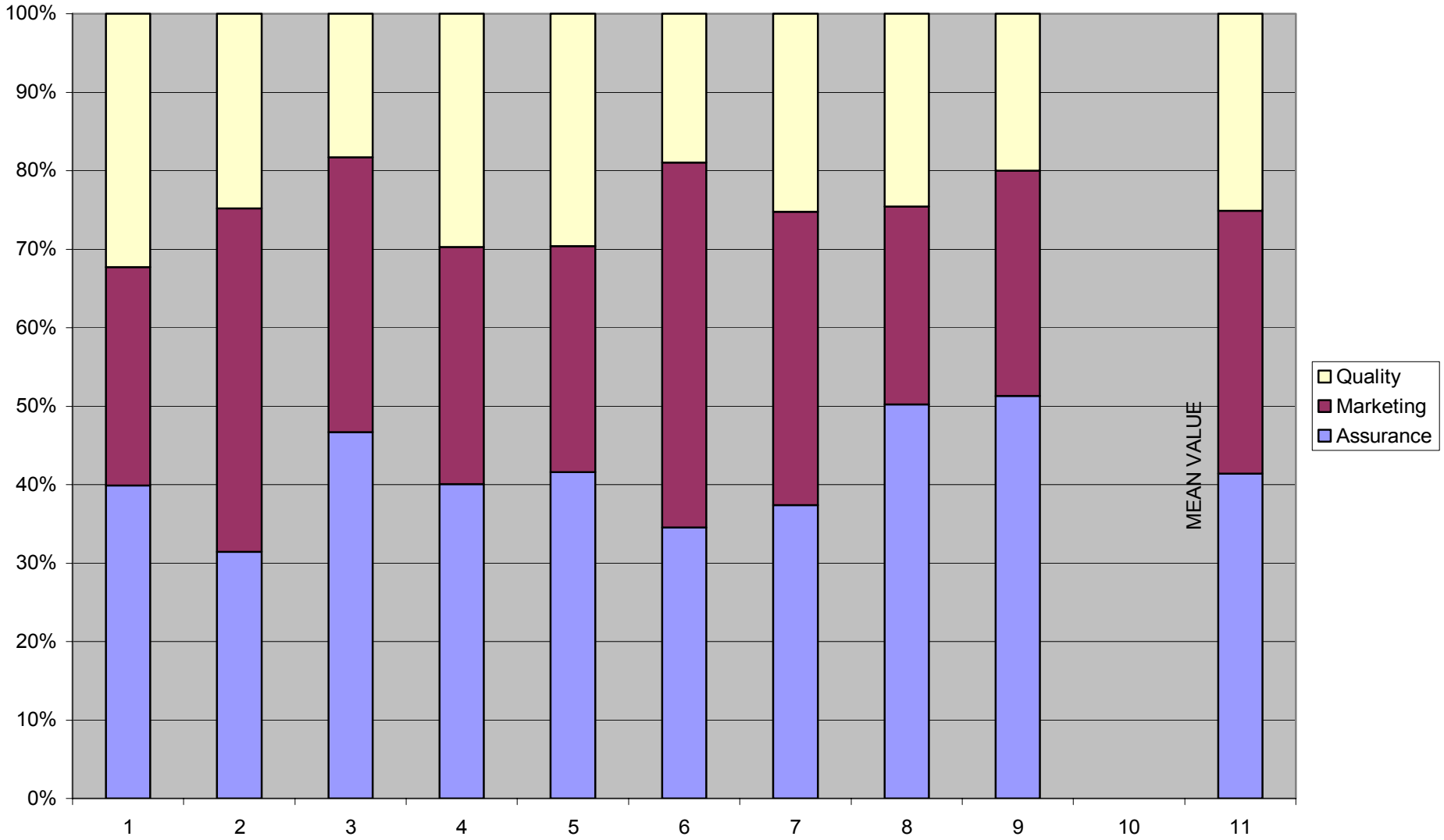


Chart 9: Credit policy percentages with unbiased weights.

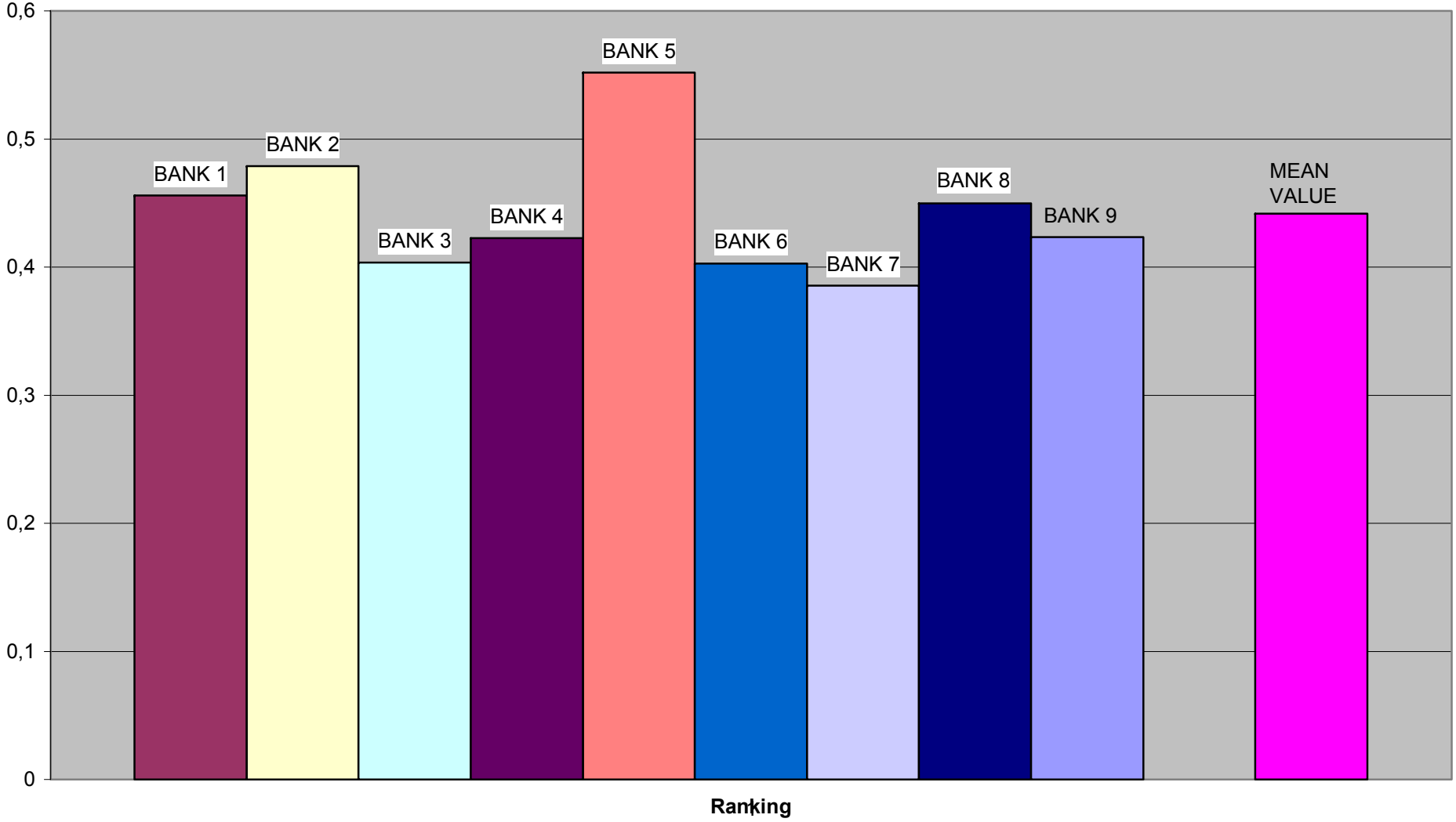


Chart 10: Ranking with unbiased weights.

4.4 Conclusion

4.4.1 Conclusions

Charts 1 and **6**, display the explicit performances of the participating banks. Three trends may be extruded from this graphic illustration.

- The first category comprises banks whose credit policies emphasize first on Assurance matters then on those regarding Spreading and last on Quality matters. This trend is the most common and this fact is reflected in the hierarchy of the Mean Value.
- The second trend is formed by those banks that put Quality matters above Spreading issues while keeping Assurance over the top. These banks are numbered #1 and #4.
- The final trend reflected in the credit policies of banks #3 and #6 comprises these banks that are not willing to expand their loan books with new names. Being so, they appear to place Quality issues over the top and put Assurance and Marketing aside.

In **Charts 2** and **7**, a typical clustering format is illustrated. Two of the three poles are in the abscissa and the ordinate, while the third variable 'Quality' is embedded in the diagram as the circle's radius. Being so, a bank with a circle that lies upper and more right having a larger size than the others, is better positioned. The three trends may again be extruded.

Charts 3 and **8** are valuable too. Questionnaire respondents are humans with different idiosyncrasies and therefore may share the same opinions but express them with a different magnitude in terms of responses. For example Banks #5 & #8 in Chart 5, all comply with the same pattern set, however the bars of one bank may be derived from the bars of the other scaled by a certain factor. There is no qualitative characteristic that can be extruded in the cases where this happens. To overcome this scenario, the answers are normalized supposing that the three values of Level 2 data describe the entirety of the banks' policies, and are presented in the **charts 3** and **8**.

Finally, the results allow a criteria-classification. Question 7 in the questionnaire, features pure banking criteria; extracting the mean value of the registries for each leads to the following:

7a	7b	7c	7d	7e	7f	7ga	7gb	7h
CHARACTER	CAPACITY	CAPITAL	COLLATERAL	CONDITIONS	FLAG	YARD (pre-delivery)	YARD (on delivery)	ISO STANDARDS COMPLIANCE
1	0,73	0,41	0,47	0,46	0,20	0,30	0,17	0,28
1	2	5	3	4	8	6	9	7

This ranking comes as no surprise as there have been bank officers who participated in the survey and who expressed their ignorance towards bank loan proposals from customers whose names are not among the 5 -10 already in their client list, regardless of the quality of the proposed project. Once criterion CHARACTER has been satisfied, little needs to be done on behalf of the bank. Hence, BANK 6 raises the minimum score in terms of the pole ASSURANCE. The reason for this being, the ignorance towards the rest of the C's of Credit. Nevertheless, this indicated ignorance is deceptive; in the context of this survey, if a participating F.I. demonstrates little care to fundamental financing criteria, it grants itself a minimal score corresponding to Assurance matters. Yet the institutions that demonstrated small-yielding responses, may never encounter shipping credit loss as long as they focus their activity among their 'elite' 5-10 clientele. Thus such a tactic is considered 'misleading' in the terms of this analysis.

Under the assumption that ship-owners passing through the CHARACTER filter, offer enough CAPACITY standards to satisfy loan officers, it is clear out of the criteria rank that the rest have minor participation in the loan appraisal procedure.

Should loan appraisal comprise the six most important criteria, the following membership values would be attributed to each.

	LOAN APPRAISAL					
	CHARACTER	CAPACITY	CAPITAL	COLLATERAL	CONDITIONS	YARD (pre-delivery)
M.Values	1	0,73	0,41	0,47	0,46	0,30
Ranking	1	2	5	3	4	6
Percentages	29.7 %	21.1 %	12.4 %	14.0 %	13.7 %	8.0 %

The above rank demonstrates the dominance of CHARACTER (and CAPACITY) over the other criteria. It is a reliable indicator of the banks' conception as it is based on the responses to the questionnaire.

The clustering of a sector is an interesting task, as it reveals the relative position and the grouping of the various components. This is the very first one approach for the Greek ship finance sector in the academic press to best of the author's knowledge. The lending market in Greece is very interesting and vivid as it reveals the dynamics of Piraeus as a global shipping center.

The methodology employed is also quite innovative for maritime application, as AHP is not widely used in the relevant literature, despite the fact that it is widely used in decision applications. Polish researchers have used AHP along with a three level hierarchy to determine bank deposit rates. [Domanski Cz. and Kondrasiuk J.]

The results of the clustering procedure are important as well. The mapping of the lending market allows potential borrowers to select lenders in a better way as well as guides the management of the various houses towards specific directions. In the case of a specific house willing to change its relative position, the present clustering analysis may prove an indispensable tool. Last but not least is that such a model can easily accommodate more houses and change focus or biases towards specific direction by 'perturbing' the criteria weights.

4.4.2 Side conclusions

Prospects of the 4 key-sections of shipping have been discussed with the loan officers, and their –personal, opinions have been noted. It is of interest to say that the responses retained bore significant variance. The officers had different opinions about the prospects of the 4 markets although the inquiry was straightforward; what was discussed was not the status of the market at the time of the survey, but the prospect of each one, in the case of a new project involving a new-building at that time.

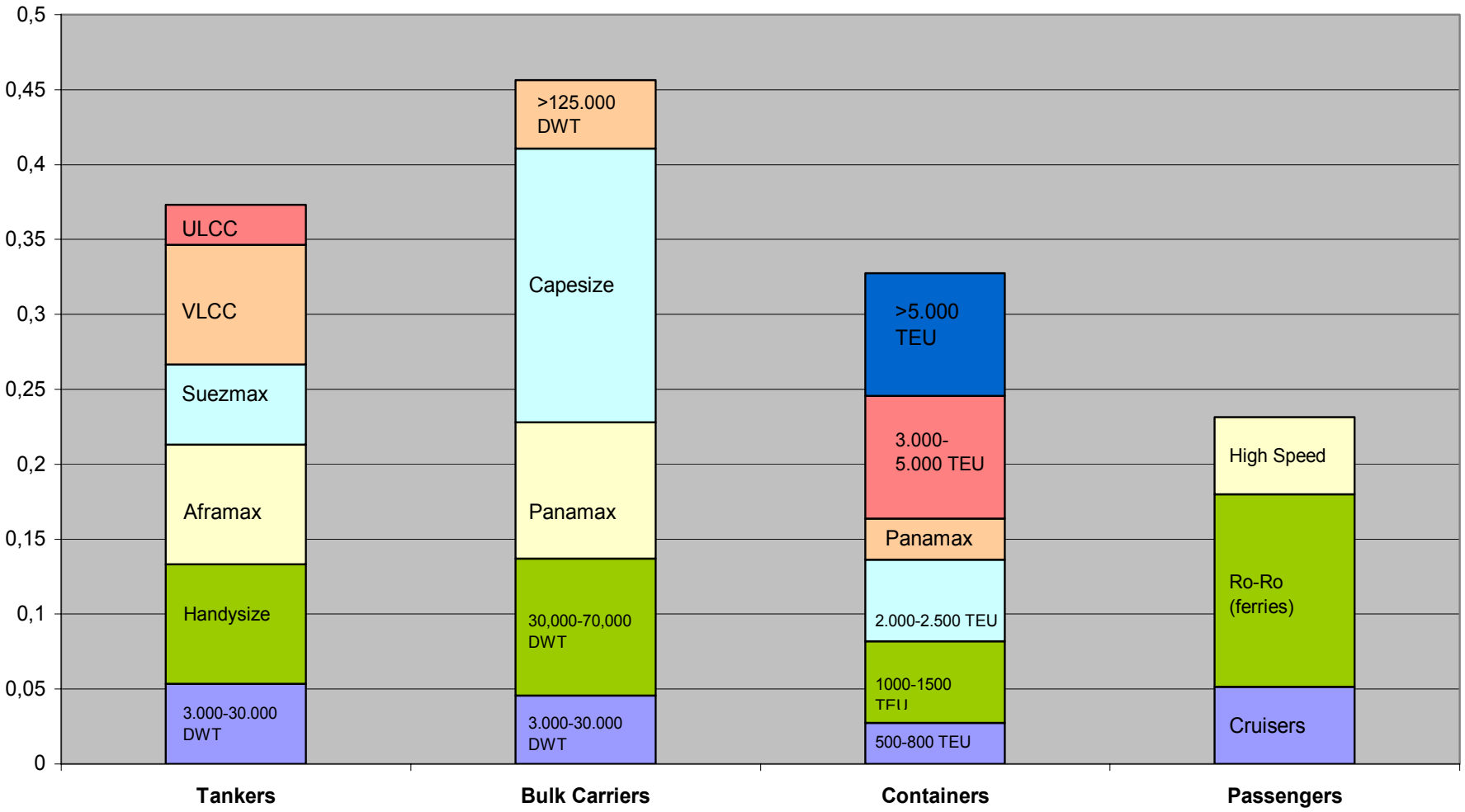
The passenger sector was the most arguable issue in the survey. There have been officers who thought highly of the passenger transportation section of shipping, whereas there have been others who completely excluded it from their operations due to lack of possible yield. Bulk carriers are the top-up runners of the survey as they seem to be the most promising class of cargo transporters followed by tankers and containers.

Each sector has been fragmented by vessel sizes and capacities. In respect to this, the results yield Capesizes (>80.000 t DWT) as the most opportunistic investment followed by Panamaxes (60.000-80.000 t DWT) in the sector of bulk carriers. In the tanker field, VLCCs (200.000-300.000 t DWT), Aframaxes (80.000-105.000 t DWT) and Handysizes (30.000-70.000 t DWT) are preferred. Last are containers with a capacity of more than 3.000 TEUs and for passenger transporters, ferries are deemed to be promising investments based on the questionnaire feedback.

Next, the analytic rating is displayed as it accrues from the survey.

Note: Had all the bankers expressed an opportunistic belief regarding the prospect of a certain market, the corresponding column would peak to value 1.

Market Prospects



Another issue discussed is the most usual reason that leads a loan at default. Here too, the answers varied. There have been officers who stated that a bank supporting its borrower may deter such a result by means of backing-up the loan; while there have been officers that charge the default to misjudgment from the borrower's part. A more modest approach stated, is that a loan defaults due to the misapplication of the 5 C's.

References table

[1.] Altman, E.I., Saunders, A. (1998). Credit Risk Measurement: Developments over the Last 20 Years. *Journal of Banking and Finance*, 21, 1721-1742

[2.] BIMCO Review 1999

[3.] Brealey, R., Myers, S. (2000) *Principles of corporate finance*, McGraw-Hill

[4.] D. Ben-Arieh and E. Triantaphyllou International Journal of Production Research, 1992, Vol. 30, No. 6, pp. 1285-1299.

[5.] Danielsson J. 'Why risk models can't be trusted' published in www.riskresearch.org

[6.] Danielsson J. 'The emperor has no clothes: Limits to risk modelling' published in the Journal of Banking and Finance

[7.] Dr. Peters GmbH & Co 'Alternative Financing Technologies-KG is still active' speech in 2000 Ship Finance Forum delivered by Dr. Peter's Group managing partner J. Salamon in Athens, Greece

[8.] Denton Wilde Sapte 'Leasing Law Review' August 2000

[9.] DRAKE P. R., (1998) Using the Analytic Hierarchy Process in Engineering Education, Int. J. Engng Ed. Vol. 14, No. 3, p. 191±196

[10.] Domanski Cz. and Kondrasiuk J. *Analytic Hierarchy Process in Banking*

[11.] FORTIS Bank 'Significant trend in Global and Greek Banking Markets' presented in MarineMoney 4th Ship Finance Athens forum October 2002

[12.] Grammenos, C.Th., Xilas, E.M. (2000) Shipping Investment and Finance, CITY University Business school

[13.] Goulielmos, M.A. (1998) Financing of shipping corporations, Stamoulis publications

[14.] Hull, J. (2000) *Options, Futures & other Derivatives*, Prentice Hall

[15.] Nelsson Risan & Partners 'Economics and expectations in the Norwegian KS Market' presented in MarineMoney Ship Finance June 2003 forum.

[16.] Petropoulos, T (2001). 'Ship Finance in Greece: Where do we go from here?'. Lloyd's Shipping Economist Ship Finance in Greece Conference (June 2001). Athens, Greece

[17.] Petropoulos, T (2003). 'Evolution of Greek Shipping: Opportunities and Challenges?' International Shipping and Bunker Conference (June 2003). Athens, Greece

[18.] Saaty, T. L., (1980) *The Analytic Hierarchy Process*, McGraw-Hill

[19.] Saaty, T.L. (1986) Axiomatic Foundation of the Analytic Hierarchy Process, Management Science Vol. 32, No. 7.

[20.] Sloggett, J.E. (1998) Shipping Finance, Fairplay Publications

[21.] Smithson Ch.W. and G. Hayt 'Managing credit portfolios by maximizing risk-adjusted return' as published in the RMA Journal December 200-January 2001 p. 44

[22.] Smithson Ch.W. and G. Hayt 'The state of the art in credit portfolio modeling' as published in the RMA Journal March 2001 p. 34

[23.] Smithson Ch.W. and G. Hayt 'Tools for reshaping credit portfolios' as published in the RMA Journal May 2001 p. 34

[24.] Smithson Ch.W. and G. Hayt 'Optimizing the allocation of capital' as published in the RMA Journal July/August 2001 p. 67

[25.] Smithson Ch.W. and G. Hayt 'Implementation of new approaches to credit portfolio management' as published in the RMA Journal October 2001 p. 67

[26.] Velentzas, J.E. (1998) Credit Institutions Law

[27.] Vergottis, A., (2000). 'Institutional Investor Perspective'. Marine Money Conference (June 2000). London, UK

[28.] Ward J. & S.Harwood paper 'Basel II: Where do we stand?'

Appendix

- **Questionnaire**

NATIONAL TECHNICAL UNIVERSITY of ATHENS

QUESTIONNAIRE

Athens, July 2003

1) Do you invest in other markets other than shipping?

❒yes ❒no

2) Which is the portion of the total portfolio dedicated to shipping?

❒	❒	❒	❒	❒
0-5%	10-15%	20-25%	30-35%	>40%

3) Do you regularly monitor the shipping market?

❒	❒	❒	❒	❒
No practical meaning	Client analysis	Follow indications of independent analysts Clarkson's Drewry κλπ	Monitoring is carried out by our staff (marketing, PR dept.)	Ad hoc monitoring department

4) Please, rate the prospect of the following markets:

a) Tanker shipping

❒	❒	❒	❒	❒
Bad	Promising	Indifferent	Good	Peak

- Product, Chemical Carriers 3.000 – 30.000 t DWT ❒
- Handy Size Carriers 30.000 – 70.000 t DWT ❒
- Aframax 80.000 – 105.000 t DWT ❒
- Suezmax 120.000 – 160.000 t DWT ❒
- Very Large Crude Oil Carriers 200.000-300.000 t DWT ❒
- Ultra Large Crude Oil Carriers >320.000 t DWT ❒

Indicate <u>one</u>

b) Bulk carrier

❒	❒	❒	❒	❒
Bad	Promising	Indifferent	Good	Peak

- 3.000 – 30.000 t DWT ❒
- 30.000 – 70.000 t DWT ❒
- Panamax 60.0000 – 80.000 t DWT ❒
- Capesize >80.000 t DWT ❒
- > 125.000 t DWT ❒

Indicate <u>one</u>

c) Container

❒	❒	❒	❒	❒
Bad	Promising	Indifferent	Good	Peak

- 500 – 800 TEU ❒
- 1000 – 1500 TEU ❒
- 18000 – 2000 TEU ❒
- 2000 – 2500 TEU ❒
- Panamax 3000 TEU ❒
- 3000-5000 TEU ❒
- >5000 TEU ❒

Indicate <u>one</u>

d) Passenger shipping

❒	❒	❒	❒	❒
Bad	Promising	Indifferent	Good	Peak

- Cruisers ❒
- Passenger Ro-Ro (ferries) ❒
- High-Speed (catamaran) ❒

Indicate one

5) Which flag is the most common in your portfolio?

❒	❒	❒	❒	❒
Opportunity flags	Rest of the world	Evenly distributed	Greek	European

6) Describe the participation of rating agencies in your business (Moody's, Standard & Poor's…)

❒	❒	❒	❒	❒
Absolutely none	Rare	Indifferent	Substantial	Total coopera-tion

7) Evaluating a loan application describe the significance of the following:

a) character and track record of applicant shipowner

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

b) manegerial capacity

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

c) capital –equity participation

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

d) collateral such as mortgages, etc.

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

e) condition of the market

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

f) flag registry

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

g) shipyard (newbuildings)

pre-delivery

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

on delivery

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

h) ISO compliance

❒	Insignificant	❒	❒	❒	The most	❒

1		3	5	7	important 9

8) Describe the bank's stance towards syndicated loans

❒ Confront the Credit Policy .	❒ Good to be avoided	❒ Indifferent	❒ Positive, as it spreads credit risk	❒ Arranger of such loans

9) Should a client of yours suggest that part of his debt be converted into equity capital of the indebted company thus making you a partner, would you negotiate? (convertible loan)

❒ No, it confronts the Credit Policy	❒ Only at certain occasions (profitable company, good stock performance)	❒ Indifferent	❒ Yes, it is a security should default occur	❒ Common practice

10) Up to which extent of a project would you undertake?

❒ Up to 10%	❒ Up to 30%	❒ Up to 50%	❒ Up to 70%	❒ Up to 90%

11) Do you provide finance other than senior debt on a higher interest rate and a corresponding 2nd mortgage (mezzanine finance)?

❒ No, never	❒ On special occasion	❒ Indifferent	❒ Yes sometimes	❒ Common practice

12) Leasing is considered to be a promising method of acquiring and operating a vessel. Do you provide this off-balance sheet financial scheme?

❒yes ❒no

If yes, please express the interest you pay on the following:

- Leasing as a financial instrument

❒ Insignificant	❒ Less significant	❒ Significant	❒ Important	❒ The most important

- Client consulting for the maximum convenience

❒ Insignificant	❒ Less significant	❒ Significant	❒ Important	❒ The most important

- Securitization for collateral

❒ Insignificant	❒ Less significant	❒ Significant	❒ Important	❒ The most important

- Legal issue

❒	❒	❒	❒	❒
Insignificant	Less significant	Significant	Important	The most important

13) Please, indicate the currency you consider as more solid.

- Euro ❒
- U.S. Dollar ❒
- Japanese Yen ❒
- English Pound ❒

14) Do you refinance loans that have first been issued by the competition?

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

15) Would you refinance loans that have first been issued by you? (restructure)

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

16) Please, indicate the maximum accepted loan period

❒	❒	❒	❒	❒
1-3 yrs	6-9 yrs	12-15 yrs	18-21 yrs	24-27 yrs

17) Would you finance a newbuilding that won't be constructed in a traditionally shipbuilding country?

pre-delivery

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

on delivery

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

18) Do you explicitly demand that your clients comply with the international standards of IMO?

❒yes ❒no

19) According to an American survey, the world bond issuances have backed down. What are the prospects of high yield bonds?

❒	❒	❒	❒	❒
Bad	Promising	Indifferent	Good	Opportunity

20) Indicate the influence of the competition into the development of the interest rates you charge.

❒	❒	❒	❒	❒
None	Practically small	Indifferent	Great	The most important

21) World Capital markets provide the opportunity of raising equity to finance shipping.

a) Do you believe that capital markets may be competitive towards bank financing?
b) What are the prospects of funds?

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……

22) Mr Harris Antoniou, Head Shipping της Fortis Bank, in the 4th **Greek Ship Finance Forum** stressed that the Greek bank market is the most competitive source of finance for the shipping industry, as the interest rates are way below rates charged in the rest of the world.

a) how cheaper are Greek bank loans compared to the usual rates charged?
b) how expensive are usually shipping loans?
c) which is the main reason for this?

……
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23) What do you consider as the main reason for the default of a loan?

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- **The role of the flag in ship finance**

The choice of a Flag State has become an even more important decision in the last few years due to stringent international regulations, tighter port state controls and the number of Flag States that are available to a ship owner.

Does a vessel's flag of registry matter? Do lenders, shipbuilders and insurance underwriters finance vessels based on the Flag State? Is a Flag State's vessel inspection program, enforcement of safety and pollution prevention standards and casualty/loss records important to lenders? Does a Flag State's system of mortgage recordation affect ship financing?

The obvious answer to all of these questions is yes, but these questions raise just a few of the many issues that must be considered and weighed by a ship owner when choosing a Flag State and by a financial institution when financing a vessel.

The confidence of international lending institutions in a Flag State should be the first consideration of a ship owner when determining the flag of registry. Banks will not be willing to advance funds to owners where the vessel registration and mortgage recordation systems of a Flag State present obstacles to the enforcement of lender security.

In addition, lenders and insurance underwriters will review a Flag State's enforcement of international safety and environmental standards, its casualty record, and its compliance with international rules and regulations. If the standards of a Flag State are low, the risk of exposure to liability for environmental pollution, casualty or port state detention is correspondingly high. International maritime rules and regulations and port state control have had a significant impact on operational costs due to port state detentions, additional maintenance requirements, and time off-hire. Choosing a registry that is targeted by port state control countries could cost owners and affect a ship owner's ability to repay debt.

As a ship moves from port to port, a Flag State imparts its nationality to that ship, and therefore its protection, to those who finance it or rely upon it, making the choice of flag an extremely important decision.

Therefore, it is important to identify some of the necessary qualities that a ship owner should review and insist upon when considering a Flag State.

Flag State Administration:

The responsibilities of a Flag State have been defined through various international conventions and regulations such as: the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), the International Convention

for the Safety of Life at Sea (SOLAS), the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW 78/95), the Convention on International Regulations for Preventing Collisions at Sea (COLREG) 1972, the International Convention on Load Lines (LL) 1966, and the 1982 United National Convention on the Law of the Sea (UNCLOS).

The Flag State's role is, perhaps, most clearly described in the 1982 Convention on the Law of the Sea. In particular, Articles 94 (Duties of the Flag States) and 217 (Enforcement by Flag States) of this convention greatly contribute to a comprehensive understanding of the duties of a Flag State and how it should oversee the administrative, technical and enforcement of safety issues with regard to vessels flying its flag.

Accordingly, the first and most obvious feature of a Flag State to review is the quality of its administration. A ship owner and lender must consider the location, experience, service and representation of a Flag State's maritime administration.

Size/Location

With increased competition among open registries, a Flag State with an adequate maritime infrastructure can service clients efficiently and effectively. The infrastructure of a Flag State must be large enough and located in major maritime ports in order to adequately service an international clientele. Moreover, a Flag State should be able to register and record mortgages in each of its representative offices.

Experience/Reputation

The ship owner needs to take into account the experience of a Flag State. Ship owners should consider how long the current administration has been administering the maritime program for the Flag State. Reputation of a Flag State is also an important factor that should be weighed by a ship owner. A good indication of a Flag State's reputation can be found by looking around the industry. Do well known owners make use of the Flag State?

Quality certification of the maritime administration can also be of tremendous worth and provide a yardstick for ship owners and lenders to utilize in selecting a Flag State. A competent Flag State should have successfully completed International Organization for Standardization (ISO) certification. This certification provides an opportunity for a Flag State to have its management operations and administrative functions documented by internationally recognized unbiased third party auditors.

Service: Speed/Convenience

Competition among Flag States is so great today that a superior level of service should be the norm, not the exception. A Flag State must have an efficient regis-

tration process and be flexible enough to adapt to problems that are inherent in a closing. A Flag State that has bureaucratic "red tape" procedures should be avoided. Moreover, a Flag State needs to have a 24 hour, seven days a week, communication system to handle any emergency response situation.

Active Representation

The duties of a Flag State continue after a vessel is registered. The Flag State role should be proactive rather than reactive. An acceptable Flag State will function for a ship owner as a facilitator with a variety of forces, including port states, shipyards and classification societies. A Flag State should not delegate all of its duties to classification societies but have a close working relationship with classification societies. Continual communication is essentially, especially if the classification societies are issuing certificates on behalf of the Flag State.

A Flag State's duty to enforce applicable international laws is extremely important in terms of the liability of owners, operators and lenders. The Flag State must participate in the work of international organization, such as the International Maritime Organization, and must disseminate any pertinent information from these organizations to ship owners.

A Flag State that meets all of these necessary criteria is the Marshall Islands. International Registries, Inc. (IRI) has been administering maritime registries for more than 52 years and has developed the Marshall Islands maritime program into the ninth largest open registry in the world. Currently, a client can register and record a mortgage in any IRI office worldwide at any time, on any day. This decentralization of the vessel registration and mortgage recordation systems enables ship owners to register their vessels quickly, in their own countries and time zones.

IRI's Maritime Operations Department has developed an efficient vessel registration and maritime administration program. In 1995, IRI's Maritime Operations Department was the first international maritime administration to receive the ISO 9002 certification. This certification encompasses operational and administrative functions, which includes vessel registration, mortgage recordation, crew examination, officer certification, seafarers' identification and qualification documentation, radio station licensing, vessel inspections, technical assistance and investigations.

IRI's technical staff possesses a broad range of expertise, ranging from backgrounds in international ship management to experience as nautical inspectors and marine safety specialists, enabling the department to assist and answer any type of query from a ship owner. The Marshall Islands registry is capable and willing to act decisively and responsibly, providing technical assistance in resolving

difficult situations, and conducting regulatory responsibilities in a fair and uniform manner. In addition, the Maritime Operations Department is supported by a sophisticated computer database that provides up-to-date status on inspections, correction of deficiencies, vessel certificates, crew certification and vessel manning.

IRI's experienced and dedicated maritime administration has allowed the Marshall Islands maritime program to be at the forefront of international issues. For example, the Marshall Islands led the way in the fight to eliminate the plague of fraudulent seafarers certificates by establishing one of the first websites for owners and operators to verify licenses and certificates. The database of valid certifications, with more than 50,000 entries is updated weekly. In addition, pursuant to ISO 9002-certified system, there are audit procedures in place to prevent abuses such as unauthorized issuance of certificates to unqualified applicants. Experience, location, service and representation are all reasons why reputable ship owners such as Exxon Mobil, Apex Marine, OMI Corporation, Crowley Marine Services, Overseas Shipholding Group and Pronav Ship Management currently fly the Marshall Islands flag.

Political Stability:

Owners and lenders must be concerned with the political stability of a Flag State. Political stability is essential to ensure continuity in rule of law and in the Flag State administration. Moreover, instability may lead to international sanctions that could effect a Flag State's reputation and inhibit a vessel's ability to trade. If the vessel trades with a particular country, it must also be determined if there are any cargo or flag preference requirements imposed by the country to which the vessel trades.

The Marshall Islands is a Pacific nation that enjoys political stability. It has been an independent, sovereign country since 1986 and a full member of the United Nations since 1991. It has a blend of American and British models of government with a President and a bicameral Parliament.

Maritime Law:

A ship owner needs to consider whether the maritime law of a Flag State contains provisions invoking case law of another jurisdiction, or, in the alternative, offers a satisfactory local body of legal precedent. Consideration must also be given to the flexibility of the law, has it or can it be amended to accommodate and allow for modern financing arrangements and communication capabilities.

The Marshall Islands has modern maritime legislation based on United States maritime law. Section 113 of the Marshall Islands Maritime Act of 1990, as amended (the "Maritime Act") states that insofar as it does not conflict with any

other provisions of the Marshall Islands law, the non-statutory general maritime law of the United States is adopted as general maritime law of the Republic of the Marshall Islands.

The Maritime Act also includes cutting edge legislation that may be attractive to lenders, such as the continuation mortgage statute. In a case where a mortgaged vessel is registered in a foreign flag, the continuation mortgage statute will allow the foreign mortgage to be transferred along with the vessel to the Marshall Islands, providing it with legal security and protection of the lender's lien. This "tacking" legislation provides the continuation of the preferred status of the mortgage without interruption. The priority of the lien will date from the original recording date of the foreign mortgage.

Mortgage Recordation System:

A Flag State needs to ensure that mortgages are properly recorded in a public mortgage registry, insulated from political turmoil or other incidents so that the lender has a lien enforceable in a court of law. The mortgage should be able to be recorded in a language understood by the lender, instead of having to be translated before recordation.

The law of a Flag State should include satisfactory statutory provisions covering ranking of liens, including that of a vessel mortgage, in the event of a forced or judicial sale in admiralty. A Flag State's law should also permit speedy deletion/transfer out of the flag, taking into account protection of the mortgagee's interests, in case it becomes necessary to change flags.

Pursuant to Marshall Islands law, mortgages can be recorded anywhere in the world and the public registry is in the central office of the Maritime Administrator in the United States, which is currently located in New York. The Maritime Act also addresses the ranking of liens, including the ranking of a mortgage when a vessel is sold in the event of forced or judicial sale in admiralty. Moreover, the Maritime Act outlines the procedures for the discharge of a mortgage.

Safety Record:

Heightening safety and environmental demands and increasingly onerous port state inspection practices render it potentially costly for lenders, insurance underwriters and owners to register their vessels with a Flag State that fails to enforce uniformly adequate safety standards.

Therefore, a Flag State needs to have a good vessel safety record that includes an annual safety inspection program combined with a constant review of vessel performance during port state and classification society inspections. Such oversight ensures that owners operate vessels in accordance with International Safety Management standards, in turn providing lenders with a viable asset.

The Marshall Islands was rated as the safest of the ten largest open registries by the Paris MOU in 1999 and this year the Marshall Islands became the only major open registry to qualify for the United States Coast Guards' ("USCG") QUALSHIP 21 Award. QUALSHIP 21, the USCG's new inspection program, came into effect on 1 January 2001. A prerequisite for award under the program is being flagged in a registry that has passed the Port State Control ("PSC") detention test. The Flag State must have a PSC detention ratio of no more than one third of the USCG's overall detention ratio, and have at least 10 distinct vessel arrivals in each of the previous three years. The Marshall Islands easily met this standard.

Registration and Tonnage Tax Fees:

A Flag State's vessel registration and tonnage tax fees are important to both a ship owner and a lender. These fees should be transparent and competitive.

A Flag State is in business to make money, but its registration and tonnage tax fees must remain competitive, allowing a ship owner to compare and "shop" among Flag States. However, the Latin expression caveat emptor, "let the buyer beware", should be heeded; if not, the expressions "you get what you pay for" and "it's too good to be true" may end up haunting a ship owner.

A ship owner has to carefully review all expenses, not just the published Flag State fees. There may be hidden costs such as document translation expenses or legal fees from a local law firm within a Flag State's jurisdiction. Moreover, a ship owner must take into account the fact that the cost of registering a vessel also includes the marine safety and inspection systems and their accompanying infrastructure in the Flag State.

Unfortunately, some Flag States do not vigorously enforce international conventions and choose to have a small or non-existent marine safety and inspection budget, giving that Flag State a harmful competitive advantage but ultimately leading to hidden costs such as port state detention fees and related off-hire and maintenance fees that may be incurred by a ship owner.

Last year, IRI did a study to see how the Marshall Islands maritime registry compared to other registries such as Panama and the Bahamas. To become competitively priced, IRI cut the annual tonnage tax in half, from US$.25 per gross ton to US$.20 per net ton.

Although no single factor will influence a ship owners decision, a Flag State's administration, political stability, maritime law, mortgage recordation system, safety record and registration and tonnage tax fees all have the potential to impact a vessel's income generating capability and ability to pay indebtedness.

Investment in the shipping industry can be profitable, but it must be done with a great deal of consideration for the choice of Flag State. A ship owner must review

all of the necessary Flag State qualities, compare each Flag State and eventually answer the ultimate question:
Which Flag? The Choice is Yours!

- **Values assignment**

The classification/clustering is based on the above sectional key points, which indicate equal criteria among them some qualitative and others quantitative. The mathematical manipulation of the data must be carried on after the registries of the questionnaire have been brought down to a common basis. This section of the Appendix, displays the numerical value assignment to the registries of the questionnaire. The calculations follow the context of the theory referred to in chapter 4.

First, the quantification of the criteria of the pole ASSURANCE, then those of the pole MARKET PENETRATION and last those respective to the pole QUALITY.

1) Which is the portion of the total portfolio dedicated to shipping?

❒ 0-5%	❒ 10-15%	❒ 20-25%	❒ 30-35%	❒ >40%

This feature 'portion of portfolio dedicated' is a quantitative feature with subjective meaning. The five descriptors [0-5%, 10-15%, 20-25%, 30-35, >40%] are quantitative but with some qualitative characteristics with respect to this feature. It is necessary to fully quantify them. To accomplish this, pairwise comparisons will be used.

	0-5%	10-15%	20-25%	30-35%	>40%
0-5%	1	3	5	7	9
10-15%	0.333	1	3	5	7
20-25%	0.2	0.333	1	3	5
30-35%	0.143	0.2	0.333	1	3
>40%	0.111	0.143	0.2	0.333	1

In the former table, each of the five different options provided is compared with each other. The following computation is used as mentioned in 4.2.2:

$$V_i = \left(\prod_{j=1}^{N} a_{ij} \right)^{1/N}$$

Where V_i is the value pertinent to row i. For example $V_1 = (1x3x5x7x9)^{1/5} = 3.936$. When the eigenvector approach is applied to the previous reciprocal matrix, the following vector of numerical values is derived:

Descriptor	Numerical value	Normalized value
0-5%	3.936	1.000
10-15%	2.036	0.517
20-25%	1.000	0.254
30-35%	0.491	0.125
>40%	0.254	0.064

Note that the previous numerical values were normalized by dividing them with the maximum entry in that vector. This is why 0-5% is associated to the value 1.00. Once the five descriptors have been quantified the 'portfolio portion dedicated' feature can be expressed numerically.

2) Evaluating a loan application describe the significance of the following:

a) character and track record of applicant shipowner

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

b) manegerial capacity

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

c) capital –equity participation

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

d) collateral such as mortgages, etc.

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

e) condition of the market

❒	Insignificant	❒		❒		❒	The most	❒
1		3		5		7	important	9

For sections a) throughout e) describing the 'how important?' feature the analysis produces the following vectors to express the importance scale in a unified manner. A comparisons table is omitted here, but obvious to create.

Descriptor	Numerical value	Normalized value
1 Insignificant	0.254	0.064
3	0.491	0.125
5	1.000	0.254
7	2.036	0.517
9 The most important	3.936	1.000

3) Up to which extent of a project would you undertake?

❒ Up to 10%	❒ Up to 30%	❒ Up to 50%	❒ Up to 70%	❒ Up to 90%

Here, a quantitative feature is at hand. To transfer the percentages to a 0-1 scale they are divided by the greatest value and subtracted from 1, this way assigning value 0 to the 90% option. That is:

Descriptor	Numerical value (%)	Normalized value
Up to 10%	10	0.889
Up to 30%	30	0.667
Up to 50%	50	0.444
Up to 70%	70	0.222
Up to 90%	90	0.000

4) Please, indicate the maximum accepted loan period

❒ 1-3 yrs	❒ 6-9 yrs	❒ 12-15 yrs	❒ 18-21 yrs	❒ 24-27 yrs

For this criterion, the pairwise comparisons are displayed below:

	1-3 yrs	6-9 yrs	12-15 yrs	18-21 yrs	24-27 yrs
1-3 yrs	1	3	5	7	9
6-9 yrs	0.333	1	3	5	7
12-15 yrs	0.2	0.333	1	3	5
18-21 yrs	0.143	0.2	0.333	1	3
24-27 yrs	0.111	0.143	0.2	0.333	1

After the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
1-3 yrs	3.936	1.000
6-9 yrs	2.036	0.517
12-15 yrs	1.000	0.254
18-21 yrs	0.491	0.125
24-27 yrs	0.254	0.065

Note that 1-3 yrs exposes the bank to pole ASSURANCE and therefore is assigned value 1.

1) Describe the bank's stance towards syndicated loans

❒	❒	❒	❒	❒
Confronts the Credit Policy .	Good to be avoided	It depends	Positive, as it spreads credit risk	Arranger of such loans

Loan syndication, a fully qualitative feature, is numerically expressed in the same manner:

	Confronts the credit policy	Good to be avoided	It depends	Positive, as it spreads credit risk	Arranger of such loans
Confronts the credit policy	1	0.333	0.2	0.143	0.111
Good to be avoided	3	1	0.333	0.2	0.143
It depends	5	3	1	0.333	0.2
Positive, as it spreads credit risk	7	5	3	1	0.333
Arranger of such loans	9	7	5	3	1

After the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
Confronts the credit policy	0.254	0.064
Good to be avoided	0.491	0.125
It depends	1.000	0.254
Positive, as it spreads credit risk	2.036	0.517
Arranger of such loans	3.936	1.000

2) Should a client of yours suggest that part of his debt be converted into equity capital of the indebted company thus making you a partner, would you negotiate? (convertible loan)

❒ No, it confronts the Credit Policy	❒ Only at certain occasions (profitable company, good stock performance)	❒ Indifferent	❒ Yes, it is a security should default occur	❒ Common practice

Pairwise comparisons table:

	Confronts the credit policy	In certain occasions	Indifferent	Yes, it is a security	Common practice
Confronts the credit policy	1	0.333	0.2	0.143	0.111
In certain occasions	3	1	0.333	0.2	0.143
Indifferent	5	3	1	0.333	0.2
Yes, it is a security	7	5	3	1	0.333
Common practice	9	7	5	3	1

After the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
Confronts the credit policy	0.254	0.064
In certain occasions	0.491	0.125
Indifferent	1.000	0.254
Yes, it is a security	2.036	0.517
Common practise	3.936	1.000

3) Up to what percentage of a project would the bank finance?

❒	❒	❒	❒	❒
Up to 10%	Up to 30%	Up to 50%	Up to 70%	Up to 90%

Here, a quantitative feature is at hand. To transfer the percentages to a 0-1 scale they are divided by the greatest value, this way assigning value 1 to the 90% option. That is:

Descriptor	Numerical value (%)	Normalized value
Up to 10%	10	0.111
Up to 30%	30	0.333
Up to 50%	50	0.555
Up to 70%	70	0.777
Up to 90%	90	1.000

Note that this time, 90% reveals exposure to the pole MARKET PENETRATION whereas 10% reveals exposure to the pole ASSURANCE. This is why the criterion is calculated twice in respect to the each of two poles.

4) Do you provide finance other than senior debt on a higher interest rate and a corresponding 2nd mortgage (mezzanine finance)?

❒	❒	❒	❒	❒
No, never	On special occasion	Indifferent	Yes sometimes	Common practice

Mezzanine finance is by no means a quantitative criterion; therefore it is expressed numerically in the usual manner:

	No, never	On special occasions	Indifferent	Yes, some-times	Common practice
No, never	1	0.333	0.2	0.143	0.111
On special occasions	3	1	0.333	0.2	0.143
Indifferent	5	3	1	0.333	0.2
Yes, some-times	7	5	3	1	0.333
Common practice	9	7	5	3	1

After the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
No, never	0.254	0.064
On special occasions	0.491	0.125
Indifferent	1.000	0.254
Yes, sometimes	2.036	0.517
Common practice	3.936	1.000

5) Leasing is considered to be a promising method of acquiring and operating a vessel. Please express the interest you pay on leasing as a financial instrument

❒ Insignificant	❒ Less significant	❒ Significant	❒ Important	❒ The most important

This is a 'how important?' feature therefore the analysis produces the following vectors to express the importance scale in a unified manner. A comparisons table is omitted here, but obvious to create.

Descriptor	Numerical value	Normalized value
Insignificant	0.254	0.064
Less significant	0.491	0.125
Significant	1.000	0.254
Important	2.036	0.517
The most important	3.936	1.000

6) Do you refinance loans that have first been issued by the competition?

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

For this quantitative feature the same comparisons table is employed:

	No, never	On special occasions	Indifferent	Yes, sometimes	Common practice
No, never	1	0.333	0.2	0.143	0.111
On special occasions	3	1	0.333	0.2	0.143
Indifferent	5	3	1	0.333	0.2
Yes, sometimes	7	5	3	1	0.333
Common practice	9	7	5	3	1

Therefore, after the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
No, never	0.254	0.064
On special occasions	0.491	0.125
Indifferent	1.000	0.254
Yes, sometimes	2.036	0.517
Common practice	3.936	1.000

7) Please, indicate the maximum accepted loan period

❒	❒	❒	❒	❒
1-3 yrs	6-9 yrs	12-15 yrs	18-21 yrs	24-27 yrs

This feature 'maximum acceptable loan period' is a quantitative feature with subjective meaning. The five descriptors [1-3 yrs, 6-9 yrs, 12-15 yrs, 18-21 yrs, 24-27 yrs] are quantitative but with some qualitative characteristics with respect to this feature. It is necessary to fully quantify them. To accomplish this, pairwise comparisons will be used:

	1-3 yrs	6-9 yrs	12-15 yrs	18-21 yrs	24-27 yrs
1-3 yrs	1	0.333	0.2	0.143	0.111
6-9 yrs	3	1	0.333	0.2	0.143
12-15 yrs	5	3	1	3	0.2
18-21 yrs	7	5	3	1	0.333
24-27 yrs	9	7	5	3	1

After the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
1-3 yrs	0.254	0.065
6-9 yrs	0.491	0.125
12-15 yrs	1.000	0.254
18-21 yrs	2.036	0.517
24-27 yrs	3.936	1.000

Note that this time, 24-27 yrs reveals exposure to the pole MARKET PENETRATION and therefore is assigned value 1, whereas 1-3 yrs reveals exposure to the pole ASSURANCE. This is why the criterion is calculated twice in respect to the each of two poles.

8) Indicate the influence of the competition into the development of the interest rates you charge.

❒	❒	❒	❒	❒
None	Practically small	Indifferent	Great	The most important

Pairwise comparisons table:

	None	Practically small	Indifferent	Great	The most important
None	1	0.333	0.2	0.143	0.111
Practically small	3	1	0.333	0.2	0.143
Indifferent	5	3	1	3	0.2
Great	7	5	3	1	0.333
The most important	9	7	5	3	1

After the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
None	0.254	0.065
Practically small	0.491	0.125
Indifferent	1.000	0.254
Great	2.036	0.517
The most important	3.936	1.000

5) Which flag is the most common in your portfolio?

❒	❒	❒	❒	❒
Opportunity flags	Rest of the world	Evenly distributed	Greek	European

The feature 'flag' is qualitative. The same approach as previous is to be followed. First, the comparisons table:

	Flag of convenience	Rest of the world	Indifferent	European	Greek
Flag of convenience	1	0.333	0.2	0.2	0.2
Rest of the world	3	1	0.333	0.2	0.2
Indifferent	5	3	1	0.2	0.2
European	5	5	5	1	1
Greek	5	5	5	3	1

After the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
Flag of convenience	0.305	0.116
Rest of the world	0.525	0.200
Indifferent	0.903	0.344
European	2.626	1.000
Greek	2.626	1.000

Note that this time although the options are arranged in order of qualification standard requirements, they do not have the same distance between them. This is because the dominant options are really 'Flag of convenience' or 'Indifferent' so there would be no point in further resolution.

6) Describe the participation of rating agencies in your business (Moody's, Standard & Poor's…)

❒	❒	❒	❒	❒
Absolutely none	Rare	Indifferent	Substantial	Total coopera-tion

For this qualitative feature, the pairwise comparisons table is displayed below:

	None	Rare	Indifferent	Substantial	Total coop-eration
None	1	0.333	0.2	0.143	0.111
Rare	3	1	0.333	0.2	0.143
Indifferent	5	3	1	0.333	0.2
Substantial	7	5	3	1	0.333
Total coop-eration	9	7	5	3	1

Unsurprisingly, the numerical expressions are here again:

Descriptor	Numerical value	Normalized value
None	0.254	0.064
Rare	0.491	0.125
Indifferent	1.000	0.254
Substantial	2.036	0.517
Total cooperation	3.936	1.000

7) Evaluating a loan application describe the significance of the following:

f) flag registry

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

g) shipyard (newbuildings)

pre-delivery

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

on delivery

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

h) ISO compliance

❒	Insignificant	❒	❒	❒	The most	❒
1		3	5	7	important	9

For sections f) throughout h) describing the 'how important?' feature the analysis produces the following vectors to express the importance scale in a unified manner. A comparisons table is omitted here, but obvious to create.

Descriptor	Numerical value	Normalized value
1 Insignificant	0.254	0.064
3	0.491	0.125
5	1.000	0.254
7	2.036	0.517
9 The most important	3.936	1.000

8) Would you finance a newbuilding that won't be constructed in a traditionally shipbuilding country?

pre-delivery

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

on delivery

❒	❒	❒	❒	❒
No, never	On special occasions	Indifferent	Yes, sometimes	Common practice

For this quantitative feature the same comparisons table is employed:

	No, never	On special occasions	Indifferent	Yes, sometimes	Common practice
No, never	1	0.333	0.2	0.143	0.111
On special occasions	3	1	0.333	0.2	0.143
Indifferent	5	3	1	0.333	0.2
Yes, sometimes	7	5	3	1	0.333
Common practice	9	7	5	3	1

Therefore, after the 4.2.2 computation is applied, the following vectors come up:

Descriptor	Numerical value	Normalized value
No, never	3.936	1.000
On special occasions	2.036	0.517
Indifferent	1.000	0.254
Yes, sometimes	0.491	0.125
Common practice	0.254	0.065

- **Greek ship-owners activity 2003**

By December 2003 the following have been published.

Vafeias Group bought panamax 'North King' built on 1988 worth $14 million. This ship will be put into service on 2004 under the management of Australlian corp. Brave Bulk Transport. The same group sold three tankers under construction in Chinese yards SWS to the Hindu group ESSAR for $125 million. Brave Maritime Corp of the Vafeias group the 37.000 DWT bulk carrier 'Imperiale' built on 1982 to Greek interests for $5.1 million. It is considered that this transaction is a sale and lease back scheme as it is possible that the vessel will be leased back to Brave Corp. In parallel, the 150.000 DWT bulk carrier 'Gladiator' built on 1983, is expected to be transferred to Turkish buyers for $18 million.
The Vafeias Group owns three subsidiaries that manage 28 cargo ships.

Polys Hajiioannou brother of Stelios Hajiioannou (owner of Stelmar Shipping Ltd.), ordered 4 106.000 DWT tankers. The order is valued at €160 million and the estimated time of delivery is 2007. A bareboat charter is arranged from U.S. Skaugen PetroTrans.
P.Hajiioannou is the owner of 17 VLCC and Aframax Tankers which he operates in the SPOT market along with that he is shareholder of Stelmar Shipping Ltd.

Restis Group concluded bought in 2003 the 169.000 DWT 'Philippe LD' built on 1999 from Louis Dreyfus Armateurs. Shipbrokers state the ship's cost to be $41 million and that it has been already chartered from Swiss marine at $22.580 per day.
The group's fleet comprises 9 bulk carriers and 3 double-hull tankers under construction (delivery on 2004) that cost $108.6 million.

Ceres Hellenic, bought 'World Cronos' and 'World Kandrind' two 110.000 DWT aframaxes for $90 million from Niarchos Group and moved on to the buying of the 150.000DWT tanker 'Paros' built on 2002 and which Ceres operated since that time from Alafouzos Group. The transaction cost was $49 million.
The company, recently also sold two aframax tankers; 2-year old, 106.000DWT tankers 'Fidelity' and 'Fantasy' were sold to Norwegian entrepreneurs for $84 million each.

- **Glossary**

Amortization: The redemption of bonds or loans by annual payment from a sinking fund. In the case of ship mortgage loans, the lender is looking to the contractual or anticipated operating cash flow of the mortgaged vessel to amortize the loan.

Asset play: A term which is used to describe highly-geared investments in second-hand build vessels with the intention of reselling such vessels at higher prices within a relatively short period. The asset-play concept however, is dependent for success on a period of consistently rising second-hand vessel prices. Investors run the risk of substantial losses in stagnant or falling markets.

Asset value: The realisable value of the assets upon sale. Banks look to the resale value of ships as one protection in the event of a borrower defaulting on a ship mortgage loan, and will attempt to limit the value of their loan to a percentage of the estimated asset value.

Assignment: A contract by which a debtor is authorised to remit to an assignee generally a bank, for the account of the assignor, sums of money or documents of title. In a typical ship mortgage loan, the borrower will assign to the bank his charter hire receipts and insurance documents.

Balloon: A contractual payment of specific amount, intended primarily to reduce the amount o periodic instalments of principal on a loan. The balloon is added to the final instalment, at which time it is not infrequently refinanced. Balloons are widely used in ship mortgage loans firstly because shipping cash flows may be neither large nor reliable enough to amortize the full value of the loan in the ordinary way, and secondly because the scrap value of a ship provides ample security for such a deferred payment.

Bank: A federally regulated financial institution that, in general, engages in the business of taking deposits, lending, and providing other financial services.

Bank for International Settlements (BIS): A central banking institution owned and controlled by central banks, with a board comprising the governors of the central banks of the Group of Ten countries. BIS has become an important forum for international monetary and financial co-operation between central bankers and, increasingly, other regulators and supervisors.

Basis point: One-hundredth of a percentage point (0.01 per cent).

Bridging loan: A short–term advance pending the borrower's receipt of fund from another source.

Bullet loan: a loan, the principal of which is repayable in its entirety upon maturity with interest only being paid in the interim. It is analogous to a corporate debt issue without a sinking fund.

Cash flow: The pattern of the flow of cash within a business over a period of time. It is established by adjusting the net profit for all non-cash items, principally depreciation, and profits/losses on capital transactions, thereby arriving at operating cash flow, and then adding and deducting items relating to the inflow of capital, the purchase of assets for cash and repayment of debt. Cash flow is the banker's chief concern in assessing the probability of a loan being repaid on schedule. The ratios of net cash flow to debt service, interest charges and total capital are critically important measures of the creditworthiness of a business.

Collateral: Additional security distinct from the primary security. In many cases though, it is a synonym for security.

Commercial bank: A bank involved in international trade/corporate banking.

Commercial paper: Short-term unsecured promissory notes issued by major companies. Only large shipping companies with the first call credit ratings have access to the commercial paper market.

Cost of Capital: The rate of return required by investors on the capital provided by them.

Debenture: An acknowledgement of indebtedness, usually including a charge on the assets of the company. A debenture holder will generally receive a fixed rate of interest. Redeemable debentures give the holder the right to repayment of principal at the stipulated date. Debentures are unsecured bonds.

Debt/Equity ratio: usually defined as the ratio of long-term debt, including the current portion, to shareholders' funds. Also known as gearing and in the United States as leverage. This is one of the most important credit ratios, variance of which, are the equity ratio (book equity to total capital) and the ratio of debt to total capital. The capital structure of the shipping industry has featured debt/equity ratios higher than the average in most other industries, leading to considerable financial instability during periods of recession.

Default: Failure to repay a loan or an overdraft as promised.

Drawdown: The taking up of part or all of a term loan or standby credit facility. Until the drawdown is complete the borrower will usually have to pay the lender a commitment fee on the indrawn balance.

Equity: Ownership in a company. While bonds represent debt, stocks represent equity.

Financial institution: Institution such as a commercial or investment bank, trust company, brokerage house, insurance company, credit union that partici-

pates in financial transactions involving cash or financial products, normally in the role of intermediary. The primary role of these institutions is to facilitate the financing of investments, from home mortgages to the raising of funds via the issue of debt or equity for financing mega-projects. They also provide insurance, take on fiduciary responsibilities, store cash and securities for safekeeping, etc.

Floating rate: The basis on which interest is usually calculated in respect of medium-term shipping loans. The rat repayable is set at a fixed margin above the relevant interbank offered rate (generally LIBOR).sequence with which the rate is adjusted depends on the term of the reference LIBOR rate, but is usually at six monthly intervals.

Flotation: The launching of a company and particularly of a new capital issue. It usually involves the listing on a recognised stock exchange of one or more classes of a company's securities in conjunction with the raising of additional or start-up capital. In the U.S. a flotation is referred to as an initial public offering or IPO.

Forwards: These are tailor-made futures not traded on exchanges; a corporation that wishes to buy foreign equipment after some time but is worried about interest rates performance may lock-in the interest rate by buying a forward rate agreement (FRA) from a bank.

Futures: They are contracts of an order to buy or sell an asset or commodity, placed in advance of the delivery date not paid until that date. In other words they are contracts of future fulfilment.

Gilt-edged funds: Having a high degree of reliability as an investment.

Hedging: The use of market mechanisms by a trader or operator of a business to obtain protection against loss through fluctuations. In shipping for example, an owner, operator or charterer may use the BIFFEX freight futures market to limit his exposure to fluctuations in SPOT dry cargo freight rates. Protection against fluctuations in interest rates, currencies and banker prices may also be obtained through the respective forward swaps markets.

Institutional investors: Banks, pension funds, investment trusts, unit trusts, mutual funds and insurance companies.

Issue price: The price at which stock or shares are issued are issued to the public. This may or may not be the same as the nominal or par value of the sales.

Kicker: an equity interest in the residual value of an asset, accepted by a bank as additional security or a sweetener in an otherwise marginal loan propositions.

Liquidity: The ability immediately to meet one's financial commitments. In the case of shipping companies this should entail the maintenance of substantial balances of cash and short-term investments, since the relationship between current income and short-term payable may quickly become adversed.

Marketability: The degree of investment demand for a particular asset offered at a given price. A banking definition.

Mezzanine Financing: Financing also called bridge financing, intended for additional expansion of market before the company goes public. Often this financing is structured so that it can be repaid from the proceeds of an IPO.

Monetary policy: The process of managing the supply of money and credit to contribute to economic performance. The Bank of Canada manages Canadian monetary policy mainly through its influence on short-term interest rates, though it is ultimately answerable to the federal government for its actions. The Bank influences short-term interest rates by adjusting its own bank rate. A rise in the bank rate is an act of "tightening" the supply of money and credit, at once restraining elements in the economy which contribute to inflation and elements which contribute to economic performance. The reverse is also true. The bank rate and the money supply influence interest rates and the exchange rate of the Canadian dollar and determine the monetary conditions in which the Canadian economy operates. For more information on the monetary policy, visit the Bank of Canada Monetary Policy Web page

Non-recourse finance: Finance provided to a borrower without specific liability of the borrower to repay. Repayment is assured by other means. For example by a government guarantee, a confirmed documentary credit or by a stream of contractual income from the project which will be channelled through the financing bank.

Organization for Economic Co-operation and Development (OECD): A Paris-based organization with a membership of 29 industrialized countries responsible for study of and co-operation on broad range of economic, trade, scientific and educational issues.

Off-balance sheet: Borrowing which does not appear on a company’s balance sheet. Leasing has been the principal form of off-balance sheet financing, although accounting practice in a number of countries now requires finance leases to be included in the balance sheet as fixed assets and matching long-term liabilities. Shipping has been particularly susceptible to the attractions of off-balance sheet financing, since the capital expenditure required to purchase ships outright has often been out of proportion to the net worth of the ship-owner. The chartering of vessels over long periods equivalent to operating leases has been a favoured method of fleet expansion. The present value of this off-balance sheet liabilities has not infrequently become dangerously excessive and sometimes brought about the financial collapse of shipping groups during freight market recessions.

Options: An option offers its owner the right but not the obligation to buy or sell an asset in the future at a price agreed upon today.

Placing: A private sale of a new issue of shares to a limited number of investors. The sponsoring investment banks will generally undertake to carry out such a placing on a best efforts basis whereas a flotation or IPO will generally be underwritten.

Primary market: The market in which securities are initially sold or offered.

Rights issue: the issue of additional shares

Secondary market: The market in which previously issued securities are traded, as distinguished from the new issue or primary market.

Swaps: It is the ultimate risk diversification and managing tool; an officer managing a portfolio exposed to interest rates, may arrange to exchange the obligation stemming from the ownership of these assets with another risk, based on assets exposed to the movement of NASDAQ for example, without actually gaining the ownership of these assets. This way one gains access to the risks accompanying other businesses.

Venture capital: A main source of financing used to fund start-ups that do not have access to capital markets. It involves investing in high risk and high return projects that are usually innovative in nature and involving lot of uncertainties.

World Bank: An agency of the United Nations established at the end of the Second World War to promote post-war economic recovery, development and trade, principally by providing development finance. The Bank promotes economic development and growth in developing countries by providing investment resources (e.g. capital and expertise) in support of development projects and microeconomic policy reforms that contribute to growth.

World Trade Organization (WTO): Established on January 1, 1995 to replace the Secretariat of the General Agreement on Tariffs and Trade, the WTO is the cornerstone of the world trading system. It provides the principal contractual obligation determining how governments frame and implement trade legislation and regulations. It is also the multilateral platform on which trade relations among countries evolve through collective debate, negotiation and adjudication.