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A STUDY OF THE CONCEPT AND PRACTICE
OF PROJECT FINANCING IN U.K.
BASED BANKS

by

CHRISTOPHER P. GILL B.Sc.(Hons.)

A Master's thesis submitted in partial fulfillment of the requirements for the award of Master of Philosophy of the Loughborough University, March 1981.

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SUMMARY

The thesis reports the results of an exploratory study, designed to examine and clarify the concept and practice of project financing within the U.K. banking industry and with particular reference to the petroleum and minerals industries.

The specific objectives of the research were:
(a) To determine exactly what is meant by the term project financing
(b) To identify the motives of both borrowers and banks in using project financing
(c) To examine and assess the practices of banks when evaluating and arranging project financing deals.

After a review of the relevant literature twenty-seven banks were visited. Senior bankers involved in project financing were interviewed using a 'focused' interview approach. An interview guide consisting of a series of topic headings covering all aspects of project financing was used. This allowed considerable freedom to develop and probe certain points where appropriate.

The thesis is arranged in three parts. Part I is concerned with the project finance market and deals with the definition and concept of project financing; the history and reasons for growth; and the roles and participants in project financing. Part II is an examination of the practices of banks when arranging project finance. It covers the
processes of identifying, measuring and controlling project risks, using as a framework the concept of risk analysis. In addition, sources of finance and the pricing of loans are also covered. Part III presents some general findings regarding future developments in project financing, and areas for further research are identified.
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Notes

1. Numbers in brackets refer to references given at the end of each chapter.

2. Raised numbers refer to footnotes which also appear at the end of each chapter.
PART I

THE PROJECT FINANCE MARKET
CHAPTER 1

INTRODUCTION

This Chapter sets out the general purpose of the thesis. It states the objectives of the work, the approach adopted and some of the limitations of this approach.

1.1 GENERAL PURPOSE

The general purpose of this research was to investigate the concept and practice of project financing within the U.K. banking industry. Specifically, the research work had the following objectives:

1. To determine exactly what is meant by the term project financing.
2. To identify the motives of both borrowers and lenders in using project financing.
3. To examine and assess the practices of banks when arranging project financing.

Of these objectives the third was considered to be the most important.

The initial motivation for the work derived from the increasing coverage which 'project financing' has received in recent years in various journals. While the phrase project financing has appeared at regular intervals it is discussed at a relatively superficial level. A need was therefore perceived for an exploratory study, designed to examine and clarify the concept and practice of project financing in some depth.
1.2 SCOPE OF THE ENQUIRY

The subject was approached from the position of banks located in the U.K., rather than from the viewpoint of the borrower. Banks located in Europe or the U.S.A. were excluded as time was limited and the problems and expense of visiting them would have been prohibitive.

The study was not limited to project financing in any particular industries; the only requirement was that the financing was arranged by banks located in the U.K. The nature of the subject dictated, however, that the research concentrated only on hydrocarbon and mineral projects. Moreover, it was found that U.K. based banks were more involved with hydrocarbon than mineral projects and so the bias of the research tended to be towards project financing in the petroleum industry.

It was also considered to be too restrictive to examine only, say, project financing in the North Sea, or in developed countries in view of the newness of the subject and the fact that the general practices of banks are similar in all projects regardless of location or industry. Therefore no geographical limits were placed on the location of projects.

1.3 REVIEW OF PREVIOUS LITERATURE

A major aim of the work was to review all of the available literature on project financing and the related areas of financing the petroleum and minerals industries.
Project financing has only recently been the subject of any writing and most of the literature cited dates from 1970 onwards. A few of the references from the 1950's and relating to production payment financing of the Texan oil fields were also examined since this was the real birth-place of project financing. An extensive survey of this literature was not, however, undertaken as the articles could add very little to the main objective of the research which was a survey of current practices in the U.K.

A major problem in the literature search was the diverse nature of the sources of reference. The subject covers several fields including economics, management, banking, finance and petroleum and mining engineering. Most of the references took the form of journal articles and there are very few books on the subject - the two most important being White (1) and Nevitt (2). However, White's book is concerned with financing the petroleum industry in general, and Nevitt concentrated mainly on the use of leasing and covered project financing in the U.S.A.

The only significant prior research discovered was by Wynant (3). This can be distinguished from the present work in that it was restricted to the mining industry in the U.S.A. and examined the subject from the borrower's viewpoint. The main focus of his work was also on the balance sheet aspects of project financing.

1.4 METHOD OF INVESTIGATION

It was found that the literature on project financing raised more questions than it answered and the second stage of the research was
designed to clarify and substantiate some of the issues raised.

1.4.1 Methodology

Leedy (4) described four basic types of research methodology:

i) The historical method

ii) The analytical method

iii) The experimental method

iv) The descriptive survey method

i) The historical method - This relies on data derived from documentary evidence, and in particular on primary data. Certain parts of this research did involve the use of documentary evidence, particularly as regards the illustrative case studies of project financing that are given as appendices.

ii) The analytical method - The objective here is to collect data that are essentially quantitative in nature and then to analyse the data using analytical techniques. The researcher is primarily concerned with the testing of a statistically based hypothesis. This methodology was considered inappropriate for this research which aimed to establish practices, for which numerical data are not available.

iii) The experimental method - The essential characteristic here is an attempt to control the research situation except for those variables under study. Clearly this methodology would have been inappropriate.
iv) **The descriptive survey method** - The essential characteristic of this methodology is to observe and record what is seen, using techniques such as interviews, questionnaires etc. This was the methodology adopted for the bulk of the research.

It appears to be widely accepted\(^3\) that academic research need not necessarily consist of the formulation and testing of hypotheses or the use of quantitative techniques. Selltiz (5), for example, stated:

"...we may think of research purposes as falling into a number of broad groupings:

1) to gain familiarity with a phenomenon or to achieve new insights into it, often in order to formulate a more precise research problem or to develop hypotheses; 2) to portray accurately the characteristics of a particular individual, situation, or group (with or without specific initial hypotheses about the nature of these characteristics); 3) to determine the frequency with which something occurs or with which it is associated with something else (usually but not always, with a special initial hypothesis); 4) to test a hypothesis of a causal relationship between variables."

This research really falls within the second category.

Similarly Moser (6) has argued that survey research need not use quantitative techniques:

"Analysis of survey material does not necessarily have to be statistical. To the extent that interest centres on the individual case rather than on the characteristics of the aggregate, non-quantitative methods of analysis and evaluation may be preferred; and, even in surveys concerned chiefly with aggregates, non-quantitative methods can play an important part."

In view of the fact that the work represented one of the first pieces of academic work relating to the practice of international bank lending
and certainly the first on project financing in the U.K., it was decided to adopt a pragmatic and qualitative approach rather than to attempt a quantitative or theoretical analysis.

1.4.2 Techniques

Within the descriptive survey method, several techniques may be used. This research made use of what Moser (6) p.296 termed the guided or focused interview. This, he said, is a situation "...in which the interviewer, whilst allowing the respondent a good deal of freedom, aims to cover a given set of topics in a more or less systematic way".

An interview guide consisting of a series of topic headings together with a few open-ended questions, was drawn up from some of the issues raised in the literature. While all of the interviews covered the basic topics, the emphasis of the interview varied depending on the bank being interviewed, and if the interviewee raised a novel point this was explored in more depth.

Other techniques were considered but subsequently rejected. The first alternative was to use a formal questionnaire requiring either 'yes/no' type answers, or some form of open-ended but pre-coded answers.
Both of these approaches have the advantage over the focused interview that they permit quantification and statistically significant results to be obtained. However, the questionnaire was rejected in favour of the focused interview for the following reasons:

(i) It was not possible to define the total 'population' of banks involved in project financing and therefore a statistically acceptable sample could not be obtained.

(ii) Different banks are involved in different segments in the market and so the population is not homogeneous. Some banks act as advisors, some as lenders and some as both.

(iii) Every project financing has unique objectives and problems and while it was at first hoped to produce, for example, some measure of the frequency with which certain types of security were used, it was soon realised that such generalisations would not be particularly meaningful and that the bankers would not be prepared to make unqualified generalisations.

(iv) Project financing appears to be an example of what Simon (7) has termed a 'non programmed decision', characterised by multiple conflicting and non-quantifiable objectives and no clear metric for achieving an optimum or satisfactory solution. This suggested further that the subject was not capable of being analysed in a statistical manner.

It was considered that the focused interview approach was more appropriate for an exploratory study particularly because:

(i) It gave considerable flexibility to the interview, enabling both questions and answers to be clarified where necessary, as well as permitting deeper probing into certain answers.
(ii) It enabled the interviewee to qualify his answers and discuss specific situations to a degree which would not have been possible using a formal questionnaire. This was considered particularly important as it was felt that the cooperation of the interviewees would have been lost if they had been asked to answer in an over simplified way. As Merton et al [8] said "..... it allows his (the interviewee's) responses to be placed in their proper context rather than forced into a framework which the interviewer considers appropriate".

Naturally, exploratory research work using the focused interview has certain limitations. In particular, it must be emphasised that statements of exactness cannot be made, and the ability to make valid generalisations is limited. Where possible however, statements and conclusions are made in terms of 'trends' or 'tendencies' in order to avoid being too dogmatic. The work also outlines the techniques and 'tools of the trade' which can be applied if appropriate in particular situations, as well as giving some indications as to the situations in which bankers considered these 'tools' to be appropriate.

In order to respect a frequently expressed desire for confidentiality, it proved impossible to attribute the various statements and opinions contained in this thesis to particular banks or individuals. This was not thought to detract from the usefulness of the findings; revealing the name of the organisation making the statement would add very little. Where differences in opinion appeared to be related to the type of bank (eg merchant or commercial) this fact is noted, however.

Another approach to the research that was considered is the use of case studies. This was rejected for the following reasons:
[i] Case studies would seem to serve only as illustrations of the application of techniques in a specific situation and this is only appropriate if there is a pre-existing framework which describes the processes in more general terms. In the case of project financing the practices were not already clearly described; indeed that was the objective of this research. To have done this and included case studies would have made the thesis too long.

(ii) Each project is unique and so to satisfactorily cover the practice of project financing several case studies would have been necessary - eg perhaps an oil extraction project, a refinery, a mine, and a pipeline.

(iii) Considerable problems were envisaged in obtaining permission to use highly confidential information. Certainly no bank was willing to allow confidential material to be used in the thesis and it was also doubted whether borrowers would have given their permission either.

As a compromise to the use of full case studies two things were done. Firstly, illustrative case studies are included as appendices. These are not 'true' case studies produced from first hand information, but they are intended to give an outline of the structure of some project financings. All of the information was obtained from non-confidential, but reliable, published sources including in particular documents lodged at the Companies Registration Office. Naturally, this meant that the choice of the cases and the nature of the information disclosed were determined by the availability of published information.

Secondly, two banks allowed me to study all of their files and the documentation relating to eight recent project financings. This was done on the understanding that no specific information relating to these
projects would be disclosed in this thesis. The objective in examining this information was rather to obtain a complete picture of the information provided and the documentation used which could be used as a framework when writing the thesis.

1.5 SURVEY SAMPLE

A total of 27 banks were visited during the course of the research. Appendix I lists these banks according to the type of institution. The banks were identified in a rather ad hoc manner as no source is available which lists all of the banks engaged in project financing. The following sources were used to identify the banks:

1. Published articles on project financing
2. 'Tombstones' of known project financings
3. Bank advertisements listing project financing among the services offered
4. Suggestions by other banks.

It is thought that all of the main banks active in project financing in the U.K. were identified by this process and that the findings, though not quantitative, give a representative view of the project financing market. Most banks interviewed had acted as advisors or lead managers rather than simply as participants, as the main objective of the research was to examine the practice of banks in arranging project finance. However, two of the banks interviewed had only acted as lenders to date, although it was known that they would be or hoped to be acting as lead managers in the near future.

The appointments were arranged by telephone since this was thought to be a more effective way of making contact with the right person
than letter writing, given that the name of the person or his job title was not known in advance. Interviews were generally conducted with senior bankers who were actively involved in project financing. Usually only one person in each organisation was interviewed although in four cases interviews were held with two or more bankers.

None of the banks which were approached declined to be interviewed and all of the bankers had a very helpful attitude, devoting a considerable amount of time to answering my questions. The interview lasted between 45 minutes and 2½ hours.

1.6 STRUCTURE OF THESIS

The thesis has been arranged in three parts. Part I is concerned with the project finance market and deals with the definition and concept of project finance; the history and reasons for growth; and the roles and participants in project financing. Part II is an examination of the practices of banks when arranging project finance. Risk analysis is used as a framework for the non-financial practices and there is also a chapter on the sources of finance. Part III presents some general findings regarding future developments in project financing and suggestions for further research.
NOTES TO CHAPTER 1

1. Unlike WYNANT (3) who restricted his work to the mining industries.

2. Throughout this thesis, the words 'petroleum' and 'hydrocarbon' are used to cover both oil and gas projects, while the terms 'minerals' and 'mining' refer to the various hard minerals such as bauxite, aluminium, copper, coal etc.


4. For example, the "completion guarantee" is one type of security used in project financing, but it is not a homogeneous instrument and the strength of terms and conditions vary from project to project. Moreover in certain cases a completion guarantee is not taken, but other commitments are obtained which provide equivalent security.

5. See section 4.2 for details of these roles.
References - Chapter 1


CHAPTER 2

PROJECT FINANCING - DEFINITIONS AND CONCEPTS

2.1 INTRODUCTION

'Project financing' has been heralded as a novel approach to financing by many authors. The aim of this chapter is to examine what is meant by the term project financing and what distinguishes it from more conventional financing.

2.2 DEFINITION OF TERMS

Unfortunately, a universally accepted definition of project financing which is simple, clear and concise, does not seem to exist, and even today 'project financing' can mean different things to different people. For example, several U.K. merchant banks have established 'Project Finance' departments but when three of these banks were approached it was found that they engaged in little or, in some cases, no project financing as we shall define it. These banks had, it appeared, simply re-named their old Export Credit departments, Project Finance departments and changed little else. While export credits are used to finance projects, and indeed may be a constituent part of a 'project financing', the activities of these banks were not considered to fall within the more generally accepted definition of project financing and so were excluded from this thesis.
2.2.1 Project

The World Bank definition of a project is "a proposal for a capital investment to develop facilities to provide goods and services" (1). This is a very broad definition and can cover any capital investment, large or small. 'True' project financing, tends to predominate in the energy and natural resources industries since it is only in these industries that there is both a need for such arrangements and 'bankable' projects.

The broad areas in which project finance is used include:

(i) Extraction of hydrocarbon and mineral substances

(ii) Processing plants - e.g. LNG plants, oil refineries, aluminium smelters etc

(iii) Certain transportation facilities - e.g. pipelines

A more comprehensive list of projects where project financing is known to have been used is given in Appendix II.

The main characteristics of these projects are therefore:

(i) Size and technological complexity.

(ii) Physical facilities which can be operated as an integral unit and can be considered separately from the other activities of the company or group developing them.

(iii) Although they may involve a large expansion of an existing facility, they usually entail a start-up operation. (This thesis does not consider the use of project financing techniques for the acquisition of existing projects or companies.)

(iv) They are commercially viable undertakings rather than infra-
structure developments or social welfare projects (such as housing, roads etc).

The projects may be located in either developed countries (i.e. OECD countries), or less developed countries. Also for the purpose of the thesis most projects located in the U.S.A. are excluded, although this is a very large market, since these financings would not normally be arranged or financed by U.K. based banks. Two major markets for project financings have been the North Sea and Australia, but U.K. based banks were found to have arranged and financed projects in Latin America, Europe and the Far East.

2.2.2 Financing

The term 'finance' can cover a variety of different types of facility ranging from eurocurrency loans, through export credits to special arrangements such as advance payments and production payments which are specifically designed to avoid a borrower/lender relationship.

2.2.3 Project Financing

Perhaps the best definition of project financing found in the literature was given by Wynant (2):

"A financing of a major economic opportunity which the sponsor(s) has segregated from the assets and general purpose obligations of the company. The project borrowings are typically secured by assets and repaid by the cash flow of the project itself, and may be supported by undertakings from the sponsoring companies and other third parties".
The essential characteristics of project financing would therefore seem to be:

(i) The project is treated as a separate entity from the sponsor.
(ii) The loans are expected to be repaid from project cash flow and repayment schedules are matched to expected cash flow so as to isolate the project from the rest of the project sponsor's operations.
(iii) Some or possibly all of the project risks may be transferred to third parties (purchasers, governments or lenders).

An important distinction that has been made is between 'Project Financing' and 'financing of projects'. It is now generally agreed that if the financing scheme is relatively straightforward and if it is exclusively or primarily based on the direct and full credit of a sponsor government or company, it does not qualify as project financing. O'Brien (3) for example, argued that:

"Essentially the dividing line between project financing and merely financing a project is that in the former instance the lender's security is not purely the sponsor's guarantee, whereas for financing a project the loan can be no more complicated than a straight commercial loan with full sponsor guarantee."

Examples of 'financing of projects' are Shell's loans for the development of the Dunlin, Brent and Cormorant fields in the North Sea, and the numerous loans to Sonatrach for its Algerian gas fields and related facilities. While these loans are intended for the development of a particular project, they are backed by the full faith and credit of the sponsor. Such situations were excluded from this research.
Wynant deliberately made his definition broad so as to cover numerous different situations and this was found to be the case in practice. In particular it became apparent from the literature on project financing that the term was being used to cover two main types of activity both of which fell within the definition given above. This was confirmed in subsequent interviews.

The first type of activity, generally emphasised by merchant banks, involved financial advice and was primarily concerned with structuring a package comprising multiple sources of finance\(^2\).

The second activity covered by the term 'Project Financing', and involving primarily commercial banks, was lending, and in particular eurocurrency lending in which recourse to the sponsor was to some extent limited and where the lenders themselves were shouldering some (or all) of the project risk\(^3\).

Of course, the above distinction is not absolute, since in certain circumstances a project with multiple sources of finance may have as one component a eurocurrency loan in which lenders shoulder some project risks (e.g. INCO Soroako project)\(^4\). Moreover, the results of the interviews with commercial banks suggested that they will, in the future, increasingly seek advisory roles in addition to their eurocurrency lending activities. For these reasons the research
sought to examine both types of activity. However, in view of the fact that the advisory role arises less frequently than the lending role, the thesis tends to concentrate more on the eurocurrency lending aspects of project financing.

In addition to the above distinction, it was also found that the permutations in project financing were endless. The following situations fall within the definition of project financing:

(i) Finance arranged for the whole of the project facilities (e.g. B.P.'s Forties loan) or for only part of the project (e.g. The Trans-Tunisian pipeline loan which finances only the Tunisian section of a pipeline running from Algeria to Northern Italy).

(ii) Finance provided to a consortium of companies borrowing as a group (e.g. the Ekofisk pipeline consortium) or for only one participant in the project (e.g. the finance for Woodside's 50% share of the North West Shelf project).

The manner in which the project risks are shared between the project sponsor, lenders and third parties is also subject to wide variation between projects.

2.3 CONCEPT OF PROJECT FINANCING

The concept of project financing and the distinction between project financing and traditional corporate financing can be examined from the viewpoint of either the bank or the borrower. The following discussion examines the subject from the bank's viewpoint only. Moreover, this discussion only relates to eurocurrency lending rather than the advisory aspects of project financing.
Deverell (4) argued that: "The fundamental difference between project finance and more traditional balance sheet lending is not (therefore) one of basic philosophies but more one of approach". This view was also supported by Bulfield (5).

Certainly, in both cases lenders seek to ensure that there will be adequate cash flow with which to repay the loan in accordance with some pre-arranged repayment schedule. Equally, both involve lending rather than equity investments (such as venture capital); the latter being characterised by large potential gains from dividends and capital gains, but also high uncertainty as regards income, capital growth and recovery of principal. Although a few project financings have involved the payment of royalties (which are a form of equity return), project financing banks do not act as venture capitalists. It became apparent however, both from the literature and from interviews, that there are certain differences in approach between traditional balance sheet lending and project financing. These may be summarised as follows:

1) Focus of Appraisal

In project financing the lender looks forward rather than at previous performance. Indeed, by definition project financing involves a start-up situation where there will be no previous track record. To some extent this is an extension of a trend in traditional lending rather than a distinction. In recent
years bankers have increasingly stressed the 'going concern' approach which is forward looking, as opposed to the 'gone concern' concept which relates the forced sale value of the company's assets to its liabilities. Even when using the going concern approach, however, bankers do look at the past performance of companies as reflected in their balance sheets. In project financing there are no pre-existing balance sheets for the project and the banker has to rely entirely on future projections.

2) Nature of Risk Analysis

In traditional lending, banks are primarily concerned with evaluating the corporate credit risk to ascertain the overall ability of the company to repay. Certain established lending criteria such as the gearing ratio, current assets ratio etc are used in this evaluation, and if cash flow forecasts are provided they will relate to the company as a whole.

In project financing the lenders are primarily concerned with the viability of the project and with an evaluation of project risks. A cash flow forecast for the project is of fundamental importance. The traditional lending criteria such as gearing are not considered fundamental to project financing and are replaced by an assessment of the adequacy of project cash flow in relation to debt service.

3) Primary Source of Repayment

In traditional corporate lending the company itself is liable as principal debtor and any security taken is accessory. In
the case of a project finance loan the project is effectively the principal debtor and any guarantee or undertaking given by the project sponsor is accessory. It will only be relied upon if the primary source of repayment is inadequate. Thus while the corporate credit risk is of prime importance with traditional lending it is only a collateral risk in project financing.

4) Nature and Extent of Risks taken by Lenders

In traditional lending, banks shoulder none of the technical risks of a particular project; their only exposure being to a corporate credit risk. In project financing lenders may assume some, if not all, of the project risks. Whether the total riskiness of the loan is greater in project financing than in traditional lending is a matter for some debate but many bankers interviewed considered project financing more risky.8

5) Degree of Complexity

Traditional lending usually involves a straightforward borrower/lender relationship with relatively standardised documentation. Project financings take far longer to arrange; they may have complex structures to satisfy certain objectives of the borrower and they typically involve several parties including purchasers, suppliers and host governments in order to create a viable financing.
NOTES TO CHAPTER 2

1. Some authors also include the financing of ships in their definition of project financing. In some ways this is valid since some ship owners are small independent companies owning only one or two ships. In the past it was possible to distinguish tanker financing from project financing since the former was based primarily on the second hand value of the ship, whereas project financings are concerned with cash flows. Since the collapse of the tanker market, however, banks have apparently looked more closely at the cash flow generated by the ship and whether it is secured by long-term bareboat charters. This makes tanker financing almost analogous to say, a project financing of an aluminium smelter secured by a long-term take or pay contract. It is therefore difficult to identify any major differences in the lending principles involved, although most bankers interviewed did exclude ships from their definition of project financing.


NOTES (continued)


5. Typically finance is provided to individual partners. Joint financings on behalf of all parties are much less common because of the frequently disparate objectives of the sponsors. For instance, the relatively stronger parties normally wish to see their own corporate strengths reflected in the loan terms.

6. For a discussion of the possible arrangements see Chapter 8.

7. For a discussion of the going- and gone- concern approaches see DONALDSON, T.H. Lending in International Commercial Banking Chapter 2.

8. For a discussion of the riskiness of project financing see Chapter 10.
References - Chapter 2


(4) DEVERELL, M.C. Unpublished paper given to West Coast LNG Symposium Perth, December 1977, p.3.

3.1 INTRODUCTION

This Chapter outlines the history of project financing and examines the reasons given to explain the growth of project financing. The problems of measuring the size of the market are also discussed.

3.2 HISTORY

The concept of a loan tied to a single project or asset has been the essence of lending and investment for many years, but as we argued in Chapter 2, this is usually financing of projects rather than project financing. This confusion may explain why some authors (e.g. Gaffney (1)) have suggested that the history of project financing can be traced back to the Suez Canal, or to the financing of railway construction in the 18th and 19th centuries. These projects differ in two main respects from today's project financings:

(i) The finance was raised mainly by equity subscription rather than by bank loans
(ii) The finance was in the nature of venture capital with very uncertain prospects.

Project financing as defined in Chapter 2, appears to have its roots in the need to finance the development of the Texan oil fields in the late 1930's. The small independent oil "wildcatters"
lacked the capital to develop their wells from their own resources. As a result the concept of production payment financing was developed. This involved the banks in lending to finance the cost of development drilling, secured by an interest in the oil to be produced in the future. Instead of looking to the company's balance sheet to support a loan, the banks took the oil in the ground as security and, once extracted, used the sales proceeds to repay the loan.

The Texan banks gradually recruited reservoir engineers and other technical experts to assess the amount of oil in place and its recoverability. This enabled the banks to determine the security for a production payment even more accurately than the security behind a conventional bank loan.

By the late 1950's Horner (2) suggested that virtually every bank in the U.S. of any size had participated in oil and gas lending.

Of course, by comparison with present-day project finance deals the early Texan deals were of modest size. Nevertheless, the basic concepts involved remain the same.

In the mining industries project financing does not appear to have been used until the early 1960's. Again this finance was arranged by American based banks, and for U.S. mining companies, although many of the projects were located in developing countries.

It was not until the early 1970's that the idea of project financing reached Britain. The discovery of North Sea Oil, and in particular, B.P.'s desire to finance the first North Sea Oil field - Forties -
on a project basis, led to the establishment of project finance or energy departments in the U.K. branches and subsidiaries of the major American banks. Certain British banks also formed specialised departments - National Westminster in 1972 and Barclays in 1973. Since that time most of the major banks located in the U.K. have established groups to engage in project financing and have extended their activities both geographically and into other areas such as natural resources.

3.3 GROWTH AND DEVELOPMENT

For a market to exist in any type of good or service there must obviously be both supply and demand for that good, and bank lending is no exception. The rationale for project financing was therefore examined from two angles: why borrowers wish to make use of it (demand), and why banks are willing to engage in it (supply).

3.3.1 Demand for Project Finance

A review of the literature, talks with bankers and a study of a number of project financings revealed numerous reasons why borrowers sought project finance rather than conventional loans. Although certain generalisations may be made, several bankers stressed that motives of a borrower in seeking project financing are specific to his particular situation.

Underlying all of the motives of borrowers there lies one fundamental reason for the growth of project finance: namely the cost of capital investments in relation to the size of the project sponsor.
All the bankers interviewed and many authors\textsuperscript{5} agreed that the rising cost of capital investments was the main reason for the growth of project finance. Costs have increased both as a result of inflation and a rising real cost. Inflation is relatively unimportant since the resources of the project sponsor are likely to increase broadly in line with inflation. However, over the past few years there have been several factors which have increased the real cost of capital investments.

Among the reasons given, the main factors would seem to be:

i) Rising economies of scale

ii) Pollution controls

iii) Remote location of projects

De la Mare (3) reported that in 1974 plants in the petroleum and chemical industries were 50-100 times greater in capacity than plants in 1950 as a result of technological returns to scale. Similarly, in the mining industry Radetzki (4) found that:

"In 1969 some 36 per cent of all non-coal mine output of ore in the non-socialist world came from mines with capacities above 3 million tons/year. In 1978 the proportion had grown to about 47 per cent."

The pollution controls now required in many industrialised countries are reported by Radetzki and Zorn (5) to have added up to 25% to the capital cost of new metal mining and processing facilities.

The effect of location on real costs is perhaps best exemplified by North Sea oil projects, where the capital cost per barrel is several times
higher than onshore in the Middle East or even offshore in the Gulf of Mexico.

If projects are located in remote areas it may also be necessary to provide infrastructure - roads, railways, ports, housing etc. and whereas previously this was often financed by host governments, Ferguson & Haclin (6) reported that project sponsors are increasingly being required to meet the cost.

Given the enormous size of capital projects, which was found to be the fundamental reason for the use of project financing, it was found that borrowers have had, at various times, the following motives for using project finance:

(i) Financial motives
(ii) Risk sharing motives
(iii) Other motives

(In many cases, of course, the decision to use project finance will be the result of a combination of the motives listed below.)

(i) Financial motives
At the same time as the cost of major capital projects has increased, the ability of many companies to finance them by traditional means has declined. Historically, both the petroleum and the mining industries financed their investments from internally generated funds and equity. From the mid 1950s in petroleum and the 1960s in mining, however, companies became increasingly reliant on long-term borrowing and their
gearing ratios began to rise\(^6\). The reasons for this may be summarised as follows:

(a) Increasing investment requirements due both to the factors mentioned above and, in the case of the petroleum industry, because of moves to diversify out of oil.

(b) Falling profitability due to increased taxation and government regulation.

(c) Inability or unwillingness to raise new equity.

By the late 1960s many petroleum and mining companies were approaching the traditionally accepted levels of gearing, and they therefore sought other methods to finance their investments. This is the argument advanced by many writers for the development of project financing. Hall (7) for example, argued that:

"...The ratio of long-term debt in corporate balance sheets has been increasing steadily over the last few years thereby limiting the ability of many companies to raise their traditional gearing much further. In the absence of large amounts of fresh equity capital new sources of finance have to be utilised and this explains the current popularity of project finance".

It must be emphasised that not all companies faced these problems. Several bankers interviewed pointed out that companies such as Shell and Exxon are still able to finance projects by traditional means and have not therefore resorted to project financing, at least for financial reasons.

It appeared from the research that project financing may be used to achieve any of five financial objectives including:
(a) Extend ability to borrow.

(b) Alter lender's view on prudent gearing.

(c) Maintain financial flexibility.

(d) "Off balance sheet" finance.

(e) By-pass existing loan covenants.

[a] Extend ability to borrow.

It has been suggested that in certain circumstances, project financing may be the only means of borrowing. It was argued in (b) for example that "...the credit of the project may often be better than the general credit standing of the sponsor, attracting lenders who might not lend to the company itself".

This view was supported by many bankers interviewed. It was pointed out in particular, that the only alternative to project financing for several small companies involved in North Sea projects, such as Thomson Scottish Associates, Ranger Oil, and Tricentrol, would have been to sell or at least 'farm out' their share in the licence. It was also suggested that project finance was the only way that Woodside Petroleum Ltd could have raised the $1.4 billion needed to finance its share of the North West Shelf gas project in Australia (and further sums will be required for the second stage).

(b) Alter lender's view on prudent gearing.

In many cases being able to borrow requires that lenders alter their view on gearing but it is felt that there is
sufficient difference to merit a separate heading. A review of both the literature and some of the reported project financing revealed that a satisfactorily structured project can be financed on a much higher gearing level than is considered prudent in traditional lending. Hall (7) for example, argued:

"By allowing a banker to identify and evaluate the risks involved, a project can be financed on a much higher debt/equity ratio than would be possible for the parent company as a whole."

This view was supported by Wynant((9) p. IX-19) and Yassukovich (10). Moreover, all of the bankers interviewed agreed that the debt/equity ratio was of no direct relevance in project financing.

To give an example of this, Thomson Scottish Association was able to raise $200 million in project finance loans to finance its share of the Piper and Claymore field while having a relatively small net worth. At the time of the first $100 million loan the net worth figure was only £14.7 million. It is unlikely that Thomsons could have borrowed this amount by traditional means.

Most of the bankers agreed that project financings required a much lower equity injection than would be required in traditional lending. Two reasons for this have been advanced. Wynant((9) p.V-15) found that some bankers
thought it was because of a difference in perception, while others believed that the high gearing reflected the low risk characteristics of the project. This issue was not explored directly in this research but indirect support for both of these views was found when bankers were asked about the amount of equity they would require. Most said that they had no rule of thumb and that it was the cash flow coverage of debt service which was important. This suggests a difference in perception. However, several bankers did say that if the project was risky they would require more equity and lend less so as to increase the amount of cash flow coverage.

(c) Maintain financial flexibility

It appears that project finance is used by some borrowers in order to prevent the project being a burden on corporate cash flow or creating liquidity problems in the event of delay or interruption of production. This is achieved by linking the drawdown on the loan to capital expenditure and repayment to the cash flow generated by the project. This was apparently one reason why B.P. used project finance rather than a bond issue to finance the Forties field.

A second aspect to financial flexibility is the avoidance of new restrictive covenants. This again was apparently a consideration in the B.P. loan. Generally in corporate loans lenders set various financial covenants which may, for instance, restrict the ability of the
company to incur more than a certain amount of additional
debt. The aim is to ensure that the company will be able
to meet its obligations. In project financing the project
is treated as a separate entity and, to the extent that
the sponsor's credit is involved, it is only collateral, and
it was considered less likely that lenders would impose
covenants restricting the sponsor's financial flexibility.

Another way in which financial flexibility may be achieved
is by the use of a completion guarantee rather than an
unconditional guarantee. This means that the loan is only
guaranteed until the project is 'completed'; thereafter
the loan is non-recourse. This enables the sponsor to
minimise the period for which its credit has to stand
behind the project.

(d) "Off" balance sheet finance

This is perhaps the most frequently mentioned reason for
using project finance. The objective in this case is to
minimise the effect on the company's gearing ratio so as to enhance
the company's ability to raise debt, or to preserve its
U.S. bond or commercial paper rating. A more detailed
examination of the balance sheet effects of project financing
can be found in Chapter 12 but some of the findings are
summarised here.
Wynant's study (9) on financing the U.S. mining industry concentrated to a large extent on the off balance sheet aspects of project financing. His conclusion in 1977 was that project financing did provide off balance sheet benefits because analysts and lenders failed to take the obligations properly into account, and bond rating agencies tended to look on such obligations more favourably than they did to long-term debt. The results of his interviews with mining companies and bankers did suggest however, that off balance sheet considerations were diminishing in importance.

The interviews conducted in this research revealed that most bankers accepted that off balance sheet factors could be a reason for seeking project finance. However, they all stressed that it was much less important now than in the past. Auditors, analysts and rating agencies have apparently become far more aware of the nature and implications of project financing arrangements. A good example of this was the $1.75 billion production payment loan arranged for Shell in 1979 to finance its acquisition of Belridge Oil. Reier (11) reported that Shell had hoped to avoid damaging its bond rating by using a limited recourse production payment rather than a loan. In the event Standard and Poor's did downgrade Shell from AAA to AA+, apparently because they considered that, despite the limited recourse nature of the obligation, Shell could not 'walk away' from their investment. Perhaps significantly, however, Moody's left their rating unchanged.
A survey of some of the project financings arranged and of the balance sheets of the sponsor companies suggested that borrowers have, in the recent past perceived some balance sheet advantage. Moreover, two banks said that at least one oil company still thought that project financing carried 'off balance sheet' advantages over traditional debt financing.

It was also pointed out by one banker that certain less developed countries have sought project finance for 'off balance sheet' reasons; their objective being to keep the borrowing out of the government's accounts and therefore out of the IMF statistics. Details of these projects are not known however.

(e) By-pass existing loan covenants.

Closely related to the off balance sheet motive is the by-passing of existing restrictive covenants in debentures and loan agreements. Frequently, when loans or bond issues are made, lenders impose certain restrictions such as limits on future borrowings or maximum gearing ratios. If gearing ratios are defined as say, debt/total capital employed, companies can circumvent the restriction if the project loan is not counted as "debt".

Four bankers interviewed mentioned this as a possible reason for the use of project financing.
The only example discovered where a loan was structured in such a way as to avoid borrowing restrictions was the $825 million lent to BNOC. This was arranged as a forward purchase of oil which, it was decided, did not count as a borrowing and therefore was not subject to the statutory limit of £800 million in respect of sums borrowed or guaranteed. Although BNOC did not, in fact, exceed this limit its ability to circumvent the restrictions did cause considerable consternation in the Public Accounts Committee.

(ii) Risk sharing motives

Here the sponsor seeks to share some or all of the project risks with lenders or third parties. While in certain cases risk sharing also has balance sheet implications in that limited recourse loans may not be reported as long-term debt, many sponsors seek risk sharing for non-financial reasons.

The results of the research interviews suggested that risk sharing motives are far more important than financial motives today, except perhaps in the case of very small companies which would be unable to borrow except by way of project financing.

(a) Protection of corporate assets

This motive stems from the desire of companies to avoid being entirely dependent on the success or failure of one project. Most companies attempt to diversify their range of activities. The problem for the smaller companies in particular is that, given the huge cost of projects,
financing them by traditional means (assuming such finance was available) would require the commitment of a disproportionate level of resources to a single undertaking. Given that lenders would have recourse to all the company's assets, failure of the project would have serious consequences for the whole company. In these circumstances therefore sponsors seek to pass on most if not all of the project risks.

This was one motive, for instance, in the two Thomson financings. They wished to shelter their traditional areas of activity from recourse if anything went wrong in the North Sea, particularly as they had no previous experience of oil activities. By limiting recourse to the project assets only Thomsons were able to avoid a concentration of risk.

Several interviewees confirmed that this is a major reason for the use of project finance.

(b) Political risk avoidance

The results of the interviews suggest that this is perhaps the one of most common reason for the use of project finance of today, particularly in the case/projects located in less developed countries. All the banks interviewed mentioned this as a reason for the use of project finance. In these cases the sponsors seek to pass on the political risks, such as nationalisation, expropriation and increases in
taxes and royalties to lenders. Despite the additional interest spread that lenders will charge it is usually cheaper than purchasing political risk insurance.

Radetzki ((4) p.6-7), has suggested that this motive stems from the increasing economic emancipation of developing countries. These countries began to desire an increasing involvement in the development of natural resource projects and a share in their benefits. This resulted in increases in taxation, changes in concession agreements and in some cases, expropriation. This, in turn, encouraged mining and petroleum companies to rely more on loan finance and particularly project finance. Debt enabled the return on equity to be geared up; and if the companies did not shoulder the political risk their losses in the event of expropriation would be limited to the amount of equity they had invested.

There is also apparently a view that governments would be less inclined to expropriate assets or take other actions which would jeopardise the project's success if they know that international banks are likely to lose money. Wynant ((9) p.IX-15) for example referred to a 'comparative advantage' in managing political risk. Gurwin (12) also argued that, while oil and mining companies are considered just prey for expropriation etc., host governments are less likely to jeopardise the project if it would threaten their relationship with
leading international banks. The leverage which banks can exercise over borrowing countries in this respect is perhaps best exemplified by the case of a $300 million loan to Peru in 1976. Two preconditions for this loan were a solution of a back tax matter with Southern Peru Copper Company and compensation for the 1975 expropriation of Marcona Mining Co. It was however, pointed out that this leverage only exists in LOC's which are reliant on external finance, and that banks would not have the same influence if, say, Norway or the U.K. was to raise taxes.

The desire to share political risks with lenders appears to have been a major motive in several recent project financings for some of the largest oil companies (which traditionally have not used project finance). These include Esso in Malaysia, Shell in Sarawak (Malaysia) and Mobil Oil in Indonesia.

(iii) Other motives

Wynant (13) suggested that "the increasing frequency of joint ventures......provides a stimulus for project financing". The argument is that the use of joint ventures reduces the amount of control over the project and that companies may seek to avoid liability for problems created by other partners. Rather than engaging their own general
credit therefore, the borrowers seek to finance their share of the cost, on a non- or limited- recourse basis.

No support for this idea was found in interviews and although several minority participants in North Sea fields have raised project finance, no evidence was found to suggest that this was the reason for their use of project finance.

The second possible motive mentioned by Wynant ([9]p.II 18-19), was taxation. In the U.S.A. for example, there have been certain tax advantages in project financing. All production payments received favourable treatment until the Tax Reform Act 1969, while developmental production payments still carry a tax advantage. Similarly, Wynant stated that until its abolition in 1974, the imposition of an Interest Equalisation Tax on foreign investments in many countries encouraged the use of project financing by American companies.

Although one banker did mention that taxation considerations might be important, no examples were found during the course of the research to support this.

A final motive for using project financing that was mentioned in interviews, concerns the availability of favourable terms. It was suggested by one bank that in a recent North Sea financing the main reason for using project finance was to obtain certain undertakings from the U.K. government which would not have been available had the company borrowed on a corporate basis.
### TABLE 3.1

HOW LONDON'S FOREIGN BANKING COMMUNITY HAS GROWN

<table>
<thead>
<tr>
<th>YEAR</th>
<th>DIRECTLY REPRESENTED*</th>
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<td>1980</td>
<td>351</td>
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</tbody>
</table>

*Directly represented through a representative office, branch or subsidiary

Source: C. Parker, *Banker* Nov. 1980
Appendix VIII

Topic List for Interviews

The topic list which follows shows the main issues which were covered during the interviews. It was designed to be used as a method of structuring the interview and to serve as an 'aide memoire' during the interview. The list gives a series of headings which the interviewer wished to discuss, together with some elaboration in certain cases to ensure that the desired points were fully covered. The actual questions posed to each interviewee varied, since the intention was to achieve a structured dialogue rather than a more impersonal and inflexible questionnaire approach. However, a few questions were included in the topic list.

TOPIC LIST

A. General

1. Establish interviewee's definition of project financing.
2. Roles adopted.
3. Types of projects financed - by industry and country.
4. Approximately what proportion of your bank's energy and mineral term loans involve project finance?
5. Organisational structure - numbers and background of personnel.

B. Reasons for use of project finance

1. Perceived reasons for use by borrowers - size of project; off-balance sheet; gearing; risk sharing; other.
3. Risk - return tradeoff in loan pricing and profitability.
4. Royalties.
5. What has been the general experience with the projects your bank has financed to date?

F. Sources of finance
1. Export credits - type; limited recourse.
2. Eurocurrency - maturity; repayment schedule.
3. International agencies - World Bank; other.
4. Advance payments.
5. Leasing.
2. Reasons why lenders will provide it - profitability; avoid sovereign risk loans; satisfy demand; other.
3. Attitude of analysts.
4. Future trends - in use; in amount of recourse.

C. Evaluation
1. Technical and political - consultants and in-house experts.
2. Financial - a) discounted cash flow; sensitivity analysis; Monte Carlo simulation; other.
   b) objectives of the financial evaluation.
3. Lending criteria - debt/equity; coverage (annual, present value, life of reserve).

D. Types of security
1. Raw material supply contract.
2. Throughput agreement.
3. Sales contract.
4. Completion guarantee - definition of completion.
5. Mortgage.
6. Insurance.

E. Risk acceptance and pricing (Eurocurrency loans)
1. Risk control - generalisation regarding the acceptability of the various risks to lenders.
2. Riskiness of project financing vis-a-vis traditional lending (sovereign and corporate).
3.3.2 Supply of Project Finance

The following reasons were identified from the literature as having contributed to the willingness of banks to participate in project financing activities:

(i) Competition and profitability considerations
(ii) Dislike of general purpose sovereign risk lending
(iii) Avoidance of legal lending limits
(iv) Development of a customer relationship
(v) Existence of a demand

(i) Competition and profitability consideration

This has been advanced as one of the main reasons explaining the willingness of banks to engage in project finance. International banking is now a highly competitive business with over 350 foreign banks directly represented in London in November 1980. To this figure must be added the U.K. merchant banks, consortium banks and clearing banks which are also engaged in international banking. Table 3.1 shows the growth in the number of foreign banks in London.

In addition to the number of participants in the eurocurrency market, Davis (14) has pointed out that competition has been intensified by the increasingly homogeneous nature of the normal Eurocurrency loan since: "With few exceptions, (therefore), the key variables in negotiating a Eurocurrency loan have been reduced to maturity and pricing".
TABLE 3.2

WEIGHTED SPREAD OF PUBLICISED EUROCURRENCY CREDITS

ALL COUNTRIES (% of total loans)

<table>
<thead>
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<tbody>
<tr>
<td>up to 0.500</td>
<td>-</td>
<td>0.1</td>
<td>11.2</td>
<td>22.8</td>
<td>29.7</td>
</tr>
<tr>
<td>0.501 - 0.750</td>
<td>-</td>
<td>4.0</td>
<td>32.9</td>
<td>41.1</td>
<td>37.5</td>
</tr>
<tr>
<td>0.751 - 1.000</td>
<td>2.0</td>
<td>30.6</td>
<td>22.4</td>
<td>20.2</td>
<td>24.9</td>
</tr>
<tr>
<td>1.001 - 1.250</td>
<td>17.6</td>
<td>20.2</td>
<td>13.9</td>
<td>9.5</td>
<td>2.7</td>
</tr>
<tr>
<td>1.250 - 1.500</td>
<td>32.8</td>
<td>12.3</td>
<td>10.1</td>
<td>3.6</td>
<td>2.1</td>
</tr>
<tr>
<td>1.501 - 1.750</td>
<td>23.3</td>
<td>19.8</td>
<td>3.8</td>
<td>1.4</td>
<td>1.1</td>
</tr>
<tr>
<td>1.751 - 2.000</td>
<td>18.7</td>
<td>8.9</td>
<td>2.9</td>
<td>0.5</td>
<td>-</td>
</tr>
<tr>
<td>2.001 - 2.250</td>
<td>4.5</td>
<td>1.6</td>
<td>0.9</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>2.251 - over</td>
<td>0.7</td>
<td>1.6</td>
<td>0.2</td>
<td>0.1</td>
<td>-</td>
</tr>
<tr>
<td>UNKNOWN</td>
<td>0.5</td>
<td>0.8</td>
<td>1.8</td>
<td>0.7</td>
<td>1.9</td>
</tr>
<tr>
<td>TOTAL %</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>TOTAL $M*</td>
<td>25,389.0</td>
<td>31,673.0</td>
<td>67,074.0</td>
<td>60,510.3</td>
<td>11,689.5</td>
</tr>
</tbody>
</table>

SOURCE: World Bank Borrowing in International Capital Markets, various issues

* This Table only includes variable rate loans
The impact of competition has been manifested in two main ways. Firstly, U.K. merchant banks have been forced to seek specialist fee earning roles since the small size of their balance sheets and resultant limited lending capacity has reduced their competitiveness as eurocurrency lead managers and lenders. The U.K. merchant banks have therefore turned to project financing (among other activities) as an area where they can offer advisory facilities without the need to lend.

Secondly, the syndicated eurocurrency loans market has, particularly since 1974, been characterised by a borrower's market with very low lending spreads. Table gives a clear indication of the trend since 1975 (figures before 1976/unavailable). During 1979 84.1% of all medium and long-term eurocurrency funds lent earned a spread of 1% or less. Of course, this was not the total remuneration since banks also earn front-end fees such as management, participation and commitment fees. Although data is not published on fees, the evidence suggests that fees are not increased to compensate for lower spreads and that the same downward trend in fees has occurred.

At the same time, particularly since the collapse of Herstatt and Franklin National, banks and supervisory authorities have become increasingly concerned with the question of capital adequacy. The rate of growth in risk assets and deposits has outstripped the rate of growth of capital and capital ratios have fallen to worrying levels.
The result is that banks have become increasingly concerned with the profitability of their business rather than simply seeking a rapid growth in lending. One way of achieving this is to apply 'product differentiation' and engage in specialist lending activities where maturity and price are not the only considerations for a borrower and where there are fewer potential competitors. One such area of specialisation is, of course, project financing. Eschenlauer of Morgan Guaranty, for example, is reported by Cudaback to have said:

"Borrowers tend to be much more interested in proper loan structure than in pricing. ...I can think of no major credit (in energy/project lending) that was won on the basis of price."

The absolute level of earnings may also be increased by undertaking more risky lending (though there is a limit to the amount of risk that banks will take).

The evidence suggests that profitability has been a major consideration for banks in deciding to undertake project finance. Leeper argued in 1979 that:

"The borrower's market of the past two years with the sharp drop in the number of profitable lending outlets for banks has helped break down their resistance to the complications of project financings."

All the bankers interviewed were unanimous in agreeing that project financing offered higher spreads and fees than conventional euro-
currency lending to sovereign or corporate entities. It appeared from their replies that both the smaller number of competitors and the level of risk contributed to this, though no attempt was made to rank these in order of importance.

Several banks did, however, qualify their opinion in two ways. Firstly, they said that spreads were higher in the early years of project financing in the U.K. and spreads have subsequently declined as a result of increasing competition in project financing. As more banks have developed expertise in project financing, competition for lead management position has intensified and margins reduced.

Secondly, it was pointed out that to the extent that project financing involves taking additional risks, a comparison of the absolute levels of remuneration between conventional lending and project financing is not necessarily valid. Rather it is necessary to examine where the two types of lending lie in relation to some risk-return tradeoff. Since it is not possible to define a risk-return tradeoff, a definite conclusion on this is not possible.

(ii) Dislike of general purpose lending

Several authors have suggested that a dislike of general purpose lending to less developed countries is a reason for the use of project finance. Their argument is that in general purpose 'balance of payments' lending there is no control over the use of the funds and no clearly identifiable source of repayment.
Lenders are therefore taking both the economic risk (i.e. inability to repay) and the political risk (i.e. unwillingness to repay).

Project financing, it has been variously argued, offers the following advantages:

(a) Banks are lending to finance a specific capital investment project rather than to finance consumption. As Llewellyn (17) pointed out, this should reduce the economic risk of the country by increasing the overall level of absorption potential.

(b) Project lending may enable banks to avoid the economic risk of a country. This was suggested by Levine (18), but as he pointed out, it requires, inter alia, that project cash flows are sufficient to service the loan and that the project is located in the export sector of the economy and therefore, generates 'hard' currency revenues. If these conditions are satisfied then the loan can be repaid even if the overall balance of payments of the country is in deficit.

(c) Project lending may reduce the political risk in international lending. This argument was advanced by Wilkins (19). In the event of a radical political change it is suggested that a loan for a project which is regarded as important to the economic future of the country is less likely to be repudiated than one which was used for, say, consumption by the previous ruler.

(d) Risks are more easily defined in project finance than in country lending (Cudaback (15) p.93).
It is certainly true that much international lending is now linked to specific projects, but this does not necessarily mean that it is 'project financing' as defined in this thesis, and only a small percentage of project linked lending is project financing. Indeed, to date the majority of true project financings have been in 'developed' countries' or other countries where the economic and political risks of the type discussed above are relatively unimportant.

The opinion of the bankers interviewed was divided. Some did think that it was a factor determining their involvement in project financing though the impression was that it was not major factor. Other banks argued, however, that it was not a factor.

(iii) Legal lending limits
In several countries, bank supervisory authorities impose limits on the amounts which may be lent to any particular borrower, in order to limit the effect on lenders of failure of a single borrower. In particular the U.S. Comptroller of the Currency limits lending to any one borrower to not more than 10% of the bank's capital. The U.K. subsidiaries and branches of American banks are also subject to this rule. Borrowers include both companies and foreign governments. Unless a loan to a subsidiary of a company or a state entity of a government passes two tests it is included in the company or government's total borrowing for the purposes of the 10% rule. The first test is that the borrower has its own income to repay
the loan (the means test); and the second is that the borrower can show that the money is used in the way agreed with the lender (the purpose test). Both of these tests can be passed if a loan is structured as a project financing.

In addition to the legal lending limits imposed on U.S. banks and their subsidiaries, all banks set internal exposure limits. Although these are flexible banks may prefer a proposition based on a new entity.

No mention of these reasons was found in the literature, although two American bankers interviewed did suggest that avoidance of legal lending limits was a possible reason for the popularity of project financing.

Other banks also said that if a viable project financing was offered in a country which had already reached the internal lending ceiling set by the bank they would be inclined to finance the project whereas they would be unlikely to make a general purpose loan in the same circumstances.

(iv) Development of customer relationships

Sarmet (20) and Kingshott (21) both suggested that project financing can be a way of developing strong relationships with borrowers. The rationale appears to be as follows. In normal eurocurrency lending the only real concern of the borrower is maturity and price and the borrower will 'shop around'. Project financing, on the other hand, requires considerable expertise
## TABLE 3.3

**PUBLICISED EUROCURRENCY CREDITS BY PURPOSE**

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PETROLEUM &amp; NATURAL GAS</td>
<td>2,420.2 (8.6)</td>
<td>2,375.7 (11.5)</td>
<td>2,906.9 (10.1)</td>
<td>2,857.6 (8.4)</td>
<td>8,374.1 (11.4)</td>
<td>7,048.1 (10.2)</td>
<td>1,698.9 (10.5)</td>
</tr>
<tr>
<td>NATURAL RESOURCES</td>
<td>457.7 (1.7)</td>
<td>602.8 (2.9)</td>
<td>951.5 (3.3)</td>
<td>331.1 (1.0)</td>
<td>1,200.6 (1.8)</td>
<td>2,235.8 (3.2)</td>
<td>244.5 (1.8)</td>
</tr>
<tr>
<td>ALL EUROCURRENCY LOANS</td>
<td>28,102.3 (100.0)</td>
<td>20,553.6 (100.0)</td>
<td>28,703.3 (100.0)</td>
<td>34,185.3 (100.0)</td>
<td>73,641.4 (100.0)</td>
<td>68,646.9 (100.0)</td>
<td>13,623.8 (100.0)</td>
</tr>
</tbody>
</table>

**SOURCE:** World Bank, Borrowing in International Capital Markets, Various Issues.

**NOTES:**
1. Figures represent the latest estimate for each year. There are substantial revisions of the figures over time.
2. Not all eurocurrency lending is arranged in London though a large percentage is.
3. The data exclude export credits.
4. The data refer to gross commitments at the time of signing and do not necessarily reflect the extent to which the loan has been drawn down or repaid.
and close cooperation. If a bank is able to advise and/or lead manage a complicated financing the borrower is likely to employ him again both for project financing and other banking operations. Moreover, other potential borrowers are likely to consider favourably for a lead position a bank which has demonstrated its expertise in structuring other financings. Two bankers interviewed saw this as a reason for involvement in project financing.

(v) Existence of a demand

It is clear that without a potential demand, banks would not have entered the market for project financing and that growth has been mainly demand-led.

The demand manifests itself at two levels. Firstly, there is the potential market for project financing which derives from the ever increasing investment requirements in the energy and natural resource industries.

As Leeper ([16], p.77) argued:

"Undoubtedly, the largest single factor in bringing the technique (project financing) across the Atlantic has been the need to finance the exploitation of North Sea oil reserves".

3.3 More generally, as Table / shows, lending to the energy and natural resource industries constitutes a sizeable share of total eurocurrency lending, and banks believe that future demand is likely to be just as high. Therefore, banks are concerned to develop energy lending activities.
Moreover, lending to these industries frequently takes the form of project financing and many banks interviewed believed that an increasing proportion of energy lending will be by project finance. Therefore to become established as an energy lender, banks have to be able to offer project financing services.

This view was supported by a large number of the bankers interviewed, and the feeling was that they had to move with the times or lose out.

3.4 SIZE OF THE MARKET

In view of the nature of the subject it proved impossible to quantify the amount of project financing that is undertaken. Banks were asked to indicate the amount of their energy and mineral term loans that were made on a project finance basis, but in many cases, they were reluctant to give a precise answer, while others gave answers ranging from 10% to 60%. Indeed, it was pointed out that to give a precise answer would be misleading since if they had recently participated in a project financing the proportion of project lending outstanding would be higher than at other times. For instance, when the Woodside loan is syndicated the figures will be much higher as a substantial sum is involved. Generally, the replies were that only a small proportion of loans involved project finance, though many added that it was likely to grow. This question was also not relevant for merchant banks which did little, if any, lending.
It was not possible to determine the size of the market from published statistics either. Figures are available showing the amount of publicised eurocurrency loans to the petroleum, natural gas and natural resources industries (see Table 3.3) which, if we had been able to estimate a proportion for project finance, should give a figure for eurocurrency project financings. However, even this would have been misleading since:

1. The World Bank figures exclude unpublicised credits, but include credits not yet drawn.
2. Project financing may involve other sources of finance including export credits. Export credits are specifically excluded from the World Bank figures.
3. Some project financing may occur outside the two industry categories mentioned, though this is likely to be small.
4. The data relate to all eurocurrency lending. Not all of this is arranged in London, (though the great majority is and this is likely to be particularly true for project finance).

The third alternative might be to identify all project financings arranged and add up the total amounts lent. However, it is not even possible to determine from published sources, such as tombstones and the World Bank’s list of eurocurrency loans, if the particular loan was a project financing as defined in this thesis.
3.5 CONCLUSION

The results of interviews and a survey of the literature suggest that project financing originally grew up as banks sought ways of meeting a demand that could not be satisfied by traditional lending techniques. The cost of projects exceeded the resources of the sponsors who therefore sought ways to enhance their borrowing capacity. Initially cosmetic, off balance-sheet motives were important but over time this has become less so. For smaller companies the other financial motives such as ability to borrow and increasing gearing remain important but for other borrowers, risk sharing motives, and particularly the sharing of political risk, tend to predominate.

As regards the supply of project financing it can be concluded that the main reasons are competitive. Competition has led banks to seek specialist areas where the pressure on lending margins is less. Moreover, banks believe that, in order to participate in energy and natural resource financing (which is likely to remain an important part of eurocurrency lending) they have to be able to offer project financing services. The other reasons listed, such as avoidance of general purpose lending and lending limits, were found to be of secondary importance.
NOTES TO CHAPTER 3

1. See WHITE, N.A. "Financing the International Petroleum Industry" Chapter 5 for a more detailed discussion of this period.


3. It is difficult to generalise on the amounts involved. The smallest project finance loan encountered in this research was for $50 million while at the other extreme the first stage of the Woodside project requires a project finance loan of $1.4 billion.

4. Neither RADETZKI and ZORN (5) Chapter 4, nor WYNANT (9) Chapter II, mention the use of project finance during the 1950s.

5. See for example, FOWLER, Banker December 1977, p.49; VANDER WEYER, "Financing of Long-Term Development" p.157; LEEPER, Banker 1979, p.77; MARPLE, Banker December 1977, p.47.

6. For background to the trends in financing the petroleum and mining industries, see WHITE, N.A. op cit, Chapter 2; RADETZKI, M. and ZORN, S. op cit, Chapter 4.

7. See Section 11.3.1 for a discussion of their attitude to equity.


10. See Section 9.6 for a discussion of completion guarantees and the definition of completion.

11. Off balance-sheet is perhaps a misleading term since it is very difficult to completely avoid disclosure. However, it is normally taken to mean situations where the liability is reported in a category other than 'long term debt'; this may include classification as a 'deferred liability' or as a note to the balance sheet under contingent liabilities.

12. See Chapter 12 for the results of this survey.


17. See Chapter 10 for a discussion of the risk return tradeoff and bank's opinions on profitability.

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(6) FERGUSON, N. & HACLIN, G. "Is There Enough Money in Mining?" Banker, September 1976, p.103.

(7) HALL, W. "The Fashionable World of Project Finance" Banker, 1976, p.73.


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(12) GURWIN, L. "Financing: Where the action is" Institutional Investor, July 1979, p.117.


(16) LEEPER, R. "Perspectives on Project Financing" Banker, September 1979, p.77.


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CHAPTER 4

ROLES AND PARTICIPANTS IN PROJECT FINANCING

4.1 INTRODUCTION

This chapter examines the nature of the main roles that banks may play in project financing, namely advisor, lead manager and participant. It also examines the roles that different types of banks have adopted and the reasons for this. Finally, certain aspects of the organisation of project financing activities and the use of industry experts are discussed.

4.2 ROLES IN PROJECT FINANCING

There are three main roles that banks may adopt in project financing: advisor, lead manager and participant. The main focus of this research was on the first two areas, although two banks interviewed had only acted as participants (at least to date).

As in many areas of project financing, it was found that these roles are by no means clearly defined. For instance, as regards advisory relationships, banks may act either as independent advisors or give advice with the option to lend. Moreover, lead management positions will involve a limited amount of advisory work. In addition, the amount and type of advice given was said to vary.
4.2.1 Financial Advisors

Not every project financing has involved the use of a financial advisor, or, as they are sometimes called, 'financial engineer'. Indeed, it was suggested that many borrowers feel that the benefits of an advisor are outweighed by the additional cost of his remuneration. The advisor is appointed by the borrower and usually remunerated by way of a fee. Generally there is considerable competition for advisory positions which can involve a substantial amount of unproductive work for the unsuccessful banks.

Advisors were said to be most commonly employed when several alternative sources of finance are available. Their primary function in these situations is to recommend an 'optimum' financing plan using the mix of sources of finance which is most advantageous to the borrower, and to coordinate the raising of these various sources of finance. In addition, the advisor will advise on the credit and loan structure of the project, as discussed in chapters 8 and 12.

It is not always the case, however, that an advisor will be appointed where multiple sources of finance are available. For instance, Inco Ltd. arranged the financing and security for their nickel project in Indonesia without using an outside advisor, and De Gavre (1) gave several reasons for this:

(i) Cost of outside advice.

(ii) The Company is transferring to outsiders the knowledge and experience gained in putting together a financing plan which they would not be able to draw on in the future.
(iii) Insiders are often better at vigorously and persistently pursuing the company's objectives and interests.

Similarly, advisors have been used even when the financial package is relatively straight-forward. The Thomson Organisation employed S.G. Warburgs as an advisor for its Piper loan and Morgan Grenfell is acting as advisor to Woodside Petroleum in the North West Shelf gas project in Australia. Both of these projects were financed by a single eurocurrency loan.

Advisors are frequently occupied on a project for several years. One bank interviewed said, for example, that they had been involved in a uranium mining project for eight years.

When it comes to the provision of finance, there are several possibilities. Some advisors are wholly independent and are not permitted to act as lenders. Other banks interviewed said that when they bid for an advisory position they seek to establish with the borrower that this will not preclude them from consideration for a lending role. For these banks, as Clarke and Macleod (2) suggested:

"The attraction of becoming project advisor is not so much the fees, because of the intensity of the labour involved, but the opportunity to be on the inside track when the time arrives to arrange financings for the project."

This latter possibility can, of course, give rise to a conflict between the interests of the advisor's clients and those of the bank as lender. As Morris (3) pointed out:
"The client's interest is to give as little security as possible and to get as fine terms as possible, while the interest of his bank as lender must be to maximise both the lender's security and the bank's reward."

The banks interviewed were divided on this question of conflict of interest. Some banks, particularly certain U.K. merchant banks which undertook advisory work, believed that there was a real possibility of a conflict of interest and stressed the importance of an independent advisor. Other banks, which preferred to lend as well as advise, considered that from a credibility point of view it was important to 'put their money where their mouth is'. It was also suggested by two banks that some independent advisors have misjudged the state of the market and have negotiated higher interest margins or tighter security conditions than were necessary to attract lenders. This implies that in some cases an independent advisor may not be of any benefit to the sponsor. Furthermore, it was also pointed out that competition for lending positions should ensure that the terms are the best available even when an independent advisor is not employed.

In cases where a bank is acting as an independent advisor it will only play a co-ordinating role in the financing, and other banks will be appointed to lead manage the financing. The function of the advisor at this stage was said to vary from project to project. In some cases, the advisor may be required to recommend a lead bank or, if the lead position is to be contested, to assist the sponsor in selecting the banks to be approached. The advisor may also sometimes be retained during negotiations on loan terms.
4.2.2 Lead Managers

Lead managers are appointed to arrange a particular source of finance (e.g. eurocurrency loan or export credit). The distinction between lead managers and advisors can be somewhat vague because in cases where an advisor is not appointed, the lead manager will perform the functions otherwise performed by the advisor.

As well as arranging the finance, the lead manager will also usually take a major participation in the loan, though it is apparently possible for U.K. merchant banks to lead manage while only lending a small amount. It is not possible to generalise on the percentage of the total loan amount that the lead manager must lend. This will depend on the size of the loan. It was said however, that a lead bank must lend at least as much as any other participating bank.

As remuneration, the lead manager receives a lump sum management fee, fixed as a percentage of the loan amount, together with the normal interest rate paid to lenders. The management fee was said to be higher when an independent advisor is not employed, although banks were unwilling to give any indication of the actual level of management fees.

The process of arranging a eurocurrency project loan is much the same as for a straightforward eurocurrency loan, and it is not proposed to describe this process in any detail. One important activity for the lead manager is however, the preparation of the 'information (or placement) memorandum'. In the case of project finance loans this is quite a lengthy document which is provided to potential...
members of the loan syndicate. A review of several information
memoranda revealed that they contain information on the following
broad areas:

(i) Outline of the terms of the loan agreement (maturity, repayment
fees and interest rate etc.).
(ii) Summary of the agreements signed or to be signed which will
provide the credit support for the project
(iii) Details of the project and the sponsor(s)
(iv) Financial analysis of the project, including cash flow forecasts
(v) (Where applicable) Consultant's report on the geology of the
oil or gas field, the amount of reserves and their recoverability.

Although the information memorandum is theoretically provided by the
borrower, in the case of project financing in particular, it is
apparently prepared by the lead managers.

The function of the information memorandum and the liability of the
lead manager for information it contains has been the subject of
litigation in the U.S. In the Colocotronis Case 10 seven U.S. parti-
cipant banks claimed against the lead bank inter alia:

(i) It had special skills in ship financing on which the participant
banks relied
(ii) It had a special banking relationship with and special access
to the borrower which other banks did not have
(iii) It was solely responsible for determining with the borrower the
pricing and other terms and conditions of the loan.
The banks claimed misrepresentation of material facts and omission to state material facts and hence a breach of fiduciary and other duties as lead manager.

This case would seem to be particularly relevant to project financing since, as Leeper (4) pointed out: "In a project financing, participating banks will rely much more heavily on the information memorandum".

The reason for this is that, unlike lending to an established company, information from sources other than the information memorandum is far more limited.

The Coloctronis case was subsequently settled and so a judicial opinion on this problem is not available. As a result of the case, however, lead managers did tighten up the wording of their disclaimer clauses, and the information memoranda studied were found to have clauses stating that the contents had been approved by the borrower, who had requested and authorised delivery of the memorandum, as well as a disclaimer stating that the lead managers cannot be held responsible for any omissions and that credit decisions should not be made purely on the basis of the memorandum. Lead managers said that they considered these disclaimers to be sufficient to avoid any liability for misrepresentation.
4.2.3 **Lenders**

The decision on who to invite into a syndicate appeared to be one of the more difficult tasks for a lead manager, especially as project financing is very popular. Several lead managers stated that they prefer experienced energy lenders in view of the complexity of many of the deals. At the same time, borrowers may also wish to invite certain banks into the syndicate in order to maintain a banking relationship 12.

The lender's remuneration is derived primarily from the interest spread, although in certain cases a participation fee is also offered. This is a lump sum calculated as a percentage of the amount lent.

Generally, the lenders are offered a participation on a take-it or leave-it basis; the terms and conditions of the loan having been previously negotiated by the lead manager, although lenders may be able to suggest minor amendments to the loan documentation.

4.3 **PARTICIPANTS IN PROJECT FINANCING**

The participants in project financing in the U.K. can be categorised as follows:

(1) U.S. commercial and merchant banks
(2) U.K. commercial banks
(3) U.K. merchant banks
(4) Other foreign and consortium banks
(5) U.S. investment banks.
4.3.1 U.S. Commercial and Merchant Banks

These two categories have been grouped together as it was found that U.S. merchant banks are subsidiaries of the commercial banks, and tended to work together in project financing activities.

The large U.S. commercial banks such as Bank of America, Chase Manhattan, Citicorp, and Morgan Guaranty have traditionally been the leaders in project financing in the U.S. and this appeared to be equally true in the case of their U.K. based activities. Clarke and Martin (5) suggested that of these four, Morgan Guaranty and Chase Manhattan were probably the most active.

It is also clear from an examination of the lead managers in project financing that there have been relatively few eurocurrency loans that have not contained at least one American bank in the lead management group. Moreover, Cudaback (6) suggested that it is generally the American bank which carries out the negotiation and technical work.

Most of the U.S. banks interviewed had acted, at one time or another, in all three project financing roles. Although a few of the U.S. merchant banks interviewed were prepared to take independent advisory roles if necessary, they expressed a preference for advisory roles which carried an option to lead manage as well. This was apparently because, unlike the U.K. merchant banks, the U.S. merchant banks had access to considerable lending power through the commercial banking arm.
4.3.2 U.K. Commercial Banks

As noted in Section 3.2, the U.K. commercial (or clearing) banks did not become involved in project financing until the early 1970's with the need to finance North Sea oil developments, and the Forties field in particular.

It was from the team working on the Forties loan that National Westminster formed an Oil and Gas department. Subsequently, this has been expanded and is now called the Energy and Natural Resources department. Barclays formed its own oil department in 1973, and since that time Midland and Lloyds have also developed expertise in project financing and energy financing generally.

All of these activities are conducted in the International Divisions or companies of the respective clearing banks, though in some cases, sterling denominated project financing is undertaken by the Domestic Divisions.

The British clearing banks were found to have reached different stages as far as project financing is concerned. Barclays Bank International and National Westminster were the most well established. They stated that they are willing to take any of the three roles mentioned in Section 4.2. Both banks said, however, that they would only consider advisory situations where they expected to be able to lend as well.

Lloyds Bank International is said to be a relative newcomer to project financing but it is seemingly very aggressive. It has been involved
in project financing both as a participant and as a lead manager, but no advisory work appears to have been undertaken.

Midland Bank has as yet only acted as a participant in project financing. However, they have recently established a separate Project Finance company which is intended to engage in advisory work. Again, the objective is to act as a lead manager as well as advisor rather than as an independent advisor.

In addition to the English clearing banks, the Scottish clearing banks, and in particular Bank of Scotland and Royal Bank of Scotland, have developed a presence in oil lending. Their focus of attention is however, mainly limited to the North Sea and they have only acted as participants in project financing.

4.3.3. U.K. Merchant Banks

The U.K. merchant banks interviewed typically had a separate project finance department or division, although two had established separate companies. Their project finance activities were seen as an outgrowth of traditional export credit business, and the arranging of export credits still constitutes an important part of their work. For some of the banks approached this represented the whole of their activities and they did not engage in any 'true' project financing as defined in this thesis. This was the case, for example, in Barings Brothers, and also at Lazards despite the fact that in 1972 they co-lead managed the Forties loan. However, the remaining U.K. merchant banks were involved in 'true' project financing in addition to their export credit activities.
At various times most of the banks had undertaken all three of the project financing roles. Their bias appeared to be towards advisory rather than lending activities, however. The U.K. merchant banks have a small lending capacity as compared with the commercial banks, in view of the small size of their balance sheet. Therefore, the pressures of competition have forced them to concentrate on advisory roles.

The banks interviewed were willing to act either as an independent advisor or as an advisor and lead manager depending on the desires of the borrower. When acting as lead managers, however, they do not lend very much if anything. This is unlike the usual situation where the lead manager takes a substantial share of the loan. But the merchant banks suggested that lending is not so important to them as it is to commercial banks, particularly as they are seeking a return on their investment in personnel rather than a return on assets. Thus the advisory fee alone may be satisfactory remuneration for them while it is less so for commercial banks.

4.3.4 Other Foreign and Consortium Banks

This section covers three main groups of banks with experience in project financing - Canadian banks, European banks, and Consortium banks.
The Canadian banks have been involved in the provision of project finance in Canada for several years and two Canadian banks - Royal Bank of Canada and Bank of Montreal - were found to be involved in project financing from their U.K. offices. Other Canadian banks (e.g. Toronto Dominion) apparently refer project financings to Canada.

The Royal Bank of Canada is involved in project financing through both its commercial and merchant banking arms in the U.K. and has advised, lead managed and participated in project financings. Again the advisory roles are apparently undertaken with a view to lending. The Bank of Montreal, on the other hand, has only acted as a participant, but when interviewed they said that they were seeking lead management positions. Indeed, they have recently obtained a co-lead management role in the Woodside project.

Of the European banks, the most active appeared to be Crédit Lyonnais. Cudaback (6) reported that they beat 20 other banks, including Morgan Guaranty and Citibank, to win the lead management position for a $200 million loan to Agip to finance its share of the Maureen North Sea oil field. The other major French banks, Société Générale, and Banque Nationale de Paris (BNP) are said to be less active in project financing although BNP has obtained a co-lead management position in the Woodside deal. None of these banks were interviewed, however, as their project finance activities were found to be based in France and therefore fell outside the scope of this thesis.

Other European banks which have been involved in project finance include Deutsche Bank, Amsterdam Rotterdam Bank and Den Norske
Creditbank, but to date this has primarily been in the North Sea and they were not considered by the banks interviewed to be major competitors in project financing.

Finally, among the many consortium banks in London two were found to have established a reputation in project financing and were therefore, interviewed. These were: International Energy Bank and European Banking Company.

The International Energy Bank (IEB) was established in 1973 by six banks to enable these banks to participate in North Sea financings. Since then, its mandate has been extended to cover all types of energy financings worldwide, (though not restricted to project financing).

It quickly made a name for itself in project financing by co-lead managing four loans with the Republic National Bank of Dallas. However since 1976, when the last of these loans was signed, the IEB has not held any major lead management positions for project financings. The IEB said that this was because of the great competition to lead manage deals, but elsewhere it was suggested that, in common with many consortium banks involved in other activities, the problem is that shareholding banks have now also developed expertise in the same area and no longer refer business to the consortium bank. As a result, the IEB now acts primarily as a participant.

The European Banking Company established a project finance department in 1977. This was said to cover export finance, leasing and finance for projects, as well as project financing as defined in this
thesis. Initially the EBC only acted as a participant, but now they are willing and able to act as lead managers and also as advisors, either independent or in addition to lending.

4.3.5 U.S. Investment Banks

The U.S. investment banks apparently play a significant part in project financing in the United States, particularly as advisors. For example, an article on project financing by Burke and Schoch [7] referred only to investment banks. According to Burke and Schoch their particular area of expertise lies in arranging long-term and often fixed rate finance from institutions, particularly insurance companies.

When the U.K. subsidiaries of four leading investment banks were approached, however, it was found that project financing activities were based in New York and therefore fell outside the scope of this study.

4.4. ORGANISATION OF PROJECT FINANCING ACTIVITIES

The organisation of project finance activities and related issues such as the credit approval systems used were not originally included as part of the study, but it emerged towards the end of the research that it could be an important area for further study. Some basic findings relating to the organisation of project financing are included, however.
Most of the commercial banks interviewed had established a separate oil and gas or similarly named department to engage in energy lending, and within these departments project financing for the energy industries was undertaken in addition to more traditional lending. Most of the major U.S. banks also had a 'Project Finance' department, usually located in their merchant banking subsidiary. These were found to be used primarily for advisory work and also lead management in natural resource projects, while the commercial bank dealt with lead managing energy project financings themselves.

National Westminster and Barclays Bank International had an Energy department while Lloyds and Midland had both a project finance group and an oil and energy group. Generally, the banks interviewed employed a few people recruited from the oil industry, while the majority of the staff had a banking background. In addition, some banks employed various types of engineers to assist with the technical aspects of project evaluation. Most commonly this was a reservoir engineer, although some banks interviewed also had access to mining engineers and geologists, refinery engineers, and civil engineers.

All of the American and Canadian banks interviewed had access to in-house engineers. However, only one American bank employed engineers in London, while one Canadian bank said they were considering it. The rest of the banks were able to call engineers over from America or Canada when required.
As far as the British banks were concerned, the Bank of Scotland, the International Energy Bank, Barclays Bank International and European Banking Company employed in-house engineers, though in the last two cases one of the engineers was self-employed and only worked for them as and when required. The rest of the banks did not have any in-house expertise and said they would use outside consultants where necessary. Some did admit that when it came to the engineering meetings the lack of an engineer on the staff was a problem as the meetings were extremely technical. In-house engineers were also seen as useful when bidding for lead management or advisory roles, when they can be used to undertake a preliminary study of the project to ensure that it is viable and financeable. However, among the reasons given for not employing full-time engineers were:

1. The danger of getting out of touch with technical development
2. The problem of keeping highly paid people fully occupied
3. The high degree of specialisation of engineers.

Some of the American banks agreed that it was not worth having engineers in London because there were no small scale projects to keep them occupied in between major projects (as there are in the U.S.A.).

In-house engineers were found to be used for evaluating the reports of independent consultants and to watch over the independent consultant and sponsor so as to ensure that the right questions are asked. This was seen as an important function for two main reasons:

1. Reservoir engineering is not an exact science and banks thought it was useful to have a way of checking on the assumptions made by the sponsor and consultants.
2. More contentiously, some banks suggested that it was not in the interest of consultants to produce a very unfavourable report since, though technically independent they are paid by the project sponsor.

The in-house engineers are apparently not, however, used to undertake a full-scale evaluation of say, the reservoir for the lending banks, both because it would involve too much work for a small team of engineers, and also because no lead bank wished to accept responsibility for providing a reservoir evaluation to other lenders. It was also suggested that lenders would prefer an independent report from a well known consultant rather than a report from the lead bank.
1. The fee can be set in a number of ways. Among the alternatives suggested in interviews were:
   (a) man hours worked
   (b) a lump sum amount
   (c) a percentage of total funds raised
   (d) some combination of any of the above.

2. See Chapter 11 for a discussion of the various sources of finance available, and the objectives applied when structuring the financing plan.


5. This was the situation for both Warburgs and Morgan Grenfell in the projects mentioned.

6. These will include the evaluation of project risks and advice on the terms and conditions which will be acceptable to lenders.

7. In view of the small size of their balance sheets it is accepted by the market that the merchant banks can give their 'seal of approval' to a loan while only lending a small amount.

8. Because of internal and prudential lending limits banks will take a smaller proportionate share in a large loan.
NOTES (continued)


11. See WOOD, P. "Law and Practice of International Finance" p.260-61, for a discussion of these exclusion clauses.

12. For further details on the marketing of syndicated loans see TERRELL & MARTINSON op cit. p.37-38.

13. One of the new exceptions was the $200 million Maureen field loan for Agip (U.K.) led by Crédit Lyonnais (see MONTAGNON, P. Financial Times, 24 November 1980).

14. This view is supported by CLARKE & MARTIN, Euromoney, October 1980, p.240.


17. Its shareholders are: Banque de la Société Financière Européenne 20%
    Bank of Scotland 15%
    Barclays Bank International 15%
    Canadian Imperial Bank of Commerce 20%
    Republic National Bank of Dallas 20%
    Banque Worms 10%

18. These were loans to finance the Piper and Claymore fields for both Thomson Scottish Associates and Occidental Petroleum.

19. A consortium bank owned by partners in the EBIC group.

20. Goldman Sachs; First Boston; Salomon Brothers; and Loeb Rhoades, Hornblower & Co.
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PART II

PRACTICES IN PROJECT FINANCING
CHAPTER 5

RISK AND PROJECT FINANCING

5.1 INTRODUCTION

When defining project financing in Chapter 2, one of its characteristics was said to be the transference of some or all of the project risks from the project sponsor to either lenders or other third parties. One of the functions of both advisors and lead managers is to determine how much risk can be borne by the lenders and how much should remain with the sponsors or be passed to third parties.

This Chapter provides the background to this process by discussing the concept of risk, bank lending risks, and the theory of risk analysis.

5.2 THE CONCEPT OF RISK

It is not intended to enter into a discussion of the most appropriate definition of risk since the debate does not appear to have been resolved as yet. As a working definition, however, the one given by Rowe [1] was adopted: "Risk is the potential for realization of unwanted negative consequences of an event".

This notion of risk is what some have called 'pure' risk - any potential negative consequences (e.g. losses or reduced benefits) are considered. The definition is however still somewhat vague since the term risk may be used to describe simply the possibility of a
negative outcome no matter how remote, or to describe the probability of the negative outcome occurring. The following statement which can be made about project financing serves to illustrate this. It can be said that banks are only prepared to shoulder certain risks if the risk is low. In other words banks are prepared to accept the possibility of something going wrong if they believe that the probability of it happening is low. However, a low probability event with an associated high possible negative outcome may produce the same expected value of loss.

No satisfactory way could be found to avoid using the term risk to cover both situations but it is felt that the sense in which is used should be clear from the context of the sentence.

Another concept that needs to be introduced is the distinction made by Rowe [1] p.17-18, between descriptive uncertainty and measurement uncertainty. Descriptive uncertainty was defined as "an absence of information relating to the identity of the variables that explicitly define a system", while measurement uncertainty is "absence of information relating to the specification of value assigned to each variable in the system".

5.3 RISK IN BANKING

The risks to which banks are exposed may be categorised in numerous ways. Moore [2] for example, classified banking risks as follows:

1. Credit risk - the risk that the assets of the bank will not be repaid in full and on time.
2. Liquidity risk - the risk that the bank will be unable to repay its depositors on time because it lacks
readily available money (particularly because of maturity mismatching).

3. Interest rate risk - the risks that the cost of liabilities rises faster, or exceeds the earnings on, assets.

4. Currency risk - the risk of loss arising from the movement in the relative rates of exchange between currencies.

5. Investment risk - the risk of the principal value of securities, bonds and debentures declining in value as interest rates rise.

6. Commercial risk - the risk of fraud, operational error and mistakes, incompetence or forgetfulness.

Project financing can give rise to exposure in all the categories of risk listed above, with the exception of investment risk. The present thesis is concerned solely with the credit risk in project financing and does not consider the other risks. These risks will be dealt with by the banks in the context of the overall management of their balance sheets, and they are not specific to project financing. No fundamental differences in the nature of project finance loans were found which would give rise to special problems of illiquidity, currency mismatching or interest rate risk that are not encountered in normal eurocurrency lending. The only possible exception to this was the fact that many project finance loans generally permitted greater flexibility in repayment than is the case in normal loans, and this could therefore give rise to problems in managing liquidity.
positions. However, since these loans would only constitute a very small proportion of a bank's total loan book the effect was thought to be small and therefore, not meriting a detailed study of liquidity management.

As regards the amount of risk that banks should take, Crosse and Hempel (3) argued that:

"Taking risk can almost be said to be the business of bank management. ......On the other hand, a bank that takes excessive risks, or, what is more likely, "takes them without recognising their extent or even their existence" will surely run into difficulty." (my italics)

Thus it would seem to be accepted that banks should take certain risks, although not excessive risks, provided that they are aware of their existence and magnitude. This, as is discussed in section 5.4, is the reason for a formal approach to risk analysis in project financing.

Two factors (should) mitigate against banks taking excessive credit risks, however. Firstly, banks are highly geared organisations which finance their lending largely from borrowed funds. Therefore, if their assets fall in value by more than a small amount their cushion of profitability and capital will be eroded and the future of the bank jeopardised.

Secondly, lenders are remunerated principally by a small and fixed margin over their cost of funds. This means that:
"a bank normally has no 'upside potential' on its (loan) assets: if the project being financed is particularly successful, the interest rate received does not automatically rise"\(^4\). Unlike an equity investor the lender cannot balance out failures and unexpectedly successful projects. If the project goes surprisingly well, the interest spread is unchanged, while if it fails the bank may lose its loan.

These two considerations go a long way to explain the traditional conservatism of banks in lending generally and their approach to the analysis of risk in project financing in particular.

5.4 **RISK ANALYSIS**

During the review of the project financing literature, it became clear that the analysis of project risks was an important aspect of project financing \(^3\). Moreover, it was also evident that the analysis was more formalised than in traditional lending. It was therefore decided to use risk analysis as a framework to examine bank practices in analysing project risk.

Revell \(^5\) reported that the theory of risk analysis was developed during the 1950's. It has been applied to several situations including the analysis of the societal risk of nuclear power stations and liquefied natural gas plants \(^4\) and industrial risk management \(^5\). Revell also applied it to the analysis of risk in banking.
Figure 5.1

Steps in Risk Analysis

Risk Identification

Risk Estimation

Risk Control

Hedging

Combination

Risk Acceptance

Risk Transfer

Risk Avoidance

Loss Prevention Reduction
The processes involved in risk analysis are shown in Figure 5.1 and may be summarised as follows:

1. Risk identification - this is concerned with identifying the nature of the risks that a project could be exposed to, thus reducing descriptive uncertainty.

2. Risk estimation - this involves measuring each risk in order to determine the likelihood of the risk occurring and the severity of the loss, thus resolving measurement uncertainty.

3. Risk control - this involves a decision on the best method of handling the particular risk. Horrigan (6) lists the following alternatives:

   (i) Risk avoidance - in a lending situation this would obviously mean declining to participate.

   (ii) Risk assumption - when looked at from the lender's viewpoint this means that the lenders will shoulder the risk. This may be planned or unplanned.

   (iii) Loss prevention or reduction - this involves attempts to reduce the chance of loss. An example in project financing might be the negotiation of a sales contract with a minimum floor price.

   (iv) Risk transfer - from the sponsor's viewpoint risks may be transferred either to lenders or to third parties by the use of insurance, government guarantees etc.

   (v) Hedging - an example in project financing is arranging finance in the same currency as project revenues to hedge an exchange risk.
(vi) Combination - for project sponsors this may involve using a joint venture, while for lenders it is the syndication of a loan among several banks. Pooling risk reduces the exposure of any one bank or sponsor to project risks.

The framework of risk analysis seemed to be sufficiently broad to cover the activities of advisors, lead managers and lenders. They all undertake the same process of identifying, measuring and deciding how to control the risks, although the options available in the control of risk in particular do vary. The advisor is generally employed from the very start of the project and will have considerable flexibility in choosing risk control methods. The lead manager on the other hand, may be presented with a situation in which, for example, the sales contracts have already been negotiated. Therefore, the options available may be reduced. Finally, lenders will be faced with only one risk control option - to accept or decline to lend to the proposition they are offered. They may also however, have some scope for varying the amount they are prepared to lend.

It should also be emphasised that while the three elements of identification, measurement and control will always be present they may not be performed in such clearly defined sequential steps. Firstly, many bankers have a clear idea of the risks which will affect a particular project and so do not have to formally identify them. Secondly, some of the risk control measures may have been taken before the banks become involved and so the risk measurement will take place using
the situation after, for example, long-term sales contracts have been negotiated, rather than being used to determine whether they are necessary. Thirdly, the process is iterative, and one in which the banks will have to negotiate with the borrower to obtain the security or the terms that they require. Depending on the relative bargaining strengths of the borrower and the banks, certain options may not be available and the bank will have to go back and consider other alternatives to arrive at a solution which is acceptable to both borrowers and lenders. It must be emphasised that the solution has to be acceptable not only to the lead manager; the real question is whether it will sell in the market.

While the framework of risk analysis is an over-simplification it was considered a useful way of highlighting the processes involved and presenting them in a clear manner.
NOTES TO CHAPTER 5

1. For such a discussion see, for example, WOOD, O.G. *Journal of Risk and Insurance*, March 1964.

2. A few project financings have involved the payment of a royalty, however.

3. HOFMANN, M.D. argued, for example, that "....lenders to the project must be fully aware of the potential risks peculiar to each aspect of the project in order to analyse its overall creditworthiness". (AMR/Euromoney Conference on Project Financing, November 1979, p.5).


5. See, for example, HORRIGAN, W. "Risk, Risk Management and Insurance".

6. This is sometimes termed risk evaluation, but for reasons of clarity the term risk control is preferred.
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CHAPTER 6

RISK IDENTIFICATION

6.1 INTRODUCTION

Risk identification is concerned with the removal of descriptive uncertainty and involves determining the type of risks to which a project could be exposed.

6.2 PROCESS OF RISK IDENTIFICATION

Horrigan (1) mentioned two broad approaches which are used by risk managers in industry. The first is the 'check list' approach whereby the risk manager inspects an existing or proposed project and determines which of the risks mentioned on the check-list apply in that situation. Secondly, there is the 'flow chart' approach which "is an attempt to itemise all the operations and services which are interposed between the suppliers of raw materials and the final consumer". (Horrigan (1) p.18).

The approach adopted by banks appeared to be more akin to the check-list approach. At the same time, the process differed in several respects. None of the banks interviewed used a formal written check-list of risks which was designed to cover all projects. The process of risk identification appeared to be far more intuitive. Secondly, unlike the industrial risk manager, the banks appeared to use much broader categories of risk. Thirdly, the industrial risk manager is primarily concerned with specific aspects of technical risks. Bankers
are not technical people nor have they the time to undertake a detailed review of the technical aspects of the project. To a large extent they are reliant on the ability of the project sponsor in this area.

6.3 PRINCIPAL PROJECT RISKS

This Chapter is concerned solely with the identification of risks. Discussion of the ways banks measure and control these risks is the subject of subsequent chapters. Much of the illustrations regarding the nature of project risks are drawn from North Sea Oil projects. This is simply because information was more readily available for these projects, although the risks identified below can arise in any type of project.

The principal project risks mentioned in the literature and by bankers may be summarised as follows:

1. Completion risk
2. Cost overrun risk
3. Raw material risk
4. Reserve risk
5. Market risk
6. Operating risk
7. Operator risk
8. Consortium structure risk
9. Country risk
10. Credit risk
11. Exchange rate risk
12. Transportation risk
13. Legal risk.
Exploration risks are not included in this list as project finance is not used to finance exploration costs. Banks will only be approached for project finance once an oil field has been explored and is considered commercial.

6.3.1. Completion Risk

'Completion' is used in project financing to mean much more than completion of construction. A project is only considered complete when it is built and producing at planned levels.

The completion risk was thought by most bankers interviewed to be the most significant project risk factor. Completion risk covers not only non-completion but also the risk of delay in completion, and the risk that the technology, once 'completed', will be inadequate to produce the output in the quantities and/or qualities assumed. The risk will obviously be higher when new technology is involved, but it is important in all projects. Non-completion would clearly give risk to the largest potential loss, (a half completed pipeline 300 feet below the sea has very little scrap value), but the other aspects are also significant. "Since-lenders-in project financing are primarily reliant on the cash flow from the project and since this cash flow will not commence until the project is complete, any delay in completion could have a serious effect on the ability of the project to meet planned repayments. Moreover, particularly at times of high interest rates, the additional interest charges incurred during the period of delay may be considerable and reduce the viability of the project."
Castle (2) surveyed 29 project financings and found that one of the most common problems was the inability to complete a project within the time span originally anticipated. Only 17 projects had reached a point where they could be evaluated and of these 10 (59%) had experienced completion delays. These delays ranged from 1 month to 20 months and 5 projects (29%) were delayed for 6 months or more.

In certain areas the problems of delay are particularly severe. In the North Sea, for example, even the most experienced oil companies have encountered serious completion delays, particularly in the construction and installation of offshore platforms. The float-out and installation of a platform requires very calm seas and this 'weather window' is relatively short. If this is missed, installation may have to be delayed for almost a year.

To give a few specific examples of delay in the North Sea, the Frigg jacket sank while being towed into position; completion of the steel platform for the Piper field was delayed by 5-6 months by industrial disputes, and final delay was 19 months; and the Brent 'A' platform was delayed for 2 years owing to a combination of design problems, industrial disputes and an accident involving one of the key cranes.
TABLE 6.1

SELECTED NORTH SEA FIELDS START-UP DELAYS

<table>
<thead>
<tr>
<th>Field</th>
<th>Original Planned Start-Up</th>
<th>Actual Start-Up of Production</th>
<th>Delay (Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argyll</td>
<td>June 1974</td>
<td>June 1975</td>
<td>12</td>
</tr>
<tr>
<td>Auk</td>
<td>May 1974</td>
<td>December 1975</td>
<td>18</td>
</tr>
<tr>
<td>Beryl</td>
<td>November 1975</td>
<td>June 1976</td>
<td>7</td>
</tr>
<tr>
<td>Claymore</td>
<td>March 1977</td>
<td>November 1977</td>
<td>8</td>
</tr>
<tr>
<td>Dunlin</td>
<td>November 1976</td>
<td>August 1978</td>
<td>21</td>
</tr>
<tr>
<td>Forties (3)</td>
<td>November 1974</td>
<td>September 1975</td>
<td>10</td>
</tr>
<tr>
<td>Heather</td>
<td>July 1978</td>
<td>October 1978</td>
<td>3</td>
</tr>
<tr>
<td>Montrose</td>
<td>July 1976</td>
<td>June 1976</td>
<td>-</td>
</tr>
<tr>
<td>Ninian (4)</td>
<td>June 1978</td>
<td>December 1978</td>
<td>6</td>
</tr>
<tr>
<td>Piper</td>
<td>May 1975</td>
<td>December 1976</td>
<td>19</td>
</tr>
<tr>
<td>Thistle</td>
<td>February 1977</td>
<td>April 1978</td>
<td>14</td>
</tr>
</tbody>
</table>

(2) Source:  Offshore Engineer, Oil & Gas Activity Supplement, January 1980.
(3) Start up date of first platform
(4) Start up date of first platform
Table 6.1 analyses the expected and actual start-up date for certain North Sea fields which have been completed. Not all of these were project financing (Claymore, Forties, Piper, Ninian and Thistle were), but they serve to illustrate the importance of completion risks.

8.3.2 Cost Overrun Risk

Cost overrun, or cost escalation, has been defined as:

"The difference between the original estimate of the final cost of the project and the final out-turn cost or latest estimate of the final cost" (3).

In project financing only the final out-turn cost is important. It should also be remembered that the original cost estimate already includes an allowance for expected cost increases and also a contingency of, say, 10%, to cover unspecified increases, and that the cost escalation represents increases over this amount. The effect of unplanned cost overruns is clearly to give rise to additional financing requirements to enable the project to be completed. In the extreme this could cause a dilemma for lenders as they may have to increase their lending to enable the project to be completed and yet project cash flows may be insufficient to service the additional debt.

In Castle's survey this proved to be the most common difficulty associated with new projects. Of the 17 projects in his sample, 12 (71%) experienced cost overruns 3. These overruns ranged from
TABLE 6.2
FORTIES FIELD DETAILED BREAKDOWN OF
DEVELOPMENT COST ESCALATION

<table>
<thead>
<tr>
<th></th>
<th>ESTIMATE MID 1972</th>
<th>ACTUAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform</td>
<td>499</td>
<td>1,540</td>
</tr>
<tr>
<td>Drilling</td>
<td>116</td>
<td>520</td>
</tr>
<tr>
<td>Pipeline</td>
<td>162</td>
<td>265</td>
</tr>
<tr>
<td>Terminal</td>
<td>47</td>
<td>80</td>
</tr>
<tr>
<td>Multi purpose support vessel</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>76</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td><strong>900</strong></td>
<td><strong>2,680</strong></td>
</tr>
</tbody>
</table>

Source: Wood Mackenzie
300% to 5% of original cost, and 8 projects (47%) had overruns of more than 20%. Moreover, most of these projects were completed before the acceleration in inflation rates from the mid 1970s onwards.

Cost escalation in North Sea projects has been the subject of a special study commissioned by the Department of Energy (3). This study concluded that the cost escalation:

"is best considered as a manifestation of the difficulties of managing, to a short time scale, the design, resourcing and fabrication of novel and complex structures and installing and commissioning them in a hostile environment."

The Study found (p.35) that, taking the expected cost of all fields being developed in September 1973, the estimated cost (or out-turn cost) of the projects had increased by 144% in a period of 18 months. Of this, unanticipated inflation accounted for about 30%, and increases in the physical quantities of resources required accounted for about 90%.

To give just one example of cost escalation, Table 6.2 gives a breakdown of the costs associated with developing the Forties field. In 1972 B.P. raised $930 million (in fact £180 million + $468 million). This figure was originally expected to be sufficient to finance the whole of the development cost, but in the event the actual cost was almost three times as much. Although B.P. had no difficult in meeting this cost escalation, and although the project was still viable, in different circumstances such cost escalation could cause considerable problems.
Cost escalation in the North Sea was apparently due, in a large part, to the fact that oil and construction companies had little idea of the extent of the technical problems in developing a North Sea field. For example, Wood Mackenzie (4) reported that many designers underestimated the thickness of steel that was required for North Sea platforms.

It is unlikely, therefore, that the extent of cost escalation is as great in current North Sea projects. As in most situations there is a 'learning curve' and even in 1976 Wood Mackenzie (4), p.8, said “Today, there are genuine reasons for believing that the average rate of escalation in North Sea development costs have been tempered....”. At the same time, however, it is still an important risk area for banks to examine.

6.3.3 Raw Material Supply/Price Risk

This risk only applies in processing and pipeline projects where, in order for the project to generate revenues, raw materials have to be input into the facility. The risk is that the required inputs will either be unavailable or only available at a much higher price than was assumed in the cash flow projections. In some cases, if raw materials are unavailable from the planned source, the project may be jeopardised. Smith (5), for example, pointed out that:

"Ore from different mines sometimes differs sufficiently to require specific design variations in processing plant which significantly limit, or even preclude, substitution between alternative sources of supply in the short-term".

Just as important as the supply of physical raw materials (e.g. crude oil and ore) is the supply and price of the other inputs such as
### TABLE 6.3

**NORTH SEA OIL RECOVERY FACTORS**

<table>
<thead>
<tr>
<th>U.K. SECTOR FIELD</th>
<th>RECOVERY FACTOR (PER CENT)</th>
<th>NORWEGIAN SECTOR FIELD</th>
<th>RECOVERY FACTOR (PER CENT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argyll</td>
<td>15</td>
<td>Albuskjell</td>
<td>52.5</td>
</tr>
<tr>
<td>Auk</td>
<td>42.5</td>
<td>Balder</td>
<td>20</td>
</tr>
<tr>
<td>Beryl</td>
<td>40</td>
<td>Cod</td>
<td>50</td>
</tr>
<tr>
<td>Brent</td>
<td>47.5</td>
<td>Edda</td>
<td>31</td>
</tr>
<tr>
<td>Buchan</td>
<td>25</td>
<td>Ekofisk</td>
<td>20</td>
</tr>
<tr>
<td>Claymore</td>
<td>35</td>
<td>W. Ekofisk</td>
<td>35</td>
</tr>
<tr>
<td>Cormorant S.</td>
<td>45</td>
<td>Eldfisk</td>
<td>14.5</td>
</tr>
<tr>
<td>Dunlin</td>
<td>42.5</td>
<td>E. Eldfisk</td>
<td>16</td>
</tr>
<tr>
<td>Forties</td>
<td>40</td>
<td>Hod</td>
<td>32</td>
</tr>
<tr>
<td>Heather</td>
<td>40</td>
<td>Murchison</td>
<td>44</td>
</tr>
<tr>
<td>Montrose</td>
<td>50</td>
<td>Sleipner</td>
<td>19</td>
</tr>
<tr>
<td>Murchison</td>
<td>40</td>
<td>Statfjord</td>
<td>50</td>
</tr>
<tr>
<td>Ninian</td>
<td>37</td>
<td>Tor</td>
<td>27</td>
</tr>
<tr>
<td>Piper</td>
<td>40</td>
<td>Setor</td>
<td>21</td>
</tr>
<tr>
<td>Statfjord</td>
<td>50</td>
<td>Valhall</td>
<td>24</td>
</tr>
<tr>
<td>Tartan</td>
<td>37.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thistle</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SOURCE:** JOHNSON, C. "North Sea Energy Wealth 1965-85" Vol.1, p.32

(Taken from Wood Mackenzie figures)
power supplies and labour. In certain processes such as the smelting of aluminium, the supply of electricity is of paramount importance to the viability of the project. According to Hodson (6) "Up to half the cost of producing aluminium from the raw material, bauxite, is accounted for by energy used in the processes".

An example given by Kuczynski (7) illustrates another aspect of the raw material supply risk. The Trans-Andean oil pipeline was apparently undertaken before there were sufficient technical assurances from reputable sources that at least 300,000 barrels a day would be available to be put through the pipeline. In fact in 1977 at least, the likely flow was half the expected amount.

6.3.4 Reserve Risk

The equivalent of the raw material supply risk in extractive ventures (minerals and hydrocarbons) is the reserve risk. There are two main elements to this risk. Firstly, there is the risk that the reserves in place will not be as much as was originally expected. Secondly, there is the risk that not as much can be extracted as was planned. It is never economically or technically viable to recover 100% of the reserves in place. Tiratsoo (8) suggested that in gas reservoirs as much as 90% of the reserves in place can be recovered, while in oil reservoirs the recovery factor may be much lower. North Sea Oil recovery factors average about 40% in the U.K. sector and 30% in the Norwegian sector. Table 6.3 gives the recovery factors estimated by Wood Mackenzie & Co. for several North Sea oilfields.

If recoverable reserves are less than forecast, then clearly the amount of project cash flow available to repay the loans will be reduced.
This became a problem in one of the projects surveyed by Castle (2).

The amount of reserve risk was said to vary depending on the type of project. Thus in coal mining, it is relatively easy to determine the size of reserves. On the other hand, because of the high cost of drilling exploration and delineation wells, the reserve estimates in offshore oil and gas reserves are based on a relatively small amount of information. White (9), for example, pointed out that while "in a typical U.S. field an oil company might drill 15 exploratory wells to prove a field, in the North Sea, where drilling costs may be ten to twenty times as high, oil companies are having to make do with four wells to prove a field". Moreover, as Tiratsoo (6) stated:

"Since many of the factors which are needed to calculate the volumes of oil or gas that were originally in-place in an accumulation will only be obtainable after a number of wells have been drilled into it and the field put into production, the extent of the reserves of oil or gas originally present and ultimately likely to be recoverable may not be calculable until an appreciable proportion of the field's life-history has elapsed".

Since finance is required to drill the wells and put the field into production, banks are required to make decisions while there is still considerable uncertainty over the amount of recoverable reserves.
Because of uncertainty in the measurement, reserves are usually classified as either 'proven', 'probable' or 'possible' and are defined as follows:

'Proven' reserves - those which on available evidence are virtually certain to be technically and economically recoverable.

'Probably' reserves - those which are estimated to have better than 50% chance of being technically and economically recoverable.

'Possible' reserves - those which at present are estimated to have significantly less than 50% chance of being technically and economically recoverable.

6.3.5 Market Risk

This risk again has two elements, first, the risk that the output of the project cannot be sold in the planned quantities (marketability risk), and secondly, the risk that the market price will fall below the level assumed in the cashflow projections (price-risk).

Any reduction in either market price and/or marketability of the product will have a direct effect on the revenues generated by the project and therefore, on the ability of the project to service its debt.
TABLE 6.4

METAL PRICE TRENDS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper(1)</td>
<td>87.7</td>
<td>103.6</td>
<td>100.0</td>
<td>75.3</td>
<td>72.5</td>
<td>123.3</td>
<td>148.6</td>
<td>94.6</td>
<td>132.2</td>
<td></td>
</tr>
<tr>
<td>Nickel(2)</td>
<td>74.2</td>
<td>83.1</td>
<td>100.0</td>
<td>101.5</td>
<td>103.1</td>
<td>114.8</td>
<td>135.9</td>
<td>166.3</td>
<td>226.6</td>
<td></td>
</tr>
<tr>
<td>Aluminium(3)</td>
<td>90.0</td>
<td>95.8</td>
<td>100.0</td>
<td>100.5</td>
<td>212.7</td>
<td>234.0</td>
<td>174.0</td>
<td>156.7</td>
<td>342.6</td>
<td></td>
</tr>
</tbody>
</table>

(1) LME Settlement price
(2) Free market price, refined, delivered
(3) Virgin ingots, delivered

SOURCE: Annual Abstract of Statistics
Certain types of project are particularly susceptible to market risks. The prices of many minerals are particularly volatile (see Table 6.4 for examples) and in addition, some minerals do not have a broad international market. Thus, for example, Radetzki & Zorn (10) suggested that in the case of refined copper, lead, zinc and tin, there will always be a market for the product at same price through the London Metal Exchange and so the price risk is the main element in the market risk. On the other hand, metals such as bauxite, iron ore and copper concentrates are less readily marketable through the international metal exchanges.

LNG projects face particular problem of marketability. They are designed as an integrated scheme from well-head to ultimate user, and, as Lewand and Meyer (11) pointed out, at present the ability to transfer to alternative markets is limited. The number of receiving facilities available to handle LNG imports is limited, and LNG ships are designed for specific routes and so may not be able to be switched to other routes. Transportation costs may also preclude alternative routes.

Natural gas projects may also face peculiar market risks in view of the fact that in many countries there is a monopoly over the purchase of gas.

Crude oil appears to be one of the few commodities encountered in project financing which has a broad international market and is traded widely.
The market price risk proved to be a problem in one of the projects in Castle's sample. De Gavre (12) also reported that it was necessary to reschedule some of the debt for the Scroako nickel project in view of depressed world nickel prices.

6.3.6 Operating Risk

This heading covers the many problems that may be encountered once the project is in operation. Included in this section are risks such as fire, earthquake, blowout etc. which are sometimes termed 'force majeure' risks.

Operating risks may result in either interruption in production or higher operating costs and may, therefore, either delay or reduce the ability of the project to service its debts.

Of the 17 matured projects in Castle's survey, 9 (53%) had severe trouble in this respect. Two ended in bankruptcy and six others did not generate enough cash flow during some period of the financing to cover payments of principal.

Projects in the North Sea have faced significant operating risks. In 1977 there was a 'blowout' on the Bravo platform in the Ekofisk field which interrupted production. In November 1976 the Ekofisk 'A' platform caught fire which again interrupted production, and a break in the Thistle pipeline caused production to be halted.
Stalvies (13) also pointed out that it is not known how the concrete used in large gravity platform will perform over a long period of time, as in the past it has not been possible to test it under the conditions to which it is now exposed. Similarly in the case of steel platforms there is a risk of corrosion.

6.3.7 Operator Risk

Closely allied to the operating risk is the technical and managerial ability of the operator to plan, commission and operate the project. As Hofmann (14) has pointed out:

"All too often, lenders focus on the technicalities of the project and do not sufficiently examine the experience, integrity and commitment of the project management and do not sufficiently scrutinise the ability of the operator to optimise profitability.... Granted a good operator cannot create hydrocarbon reserves itself, but it can certainly make the best of any given situation........".

In most lending situations bankers assess the integrity and experience of the borrower but in project financing, banks may also have to extend their assessment to other parties. When a joint venture or consortium is set up, one company is appointed as operator. While major decisions are approved by majority vote,
the operator will be responsible for the day-to-day operations of the project. Since most partners will raise finance individually, the borrower may well not be the operator of the project. Indeed in the Piper and Claymore field, one of the partners, Thomson Scottish of oil projects. Associates had no previous experience. The lenders were, therefore, reliant on the ability and expertise of Occidental, the operator.

Moreover, while information on the reservoir, for example, is examined by independent consultants, consultants have to rely on basic data provided by the operator. Thus the integrity of the operator is important.

6.3.8 Consortium Structure Risk

This risk applies when projects are joint venture operations owned by several companies. The first consideration here is that the borrower may only have a small share in the project and lenders to that company will therefore have no way of ensuring that the project is developed and operated as they wish. They are dependent on the decisions reached by a majority vote. While it is difficult to conceive of situations in which other participants would reach decisions which prejudiced the ability of one bank to repay, this is still a risk which is apparently considered.

The second aspect to this risk is specific to North Sea projects; (similar rules may apply elsewhere but this is not known for certain).
Davies (15) pointed out that U.K. petroleum production licences are issued jointly to all members of the consortium and no member has a right to a divisible share of the licence. Thus a breach by any one member of its licence obligations could result in the Department of Energy revoking the licence without compensation to the non-defaulters.

The consortium documents are also likely to require that each member of the consortium is responsible for a pro-rata share of the obligations of a defaulting member. If the borrower is unable to meet this, it may then also be in default and therefore, lose its interest in the field. Thus, the lenders could face a dilemma between lending more to enable the borrower to meet the obligations of the defaulting member, or permit the borrower to default as well.

The result is that the lenders are closely concerned with the ability of all consortium members to meet both their financial obligations and licence obligations.

6.3.9 Country Risk

Nagy (16) defined country risk as:

"Exposure to a loss in a cross-border lending, caused by events in a particular country, events which are, at least to some extent, under the control of the government, but definitely not under the control of a private enterprise or individual".
FIGURE 6.1

COMPONENTS OF POLITICAL RISK

POLITICAL RISK to FOREIGN VENTURES

REPATRIATION RESTRICTIONS

OIL EXPORT RESTRICTIONS

RESTRICTIONS ON REMITTANCES

INADEQUATE RETURN on INVESTMENT

Civil Disorder Losses
External War Losses
Sudden Expropriation
Creeping Expropriation
Fiscal Changes
Domestic Price Controls
Production Restrictions

Country risk can be further divided into two categories:

(i) Political risk

(ii) Economic risk

(i) Political risk

The term political risk has been used to cover many different situations. Some authors equate political risk with political change and instability - e.g. civil war, riots, coups etc. Others define it more broadly to encompass the "possible occurrence of political events of any kind that cause a loss of profit potential and/or assets...". This broader definition accorded more with the interpretation of political risk by the bankers interviewed. The components of this broader definition of political risk are summarised in Figure 6.1. Gebelein (17) divided up the components of political risk into two broad categories. Firstly, those actions which affect repatriation of either oil or revenues. Of these, the latter is probably of greater concern to the lender since if project revenues cannot be sent abroad, repayment of loans will be impossible.

The second broad category covers political actions producing an inadequate return on investment. The most extreme situations are damage to facilities resulting from wars and riots, and sudden expropriation or nationalisation. In addition, projects can be affected by more subtle forms of government interference, such as increased taxes or royalties; imposition of import duties on raw materials or restrictions on their importation; price controls; controls on production; and renegotiation of the sharing arrangements under production sharing contracts.
The U.K. government's taxation policy is a significant aspect of political risk for North Sea Oil projects. The U.K. government also has powers to control the rate of depletion of a field to ensure that oil companies do not deplete it too quickly. Although production plans are approved by the Department of Energy and they have given assurances that any use of their powers to cut production would 'recognise the technical and commercial aspects of the field in question'\(^8\), there is still a danger that controls could be introduced or some other regulation added. A good example of the latter is the restrictions on the flaring of gas. Frequently gas is found in small uneconomic quantities mixed with oil. If this gas cannot be collected or reinjected into the well, and if flaring is restricted, the only alternative is to reduce production. Johnson (18) reported, for example, that the Brent B platform had to be shut down from June 1977 till late summer 1978 because of restrictions on flaring. Shell estimated that the cost was £57 million in revenue postponed.

(ii) **Economic risk**

Economic risk refers to the ability of a country to generate foreign exchange either by a surplus on the current account of the balance of payments or new foreign capital inflows. A consideration of economic risk is of prime importance in balance of payments lending where repayment of foreign loans can only be achieved if foreign exchange can be generated.
In Section 3.3.2, however, it was suggested that economic risk could be avoided, provided that the project was located in the export sector of the economy and therefore, generated its own foreign exchange with which to repay project loans.

However, economic risk must be considered if, for example, the project carries a government guarantee. The lender is then concerned with the creditworthiness of the government and its ability to repay if called upon.

Moreover, Eschenlauer (19) has pointed out that:

"a host country in favourable economic circumstances will be less motivated to put pressure on the cash flows of a petroleum project, which is why it is important to have a feel for the overall economic outlook for the country".

Economic risk may, therefore, affect a project in two main ways: Firstly, when a government guarantor is unable to repay, and secondly, if the government if forced to use increases in taxes (or impose exchange controls restricting remittance of earnings) to correct economic problems.

6.3.10 Credit Risk

Although, when defining project financing, it was said that banks treat the project as a separate entity, and although the non-recourse aspects of project financing are frequently emphasised, in many cases lenders are exposed to a corporate credit risk.
As was emphasised in Chapter 2, however, the corporate credit risk is accessory, or secondary, in project financing since it will only arise in the security given to support a project.

Depending on the arrangements, banks may have to assess the credit risk of both the project sponsor and/or third parties. Exposure to credit risks will arise when such security as sales contracts, sponsor or third party guarantees, and completion guarantees are given. The reason why the credit risk is important should be clear - there is little point in taking a completion guarantee which requires the sponsor to meet cost overruns, for example, if the company is not in a position to do so. As noted in section 6.3.8, the credit standing of other consortium members in a project is also considered important.

6.3.11 Exchange Rate Risk

This risk can arise if borrowing is denominated in one currency but the cash flows from which repayment is to be made is in a different currency. While the cash flow may be sufficient to service the debt at existing exchange rates, there is a risk that fluctuations in exchange rate could affect the ability to service debt.

6.3.12 Transportation Risk

This is a risk mentioned by Yassukovich (20), and involves the possibility that interruption in the availability of transportation facilities (pipelines, tankers, LNG carriers etc.), will affect the ability of the project to generate revenues and thus service its debts. We have already mentioned the risk of damage to pipelines under the heading
of operational risk. Transportation risk is also seen to be particularly important in LNG projects where the ships are highly specialised and are designed for specific routes. If ships are laid up for maintenance or repairs, it may not be possible to find other ships to transport the LNG.

6.3.13 Legal Risk

The main aspect of legal risk involves the possibility that the terms and conditions of the credit support and other agreements (discussed in chapter 9) either contravene local laws or are inadequately drafted. This could leave certain loopholes in the legal structure of the project and give rise to problems for lenders at a future date.
NOTES TO CHAPTER 6

1. The type of projects and the exact definition of project financing were not stated, but the definition is believed to correspond to the one used in this thesis.

2. Not all of these were 'project financing' situations but the nature and scale of the problem will be no different.

3. The definition of cost overruns is not given but is believed to be the same as used here.


7. It is reported in Offshore Engineer (September 1980, p.33) for instance that in 1975-6 Indonesia altered the production sharing terms from 60 : 40 to 85 : 15 in favour of the State oil company.

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CHAPTER 7

RISK MEASUREMENT

7.1 INTRODUCTION

This Chapter examines the second stage of risk analysis - risk measurement - which is concerned with the resolution of measurement uncertainty.

7.2 PROCESS AND PURPOSE OF RISK MEASUREMENT

Risk measurement in project financing was found to involve several processes. These are:

1. Determining the likelihood of a particular risk occurring
2. Determining the effect on the project of the occurrence of these risks
3. Determining the effect on lenders of such risks.

A distinction was made between the effect on the project and the effect on lenders of the occurrence of a particular risk as the results may not be the same. When structuring the project, it is possible to take steps which either reduce the impact of a risk on project cash flows, or ensure repayment even if project cash flows are reduced.

The term risk measurement may imply a highly quantitative approach, and while this is true in other situations where risk analysis is used, it was not found to be the case in project financing. Indeed many aspects of project risk are not capable of quantification.
Moreover, although the process of risk measurement was divided into three elements above, these are not formal distinctions used by banks. Rather they represent a formalisation of a far more intuitive process.

Risk measurement was found to be used for different purposes in project financing, depending on the type of activity the bank was undertaking. Advisors apparently used risk measurement to identify areas of particular risk with the objective of laying-off these risks to the most appropriate party to the satisfaction of both lenders and the project sponsor. Lead managers have much the same approach but, as was emphasised in Chapter 5, the flexibility may be more limited, as some of the structuring of the project may already be completed. Lead managers also need to be aware of the riskiness of the project in order to set an appropriate level of remuneration commensurate with the amount of risk the lenders are shouldering. Finally, lenders used risk measurement to assess the riskiness of the proposal in order to arrive at a decision on whether to participate or not.

The process of risk measurement can be divided up into two main elements, although this again is not a formal distinction made by bankers. These may be termed:

1. Technical assessment
2. Economic assessment
7.3 TECHNICAL ASSESSMENT

The technical assessment is basically a qualitative assessment of the technical aspects of the project. It is primarily concerned with establishing the likelihood of a project risk occurring. Some technical aspects of the project will, of course, also be included in the economic assessment if they are part of the project cashflow.

The technical assessment will be considered under three main headings: reserve risk, country risk, and other risks.

7.3.1 Reserve Risk

The first element of reserve risk we identified in Chapter 6 was the oil in place risk. This is apparently not considered to be too serious a risk, at least when the geological structure of the field is not too complicated. The recoverability risk of a non-producing field is, however, more difficult to assess. Parker (1) pointed out that: "the optimum production rate cannot be accurately determined until production actually commences....."

Estimates for recoverable reserves and the production profile of the field will be provided by the project sponsor (or operator). It is usual, however, for the banks to require reports from one, and sometimes two, independent consultants. Banks stated that these would be internationally known consultants (the most widely quoted example being De Goyler & MacNaughton). The report is prepared from basic data provided by the project sponsor, and is therefore only an independent interpretation of the results obtained by the sponsor.
In addition to information on the reservoir, the consultant's report may also include a full cash flow forecast. Some independent consultants also carry out simulations of the reserves and sensitivity analysis of cash flows.

Many American banks and some other banks were found to have access to in-house engineers, either in London or more usually in America. These engineers are used to assess the independent consultant's report, since many banks emphasised that reservoir engineering is far from an exact science. In one project that was studied, for example, two independent consultants' reports were produced. One of them gave a figure for recoverable reserves 1.7 times higher than the other. However, since the amount of reserves required to repay the loan was only 30% of the lower estimate the risk to lenders was considered small.

Banks then assess, on the basis of the above information, the magnitude of the reserve risk. In addition, if it is thought likely that reserves may be less than expected, banks said that they might also assess the impact of changes in the production profile on the viability of the project as part of the economic assessment. In this assessment banks usually err on the side of caution and only include 'proven' recoverable reserves in the cash flow forecast.
7.3.2 Country Risk

No direct questions were asked regarding the methods used to evaluate the political and economic risk of a country. This evaluation is performed as part of the bank's total international operations and is not specific to project financing. Therefore, it was thought appropriate to exclude it from the interviews. Some general comments were, however, made during interviews.

When evaluating a project, a report on the political and economic risks of the country concerned will be prepared by the bank's country risk experts. This report will assess the political stability of the country; its economic situation; and the importance of the project to the country as a whole. From this, banks can assess the likelihood of political risks occurring. As part of the economic assessment banks may also examine the impact of changes in taxation, royalties, production sharing contracts and depletion controls on the ability of the project to service its debt.

7.3.3 Other Risks

In order to establish the likelihood of other risks occurring banks stated that they might also require reports on other aspects of the project. Firstly, many banks had access to in-house experts and economists specialising on particular industries. These could be
called upon to report on such things as future price expectations, and marketability of the product. Particularly important in the case of mines is the question of whether it is a 'low cost' or 'a high cost' mine. If the market was to suffer from over capacity, a low cost mine is clearly better placed to continue selling and making positive cash flows than a high cost producer.

Some banks also said that, in the case of processing facilities, they might commission an independent market study covering the supply and demand prospects of the project.

In some cases construction engineering consultants have also been used to report on the construction schedule and costing of the project to ensure that these are not over optimistic and that the project is therefore likely to encounter delays and cost overruns.

In-house credit analysts will be used to assess the credit risk of the sponsor and other parties as well as the technical and managerial ability of the operator of the project.

7.4 **ECONOMIC ASSESSMENT**

The economic assessment is primarily concerned with measuring the likely effect of the occurrence of project risks on the ability of the project to service its debt, using the cash flow forecasts of the project. This section examines some of the techniques available for making this economic assessment and the use made of them by banks.
The first step in the economic assessment is clearly to obtain a cash flow forecast. For advisors and lead managers the basic data provided by the project sponsors and/or independent engineering consultants, while for lenders a cash flow forecast will be included in the information memorandum. This is taken to be the 'best' or 'most likely' estimate of future cash flow and is used as the 'base case' in subsequent evaluation.

In some cases, however, banks may use a more conservative cash flow forecast than that provided by the project sponsor. In the case of oil and gas projects, banks will usually only include 'proven' reserves, and if their view of future costs or prices is more pessimistic than that assumed by the sponsor they will use the more pessimistic view.

In addition, if the cash flow is highly uncertain it will probably be excluded from the calculation. This was the case, for example, in an oil and gas project that was studied. The gas was to be delivered to an LNG plant owned by the government but there was considerable uncertainty regarding completion of this plant. Therefore, as well as evaluating the project as planned, the banks also evaluated the project on the basis that only oil was produced.

Most banks interviewed had relatively sophisticated computerised cash flow models and experts to construct such models for particular situations - e.g. North Sea U.K. sector, Malaysia etc. This means that the model will take account of the specific tax regime in that
country. Only one bank interviewed did not have computerised models, and this bank had only acted as a lender to date.

7.4.2 Discounted Cash Flow

The primary concern of banks when evaluating cash flow forecasts is with the ability of the project to generate sufficient cash flow to be able to service its debts. While many banks emphasised this point, it was found that several banks used measures of profitability in their assessment. In particular many banks used discounted cash flow techniques to calculate either the 'Internal Rate of Return' of the project, or more usually, the 'Net Present Value'. These are both measures of profitability for the project sponsor and therefore of no direct relevance to a lender. While profitability and debt service capacity are to a certain extent interrelated this need not necessarily be the case. Indeed, it is possible to conceive of situations where a project has a satisfactory NPV, but is not acceptable to lenders. This could happen if very large cash flows were to arise towards the end of the project's life and which would therefore require loans for a maturity longer than the banks were willing to provide.

Several reasons were given by bankers to justify their use of discounted cash flow techniques.

Firstly, some banks said that calculating the NPV served as a check on the evaluation made by the project sponsor to ensure that the project will be beneficial to him. This may be true in some cases, but it should be pointed out that frequently the banks are dealing
with major multinational companies and they will not have made the decision to proceed with the project without carrying out extensive studies themselves.

Secondly, some banks said that they like to see a high NPV as it shows it is a good project and one to which the project sponsor is likely to have a high degree of commitment.

Thirdly, several banks used the NPV not as a measure in itself, but as a way of facilitating other calculations, particularly coverage factors. \(^5\)

Fourthly, it was suggested by one bank that a low profitability measure may increase the political risk of projects located in developing countries. In the event of a new government taking over it was thought more likely that it would repudiate debts incurred for bad/unprofitable projects. This seems a rather tenuous argument and indeed, it would seem more likely that a very profitable project would face greater political risk, either through expropriation or at least higher taxation or renegotiation of the concession agreement.

Finally, and perhaps most reasonably, some banks said that the NPV calculation can be used to show the sponsor the benefit to him of structuring the project in a certain way.

Another important issue that was raised with banks which were using discounted cash flow (and NPV in particular) was the choice of the interest rate to be used in discounting. It was found that all banks used an arbitrary discount rate ranging between 10\% and 15\%. They
all acknowledged that this was a purely arbitrary figure though two banks said they were attempting to formulate a policy on it.

In fact none of the theory of capital budgeting is any help in resolving this problem. The theory suggests that the financing and investment decisions should be treated separately and that the appropriate discount rate is the company's 'cost of capital'. However, using the company's cost of capital would not seem appropriate in project financing since the project is treated as a separate entity, and may have more than one project sponsor. More recently Keane (2) has proposed that the discount rate for a specific project should "refer to the rate on a publicly traded asset of like maturity and risk, and this effectively implies reference to the corporate bond market". But this proposition has also been criticised and it would therefore appear necessary to conclude that an arbitrary discount rate is the best choice available. Moreover, the question of the appropriate discount rate is only really important when making the capital investment decision, since it is only then that the NPV calculation is used as a measure of profitability.

7.4.3 Sensitivity Analysis

This was found to be the most frequently used technique for assessing the effect of project risks on the ability of the project to repay. All of the banks with computerised cash flow models said they performed sensitivity analysis on project cash flows. Among the variables subjected to such analysis were: delays in completion; interruptions in production; and changes in price/operating costs, tax rates and production profiles.
Rappaport (3) defined sensitivity analysis as:
"a study to determine the responsiveness of the conclusions of an analysis to changes or errors in parameter values used in the analysis".

Normally in capital investment analysis, sensitivity analysis is used to determine the degree of change in either the IRR or NPV of the project when key variables in the project are exposed to (unfavourable) variances. The objective is to answer 'what if?' questions - e.g. what if completion was delayed for one year? Normally no attempt is made to determine the likelihood of these events occurring; the objective is simply to indicate the areas where the project is most sensitive to change, usually with the intention of investigating these areas in greater depth.

The use of sensitivity analysis in project financing varies somewhat from this process described above. Firstly, some banks performed sensitivity analysis on undiscounted annual cash flows rather than on the NPV, while others used the NPV. The argument put forward for the use of undiscounted cash flows was again that banks are primarily concerned with the ability of the project to service borrowing and the effect of changes in key variables on this ability. In particular undiscounted cash flows were seen as useful as they permit the bank to identify years when the coverage of debt service is low. This can then be used when setting covenants in loan agreements to ensure the banks are adequately protected in those years.
Secondly, it appeared that most banks did not vary each element of project cash flow by an arbitrary figure of say 10% but rather made some assessment of the likely magnitude of any change and used this. Thus for example, it was said that the amount of variation applied in the case of mineral prices would be large (e.g. 40-50%) while in the case of oil projects it would not be a question of lowering oil prices but rather reducing the escalation factor or holding them constant in money terms.

Thirdly, the objective in using sensitivity analysis is generally not to identify key risks and then seek additional information on these areas so as to reduce the measurement uncertainty. In fact, there appeared to be two ways in which sensitivity is used.

(i) To identify risks to which the project is particularly sensitive (in terms of its ability to repay debt) with the objective of laying these risks off. This appears to be the way in which financial advisors use sensitivity analysis. The methods of laying-off risk may either reduce the risk to the project (e.g. by negotiating sales contracts with floor prices) or they may reduce the exposure of lenders to that risk (e.g. by taking a completion guarantee).

(ii) To determine a 'worst case' situation with the objective of ensuring that project cash flows are still sufficient to service debt.
This approach appeared to be the main way in which sensitivity analysis was used by lead managers and lenders. In this case they alter not one but several variables at a time and the outcome is perceived as the worst case that is likely to occur with a reasonably high probability. In other words, the 'worst case' is not an absolute disaster situation which is very unlikely to materialise but a reasonably pessimistic view based on previous experience of similar projects. Alternatively, some banks approached this slightly differently by assessing the extent to which the project needs to go wrong before it is unable to service its debts, together with a subjective assessment of the likelihood of this occurring.

7.4.4 Monte Carlo Simulation

This approach to risk analysis was first suggested by Hertz (4). Basically it involves estimating a range of possible values for each variable comprising the project cash flow. To each value a probability is assigned, giving a probability distribution for each of the variables. Then using the Monte Carlo procedure, random values are selected for each variable and used to compute the IRR or NPV for the project. This process is repeated numerous times, each time selecting a new value for each variable, and generating a new figure for the NPV. These are then usually represented graphically in the form of a probability distribution representing possible outcomes for the project NPV. Figure 7.1 represents two hypothetical distributions.
Project 1 has a lower expected (or mean) IRR than project 2 (as shown by points A and B respectively), but it is less risky, as Project 2 has a higher variance of possible outcomes than project 1.

Only one bank interviewed used Monte Carlo simulation in the analysis of projects and even here the reason for using it did not appear to be clear. The problem with the technique is that it measures profitability and as we have argued earlier the banker is primarily concerned with the debt service capacity of the project. When this point was raised the response was that they believed it was useful to determine the likelihood of a project having a low return. This bank also thought it could be useful in showing the benefit to the project sponsor of alternative structures. It would seem however, that in assisting lenders it is of less use. Although it does give an overall measure of the riskiness of a project it appeared from the interviews that banks are more concerned with analysing the individual elements making up this overall riskiness. Certainly, other banks
did appear to be aware of Monte Carlo simulation but did not consider that was useful. In addition to the point made above it was also suggested that it is extremely difficult to generate reliable subjective probability estimates to be applied to the values for each variable. This is seen as a problem even within major industrial companies as managers are said to be reluctant to produce probability estimates. It becomes even more problematic when a bank is performing the simulation, since they will be required either to invent their own probability distributions or use ones provided by third parties. A third possibility is to use one of the more common probability distributions as an approximation to the actual distribution. In all cases there will be considerable subjectivity which many banks felt would reduce the usefulness of the model. At present it appears that banks only go as far as to get experts to state the likelihood of certain events such as cost overruns or delays occurring, without incorporating this into a formal model.

7.4.5 System Dynamics

Brzozowski (5) has suggested that system dynamics may have an application in project financing, and gave as an example of its use, the evaluation of a petrochemical plant. Coyle (6) has also developed a system dynamic model for an underground mine. However, no banks interviewed were using this technique. In fact, in many ways system dynamics is similar to sensitivity analysis. As Brzozowski ([15] p.41) argued: "The use of such a technique allows a manager to vary policies and assumptions one at a time in order to note how sensitive the system behaviour is to each individual modification".
The only fundamental difference between system dynamics and sensitivity analysis is that the former is dynamic. Since no bank was using it, the technique is not discussed further.
NOTES TO CHAPTER 7

1. Basic data might include seismic information, well-test results, core analyses and electrical logs from the delineation wells drilled to date.

2. See section 4.4

3. The 'internal rate of return' (IRR) is defined as the discount rate that equates the present value of expected future net cash flows to the capital outlay i.e. the discount rate where NPV = 0.

4. The net present value (NPV) of a project is defined as the difference (in money terms) between the present value of net cash flows and the capital outlay of the project when discounted at some appropriate discount rate.

5. See section 11.3.2 for the methods used to calculate coverage ratios.

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CHAPTER 8

RISK CONTROL

8.1 INTRODUCTION

This chapter examines the process of risk control and the alternatives open to banks when deciding on how to deal with each project risk. It also examines some of the situations in which lenders may be willing to shoulder particular risks.

8.2 PROCESS OF RISK CONTROL

This is the final step in risk analysis and involves determining the best way of handling the risks once they have been identified and measured. The best way of dealing with each risk will clearly vary from project to project and depend on the nature of the project, the objectives of borrowers, and the attitude of lenders. As Nevitt(1) has suggested:

"the key to successful project financing is structuring the financing of a project with as little recourse as possible to the sponsor while at the same time providing sufficient credit support through guarantees or undertakings of the sponsor or third party so lenders will be satisfied with the credit risk."

It was frequently emphasised during interviews that the process of risk control is not as simple and mechanical as the theory might suggest. In particular the laying-off of risks will involve extensive negotiations. For example, if the price risk was considered unacceptable, a sales contract with a floor price would appear to be the obvious way of
avoiding this risk. In practice the availability of such contracts and the strength of their terms and conditions will depend on such factors as the state of demand for the product and the bargaining strength of the sponsor or third party. Moreover, in certain situations the most desirable form of security may not be available for a variety of reasons. For example, Spanish law prohibits all forms of mortgage or lien over hydrocarbon products. It is therefore impossible to mortgage production facilities or assign sales contracts or sales proceeds to banks.

One important area that was explored in the research was the willingness of banks to shoulder project risks. Hammar, for example, is reported by Cudaback(2) as saying:

"...if a bank is capable of financing a project, and can analyse the risks, it should be prepared to assume all those prudent risks and be compensated for them."

This view was supported by most banks interviewed. Many stated that no project risks were intrinsically unacceptable to lenders, although some banks did add that certain risks would require very special circumstances before they would be shouldered by lenders. Again, however, it is not necessarily the case that all risks which are acceptable to lenders will be shouldered by them. Deverell(3), writing about the reserve risk, for example, stated:

"...borrowers themselves sometimes feel that this is the least appropriate of all the risks for lenders to take. This is because they may consider that they will always be better equipped to evaluate such technical risks."
Here again there is the concept of a 'comparative advantage' in risk bearing. It was suggested that lenders are likely to require a higher interest margin than borrowers are willing to concede for taking this risk, given their differing perceptions of the amount of risk involved.

In the following sections the various methods of dealing with project risks are examined. Detailed discussion of some of the credit support obligations is reserved for Chapter 9. Again, it was emphasised in interviews that there are no set techniques for dealing with risks and the solutions are limited only by the ingenuity of the advisor or lead manager. The examples given therefore represent only some of the possibilities that have been used to date.

8.2.1 Completion risk

Johnson(4) argued that "the completion risk is generally considered the most difficult for banks to assume; it has normally been felt that such risks should be undertaken by equity participation...". This view was supported by all of the banks interviewed. It was argued that until the project is actually producing, the risk is really an equity risk and therefore not appropriately borne by commercial bank lenders. Certainly the early experience in the North Sea suggests that in cases of new technology particularly, the completion risk is very high.

Some banks did say that they would consider taking the completion risk if the operator and construction contractor were experienced, the technology was proven and the construction period was short. One example where this occurred was in the $100m loan to Marathon Petroleum Ireland
Ltd. to finance the Kinsale Head gas field\textsuperscript{1}. When asked why the lenders were prepared to shoulder the completion risk in this case, banks replied that the project was very near to completion and had an experienced operator. The major risks of delay associated with the fabrication of the rigs and the float out had therefore passed. The rigs were in place and all that remained was the piling, and drilling of production wells.

It was found that where the completion risks are unacceptable the most usual way to lay off the risk was to require a completion guarantee from the project sponsor. This means that until the project is "complete" the project sponsor shoulders all risks and lenders are only exposed to a corporate credit risk. However, a completion guarantee can be drafted in many different ways and not all completion guarantees enable the lenders to avoid all completion risks. Firstly, there may be a provision in the credit agreement permitting repayment of the loan to be deferred for a certain length of time if completion is delayed. Usually if the project is not completed by a stipulated date, repayment must commence regardless and will therefore be paid by the sponsor. This means that the banks are taking a limited risk that their income will be deferred, but are guaranteed that they will ultimately be repaid even if the project is never completed.

Secondly, there appears to be a trend towards less tight definitions of completion with the result that completion guarantees fall away earlier than previously. This point is discussed further in section 9.6.

Some banks also believed that increasingly in the future, banks will be more prepared to shoulder the whole completion risk. This appears
to have been the case in the Woodside North-West Shelf gas project where the lenders are reportedly taking the completion risk. Exact details are not known as information on the loan terms is not yet available.

8.2.2 Cost Overrun risk

This is also considered to be a very significant risk in most projects and one which lenders are generally not prepared to shoulder. This risk is again usually laid off to the project sponsor by means of a completion guarantee containing a requirement that the sponsor should meet all cost overruns from equity. In this situation it is clearly important to ensure that the company giving the completion guarantee is able to meet any potential cost overruns. The example of the Cuajone copper project in Peru given by Beim(5) illustrates this risk. Here a completion guarantee was executed by the project company - Southern Peru Copper Company - but not by the ultimate sponsors. Cost overruns exceeding $100m were incurred; the project company was unable to meet them and the sponsors refused to meet more than a fraction. The banks were therefore required to lend the balance to enable the project to be completed rather than lose their existing loans.

Deverell(3 p.4) suggested that in the case of North Sea projects:

"...where there have been doubts about the borrower's ability to perform, there has either been an insistence that the borrowers should arrange additional loan facilities in advance, or else ... the borrower's parent has had to guarantee performance of the completion covenant."
In some cases banks may be willing to lend an additional amount to finance cost overruns and standby facilities will be arranged in advance. This has apparently been done in the case of the North West Shelf project where a standby facility is available from lenders to finance initial cost overruns up to A$300m. In addition, equity underwriting commitments for $150m each have been obtained from Shell and Broken Hill Proprietary. These will ensure that equity is available to finance cost overruns over $300m. If cost overruns exceed $600m, however, there are no formal arrangements to cover the situation.

A third alternative for dealing with the cost overrun risk is to have a turnkey construction contract either for a fixed price or for a given price plus the first x% of any cost overrun. In this case the risk of cost overruns would be passed to the contractor. These contracts are apparently extremely rare in today’s inflationary environment so this is not usually an alternative.

8.2.3 Raw material supply/price risk

This was a risk which banks were apparently willing to take since it was usually not considered to be too great. In principle the supply risk can be avoided by having raw material supply contracts and the price risk by setting a ceiling price in the contract. This contract could be given either by the sponsor or third party. However, few banks interviewed had seen such contracts and even when they had been taken, they were generally short term contracts at market price.

Other forms of contract that have the effect of ensuring adequate supplies to operate the facility include the throughput agreement
(used for pipelines) and the processing agreement or tolling contract (used for refineries etc.). Both are contracts to put raw materials (usually crude oil or gas) into a facility and take it out at the other end.

A throughput agreement was considered essential for pipeline projects because of their high level of fixed costs and the consequent sensitivity of cash flow to below capacity operation.

In other cases formal raw material supply contracts were not taken as the risk was dealt with in other ways. In one example studied the sponsor owned a mine as well as the processing facility and the two projects were linked together so that access to raw materials was assured. Finally in an aluminium smelting project that was studied, the project sponsor was required to assure the delivery of sufficient alumina, or indemnify the banks for any reduction in smelter cash flow resulting from inadequate or late deliveries of alumina. This project did however have a 25 year electricity supply contract as the supply and cost of electricity was considered vital to the viability of such a project.

8.2.4 Reserve risk

Castle(6) argued that

"...when a project loan involved (lenders) taking the so-called "reserve risk", I would not suggest a non-recourse project financing unless the reserves are classified as proved producing.... If the financing is backed by a guarantee of completion and the reserves are classified as proved nonproducing it is not unusual for the lenders to take the reserve risk in a project loan if a hard-mineral reserve is being developed. It is possible - but more difficult - to arrange such a financing if the mineral is oil and gas."
In fact it was suggested in interviews that banks in the UK are prepared to accept reserve risk either from the start or after a (relatively short) period of production in many cases, as the reserves reserve risk was perceived to be low.

In some cases, however, they may only be willing to take one part of the reserve risk. For example, in the loan to BP to finance the Forties field\(^2\) the banks were willing to assume the oil in place risk but not the recoverability risk. This was the first North Sea financing and although the banks were happy with the oil in place - two independent consultants had reached very similar conclusions - there was greater uncertainty concerning the recoverability factor. BP therefore guaranteed a minimum recovery factor of 44% which meant that if there was oil in the reservoir but it could not be extracted, BP would have to repay the loan.

In other cases banks are prepared to take the reserve risk once certain production tests, defined in the completion guarantee, have been achieved. Bankers considered, however, that the length of time over which minimum flow rates had to be achieved (usually a maximum of 6 months) was inadequate to demonstrate the ability of the reservoir to continue producing at these rates. They suggested that this test only ensures that the facilities are capable of operating at these flow rates.
In situations where the lenders are taking the reserve risk, Castle (6(p.29)) suggested that the repayment of the loan should be by a dedicated percentage of cash flow rather than by a fixed repayment schedule. It appeared from the projects studied that this is also usually the case in UK project financing. This avoids the risk that reserves will be depleted faster than planned and leave part of the loan outstanding when reserves are exhausted, as might be the case if a fixed repayment schedule is used. An analysis of the alternative repayment schedules used is given in section 11.4.2.

8.2.5 Market risk

The willingness of lenders to assume the marketability and price risk was found to vary depending on the type of project. In oil projects, banks said they were always prepared to shoulder the market risk as crude oil is a commodity which is widely traded, and the risk of a substantial fall in market price was considered remote.

In other types of projects lenders were less prepared to shoulder market risks for the reasons given in section 6.3.5. In gas projects the gas is usually purchased by a monopoly, and is often transported by pipeline. Therefore the ability to switch to other markets is limited. In LNG projects alternative markets are also restricted because of the limited number of receiving terminals and problems of transportation; and in many mining projects prices are volatile and marketability limited. Finally, as regards processing facilities, White(7) suggested that lenders are unlikely to bear the market risks as demand for refined products and petrochemicals is variable and the differential between the price of the raw material and the price of the output may either
be negative or at least insufficient to cover operating and finance costs.

In these situations, banks said that it was common to find some form of support to ensure there are adequate revenues. Frequently, this is by way of a long term sales contract. One bank went so far as to say that in LNG projects the sales contract is the only thing that makes the project viable. In some cases the contracts may also include a floor price, but banks said that this was increasingly rare.

In the case of pipelines and processing facilities the market risk can also be avoided by the use of throughput agreements and processing agreements respectively.

Sometimes a formal contract is not signed, but the sponsor may guarantee to provide raw material at one end and take the processed product (this was the case in one project examined). Another possibility, (used in another of the projects studied) is for the sponsor to guarantee a minimum price so that if the market price falls below a certain level the sponsor will make up the difference. An aluminium smelting project that was studied left the bank shouldering the price risk but the project sponsor effectively guaranteed the marketability risk. This was done by defining cash flow available for debt service as world market price multiplied by the productive capacity of the plant less operating costs. The sponsor was committed to maintain this cash flow regardless of actual sales or production levels.
8.2.6. Operating risk

Many of the elements in this risk appeared to be unacceptable to lenders. The risks of blowout and fire that were included under operating risk (but which are sometimes termed force majeure risks) are usually covered by insurance.

In cases where project sponsors chose not to insure against these risks, or where total cover is not available, it is apparently common for lenders to require the project sponsor to indemnify them and pay over an amount equivalent to what would have been received had insurance been taken out. As Deverell(3(p.5)) pointed out:

"We feel that lenders should not be expected to assume uninsurable risks, and hence we look for covenants, with performance guaranteed by parent companies if necessary, to ensure re-completion."

As regards the risk of operating costs rising, lenders often apparently shoulder this risk. However, banks said that in some completion guarantees a test was included to ensure that the economics of the project had not changed radically before the completion guarantees fell away. This has apparently been used in a few mining projects where the completion test requires that x tons of product, of y quality, be extracted at no more than z operating cost. This obviously only covers the situation at completion and operating costs could rise thereafter.

Lenders may or may not take the risk of interruption in production. In the Forties loan, (see Appendix IV), they took this risk to a limited extent. If production was interrupted prior to 1978 (subject to the presence of recoverable oil) repayment could be suspended for up to one year. After 1978 BP was required to make payments to keep repayment
8.2.7 Operator/Consortium structure risk

There is really no alternative but for lenders to shoulder these risks or to refuse to lend, since there is no way to lay it off. Lenders therefore ensure that the operator has sufficient managerial and technical expertise to complete and operate the project. Similarly for the consortium structure risk lenders can only ensure that co-participants in the project are capable of meeting obligations or have prearranged lines of finance to enable this to be possible.

8.2.8 Country risk

We suggested in Chapter 3 that one of the major reasons for the use of project financing was the desire to share political risk. Woicke(8), for example, suggested that

"the laying off, or at least sharing of political risks with lenders has lately become more and more popular in energy financing."

The first way in which political risk can be laid off is to use political risk insurance such as that provided by ECGD. This provides cover against expropriation or nationalisation; war damage; and currency inconvertibility for a premium of 1% of the insured amount. Clearly, however, this insurance does not cover all of the political risks mentioned in section 6.3.9, and moreover, it is relatively expensive in comparison with the additional spread a bank might require in return for shouldering political risks.

In several recent project financings the main objective of borrowers
has been to pass the political risk to the lenders, and all banks interviewed appeared ready to shoulder the political risk in most situations, provided there was room within their country lending limit. In one project that was studied the banks took no other risks besides the political risk (and the credit risk of the sponsor). In this case the sole objective was to put the banks at risk if the host government took any political action against the project. This was achieved by the sponsor guaranteeing a hypothetical cash flow, based on its forecast of the revenues and costs of the project and the current royalty and tax rates. This was effectively the maximum cash flow available to service the debt and if the government increased taxes or royalties the banks would immediately suffer, firstly by a delay in repayment and later by a loss of interest payments.

In other cases, however, lenders have declined to shoulder political risks and the risk had to be borne by the sponsor. This was particularly true in the mid 1970s in the UK sector of the North Sea, when there was considerable uncertainty over the government's energy policy. Argyle(9), for example, reported that in the case of the loan to Occidental to finance the Piper field in 1974, nationalisation and loss of licence were the only events that Occidental Petroleum Corporation was required to guarantee after completion. Since that time, however, fears over political risk on the North Sea have subsided and banks now appear willing to shoulder all political risks. Despite the present government's oil taxation policy, banks believed that the government would not threaten the viability of fields once they had granted a production licence.

It was pointed out during interviews, however, that banks do take certain steps to reduce political risk. Banks considered it important
to give notice to the Finance Ministry or central bank in the host country of their interest in the project. They also apparently check that the project has received governmental approval and that it is a priority project. This is thought to reduce the likelihood that the government will take action against the project. One bank also suggested that lenders should ensure that the project complies not only with the letter of the law but also with its spirit, thus acting in anticipation of any future changes in say pollution laws which could cause problems at a later date. In the UK North Sea, banks have also sought various assurances from the Department of Energy to ensure that their position is not threatened by the exercise of governmental powers.

In order to avoid the risk of a ban on the remittance of foreign exchange use is sometimes made of an external escrow account (trustee account). This enables earnings from exports to be paid into a bank account located outside the host country and operated by a trustee.

8.2.9 Credit risk

Lenders will be exposed to a corporate credit risk to the extent that the project sponsor or third parties have provided credit support obligations. These risks are therefore ones which the banks must usually either accept or decline to lend.

When structuring the project however, it is possible to reduce the magnitude of the credit risk which banks will be exposed to. If, for example, the project sponsor is not considered sufficiently creditworthy it may be possible to find a third party guarantor. This was the case in two North Sea loans. Tricentrol obtained the
UK government's guarantee for the first of its loans to finance the Thistle field, while Ranger Oil obtained the guarantee of Chevron for its Ninian field loan.

In other situations the credit risk of the borrower may be unacceptable in which case the lenders may require a guarantee of the borrower's obligations from the parent company. In other cases support from the parent company is not in the form of a direct guarantee but rather some form of indirect guarantee such as a throughput agreement or take or pay contract, or even perhaps some form of comfort letter which does not carry the full weight of a guarantee.

8.2.10 Exchange rate risk

Banks apparently seek to ensure that the project is not unduly exposed to an exchange rate risk. The usual way of achieving this is to denominate the loan in the same currency as project revenues. Davies(10) suggested that if, for example, a dollar loan is made to finance dollar expenditure on a project whose output is to be sold to German buyers, the lenders could insert a currency option in the credit agreement permitting the borrower to convert the loan once and for all into deutschmarks so as to reduce the exchange risk. It was also pointed out by one bank that in the case of oil projects, even if a loan is denominated in dollars and cash flow is in sterling there is little exchange rate risk since the world oil price is set in dollars.

8.2.11 Transportation risk

It is not known how banks usually deal with the transportation risk
in the case of LNG projects. Generally there will be a transportation contract under which the shipper agrees to transport a specified annual volume of LNG.

In the case of pipelines the transportation risk appears usually to be taken by the obligor under the throughput agreement since there is frequently a requirement for the company to make payments even if the facilities are not operational.

8.2.12 Legal risk

Legal risks can be avoided by careful drafting of the loan agreement and other contractual obligations. In addition it is usual for lenders to require formal legal opinions confirming the legal validity of all documents. This is particularly important since a number of different legal systems are likely to impinge on a project financing, including the laws of the borrower's domicile; the lender's domicile; the place of contracting; the place where the project is located; and the domicile of any parties to contractual obligations.

8.3 OTHER METHODS OF RISK CONTROL

Even when lenders shoulder project risks they frequently take steps to reduce the impact of such risks on the ability of the project to service its debts. This is achieved by ensuring that there is a sufficient safety margin of excess cash flow over and above that required to service the debt. The various methods used by banks to calculate this 'coverage' are examined in section 11.3.2.

Banks suggested that the size of the safety margin depended on their perception of the riskiness of the project. Thus risky projects will require a relatively high safety margin. This is achieved by reducing
the total amount banks lend to the project.

It was also suggested that borrowers face a tradeoff between the amount of risks they can lay off to lenders and the debt/equity ratio of the project. The fewer the risks that are shouldered by banks the more banks will be prepared to lend. This appeared to be for two reasons. Firstly, the more risks that are shouldered by lenders the greater the cushion of excess cash flow they will require for protection. Secondly, banks wished to ensure that the sponsor is financially committed to the project. If the lenders take no risks (i.e. the project is fully guaranteed) they might lend 100% of the cost as the sponsor is committed via its guarantee, while if lenders shoulder all the project risks they will require the sponsor to inject more in the form of equity.

Several loan agreements studied had cash flow coverage tests which were guaranteed by the sponsor. This ensured that if project risks occurred which reduced project cash flow below a certain multiple of debt, the sponsor was required to inject equity into the project with which to repay some of the loan and restore the coverage ratio.

8.4 TRENDS IN RISK CONTROL

Table 8.1 summarises the risks that banks are known to have shouldered in certain project financings for which information was available. It is clear that over time the willingness of lenders to shoulder project risks has increased. In the first project financing in the UK - Forties - the only significant risk shouldered was the oil in place risk. Since that time, banks suggested that they have become more familiar with the nature of project risks and so have also become more willing to shoulder them.
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<th>DATE</th>
<th>COST OVERRUN</th>
<th>COMPLETION DELAY</th>
<th>MARKET PRICE</th>
<th>QUANTITY</th>
<th>OPERATING COST &amp; TECHNOLOGY</th>
<th>OIL IN PLACE</th>
<th>RECOVERABILITY</th>
<th>POLITICAL</th>
<th>FISCAL</th>
<th>FORCE MAJEURE</th>
<th>CREDIT RISK OF SPONSOR</th>
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<tr>
<td>BP - FORTIES</td>
<td>1971</td>
<td>-</td>
<td>limited delay in repayment</td>
<td>limited sales contract</td>
<td>-</td>
<td>X</td>
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<td>-</td>
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<td>THOMSON-Piper</td>
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<td>-</td>
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<td>X</td>
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<tr>
<td>ICI-NINIAN</td>
<td>1976</td>
<td>-</td>
<td>-</td>
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<tr>
<td>MARATHON-KINSALE HEAD</td>
<td>1977</td>
<td>X</td>
<td>X</td>
<td>Sales contract</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>-</td>
<td>-</td>
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<td>1977</td>
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<tr>
<td>TRANS TUNISIAN PIPELINE</td>
<td>1970</td>
<td>-</td>
<td>-</td>
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Source: Revised by the author from numerous sources.
Certain caveats should, however, be borne in mind when discussing such trends, in view of the nature of project financing.

Firstly, the table is in many ways an over-simplification, since the extent of the risk shouldered under each category can vary from project to project.

Secondly, while there may be an increasing predisposition to shoulder project risks, the decision on whether lenders actually shoulder a particular risk in particular projects will depend on both the magnitude of the risk and the desire of the borrower to lay off that risk to lenders. Thus it is not possible to conclude that because lenders have now taken a certain risk they will always do so in future.
NOTES TO CHAPTER 8

1. See CONNELLY, J. Institutional Investor Vol.12(7) 1978 p.113

2. See Appendix IV for a summary of this loan.

3. As in all cases generalisations are difficult, and it is conceivable that a mining project might be financed without a sales contract if the mine was a very low cost producer.

4. Frequently commercial insurance premiums for some risks are considered too high and so insurance is not taken.

5. For a very detailed discussion of the type of assurances given and their legal validity see ARGYLE, R.E.S. Governmental Powers and Project Financing in the North Sea: the UK Experience, pp. 46-64

6. See Appendix VII for details of the Tricentrol financings.

7. See Wilson Committee "Financing of North Sea Oil" Research Report No.2.

REFERENCES TO CHAPTER 8

(1) NEVITT, P.K. "Project Financing" Euromoney Publications 1979, p.13


(3) DEVERELL, M.C. Address to West Coast LNG Symposium, Perth, Dec. 1977 p.4.

(4) JOHNSON, A. "Banks Willing to Consider Risks for Appropriate Remuneration" Offshore Engineer, Oct. 1979, p.59


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CHAPTER 9

CREDIT SUPPORT OBLIGATIONS

9.1 INTRODUCTION
This chapter examines in greater depth the contractual obligations outlined in chapter 8 with the objective of highlighting some of their strength and weaknesses as security.

9.2 RAW MATERIAL SUPPLY CONTRACT
Few bankers interviewed had seen raw material supply contracts used. This appeared to be partly because of the relatively few project financings involving processing facilities and partly because in many cases the particular circumstance of the project meant that the raw material supply risk had been controlled in other ways.

Since a raw material supply contract for a processing facility is the same as a sales contract for a mine the usual terms and conditions of both types of contract will be dealt with in section 9.5 covering sales contracts.

9.3 THROUGHPUT AGREEMENT
Throughput agreements are usually given to provide security for lenders when financing pipelines. Whalley[1] suggested that the throughput agreement was devised as a way of enabling the sponsor to provide what amounts to an unconditional guarantee, while avoiding the balance sheet impact of such a guarantee. The fact is that guarantees must be included as a note to the company's balance sheet and the amount of the potential liability quantified. The
accounting disclosure requirements for throughput agreements are less well established.

Fowler(2) defined a throughput agreement as:

"...an agreement to put a specified amount of product through a production facility in an agreed time period or, if not, to pay for the availability of the facility".

This definition in fact described a 'strong' throughput agreement and there are apparently many varieties of throughput agreement. Firstly, they may be given either by the project sponsor (or a related group company) or by third parties. It appeared that it is more usual in project financing for the throughput agreement to be given by the project sponsor, although third party agreements are not unknown. It was suggested, for example, that one way of financing the proposed UK gas gathering system would be for the British Gas Corporation to enter into a throughput agreement with the pipeline owner. Third party throughput agreements are apparently more common in the USA.

It is, of course, possible for more than one throughput agreement to be given. For simplicity however, we will deal only with the more usual case where one throughput agreement is used.

There are two possible types of throughput agreement. One is termed
the 'put or pay' agreement which is of the type defined by Fowler above. The alternative is to have a 'put and pay' where tariff payments are only made if product is put through the pipeline.

Usually it appears that the throughput agreements used in project financing are of the 'put or pay' type, particularly as they are generally given by the sponsors. It is less likely that third parties would accept an unconditional obligation to pay.

The tariff payments for the use of the pipeline are usually designed to cover all operating costs and debt servicing. This may be achieved either by specifying a formula in the contract or more simply by stipulating that the tariff must be sufficient to provide the pipeline owner with sufficient funds to meet all obligations due in that period.

In the case of a put or pay agreement the shipper is obliged to pay the agreed tariff even if he does not ship any produce through the pipeline or even if the pipeline is not operational. Payments made in these circumstances are usually stated to be advance payment for future shipments over and above the future obligated amounts. The obligation to make advance payments is taken to be a normal commercial commitment for accounting purposes, while from the lender's viewpoint it is effectively a guarantee. Cash flow will be generated regardless of whether the pipeline is being used up to its planned capacity, or indeed, regardless of whether the pipeline is operational.

An example of this obligation is the following clause taken from one of the project financings studies:
FIGURE 9.1  PIPELINE PROJECT STRUCTURE

- SYNDICATE OF BANKS -
  - REPAYMENT OF LOAN -
  - LOAN -
  - ASSIGNMENT OF THROUGHPUT AGREEMENT -
  - PIPELINE COMPANY -
  - THROUGHPUT AGREEMENT -
  - THROUGHPUT PAYMENTS -
  - PROJECT SPONSOR -
"Regardless of whether or not (the pipeline company) is at fault, and regardless of the extent to which the Pipeline is constructed, the obligations of the Shipper under this Agreement shall not be affected or invalidated by any circumstances including but not limited to the failure, impossibility or impracticability to have gas shipped through the Pipeline for any reason whatsoever, including but not limited to the total destruction, damage, non-functioning or change in ownership or control of the Pipeline....".

The result in this case was that lenders were able to avoid all project risks including political risk. The only risk they faced was the corporate credit risk of the shipper being unable to meet its obligations.

In a few cases, however, banks stated that force majeure clauses have been used in throughput agreements. This means that in situations where the pipeline is out of action for reasons defined as force majeure, the shipper is not obliged to make advance tariff payments. In these cases therefore the banks will be shouldering other risks besides a credit risk.

A simplified structure for a pipeline financing is shown in Figure 9.1. A nominally capitalised pipeline company is usually established to own pipeline. It will also enter into a throughput agreement with the shipper who wishes to put gas or crude oil through the pipeline. This agreement is assigned to the banks, thus giving them the right to enforce the throughput agreement.

One issue that has been raised by several authors concerns the possibility of frustration of the contract. In the U.K. the Law Reform (Frustrated Contracts) Act 1943 provides that parties are discharged from their obligations if the contract has become impossible
to perform or has been otherwise frustrated by events outside their control. The general view appears to be, however, that the Act could not be used to avoid obligations under throughput agreements. Argyle(3) for example argued that:

"It is fundamental to the operation of the doctrine of frustration as developed by the Courts that the frustrating circumstance arises without fault of either party and was not contemplated or taken into account by the parties at the time of formation of the contract....".

Since the whole objective of taking a throughput agreement was to lay-off the risks to the shipper it is clear that the frustrating circumstance was contemplated. This means that a put or pay throughput agreement will provide as much credit support as an unconditional guarantee given by the same company.

9.4 PROCESSING AGREEMENT

This is very similar in form and effect to a throughput agreement. Processing agreements are generally used in refineries, petrochemical plants etc. where the output is in a different form to the input. These agreements may be given by either the sponsor or third parties, but one of the projects studied had a processing agreement given by a third party. The obligations of the company putting the feedstock through the facility under this processing agreement were further guaranteed by its parent company. In this case the tariff payment consisted of the actual cost of processing the feedstock plus an amount sufficient to service the debt. The obligation to pay the second element of the tariff was again unconditional - i.e. it was a put or pay obligation.
9.5 SALES CONTRACT

These are normally taken in mining, gas and LNG projects. It is apparently relatively easy to obtain some form of sales contracts in these cases, as trade has historically been conducted with the support of long term sales contracts. If the market risks are to be completely avoided the sales contracts should have the following characteristics:

1. The length must be at least as long as the maturity of the loan.
2. The revenues generated must be sufficient to pay operating costs and service debt.
3. The obligation to pay must be unconditional and payments made whether or not the product is actually delivered.

This would, however, be an ideal contract and banks interviewed suggested that it was rare to find a sales contract with all of the above characteristics. As with throughput agreements, sales contracts may be given by either the project sponsor or third parties. Strong 'take or pay' contracts are unlikely to be available from third parties, but banks suggested that some sponsors are willing to enter into such agreements. Banks regarded these 'take or pay' contracts as indirect sponsor guarantees, while they have the advantage for sponsors that they are subject to less stringent disclosure requirements than unconditional guarantees.

Although strong 'take or pay' sales contracts are attractive to lenders, it was emphasised that it is not always possible to obtain such contracts. For example, De Gavre[4] reported that in the case of the Inco nickel project in Indonesia the sales contract given by the sponsor was at market prices and subject to availability of the product.
Batkin and Goodspeed(5) suggested that in the case of LNG projects third party purchasers may be willing to enter into take or pay contracts where they are effectively guaranteeing the project, since "the need for a captive source of LNG will often justify such a financial commitment by the distributor". In most other cases, however, banks thought that take or pay contracts from third parties would either be unobtainable or would be on terms disadvantageous to the project. As Beim(6) pointed out, the take or pay contract has been used "...where the customers and sponsors were identical, but it has not been accepted in any significant way by arms length customers. If they were to accept the risks of guaranteeing the debt, they may as well get the rewards of a project sponsor".

It is important to distinguish between take or pay contracts and take and pay contracts. Fowler(2) defined a take or pay contract as

"an unconditional guarantee to buy an agreed amount of a product or service whether or not it is delivered"

whereas a take and pay contract is

"where the guarantee to purchase the product or service is conditional upon it actually being delivered".

In the case of a take and pay contract the lender must analyse the ability of the producer to supply the product. The operating risks will not have been laid off to the purchaser. Moreover the banks could also be exposed to a political risk - e.g. a ban on the export of uranium. With a take or pay contract, however, the only risk the lenders face is that the purchaser will be unable to make the
guaranteed payment.

Where banks considered a sales contract was necessary they said that they would generally prefer to have a take or pay contract, although it was pointed out that it was not always possible to obtain one.

If the market risk is to be completely avoided, the contract must also be for at least the length of the loan, and banks aim to achieve this where possible. Again not all sales contracts will be long term and banks have taken ones for less than the life of the loan, in which case they are exposed to a market risk. In the case of several commodities, however, very long term contracts are the norm. LNG contracts may be for over 25 years; contracts in excess of 25 years are also apparently available in the case of bauxite; and many gas sales contracts are also long term - the Western Australia State Electricity Commission has signed a 20 year natural gas contract for the North West Shelf gas project. These contracts are clearly well in excess of the normal maturity of eurocurrency loans (12 years maximum).

A further important aspect of a sales contract is the pricing arrangement. There are several possible alternatives:

1. Fixed price - this is unlikely as it means the producer is unable to pass on any cost increases.

2. Escalated price - here one element of the price is fixed while the rest is escalated by reference to some agreed price index (e.g. labour, materials etc.). The escalated proportion may be 100% in some cases.
3. Cost-plus price - here the producer is able to pass on 100% of all cost increases and earns a given rate of return.

4. Market price - where there is a World market price quoted for the product the contract price can be linked to this and adjusted, say, every 1 or 3 months.

5. Floor price - here the contract price is again linked to market price but with some minimum price below which the contract price cannot fall.

6. Negotiated price - here the price to be charged is negotiated annually.

It was said during the interviews that if the supply contract is given by the project sponsor it may be possible to obtain a cost plus price which ensures that revenue is sufficient to cover operating costs and debt servicing. On the other hand, third party contracts are often linked to market price in which case the banks are taking a price risk. In order to limit this price risk it is sometimes possible to include a floor price in the contract, or alternatively to obtain a guarantee from the sponsor to make up the difference between the market price and some agreed price. In these cases the floor price should be sufficient to service the project debt. LNG and gas prices appear usually to be fixed on an escalated price basis.

The third main aspect of sales contracts which banks examine is the quantity requirements. To avoid the marketability risk it is necessary for the contract(s) to cover the whole of the planned production. At the same time it is important to ensure that there is a certain amount of flexibility in the contract. Apparently, the terms are usually set
either as a minimum quantity plus an option to take more if both
sides agree, or alternatively as a 'target amount with an option
for the purchaser to vary the amount by say $5-10$ per cent.

Several bankers interviewed considered that third party contracts
rarely provided much credit support for the project, firstly because
the terms are usually flexible, and secondly because there is a risk
of renegotiation. Ferguson and Haclin(7) argued that "the numerous
renegotiations of long-term purchase contracts during the period when
loans are outstanding have reduced the collateral value of these
arrangements for project lenders". Although no bank interviewed had
experienced the renegotiation of a sales contract taken as security,
they accepted that in the event of a slump in demand there was a
distinct risk of renegotiation, particularly over quantity. Although
renegotiation may well be an event of default in the loan agreement this
is of little use since it is doubtful whether the loan could be repaid.
Banks therefore felt that they would have little alternative but to
accept the renegotiation.

When a sales contract is entered into the arrangements are basically
the same as for a throughput agreement. The contract is between the
project company and either the sponsor and/or third parties as the case
may be. This contract is assigned to the lenders, giving them the
right to receive proceeds and to take steps to enforce it.

9.6 COMPLETION GUARANTEE

This was found to be the most common form of security required in
project financing, and most projects contained some requirement regarding
completion. The completion guarantee is defined by Fowler(2) as:
"An undertaking to complete a project within a certain time period and, usually, to provide funds to pay for all cost overruns. Generally completion involves much more than the mere completion of the construction of the facility".

The completion guarantee is provided by the project sponsor, and banks ensure that it is sufficiently creditworthy to meet any potential obligations. Completion guarantees therefore involve what the Wilson Committee Research Report(8) terms 'release of balance sheet in lending'. Banks have full recourse to the sponsor until completion and thereafter no recourse (or possible limited recourse). Project sponsors are thought to find this arrangement advantageous as compared with an unconditional guarantee for the life of the loan, as it enables them to 'piggy-back' their credit support from project to project.

The important elements in a completion guarantee would seem to be as follows:

1. Completion date
2. Cost overruns
3. Definition of completion.

1. Completion date.

Generally the loan agreement states that repayment of the loan will commence on completion. However, the lenders usually wish to avoid the risk that repayment will be delayed indefinitely and therefore include a final date at which time repayment must commence even if the project is not complete."
2. Cost overruns.
It is usual to stipulate in the completion guarantee that all cost overruns should be met by the guarantor. Alternatively lenders are sometimes willing to lend an additional amount to cover cost overruns.

3. Definition of completion.
This probably the most important aspect of the completion guarantee and the definition of completion is the subject of considerable negotiation. Completion usually involves much more than the mere completion of construction work. Banks did however, suggest that competitive pressures have led to the acceptance of less rigorous definitions of completion.

In the case of an oil or gas field development, the typical requirements have been as follows:

(i) Rigs are in position and facilities installed.
(ii) All production wells (or a stated number) drilled.
(iii) The field has achieved an agreed minimum level of continuous production for a stated time period (say 180 or 90 days).

and possibly

(iv) An evaluation of the reservoir by an independent consultant to ensure that the reserves are still adequate to service the loan.

The supposed reason for requiring a production test over a stated period is to enable the characteristics of the reservoir to be better assessed. Some banks doubted, however, whether this was possible, particularly as the length of the production test has been progressively shortened and some projects may require only a 1 month production test. The trend towards less stringent completion tests seems to have been
carried to an extreme in a recent North Sea project financing mentioned in interview, where the completion guarantee apparently fell away after the sponsor had invested a certain amount in the project. This appears to be the situation mentioned by Sarmet(9) when he suggested that:

"...one could imagine that after a minimum amount of investment, and on condition that the anticipated cash flow remains satisfactory, the credit structure could be changed, i.e. an increase in the portion without recourse, and the replacement of the financial guarantee during the period of construction by a simple commitment to cover cost overruns."

The rationale for this appears to be that if substantial amounts have been expended on the project the risk of non-completion is small. Lenders would still be at risk from delays in repayment, however, and most banks doubted whether the above arrangement would become widespread.

In the case of mining projects the production test may be in terms of an absolute amount of production during a stated period, since rates of flow are less important. There is also frequently a requirement regarding the quality of the output and sometimes a test to ensure that operating costs do not exceed a stated amount. The operating cost test is more necessary in mining projects than in oil projects, since operating costs are a higher percentage of gross revenues in mining than in oil.

For processing facilities the test may be that the project is working at say 85% capacity without any problems, and in the case of an aluminium smelter project that was studied, the completion test required continuous
production for 4 months during which time the project must have produced not less than \( x \) tons of aluminium while using less than certain stated quantities of raw materials such as alumina, coke and electricity.

According to Radetzki and Zorn(10):

"In addition to the normal completion requirements of bringing a project on stream at a specified production level, project sponsors are now also being held liable for achieving specified cash flow targets".

The rationale for this would seem to be as follows. While production levels are clearly important, banks are repaid from cash flow, and there is always a risk that the economics of the project might have altered during the construction period so that even if the project passed the required production test, it would not be able to service its loans. It appeared from the interviews that in fact such cash flow tests are rarely included in the completion guarantee. Banks argued that it would be unlikely for a project to be unable to service loans if production was possible. One North Sea project financing that was studied did, however, include a discounted cash flow test whereby, before the completion guarantee fell away, the present value of cash flows, discounted at a prescribed rate had to exceed by a stipulated multiple the amount of the loan outstanding.

Another issue that was raised with banks concerned their willingness to incorporate force majeure clauses into the completion guarantee. Rendell(11) for example, argued that "the sponsors will certainly want to exclude political
risks from the scope of the completion guarantee. They will argue that political events which delay, increase the cost or make it impossible to complete the project should exclude them from responsibility under the guarantee.

This sort of exclusion does appear to have been obtained by Inco for its Indonesian nickel project, but generally banks said that they would not be prepared to shoulder political risks prior to completion.

9.7 GUARANTEES AND OTHER UNDERTAKINGS

Guarantees may be obtained from various sources, the two most common being from the sponsors and from the host government. Such guarantees can vary considerably in their coverage. Unconditional guarantees given by the project sponsor are excluded from consideration since such situations do not fall within the definition of project financing adopted in this thesis.

It is not uncommon, however, for the project sponsor to give a limited guarantee covering certain specific risks which are unacceptable to lenders and which cannot be laid off to other parties. If repayment of the loan is affected by the occurrence of these risks the guarantor will be liable to repay, whereas if the loan goes into default for other reasons there is no such obligation. One example of this was the guarantee given by Occidental in respect of the risk of nationalisation or loss of licence in the Piper field. These were the only risks which would activate the guarantee after completion.

It is also common to obtain a guarantee from the project sponsor
of the obligations undertaken by the project company and other subsidiaries. This was the case, for example, in the Ekofisk transportation facility loans, where subsidiaries of major oil companies entered into a throughput agreement with the pipeline company and their obligations under this agreement were guaranteed by the parent company.

In many cases the sponsor also gives various undertakings which fall short of a full guarantee. One such example is a comfort letter where the parent company may undertake to supervise a subsidiary involved in a project, without assuming legal responsibility for the subsidiary's contractual obligations.

The second main source of guarantees is from the host government. These guarantees can take many forms, ranging from financial to political. One example of a financial guarantee was that given by the U.K. Department of Energy for Tricentrol's first Thistle field loan. This guarantee was in fact only given for four years to cover the development phase of the project. This was apparently the only way that Tricentrol was able to borrow at the time, in view of its small size and the high perceived political risk. It is also often possible to obtain a government guarantee in many less developed countries, although some countries (e.g. Indonesia) are reluctant to give guarantees as they wish to preserve their borrowing capacity.

Where financial guarantees are unavailable it was suggested by some banks that lenders should obtain what may be described as a political
guarantee. This could be, for example, an undertaking that the
government will not close the plant down for political reasons
or at least not without adequate compensation. Various undertakings
of this nature have also apparently been obtained by banks from
the U.K. government in respect of North Sea financings. These
again fall short of guarantees particularly as the Department of
Energy considers that "the form of assurance devised in terms of
current 'Government agreements' does avoid fettering the Secretary
of State's discretion" (Argyle (3) p.58). Argyle did suggest,
however, that these agreements "... are accepted by the banks as carry-
ing the 'full faith and credit' of Her Majesty's Government".

Finally, in certain very limited cases guarantees from other third
parties may be available. Nevitt(12) suggested that they may be
available if suppliers require a market, or users require a source
of supply. They may be willing to assist a project by providing a
guarantee even if they are unwilling to commit themselves directly
as an equity participant. In fact such third party guarantees rarely
appear to be used. The only case encountered in project financing
was a guarantee given by Standard Oil Co. of California (Chevron)
in respect of a loan to Ranger Oil. In return, however, Chevron
received a royalty of 8% over the life of the Ninian field together
with the right to purchase the remainder of Ranger's share of Ninian
oil. Clearly such a guarantee is only a last resort in view of the
considerable cost it involves for the borrower.
9.8 INSURANCE

Hofmann(13) argued that

"proper insurance and the investigation to make sure such insurance is in force is a vital part of any project finance scheme".

Although insurance can be used to lay off many force majeure risks, there are certain limitations to this. The first problem is that many installations, particularly in the North Sea cannot be fully insured because of capacity problems in the insurance industry. Johnson(14) reported that the Statfjord A platform could only be insured for about $900m against a total value of $1.2 billion at end-1978. Moreover, according to White(15) fixed oil and gas production platforms and refineries cannot be covered for war risks in the commercial market.

It is usual to take an assignment of insurance policies and to require a 'loss payable' clause stipulating that proceeds (over a certain amount) be paid to the lenders. The loan agreement will also regulate how these insurance proceeds are to be applied. For example in one project studied, insurance proceeds could be applied to repairs and reconstruction if they were less than a certain amount. If they exceeded that amount they could be used for re-completion provided repairs were technically and economically feasible and provided it did not prejudice the bank's ability to be repaid. Otherwise proceeds had to be applied in reduction of the loan.

9.9 MORTGAGE

All banks said that they would require a mortgage or charge over
the assets of the project, although they accepted that it was of
doubtful security value. This is because the assets are highly
specialised, and the only time banks would wish to enforce the
security would be if the project had defaulted - in which case there
would be few ready buyers. Moreover, in many less developed countries
the enforceability of a mortgage was considered doubtful.

In the USA it is possible to obtain a mortgage of oil in the ground,
but in many other countries, including the U.K., title to the oil
is not obtained until the oil reaches the well-head. Instead of
taking a mortgage over the oil in the ground therefore, Argyle
((3) p.33-5) stated that companies are required to charge their
interest in:

(i) the licence
(ii) the operating agreement
(iii) the field facilities, pipeline and onshore facilities; and
(iv) the petroleum "won and saved" and the proceeds of its sale.

He further suggested that

"the value of such securities lies less in the hope of
selling the defaulter's interest in the field and related
facilities (which in some cases must be remote) than as
a defensive mechanism against other creditors".

The same reasoning was found to apply in other situations where banks
required a mortgage.

Finally, in two projects studied, banks had taken a pledge or charge
over the shares in the project company. In one of these projects
the reason for doing this was that it was legally impossible to charge
or assign the project assets, the production licence, sales proceeds or sales contracts and so the only way to obtain control in the event of default was to have a charge over the shares of the company owning the project.

It is also common in the U.K. North Sea for banks to have a 'Special Share' in the capital of the company holding the production licence. This share gives the banks the right to appoint directors and to have voting control of the board if the loan is in default, thus enabling them to take control of the licensee's affairs in default situations. All of the four deals shown in Appendices IV to VII involved the issue of a special share.

9.10 TRUSTEE ACCOUNT

In order to avoid the risk of currency blockage and when a project is located in the export sector, a trustee account can be established in New York or London. Project revenues are then paid directly into this account operated by a bank as trustee. The proceeds will then be applied in accordance with the instructions prescribed in the loan agreement or trust deed. This arrangement was apparently used in two Indonesian projects - one a nickel project for Inco and the other for Mobil Oil Indonesia.
NOTES TO CHAPTER 9

1. See Section 12.3 for further details.

2. For further details of the arrangements for throughput agreements see WHALLEY(1) pp2-4.


6. For example, if a loan is granted and completion is expected in January 1980, the loan agreement may stipulate that repayment shall commence in January 1981 or prior completion. If the project is not complete by January 1981 the sponsor must make the repayments.

7. See DE GAVRE, (4)p.258.

8. Details of the project are given in Appendix VI.


11. ARGYLE(3) pp46-64 has a detailed review of these undertakings.

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(3) ARGYLE, R.E.S. "Governmental Powers and Project Financings in the North Sea: the United Kingdom Experience" p.15

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(7) FERGUSON, N. & HAACLIN, G. "Is there Enough Money in Mining?" Banker, 1976, p.1013.
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CHAPTER 10

THE RISK-RETURN TRADEOFF AND PRICING

10.1 INTRODUCTION

This chapter attempts to draw some conclusions regarding the riskiness of project financing in relation to traditional lending. It also examines pricing practice and assesses whether adequate account of risk is being taken when pricing. The discussion relates only to eurocurrency lending since the pricing of export credit loans is relatively straightforward.

10.2 RISKINESS OF PROJECT FINANCING

Opinions regarding the riskiness of project financing in relation to traditional lending appears to be divided. For example, Adamson stated:

"Project-type financing by its very nature is usually of a higher risk level than the corporate credit risk of the owner. The only exception that I can think of is where the owner is an extremely small and/or weak corporate credit."

On the other hand, others have argued that project financing is no more risky than traditional lending and may in fact be less risky. Thus, for example, Tucker (vice president Bank of America, San Francisco) is reported by Clarke and Martin as having said:

"Risk analysis in the project finance area should be better than in the straight loan area because it has to be more detailed. Therefore in theory at least, there is more scope for identifying and covering all the risks than in other, more straightforward forms of lending...."
It is possible to point to factors which tend to make project financing more risky and others which make it less risky than traditional lending. On the one hand it can be argued that project financing is inherently more risky than a normal loan to say a multinational company to finance the same project. A conventional loan would have the support of a cross section of assets serving various markets and in different countries. Thus no single commercial or political event is likely to affect the borrower's overall viability and ability to repay. But a single purpose, non-recourse project loan subjects the lender to all the various economic, political and force majeure risks as they may impact a single project.

On the other hand in certain cases the credit standing of a properly structured project may be higher than that of its sponsor since it may carry the credit support of strong third parties via guarantees, sales contracts etc. It can also be suggested that project financing is less risky than sovereign risk lending to less developed countries, for the reasons mentioned in section 3.3.2.

Finally, there is the point raised by Tucker above, that the risk analysis is far more formalised than in corporate lending.

It is probably impossible to arrive at any firm conclusion regarding the riskiness of project financing, particularly as the circumstances will vary from project to project. When the banks were asked whether they considered project financing to be more risky than conventional lending their views were equally divided. The majority of banks seemed
to think it was more risky than corporate lending as they usually did not have full recourse to the project sponsor. Some banks did, however, think that project financing was no more risky than corporate lending, pointing in particular to the more formalised risk analysis of the project. Several bankers felt that much corporate lending was 'name' lending, undertaken without adequate credit evaluation. As regards the relative riskiness of project financing and sovereign risk lending, banks were again divided but the majority of banks felt that project financing was generally less risky.

Another approach to this question is to assess the experience banks have had in project financing. This represents an ex post assessment of risk. No bank admitted to having suffered losses on project finance loans to date, although one bank did say that they were anticipating problems in a petrochemical project where there had been a large fall in both demand and price. Some banks also thought that there might have been a few problems with some North Sea Projects as a result of delay and cost overruns, had it not been for the huge increase in oil prices. In fact they suggested that the biggest problem was not failure to repay but rather that loans have been repaid more rapidly than anticipated, with the result that the profitability of the deal was less than expected².

Generally banks believed that the safety margin between debt service and project cash flow was sufficient to absorb most risks without affecting the ability of the project to repay, and the most significant risks are generally guaranteed, although banks also emphasised that project financing is still relatively new and in the longer term they
did expect that a few bad loans would be made.

The experience in the UK can be compared with that of the projects in the survey by Castle[3]. Here, out of 17 projects, 9 (53%) had severe trouble; 2 ended in bankruptcy and 6 others failed to generate enough cash flow during some period to cover repayments of principal. However, in only one project did the bank suffer a loss, and this was only because the project sponsor went bankrupt as well. It would probably be reasonable to conclude that project financing is slightly more risky than conventional lending, but that substantially greater risks are not being taken.

In fact it is not the absolute level of risk that is important but whether the remuneration received is adequate to compensate for this risk. Davis[4] for example argued (though not specifically in support of project financing), that:

"It is quite valid as a strategic option, however, to structure a relatively risky loan portfolio... and to rely on one's expertise and the higher return associated with this type of portfolio to minimise and absorb the higher losses which might result."

We therefore now turn to a consideration of the risk-return tradeoff in lending and the practices of banks in pricing project finance loans.

10.3 RISK-RETURN TRADEOFF

It is clear that if banks are to take additional risks they will require additional compensation, and so it is appropriate to attempt
to determine whether lenders in fact receive adequate remuneration. As Deverell(5) has pointed out, however, this risk return tradeoff is likely to have an abrupt 'cut off' point beyond which the risk is unacceptable to banks whatever the level of reward.

Richards and Contesse(6) have suggested a model for pricing project financing loans using the Capital Asset Pricing Model (CAPM). The CAPM is based on portfolio theory and was initially developed to illustrate the risk-return tradeoff for stock exchange securities. It suggests that there is a linear relationship between risk and return as depicted in Figure 10.1.

Risk in CAPM is not, however, total risk but only 'systematic' risk. This can be defined as the extent to which the return on a particular equity moves in line with the overall market return. Unsystematic risk
is the risk specific to a particular firm. It is excluded from the model because portfolio theory assumes that it can be eliminated by holding a diversified portfolio of shares.

Richards and Contesse suggested that this model can be applied to the pricing of a project loan and indeed go as far as to give a hypothetical example from which they conclude that:

"Using these results we may recommend to a syndicate of banks lending money to this field on a project basis, to charge a minimum of 19.8 per cent per annum interest."

This would appear to represent a fundamental misapplication of CAPM. CAPM was developed for stock market investors and its applicability in the lending situation is very dubious. Determining the price of a loan by reference to the covariance of the project's return with the overall market return for shares appears to be totally illogical. This could only be appropriate if the rest of the bank's portfolio was made up of equity investments. Even if we replaced the equity market return by a measure of the return on lending, the application of portfolio theory to bank lending still seems to be inappropriate. Banks are concerned with the total risk in a loan rather than just its 'systematic risk'. Loans have no 'upside potential' and so it is not viable in a lending situation to operate on a principle of portfolio diversification as in equity investment.

Even if such a model was applicable to project financing there are still several problems with the suggestion made by Richards and Contesse. These may be summarised as follows:
1. The model assumed fixed rate lending while euro-currency loans are invariably at floating rates.

2. The model ignores the maturity of the loan, which other studies have shown to be important in the pricing decision.

3. The correlation coefficient between project and market was estimated on the basis of oil company share price performance. This is invalid in project lending where the project is treated as a separate entity.

It was also clear that it would have been impossible to estimate a risk-return tradeoff empirically, against which the adequacy of the remuneration on project loans could be evaluated. None of the empirical studies on eurocurrency loan pricing have used a measure of risk that can be applied in all lending situations including governments, companies and projects. Generally these studies have concentrated on sovereign risk lending and used certain variables such as the debt service capacity as a proxy for risk.

Moreover the conclusions of these studies indicate that a simple risk/return tradeoff will not be found because many variables affect the pricing decision. Goodman(7) for example, postulated that spread depends on the level of interest rates at a particular time, the volatility of interest rates, the maturity of the credits as well as risk variables. In addition to these variables banks also emphasised that the spread charged on a particular project will also depend on
relative bargaining positions of borrowers and lenders and on the state of competition between lenders. One bank also suggested that the spread on a loan reflected as much the number of banks capable of assessing the particular risk as it does the magnitude of the risk itself. Banks were therefore unwilling to make any generalisations regarding the additional spread that might be required for shouldering certain risks.

10.4 PRICING PRACTICE

The usual form of remuneration in eurocurrency project loans is a lending margin together with certain fees. As in all eurocurrency loans the interest rate is set as a margin over the London Inter-Bank Offered Rate (LIBOR) of specified reference banks, and the borrower is frequently given the option to choose between 3, 6, 9 or 12 month LIBOR at each 'roll-over' date. In some cases the lending margin may remain the same for the life of the loan although more usually different spreads are applied over the life of the loan. In loans where there is a completion guarantee for example, the lending spread may be increased on completion of the project to reflect the non-recourse nature of the loan thereafter. Initially, the differential here was quite substantial. Tricentrol, for example, was able to borrow at a spread of 1½% over LIBOR while the loan carried a government guarantee, but when this was released the spread increased to 2½%. Banks suggested that nowadays the increased spread might only be 1% although they emphasised that generalisation here is impossible.

Another consideration is the differential between the spread on a
Table 10.1  ROYALTY PAYMENTS

<table>
<thead>
<tr>
<th>FIELD</th>
<th>SPONSOR</th>
<th>MARGIN OVER LIBOR(%)</th>
<th>ROYALTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIPER FIELD</td>
<td>THOMSON SCOTTISH ASSOCIATES</td>
<td>1½%</td>
<td>2½% royalty on Thomson's share of the first 642 million barrels.</td>
</tr>
<tr>
<td>CLAYMORE FIELD</td>
<td>THOMSON SCOTTISH ASSOCIATES</td>
<td>2%</td>
<td>3% royalty on Thomson's share of Claymore gross revenues for life of field plus 2½% royalty on Thomson's share of Piper oil after the first 642 million barrels.</td>
</tr>
<tr>
<td>HEATHER FIELD</td>
<td>NORWEGIAN OIL DNC</td>
<td>N/A</td>
<td>2½% royalty on DNC's share of production.</td>
</tr>
</tbody>
</table>

Source: Based on Wilson Committee "Financing North Sea Oil" Research Report No. 2, pp.20-23.
corporate loan and the spread on a project loan to the same company. Again generalisation was found to be impossible. The differential was said to depend particularly on the strength of the corporate borrower and the amount of risk shouldered by banks. Some banks suggested that for a major company the differential might be as low as $1\%$, while for smaller companies which were unable to borrow on a corporate basis it could be $2\%$.

As far as fee income is concerned, no information is ever published and banks were unwilling to give any generalisations regarding the possible level of fees, beyond saying that they would be slightly higher than on a straightforward loan in view of the additional work involved in arranging the loan.

In three North Sea oil projects the lenders have also taken a royalty payment in addition to the normal lending margin. Details of these are summarised in Table 10.1. These royalties were apparently given to compensate the banks for taking what approached equity risks (although banks were at pains to emphasise that they were not taking actual equity risks in these deals).

Deverell(5) has also pointed out that there is a clear limit to the amount of risk banks are willing to take even in return for a royalty. He mentioned three other cases in which royalties were paid - Tricentrol/Thistle field, Ranger/Ninian field, and LASMO/Ninian field - but in which banks were not prepared to take the risks to get these royalties. The Tricentrol loan was guaranteed by the Government; Chevron guaranteed the Ranger loan, and the LASMO finance was raised on the stock market.
Generally banks believed that it was acceptable to take a royalty in return for shouldering high risks, provided that such situations did not constitute a significant part of their portfolio. Interestingly however, two banks stated that it was their bank's policy not to lend in situations which involved the payment of a royalty. At the same time most banks believed that it was now rare for royalties to be paid, particularly in view of the intense competition for lead management positions.

10.5 PROFITABILITY OF PROJECT FINANCING

Clearly the question of profitability can be examined on both an ex ante and an ex post basis. It can also be examined on a 'gross' or 'net' profit basis (where the net profitability takes into account the costs of arranging and/or assessing the loan). Most banks agreed that, ex post, previous project financing business had been more profitable than traditional lending, as they have been able to obtain higher spreads and yet have lost no money. The loans involving the payment of royalties had been particularly profitable, given the vast increase in oil prices. However, most banks thought that the profitability of project financing had fallen over the years, given the increased competition in the market.

As regards the question of whether banks were taking adequate account of the risks when pricing, opinion was divided. Several banks believed that they were taking adequate account of the risks, although others thought that, especially recently, some loans had been made at very fine margins in relation to the potential risk. A distinction was, however, drawn between the profitability of lending and the profitability
of lead managing. It was felt that while the spread earned by lenders was barely acceptable, lead managers were in a better position since they receive management fees in addition to the spread, which accounts for the intense competition for lead management mandates.

The remuneration lead managers receive is not however, needed solely to cover risks; there are also other costs involved in arranging loans. Banks appeared to be less certain if lead managing project loans was more profitable than traditional activities, if account is taken of the time and effort expended in arranging such complex loans. Moreover it is not only the successful loans which require time to arrange; in addition considerable time is wasted preparing unsuccessful bids for lead management and advisory positions.
NOTES TO CHAPTER 10

1. See chapter 11. Export credit interest rates are based on OECD Consensus guidelines and are usually set at the minimum rate permitted under these guidelines.

2. Clearly since the lending spread is a major element in the profitability of a deal, if the loan is repaid 3 years earlier than planned, banks will earn less than if the loan had run until the planned maturity.


4. See Appendix VII for details of this loan.

5. Although it may appear strange to relate the spread on a limited recourse loan to the standing of the project sponsor, this is in fact valid since the standing of the sponsor is thought to influence the overall riskiness of the project.
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CHAPTER 11

SOURCES OF FINANCE

11.1 INTRODUCTION

This Chapter examines some of the issues involved in financing the projects, including the objectives in structuring the finance; the decision on how much to lend to a project; and the alternative sources of finance available.

11.2 FINANCING OBJECTIVES

This Section examines some of the financing objectives mentioned in the literature. Then, Section 11.4 examines the extent to which various sources of finance can achieve these objectives.

Fowler (1) mentioned the following objectives when structuring a project financing plan:

1. Maximise long-term debt

Fowler suggested that "payment of relatively higher interest rates as a trade-off for achieving long-term financing (10 to 20 years) can enhance the viability and cash flow rate of return (assuming a high discount factor) of a given project". This view is supported by Blackwell (2). In other words, the sponsor can benefit by maximising the maturity of the loans even if it means conceding a higher interest rate.
2. Maximise fixed rate financing

The argument here is that if interest rates are fixed, the impact of volatile interest rates on the project viability can be avoided. What Fowler does not say, however, is whether it is still appropriate to aim for fixed rate financing if long-term fixed interest rates are extremely high. It is likely in these situations that the borrower would prefer variable rate finance to minimise the interest cost and take advantage of any fall in interest rates, (unless the fixed rate finance is also at concessional rates).

3. Minimise refinancing risk

This risk arises when project cash flow is inadequate to service the loan over its planned maturity. In order to repay this loan it may therefore be necessary to re-finance (i.e. raise a new loan), and the risk is that at the time the loan is refinanced the market may be unfavourable.

To these objectives may be added a fourth which became apparent from interviews; namely, to maximise the amount of finance granted on concessional terms.

11.3 DEBT/EQUITY MIX

As well as deciding the type of debt finance to be raised, it is also necessary to determine the total amount that can viably be provided by debt finance, and the amount that will have to be provided in the form of equity. This is of course only relevant when the sponsor is seeking
to maximise the use of debt finance, and it was pointed out that in
some cases the sponsor may be willing to provide more in the form of
equity than lenders would have required.

Two possible approaches to determining the debt/equity mix were found
during the research; one based on the balance sheet, and the other on
cash flow. These were respectively:
1. Debt/equity ratio
2. Coverage ratio

11.3.1 Debt/Equity Ratio

It appeared from interviews that the debt/equity ratio is not used to
determine the maximum borrowing capacity of the project, and for two
reasons. Firstly, as Yassukovich (3) argued:

"There is no precise answer that can be given or
standard guidelines to follow because of the many
variables that must be analyses by the lenders before
a debt/equity ratio can be established".

In particular the two factors mentioned in Section 8.3 - the riskiness
of the project, and the extent to which the sponsor is financially
committed to the success of the project via guarantees - were found
to be particularly important.

At the same time a minority of banks did suggest that, as a rule of thumb,
you would like to see approximately 25% of the expected cost financed
by equity.

Secondly, several banks suggested that the debt/equity ratio was not,
in fact, relevant when assessing the maximum borrowing capacity of
the project and that what mattered was the ability of project cash
flow to service the debt with an adequate safety margin. They therefore, saw the coverage ratio as the primary technique is assessing borrowing capacity.

11.3.2. Coverage Ratios

Castle (4) mentioned three main types of coverage test that may be used:

(i) Annual Coverage - This measures the ability of the project to cover the required loan repayments in each year. It is computed by dividing net cash flow each year by the amount of the required loan repayment in that year. Net cash flow is usually defined as gross revenue less royalties, operating costs, taxation and interest.

(ii) Average Coverage of the Debt Service - This shows the average coverage over the life of the loans and is arrived at by averaging the annual coverage ratios.

(iii) Life of the Reserve Coverage - This is clearly only relevant in extractive ventures. The usual criterion according to Castle, is that at the time the loan is projected to be finally repaid, at least half of the reserves and half of expected net revenue still remain.

Ross (5) mentioned two other criteria for determining the maximum loan amount using a net present value calculation.
The first method is to calculate the present value of net cash inflows after taxes and royalties, but before interest. The maximum loan value is then say, 50%, of this amount.

The second alternative suggested by Ross is to calculate the present value of future net cash flows that will be generated in the period until half of the recoverable reserves have been extracted. The maximum loan amount is then equal to the present value of cash flows so calculated. (See Appendix III for numerical examples of the five alternative coverage ratios mentioned above.)

Banks interviewed in the U.K. were found to use either the annual coverage method mentioned by Castle or the first present value coverage mentioned by Ross, or both. It was said that coverage ratios calculated in relation to the life of reserves were not appropriate, particularly in the U.K. North Sea. The reason is that as a result of the North Sea tax regime, net cash flow is highly concentrated in the early years of the project. Therefore, by the time say, half the reserves have been extracted very little net cash flow would be available to service borrowing.

When performing the present value coverage test banks used a purely arbitrary discount factor ranging between 10-15% and excluded the interest charge from net cash flow. The question of discount factors was examined in section 7.4.2 where it was concluded that there is no superior alternative to the use of an arbitrary rate. As regards excluding the interest charge, the rationale is that this is effectively taken into account in the discounting process.
Banks had no rules of thumb on the coverage factor to be used in both the annual and present value coverage tests. The coverage required will depend on the riskiness of the project and the amount of credit support behind the project. A typical figure mentioned for both coverage ratios was 2 : 1 although banks said that if the project was relatively risk free, the coverage might be as low as 1.5 : 1, while in more risky projects it could be as high as 3 : 1 or more, but it was suggested that competitive pressures are forcing banks to accept reduced amounts of coverage.

It should be clear that there is no real theoretical rationale for comparing the present value of future cashflows, discounted at some arbitrary rate, with the amount of the loan, but banks did think that, regardless of the theoretical rationales, the present value coverage gave them a feel for the safety of the loan. Many banks used both the present value and annual coverage tests. It appeared that the annual coverage was considered useful in determining the required maturity of the loans and in identifying problem years where there was a low cash flow coverage. When using the annual coverage banks do adopt some idea of averaging, though the average is not actually calculated and banks said that they would not be particularly worried if one year's coverage ratio was below the target level.

As was mentioned in Section 8.3 present value coverage tests were found to have been included in a few loan agreements to ensure that a certain minimum coverage ratio is maintained through the life of the loan.
11.4 SOURCES OF FINANCE

This Section reviews the various sources of funds used to finance the capital cost of projects that were mentioned in the literature on project finance. This Section can only give a very brief outline of these sources and their terms, and it concentrates mainly on eurocurrency and export credits. This is because, although much is written about devising an optimal financial package comprising multiple sources of finance, the two main sources were found to be eurocurrency loans and export credits. Moreover, in most of the project financings referred to in this thesis, the main source of external finance was eurocurrency loans.

The following sources of finance are at least theoretically available for project financing:

1. Export credits
2. Eurocurrency loans
3. Euro-bonds
4. Equity
5. International Agencies
6. Advance Payments
7. Leasing

11.4.1 Export Credits

Most developed countries now have some kind of export assistance agency. Among the more well known may be listed:
A detailed review of the facilities offered by these different institutions and the use made of them in project financing is clearly not possible in this thesis. Some specific points pertaining to project financing are made however.

Most merchant banks (U.K. and U.S.) interviewed claimed a major role in coordinating the supply of export credits from many different countries. They saw the maximisation of export credits as a first priority in any project financing plan. In many banks the main emphasis was on U.K. export credits (ECGD) although most banks claimed to coordinate multinational sources. It was pointed out, however, that the range of countries covered will vary from bank to bank in view of the fact that it is usually necessary to have a foreign subsidiary in the relevant country.

Banks suggested that where export credits are used in project financing they are buyer credits rather than supplier credits.

Export credits do have the advantage of being a relatively cheap source of finance and the interest rate is fixed from the outset.

The terms are regulated by an 'Arrangement on Guidelines for Officially
Supported Export Credit' signed by OECD member countries. The current terms under this 'Consensus Agreement' are given in Table 11.1.

<table>
<thead>
<tr>
<th>Importing Country</th>
<th>'Relatively Rich'</th>
<th>'Intermediate'</th>
<th>'Relatively Poor'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum credit period (years)</td>
<td>6\frac{1}{2}</td>
<td>5\frac{1}{2}</td>
<td>10</td>
</tr>
<tr>
<td>Minimum interest rates for:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>credits between 2-5 yrs. (%)</td>
<td>8.5</td>
<td>8.0</td>
<td>7.5</td>
</tr>
<tr>
<td>credits over 5 yrs. to 8\frac{1}{2} yrs. (%)</td>
<td>8.75</td>
<td>8.5</td>
<td>7.75</td>
</tr>
<tr>
<td>credits over 8\frac{1}{2} years (%)</td>
<td>-</td>
<td>-</td>
<td>7.75</td>
</tr>
</tbody>
</table>

SOURCE: Based on information in Midland Bank Review Autumn 1980, p.25.

Banks said that interest rates are usually set at the minimum permitted under the Agreement which means that there is considerable advantage for the borrower in maximising this relatively cheap source of finance.

Leeper (6) reported in 1979 that ECGD had guaranteed certain export credits for non-recourse project financings - in particular a $390 million loan to Kowloon Electricity Supply Company for a power station in Hong Kong. This was seen as a novel trend since previously, even when financing projects, ECGD had always required a guarantee from either the sponsor, the host government or a bank in that country.
In fact this trend does not appear to have developed and banks suggested that ECGD was now less prepared to undertake a detailed examination of the viability of the project, in view of the time it takes, and will generally require a guarantee from the sponsor or government etc. The attitude of most other export credit agencies towards guaranteeing non-recourse loans was thought to be similar to ECGD's.

Banks felt that export credit lending was good business for them. In the case of ECGD export credits, for example, they receive a 100% unconditional guarantee from ECGD in the event of default by the borrower for any reason, political or commercial. This means that lenders have no exposure to project risks; the only risk taken is a U.K. government credit risk. Moreover, ECGD compensates the banks for the fact that the loans are at low fixed rates by making up the return banks receive to the equivalent of 11% over sterling LIBOR. This spread compares favourably with that available on eurocurrency loans, particularly if one takes into account the degree of risk.

11.4.2 Eurocurrency Loans

The bulk of finance raised for the publicised project financings encountered during the course of this research involved eurocurrency credits.

The process involved in arranging eurocurrency loans has been dealt with in Chapter 4 and the pricing arrangements in Chapter 10. It is not proposed to examine the covenants used in eurocurrency project
loans, but two particular issues were raised during the course of interviews. These related to the maturity of loans and the arrangements for repayment.

The first question was whether the maturities on eurocurrency loans were sufficiently long to enable them to be repaid from project cash flow. Levine (7), for example, suggested in 1976 that:

"......if the Euromarket requires repayments of its loans within its medium-term framework, which in most cases is less than the payback period of a development project, the market must look elsewhere than to the project itself as a source of repayment".

Most banks interviewed, felt in fact, that maturities were sufficiently long for loans to be repaid from project cash flow. Although banks were again reluctant to generalise, they stated that a project finance loan might have a planned maturity of up to 12 years. In oil projects, in fact, the problem has been that loans have been repaid faster than expected, while even in mining projects banks suggested that maturities should be long enough. It was pointed out that borrowers are looking for relatively high IRR's and, given that the project has achieved this hurdle rate, large cash flows must be expected relatively early in the life of the project. Banks thought it was therefore, only a question of ensuring that they obtained a large share of these cash flows when they commenced. It was also felt that if a project needed more than 12 years to repay, it was probably suspect.
Another issue that was raised related to the maturities available on project loans as compared to corporate loans, since it has been suggested that longer maturities are available on project loans than on general purpose loans to the same company.

Banks were divided on this question. Some thought that maturities would be longer, while others thought they would be about the same. Still others said that in many cases a project would not require the maximum maturity that was available anyway.

The second main issue on eurocurrency loans that was examined concerned the arrangements for loan repayment. Again, these were found to vary from project to project, but the following are some of the main ways in which the repayment schedule has been set.

Firstly, the repayment schedule may be fixed at the outset and be either in the form of equal quarterly or semi-annual instalments, or with the schedule moulded to the cash flow profile of the project. It is apparently rare to have such a fixed schedule, and banks did not think it was sufficiently flexible for project financing in view of the risk of interruptions in production or fluctuations in cash flow. They said that their aim was to avoid an 'event of default' under the loan agreement and continual renegotiation of the loan. It is, however, usual to have a 'target' repayment schedule specified in the loan agreement which would be achievable if everything went according to plan, and which will ensure that the loan is repaid by the planned maturity. Usually however, some flexibility is built in. This may simply be an ability to defer repayment for a maximum
period of time, after which repayment must be made at a faster rate to ensure that the loan is fully repaid by the planned maturity. Alternatively, the repayment schedule can be linked to the actual cash flow. This is usually achieved by dedicating a specified percentage of cash flow to repayment of the loan. This dedicated percentage will be set so as to ensure that, if the 'best estimate' cash flow occurs, the loan will be repaid according to the planned schedule. If cash flow is above this expected level, then the loan will be repaid faster than planned. Generally, any excess of dedicated cash flow over planned repayment is applied in repayment of the final instalment of the loan and so on, thus shortening the life of the loan. If the dedicated cash flow is insufficient to meet planned repayments, then the dedicated percentage will be increased to 100% of available cash flow. If this is still insufficient then the loan will be repaid less quickly than planned.

The definition of cash flow used is clearly important, and banks were found to use two general definitions - one termed 'gross' cash flow, and defined as revenues less royalties; and the other termed 'net' cash flow (gross cash flow less operating costs and tax). Basing the dedicated percentage on gross cash flow was said to be advantageous since it enables the banks to avoid fiscal and operating costs risks. Provided there is sufficient gross revenue to meet the target repayments the lenders will be repaid, irrespective of whether the project faces a net cash deficit as a result of increases in tax or operating costs.
11.4.3 **Eurobond**

The Eurobond market appears to be rarely used in project financing. As Yassukovich ([3] p.19) suggested "the Eurobond is usually confined to standard corporate or government obligations because of the lack of interest by investors in start-up or developing projects (pipelines are the exception)". Indeed, the only known use of the Eurobond market for what we have defined as project financing was a DM 100 million bond issue for Norpipe secured by a throughput agreement, and used to finance the Ekofisk pipelines.

The reason is apparently that bond investors are usually not prepared to undertake a detailed evaluation of projects or shoulder project risks. They prefer first class credit risks. Norpipe was able to use Eurobonds because a group of major oil companies were guaranteeing the obligations of their subsidiaries under the throughput agreement.

Another problem is that drawdown of the bonds cannot be matched to expenditure on the project; bond proceeds become available immediately on issue. Yassukovich therefore suggested that Eurobonds may be appropriate to refinance project debt at a later date, although no example was found where this had occurred.

11.4.4 **Equity**

The question of the appropriate debt/equity ratio has already been examined in Section 11.2.1, where it was suggested that equity will be required to assure the sponsor's commitment to the success or failure of the project, unless this is provided indirectly by a guarantee.
It should be stressed that this 'equity' is not necessarily funds raised on the stock market, rather it is taken to mean funds injected by the project sponsor. It may well be that the project sponsor has, in fact, borrowed this money as well, though on a full corporate credit basis.

Rendell (8) also suggested that lenders should require that all equity be paid in before project loans are available, and this was found to be common practice in the projects studied.

11.4.5 International Agencies

There are several financial institutions which have the objective of providing financial assistance for projects, usually in less developed countries. Among these may be listed: the International Bank for Reconstruction and Development (World Bank) and its affiliate the International Finance Corporation; various Regional Development Banks (e.g. Inter-American Development Bank); and the European Investment Bank. These institutions are frequently mentioned as a source of finance for projects, but it appeared that they are used relatively infrequently in project financing.

Borrowing from these agencies does have certain advantages, particularly in respect of interest rate and maturity. Loans are usually made at fixed rates and these rates may also be lower than normal commercial rates. Similarly maturities tend to be longer than are obtainable from commercial banks. Support from the World Bank etc. may also be useful if a large amount of infrastructure is required for the project.
Beim (9) for example, referred to a bauxite project in Guinea where the World Bank made loans to the Guinean government to construct a railroad and a port. This infrastructure was designed solely to serve the mining project and the project itself was separately financed by commercial banks. Finally, banks felt that the involvement of the World Bank gave a project an important 'seal of approval' in view of the detailed evaluations undertaken by the Bank, and also reduced the political risk.

Certain disadvantages of World Bank involvement were also mentioned in interviews, however. Firstly, the Bank was said to be very bureaucratic and to take a long time to perform its own feasibility studies, which could cause delays. Secondly, the World Bank requires that construction be put out to international tender which again takes a considerable time. Thirdly, they usually require a host government guarantee; and finally, the amounts lent are usually relatively small (their main function being to act as a catalyst for other funds).

11.4.6 Advance Payments

An advance payment is basically a loan made by a potential purchaser of the project's output in return for guaranteed access to such output when the project is complete. They appear to have been a major source of finance in the U.S. oil, gas and coal industries.

Most banks in the U.K. had never seen advance payments used as a source of finance in project financing and suggested that it is only in exceptional cases, where purchasers are desperate for supplies that purchasers would be willing to enter into such arrangements.
11.4.7 Leasing

Leasing is also apparently used quite frequently in the U.S.A. as a source of finance for projects. Nevitt's book on Project Financing[10] for example, discussed various leasing arrangements in some depth. Leasing does not, however, appear to be widely used in project financing arranged from the U.K. The problem does not appear to be the inability to lease large assets—a catalytic cracking unit costing £100 million was leased to Murco Petroleum Ltd in 1979[15]. The Leasing Digest[11] also reported that in West Germany a number of oxygen plants have been financed by way of leases supported by long-term sales contracts; and the Murco catalytic cracking unit was also partly secured by the assignment of a 'put or pay' processing agreement, both of which are typical project financing obligations.

When asked why leasing appears to have been so little used in project financing, banks suggested the following reasons. Firstly, in the North Sea, the Oil Taxation Act 1975 treats leasing disadvantageously in comparison with other forms of borrowing[17]. Moreover, American banks have been discouraged from leasing by an IRS ruling that North Sea platforms are fixtures. Their U.S. parents are therefore unable to benefit from the usual tax allowances given to lessors. The second reason given by banks was that with projects located outside the U.K. it would be necessary to use 'export' or 'cross-border' leasing, of which banks have little experience at present. Thirdly, since ownership of the assets vests in the lessors leasing is only appropriate when there is only one sponsor, or where a consortium wish to raise joint finance.
11.5 STRUCTURING THE FINANCE

Anderson (12) suggested that:

"One of the recent keynotes of project financing has been the creative approaches which have been taken to package credits to meet particular needs."

Similar mention of this 'packaging' of credits has been made by some U.K. authors. Bulfield (13), for example, suggested that:

"By using computer programs, numerous alternatives can be run, using 'model' structures. Comparisons can be made between various types of financing and between sources (e.g. ECGD versus Ex-Im). The aim, again, is to find the structure which maximises returns to the sponsor....".

In fact, it appeared from interviews, and from the project financings mentioned by banks, that it is relatively rare to be faced with a choice between multiple sources of finance. In many cases the only source of project finance was eurocurrency loans. Moreover, when export credits were an option, several banks suggested that the choice between the various agencies had already been determined by the procurement decision.

It also became apparent during the course of interviews that clear differences existed between banks regarding the emphasis given to the 'packaging' of finance. Generally, merchant banks saw 'packaging' as an important aspect of project financing activities, whereas commercial banks appeared to concentrate primarily on eurocurrency loans. This is clearly related to the differing roles adopted; with merchant banks acting primarily as advisors, and commercial banks acting as lead managers of eurocurrency loans.
NOTES TO CHAPTER 11

1. It would seem a priori reasonable that borrowers should seek to maximise the project gearing in order to maximise the return on equity - see BULFIELD, P.W. (13) pp.10-11 for an elaboration of this point.

2. See for example: FOWLER (1) and BLACKWELL (2).


4. Buyer credits involve a loan made by banks to the purchaser (i.e. importer) of the equipment. The bank's loan is guaranteed by the export credit agency. Supplier credits involve a loan made to the supplier (i.e. exporter).

5. At the time of writing moves are in progress to bring export credit rates more in line with market rates.


7. The interviews were conducted during the second half of 1980 at a time of relatively easy terms. At times of a 'lenders market' the maturities available are likely to be shorter. Note also that
the planned maturity may either be longer or shorter than the actual maturity depending on whether repayment is deferred or prepaid. The maturity is likely to be a function of both the project and the country in which it is located.

8. 25% was a frequently quoted figure and the President of Gulf Oil is also reported (Sunday Times, 22 September 1974) as saying that a 25% after tax return is a minimum hurdle rate.


10. The only exception to this was found to be certain pipeline financings supported by 'put or pay' throughput agreements which required tariff payments even if production was interrupted.

11. Clearly inability to meet planned repayments will be one such event which will put the loan into default.

12. This was the case in BP's Forties loan. See Appendix IV.


15. ROSE AND COOPER *World Oil*, 1 February 1977, p.49, reported that in 1972, $689 million was provided by way of advance payments, while in 1975 the figure was $3.2 billion.

16. For further details, see *Leasing Digest* January 1979, p.3-4, and *Financial Times*, 27 February 1979, p.21-24.

17. For further details see *Leasing Digest* Special report "Leasing and the North Sea", March 1980, pp.21-2.
REFERENCES - Chapter 11

(1) FOWLER, T.V. "Big Business for the Banks" Banker, December 1977, p.53


(6) LEEPER, R. "Perspectives on Project Financing" Banker, September 1979, p.83

(7) LEVINE, D.I. "It's Time for Eurobankers to Work Out What They Mean by Market Practice" Euromoney August 1976, p.43
REFERENCES (continued)


(11) Leasing Digest "Big Ticket Leasing A Special Report"

June 1979, p.7.

(12) ANDERSON, G.L. "International Project Financing"

Financial Executive, May 1977, p.41

CHAPTER 12

LOAN STRUCTURE AND THE OFF-BALANCE SHEET MOTIVE

12.1 INTRODUCTION

This Chapter examines some of the approaches to structuring a euro-currency project loan and the effect of alternative arrangements on disclosure in the sponsor's balance sheet. It also assesses the evidence regarding the off balance sheet motive in project finance.

12.2 LOAN STRUCTURE

Both Davenport(1) and Bulfield (2) mentioned three main types of loan structure:

1. Straightforward loan
2. Production repayment loan
3. Forward purchase

12.2.1 Straightforward loan

Here the loan is made to a subsidiary of the project sponsor which has been specially incorporated to own the project's assets and raise finance for construction. Repayments can be arranged in any of the ways mentioned in Section 11.4.2 and the amount of recourse lenders have to the sponsor, will vary depending on the structure of the security. Clearly, since the borrowing company is a subsidiary of
the sponsor it will be consolidated in its balance sheet, although there appears to be no established method of disclosing these liabilities. For example, the two limited recourse loans to Thomsons and the two for Occidental Petroleum are all included in the respective group accounts under the heading 'long-term debt', together with a note explaining the limited recourse nature of these loans. On the other hand, three limited recourse loans to Tricentrol and another to Petrofina are deducted from the fixed asset cost of the project, and only the net figure for fixed assets is shown on the face of the balance sheet. This calculation is, however, shown in a note to the accounts. The result is that a cursory examination of the face of the balance sheet may give a misleading picture and it is necessary to study the notes and make appropriate adjustments. If, as several banks suggested, limited recourse loans are not a true liability of the sponsor it is necessary to ensure that the limited recourse loans and associated assets are excluded from calculations of gearing etc. On the other hand, if it is believed that, regardless of legal obligations, the sponsor would stand behind the project in the event of difficulties, then both the liability and related assets should be included in such calculations.

12.2.2 Production Payment Loan

Since this thesis is concerned with financing start-up projects, only the 'development production payment' is considered. These originated in the 1920's as a means of financing the development of Texan oil fields. Production payments have, however, been applied to many types of extractive venture, including gas, iron ore and coal.
FIGURE 12.1 PRODUCTION PAYMENT LOAN

Williams and Meyers (3) defined a production payment as:

"A share of the oil produced from a described tract of land free of the costs of production at the surface, terminating when a specified sum from the sale of such oil has been realized".

The mechanics of a developmental production payment illustrated in Figure 12.1 are as follows: The project sponsor (operating company) sells a production payment to a third party. This is usually a nominally capitalised company owned by the lenders. The lenders finance 100% of the cost of purchasing the production payment by a loan to the vehicle company, and so the sponsor indirectly receives the proceeds of the loan, which it uses to develop the project. Repayment of the loan is made from dedicated cash flow of the project if and when it is producing, and lenders typically have no recourse to the sponsor. As security, it is usual to give a mortgage of the field to the purchaser of the production payment and this, together with the production payment indenture is assigned to the banks.

The result is that production payments appear on the sponsor's balance sheet as a 'deferred credit' or similar wording. The loan does not appear in long-term debt as it was made to a company owned by the lenders. The lenders will also ensure that the vehicle company does not have to be consolidated on their balance sheets by ensuring a wide spread of ownership.

In the U.S. the granting of a production payment creates an interest in the land and in the oil in the ground 4. In the U.K. and certain
other jurisdictions however, the use of production payments is more complicated. North Sea licence holders cannot acquire any title to the oil until it has actually been extracted\(^4\) and so cannot convey such an interest to the purchaser. Although it is legally possible to use a production payment in the North Sea, the preferred structure appears to be the forward purchase, and despite the fact that certain financings (notably the BP Forties loan) have been misleadingly termed 'production payments', an examination of their structure revealed that they are in fact forward purchase agreements.

12.2.3 **Forward Purchase**\(^5\)

This structure has been used in three publicised North Sea financings to date\(^6\). As can be seen from Figure 12.2, the structure of a forward purchase is very similar to that of a production payment, though there are legal differences.

Again a vehicle company is incorporated, owned by the banks\(^7\), which borrows from them. The funds are used to make advance purchases of oil etc. from the project operator for delivery if and when production commences. When production does begin the vehicle company receives the oil as it is produced but immediately re-sells it, (without taking physical delivery), usually to a company in the same group as the project operator, in order to produce cash with which to service the bank loan. Of course, this is only the bare structure of such a loan and there are endless permutations regarding the sharing of risks. The actual structure of the BP Forties field loan is shown in Appendix IV, while in the ICI Ninian loan lenders had full recourse to ICI
in the event of the field failing to produce sufficient oil for any reason.

As with the production payment, the loan itself is not consolidated into the project sponsor's group accounts as it was made to a company owned by the banks. What is consolidated is the advance payment for future oil and this is reported in the balance sheet as a "deferred liability" or words to that effect, in a separate category from "long-term debt".

12.3 'OFF BALANCE SHEET' FINANCE

It was suggested in Section 3.3.1 that borrowers have sought to use project finance to achieve off balance sheet advantages in the form of an increased borrowing capacity in excess of that normally considered prudent by lenders and investors.

It would seem that this advantage could be achieved for either of two reasons:

1. Because lenders, investors and analysts fail to recognise either the existence or full financial implications of such obligations.
2. Because analysts etc. believe that project finance obligations are different from normal corporate obligations.

Although Wynant (5) recognised both possibilities, he appeared to concentrate on the first alternative. He conducted a questionnaire survey among credit officers and security analysts in the U.S. in which he investigated their treatment of production payments, non-
capitalised leases and borrowings of unconsolidated investments.

He concluded ((15) p.35) on the basis of 56 completed questionnaires that:

"For the majority of the survey institutions, indirect liabilities as a whole are not systematically or formally included in their analysis of a company's financial position. A failure by credit and equity analysts to recognise fully the financial implications of such obligations because of either ineffective techniques, the novelty of such financing arrangements or inadequate disclosure practices may enable a firm, through the use of project and indirect borrowings, to raise total debt capital in excess of the amounts available directly at the parent level."

The implication here is of course, that as analysts and others become more aware of project finance techniques, the advantage of off-balance sheet finance will disappear.

It can be argued, however, that project finance obligations are not equivalent to straight debt obligations for the sponsor and so are advantageous even if correctly interpreted by analysts.

As Peppers and Wellman (6) pointed out:

"A non-recourse production payment is not a true debt obligation for the borrowing firm. Default on a production payment will not result in bankruptcy for the borrower, assuming that assets pledged to the production payment represent less than 100% of the firm's total assets".
The implication is that a non-or limited recourse loan (structured as a production payment or otherwise) should not be regarded as equivalent to long-term debt in calculating a company's gearing. To the extent that the project is self financing, and recourse to the sponsor is limited or non-existent, it would seem logical to exclude the project debt from calculations of the sponsor's interest coverage and gearing tests, as the lenders do not have a general claim against the corporate assets of the project sponsor.

The evidence does suggest that at least some project financings are structured to achieve purely cosmetic off balance sheet advantages. Although it is clearly dangerous to be too dogmatic, it appeared that the three North Sea financings which used a forward purchase structure - BP, ICI and BNOC - were all primarily for off balance sheet reasons. In the case of the BP loan only the oil in place risk was shouldered by lenders, while the other two financings, the loans were fully guaranteed by the parent company.

It also seems likely that cosmetic off balance sheet motives prevail when an unconsolidated project company is supported by a 'strong' take or pay, throughput or processing agreement. The obligation of the parent company to repay is effectively as great as if it had given an unconditional guarantee, and yet the disclosure requirements for such 'commercial' contracts appeared to be less stringent than for a guarantee. An examination of the balance sheets of two companies known to have entered into throughput agreements revealed that they were either apparently not shown at all or were reported in the notes to the balance sheet as a contingent liability, but without the potential liability being quantified (as is required for guarantees).
Having established that there is a potential for borrowing capacity to be increased, either because of cosmetic factors, or the limited recourse nature of the obligations, the next question that has to be explored is how analysts etc. treat project finance obligations when evaluating a company. If they are treated as normal corporate obligations, then, no borrowing capacity benefits would accrue. No analysts were approached during the research, but the banks interviewed were asked to give their opinions regarding the attitude of analysts towards project finance obligations. Most banks believed that analysts were no longer fooled by 'cosmetic' off balance sheet arrangements, such as forward purchase agreements where lenders had full recourse to the sponsor, and that these would be included in long-term debt when evaluating the company's gearing. It was thought, however, that off balance sheet advantages could still be obtained by using throughput agreements etc. rather than guarantees, largely because of the reduced disclosure requirements.

As regards limited or non-recourse finance supported by, say, a completion guarantee, banks believed that until completion, analysts would treat it as part of normal long-term debt, while after completion (i.e. once it became non-recourse to the sponsor) it would be excluded from calculations, along with the fixed assets it financed. It was thought, however, that the actual treatment might depend on the individual circumstances, and in particular the amount of recourse lenders had to the project sponsor.
This view can, however, be contrasted with that of the U.S. Financial Accounting Standards Board. In December 1977 they issued Statement No. 19 (FASB 19) which required, inter alia, that production payments should be reported as ordinary debt, regardless of the degree of recourse which lenders have. If this can be taken to an indication of the attitude of accountants towards production payments (and presumably therefore, limited recourse finance in general), it would suggest that the borrowing capacity advantages of even non-cosmetic arrangements may be limited.

The FASB has also recently issued an exposure draft of a proposed new standard which would increase the disclosure requirements for take or pay contracts, throughput agreements etc. The proposed standard (7) provided that "...for such contingencies an enterprise should disclose the aggregate commitment and the payments required in each of the next five years". When implemented, it is likely that many of the off balance sheet benefits of these obligations which at present result from inadequate disclosure, will be lost. Banks felt, however, that it would be several years before an equivalent position was reached in most European countries.
NOTES TO CHAPTER 12

1. The effect on the appearance of the balance sheet of these alternative methods of presentation can be shown by the following simplified example involving a project loan of 300 to finance an oil field costing 400.

**AN OIL COMPANY**

<table>
<thead>
<tr>
<th>ALTERNATIVE 1</th>
<th>ALTERNATIVE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Assets</td>
<td>500</td>
</tr>
<tr>
<td>Fixed Assets*</td>
<td>1500</td>
</tr>
<tr>
<td>Total Assets</td>
<td>2000</td>
</tr>
<tr>
<td>Long Term Debt*</td>
<td>1000</td>
</tr>
<tr>
<td>Equity</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>2000</td>
</tr>
</tbody>
</table>

Notes

* including 400 relating to oil field

* including 300 of limited recourse loan

*calculated as:

- Ordinary fixed assets 1100
- Oil field cost 400
- less Loan 300
  
  \[
  \text{Apparent Debt: Equity ratio} = \frac{100}{1200} = 0.7 : 1
  \]

\[
\text{Apparent Debt: Equity ratio} = 1 : 1
\]
2. The other types of production payment are the reserved production payment and the carved out production payment, both of which are used with producing properties.


6. These were: - BP Forties loan (see Appendix IV)

7. Or the vehicle company may be owned by a charitable trust which is owned by the lenders, as was the case in the BP loan (see Appendix IV).
8. No reference was found in the accounts of ENI (Ente Nazionale Idrocarburi - the Italian state oil company) to throughput agreements given by its subsidiaries in respect of the Ekofisk and Trans-Tunisian pipeline loans.

9. As an example of this, the following extract from the notes to the 1979 accounts of Texaco Inc. illustrates the difference between the reporting of guarantees and other obligations:

Note 10 Contingent Liabilities

"The Company and its subsidiary companies were contingently liable in the amount of $21,000,000 as guarantors on loans outstanding, principally of certain associated companies. Also, under long-term agreements with certain pipeline companies in which capital stock interests are held, the Company and certain of its subsidiary companies guarantee specified revenue from product shipments through the pipelines and, in the event such companies are unable to meet debt obligations, funds may be advanced against future transportation charges".

The note goes on to mention three other projects - a deep water oil port; a Swedish refinery; and a U.K. catalytic cracking unit - for which similar obligations exist.

REFERENCES - Chapter 12

(1) DEVERELL, M.C. "Address to West Coast LNG Symposium Perth" 1977, p. 7

(2) BULFIELD, P.W. "Project Finance of Major Natural Resource and Industrial Investments" paper given at International Corporate Finance Conference 1980, Zurich, p. 26


(5) WYNANT, L. "Project Financing for Extractive Ventures" Management Accounting, Vol. 60, October 1978 p. 83


PART III

FUTURE DEVELOPMENTS
CHAPTER 13

FUTURE FOR PROJECT FINANCING

13.1 INTRODUCTION

This chapter examines the future for project financing in terms of the likely future growth in its use and possible developments in techniques. It also highlights some suggestions for future research in the area of international banking and project financing.

13.2 FUTURE DEMAND FOR FINANCE

The future level of demand for project finance is clearly dependent on the financing decisions of the petroleum industry in particular, and the elements in this process are summarised in Figure 13.1.

![Diagram of Sources and Uses of Funds]

Figure 13.1 SOURCES AND USES OF FUNDS
The first element in Figure 13.1 is the financing requirement, of which the three most significant aspects are capital investments, dividends, and debt repayments. Forecasting the future level of capital investment is a particularly difficult task, depending as it does on such factors as the future growth in the world economy, energy conservation measures, and trends in oil prices, (all of which are interrelated and affect the demand for oil and gas). Then there is the real cost of meeting this demand (which depends on such factors as the location of supplies and the extent of the use of costly sources such as LNG, and the extraction of oil from tar sands or shale). This will give a measure of capital requirements in real terms, and it is then necessary to incorporate the effects of inflation in order to arrive at the capital investment requirements in money terms.

Chase Manhattan produce regular forecasts of the capital investments and financing needs of the world petroleum industry, but unfortunately only superficial information is available on the most recent forecast. This suggested that total capital expenditure over the period 1980 to 1990 will amount to $878 billion in the U.S. and about $600 billion in the rest of the world. In addition Chase assumed that dividends amount to 30% of net income and debt repayments to one sixth of the debt outstanding in each year. This produced a total financial requirement of about $100 billion in 1980, rising to about $500 billion by 1990.

Using unspecified assumptions regarding the amount of internal cash generation (historically about 70% of total sources of finance), the amount of new equity (which is likely to be small), and short term debt
finance, the Chase forecast is that the amount of new long term debt required by the petroleum industry each year will be as follows 2.

<table>
<thead>
<tr>
<th></th>
<th>1980</th>
<th>1985</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. petroleum industry</td>
<td>13</td>
<td>26</td>
<td>47</td>
</tr>
<tr>
<td>Non U.S. industry</td>
<td>13</td>
<td>23</td>
<td>46</td>
</tr>
</tbody>
</table>

Now much of this long term debt will be provided in the form of project finance? The Chase forecast does not attempt an assessment, and it proved impossible to determine the proportion of long term debt currently provided by project finance (see Section 3.4). The view of most bankers interviewed was, however, that an increasing proportion of commercial bank loans would take the form of project finance in the future, particularly as the size of projects would continue to grow in relation to the resources of sponsor companies.

Generally banks saw little difficulty in satisfying this demand, although two banks did suggest that very costly projects (particularly LNG), might cause capacity problems for lenders, given that they set exposure limits for particular countries, industries and borrowers.

Forecasts of future investment needs in the mining industries 3 also indicate a continuing need for bank finance in the future, as well as a continuing use of project finance. The view of the banks interviewed was that their involvement in the mining industries would continue to be less important than that of the petroleum industry, although one banker suggested that the use of project financing techniques was likely to increase in the mining industries as petroleum companies (customary users of project finance), continued their diversification into mineral activities.
13.3 FUTURE TRENDS IN TECHNIQUES

Radetzki and Zorn (1) suggested in 1979 that the trend in mining project finance was away from limited recourse financings and towards more stringent completion guarantees etc. as well as towards greater equity contributions. It is not clear whether this was a general comment or related to the practice in the U.S.\(^4\). Certainly, interviews with banks in the U.K. and a study of several project financings suggested that in the U.K. in recent years the trend has been for banks to have less recourse to project sponsors, and also for the acceptable levels of cash flow coverage to be reduced. The pressures of competition was the main reason given by banks to explain this trend. When asked what the likely future trend would be, a majority of banks suggested that banks were likely to shoulder even more of the project risks in the future and have even less recourse to project sponsors. It was also thought likely that the required levels of cash flow coverage would be further reduced. The three main reasons given to explain this trend were:

1. Increasing experience in project financing and evaluation of risks.
2. Pressure from borrowers as projects became larger in relation to their resources.
3. Competitive pressures between banks.

At the same time, however, the general feeling was that if there was a major default on a project loan the natural response of banks would be extreme conservatism and that, for a time at least, they would become extremely reluctant to shoulder project risks.
13.4 SUGGESTIONS FOR FURTHER RESEARCH

During the course of this research several unresearched areas of international banking practice were discovered. In particular, the following were thought to be significant areas for further research:

1) Country risk analysis - some work has been undertaken to determine the best indicators of economic (and to a lesser extent) political risk, although the debate is as yet unresolved. There would also seem to be a need for a survey of the current practices of U.K. based banks in analysing country risk as well as the related areas of setting country exposure limits and allocating loans to different countries (particularly when the loan involves, say, a debtor located in one country and a guarantor in another).

2) Organisational structure of lending function - it became apparent during the course of the research that the project financing activities of different banks were organised in different ways. While a comparative study of this may be too restrictive, a study of the lending function in different banks, covering the organisational structure and loan approval process and the possible impact of this on the lending decision, might usefully be undertaken.

As regards further research on some of the specific aspects of project financing, it is clear that many areas would merit a more rigorous approach. In particular the question of the riskiness of project financing and its profitability were areas in which conclusions were
particularly difficult. Problems are envisaged, at least in the near future, however, in obtaining a sufficiently large and homogeneous sample with which to test these issues.

It might also be useful to explore the subject from the viewpoint of the borrower, examining in particular, their reasons for using project financing, as well as perhaps the reason given by other companies in the same industry for not using project finance.

Another area in which conflicting views were found concerned the question of off balance sheet finance. A study of the practices of analysts and lenders when evaluating the balance sheets of companies which have used project finance would also help to shed some light on the off balance sheet and borrowing capacity aspects of project financing.

Finally, it is thought that the preparation of a few selected case studies could help an understanding of the complexities of the subject.
NOTES TO CHAPTER 13

1. Given in EMERSON, J.D. "Financing the World Petroleum Industry" a report to BIAC Energy & Raw Materials Committee, September 1980. This is based on an estimated inflation rate of 8.7% per year from 1980-85 and 8.1% per year from 1985-90.

2. These figures were given by ADAMSON, J.A. "North Sea Financing - A Commercial Banker's View", paper given at Energy Law Seminar, Cambridge 1979, p.6, but it is known that they relate to the same forecast.

3. See, for example, MIKESELL, R.F. Mining Congress Journal, July 1978, and RADETZKI, M. & ZORN, S. "Financing Mining Projects in Developing Countries".

4. WYNANT, L. "A Study of Financial Strategies for Large-Scale Mining Ventures" (DBA) Harvard University 1976 p.V-10, also expressed a similar view regarding project financing in the U.S.
REFERENCES - Chapter 13

(1) RADETZKI, M. & ZORN, S. "Financing Mining Projects in Developing Countries" Mining Journal Books 1979, p.85.
APPENDICES
APPENDIX I  LIST OF BANKS INTERVIEWED

CLEARING BANKS

Bank of Scotland (International Division)
Barclays Bank International Ltd.
Lloyds Bank International Ltd.
Midland Bank (International Division)
National Westminster Bank (International Banking Division)

U.K. MERCHANT BANKS

Baring Brothers & Co. Ltd.
Hill Samuel Project Finance Ltd.
Kleinwort Benson Project Services Ltd.
Lazard Brothers & Co. Ltd.
Morgan Grenfell & Co. Ltd.
J.H. Schroder Wagg & Co. Ltd.
Standard Chartered Merchant Bank Ltd.
S.G. Warburg & Co. Ltd.

AMERICAN BANKS

Amex Bank Ltd.
Bank of America International Ltd.
Bankers Trust Company
Chase Manhattan Bank N.A.
Chemical Bank
Citibank N.A.
Continental Bank
Manufacturers Hanover Ltd.
Morgan Guaranty Trust Company
Republic National Bank of Dallas

OTHER BANKS

Bank of Montreal
European Banking Company
International Energy Bank
Royal Bank of Canada
APPENDIX II

TYPE OF PROJECT WHERE PROJECT FINANCE HAS BEEN USED

(1) Oil field development
(2) Gas field development
(3) Uranium mining and processing facility
(4) Gas liquefaction plant (LNG plant)
(5) Aluminium smelter
(6) Gas transmission system (pipeline)
(7) Oil transmission system:
(8) Nickel mining and processing facility
(9) Electricity generating station
(10) Petrochemical plant
(11) Oil refinery
(12) Oil transhipment facility (offshore oil port)
(13) Copper mining
(14) Geothermal project
(15) Coal mining
(16) Steelworks
### APPENDIX III

**ALTERNATIVE COVERAGE RATIOS**

**HYPOTHETICAL PRODUCTIONS AND CASH FLOW SCHEDULE**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>OIL (Thousands of Barrels)</th>
<th>GAS (Millions of Cubic Feet)</th>
<th>Cash Flow ($000's)</th>
<th>Cumulative Cash Flow ($000's)</th>
<th>Present Value of Cash Flow at 10%</th>
<th>Cumulative Present Value ($000's)</th>
<th>Target Repayment Schedule ($000's)</th>
<th>Annual Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>7757</td>
<td>7563</td>
<td>70447</td>
<td>70447</td>
<td>64043</td>
<td>64043</td>
<td>30,000</td>
<td>2.34</td>
</tr>
<tr>
<td>1980</td>
<td>6291</td>
<td>6134</td>
<td>57132</td>
<td>127579</td>
<td>47217</td>
<td>111260</td>
<td>20,000</td>
<td>2.85</td>
</tr>
<tr>
<td>1981</td>
<td>5007</td>
<td>4882</td>
<td>45472</td>
<td>173051</td>
<td>34164</td>
<td>145424</td>
<td>20,000</td>
<td>2.27</td>
</tr>
<tr>
<td>1982</td>
<td>3980</td>
<td>3880</td>
<td>36145</td>
<td>209195</td>
<td>24688</td>
<td>170112</td>
<td>10,000</td>
<td>3.61</td>
</tr>
<tr>
<td>1983</td>
<td>3188</td>
<td>3109</td>
<td>28953</td>
<td>238148</td>
<td>17978</td>
<td>188090</td>
<td>10,000</td>
<td>2.69</td>
</tr>
<tr>
<td>1984</td>
<td>2640</td>
<td>2574</td>
<td>23975</td>
<td>262124</td>
<td>13533</td>
<td>201623</td>
<td>10,000</td>
<td>2.40</td>
</tr>
<tr>
<td>1985</td>
<td>2285</td>
<td>2228</td>
<td>20752</td>
<td>282876</td>
<td>10649</td>
<td>212272</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>2033</td>
<td>1982</td>
<td>18463</td>
<td>301339</td>
<td>8613</td>
<td>220885</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>1866</td>
<td>1761</td>
<td>16402</td>
<td>317741</td>
<td>6956</td>
<td>227841</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>1656</td>
<td>1615</td>
<td>15039</td>
<td>332780</td>
<td>5798</td>
<td>223639</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THEREAFTER</td>
<td>22041</td>
<td>21490</td>
<td>200170</td>
<td>532950</td>
<td>32729</td>
<td>266368</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL** | 58684                        | 57218                          | 532950             | $266368                        | $100,000                         |


*Note: Cash flows occur at year end.*
APPENDIX III (continued)

Coverage ratios

1. Annual coverage – see column 8 – calculated as \( \frac{20}{7} \).
2. Average coverage = 2.73.
3. Life of reserve coverage – loan fully repaid in 1984 at which time more than half of the reserves and cash flows are still remaining. Therefore passes this test.
4. Present value coverage – maximum loan amount given by 50% of total present value of net cash flow = $266,368 \div 2 = $133,184,000. Actual loan is for $100m., therefore it is within this coverage test.
5. Present value life of reserve coverage: cumulative present value to the point where half of cash flow and half of reserves are used up (i.e. one fifth of the way through 1985 = $203,750,800 (which represents the maximum loan amount under this criteria). Since the actual loan is $100m. it is well covered.
APPENDIX IV

British Petroleum Co. Ltd. - Forties Field

Technical details

<table>
<thead>
<tr>
<th>Location</th>
<th>UK North Sea block 21/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water depth</td>
<td>348 - 402 feet</td>
</tr>
<tr>
<td>Date discovered</td>
<td>October 1970</td>
</tr>
<tr>
<td>Original cost estimate</td>
<td>$900m.</td>
</tr>
<tr>
<td>Actual cost</td>
<td>$2680m.</td>
</tr>
</tbody>
</table>

Financial arrangements

<table>
<thead>
<tr>
<th>Amount of loan</th>
<th>$468m. + £180m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of loan</td>
<td>1972</td>
</tr>
<tr>
<td>Lead managers</td>
<td>Lazard Brothers; Morgan Guaranty Trust Co.; National Westminster Bank</td>
</tr>
<tr>
<td>Type of loan</td>
<td>Forward oil purchase (see section 12.2.3)</td>
</tr>
<tr>
<td>Loan terms</td>
<td></td>
</tr>
<tr>
<td>- borrower</td>
<td>Norex Trading Ltd. (a company owned by the managing banks)</td>
</tr>
<tr>
<td>- maturity</td>
<td>9 years</td>
</tr>
<tr>
<td>- interest rate</td>
<td>1% over LIBOR rising to 1½% if not repaid by 1979.</td>
</tr>
<tr>
<td>- fees</td>
<td>Not known</td>
</tr>
<tr>
<td>- repayment terms</td>
<td>Until end 1978 repayment only from cash flow from the field. If production is interrupted prior to end 1978 (subject to the presence of recoverable oil) repayment will be suspended. Repayment must be completed by end 1982 in all events unless there is insufficient oil in place. After 1978, B.P. must make cash payments (up to the value of recoverable oil) to keep the repayment schedule if project cash flow is insufficient.</td>
</tr>
</tbody>
</table>
### Risk sharing

<table>
<thead>
<tr>
<th>Risk</th>
<th>Borne by</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion</td>
<td>BP/lenders</td>
<td>Banks have limited risk of delay in repayment until end 1978.</td>
</tr>
<tr>
<td>Oil in place</td>
<td>Lenders</td>
<td>Estimates of 2 consultants were very close to BP's estimate and there was a good safety margin.</td>
</tr>
<tr>
<td>Recoverability</td>
<td>BP</td>
<td>BP guaranteed a minimum recovery factor of 44% of oil in place.</td>
</tr>
<tr>
<td>Operating</td>
<td>BP</td>
<td></td>
</tr>
<tr>
<td>Marketability</td>
<td>BP</td>
<td>Sales agreement between Norex and BP Trading</td>
</tr>
<tr>
<td>Exchange rate</td>
<td>BP</td>
<td>BP Trading purchases the oil for the appropriate currencies to ensure that Norex faces no exchange risk.</td>
</tr>
</tbody>
</table>

### Project Structure

- **B.P. Co. Ltd.**
  - Guarantee of obligation to bring oil ashore
  - Guarantee of obligation to purchase oil

- **B.P. Oil Development Ltd.**
  - Delivers oil from Forties Field

- **B.P. Trading Ltd.**
  - Sells Oil Delivered
  - Payment for oil

- **Norex Trading Ltd.**
  - Proceeds of oil sale

- **Kimberley Oil Co. Ltd.**
  - Proceeds of oil sale

- **Banks**
  - Loan

- **Proceeds of oil sale**
  - Advances Under Forward Oil Purchase Agreement
1. Norex Trading Ltd - nominally capitalised funding vehicle owned by Kimberley Oil Co.
   - borrows from banks and makes an advance payment to BP Oil Development Ltd. in return for an agreement to deliver oil produced from the Forties field.

2. Kimberley Oil Co. - trustee of a charitable trust wholly owned by the lead managing banks.

3. BP Oil Development Ltd. - builds and operates the production facilities using the advance payment from Norex.
   - ultimately owned by B.P. Co. Ltd. but Norex Trading holds 1 special share enabling it (and therefore the banks) to take control of the company in the event of default.

4. BP Trading Ltd. - purchases Forties oil from Norex in return for cash to service the loan.
   - ultimately owned by BP Co. Ltd.

Implications of the structure.

1. Norex is not a subsidiary of BP and is not therefore consolidated in the group accounts. Norex's borrowing does not therefore appear on BP's balance sheet as long term debt.

2. The advance payment to BP Oil Development is treated as deferred revenue and when consolidated in the BP group accounts is shown as "North Sea oil advance payments" under a separate heading from long term debt.

Security for the lending

1. BP Co. Ltd. guarantee of everything except the oil in place risk.

2. Special share in BP Oil Development held by Norex enabling the banks to take over operation of the field.

3. Debentures containing fixed and floating charge given by BP Oil Development to Norex, and by Norex to the Banks.
Apparent reasons for using project finance

1. Ability to debt finance 100% of the expected cost.

2. Flexibility in drawdown and repayment of loan to avoid adverse effect on corporate cash flow.

3. Minimal impact on the ability of BP to raise funds to finance other activities (notably Trans Alaskan pipeline).

Sources of Information


2. Argyle RES "Governmental Powers & Project Financing in the North Sea" Appendix II.

3. Returns to Companies House of Norex Trading, Kimberley Oil Co., BP Oil Development and BP Co. Ltd.

APPENDIX V

Thomson Scottish Associates - Piper Field

Technical details

Location: UK North Sea Block 15/17
Date discovered: January 1975
Water depth: 475 feet
Participating companies:
- Occidental: 36.5% (operator)
- Getty: 23.5%
- Allied Chemical: 20.0%
- Thomson: 20.0%

Financial arrangements

Each participant made its own arrangements for finance. Thomson and Occidental both used project finance.

Amount of loan: $100m.
Date of loan: 1974

Loan terms
- borrower: Thomson North Sea Ltd (TNS)
- maturity: 9 years
- interest rate: 1\% over LIBOR plus royalty of 2\% of Thomson's share of the first 642m. barrels produced
- drawdown: only permitted after Thomson had invested $20m. of equity
- repayment: from a varying dedicated percentage of gross cash flow. Percentage is determined annually and is based on the relationship between the present value of future cash flow and the outstanding balance. Any excess of dedicated cash flow over the scheduled repayment may be applied as a prepayment of the loan, but if not it must be retained. In the event of default, the banks can require the borrower to pay back this excess cash flow (subsequently amended in 1978 so that only 25% of excess cash flow was subject to this clawback).
Risk sharing

<table>
<thead>
<tr>
<th>Risk</th>
<th>Borne by</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost overrun</td>
<td>Not known</td>
<td></td>
</tr>
<tr>
<td>Completion</td>
<td>Banks</td>
<td>relied on covenants given by Occidental in its own loan.</td>
</tr>
<tr>
<td>Market</td>
<td>—</td>
<td>market assured by firm sales contracts at market price.</td>
</tr>
<tr>
<td>Price</td>
<td>Banks</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>Banks</td>
<td>Occidental (the operator) was a well respected company.</td>
</tr>
<tr>
<td>Reserve</td>
<td>Banks</td>
<td></td>
</tr>
<tr>
<td>Political</td>
<td>Not known</td>
<td></td>
</tr>
</tbody>
</table>

Comments

1. The loan was essentially non-recourse to TSA, but the value of any recourse would have been small given the small size of TSA at the time of the loan.

2. The field was a particularly profitable one with comparatively low development costs, leaving a large coverage to absorb any problems.

3. While Thomson had no experience of oil, the field was being developed by an experienced operator (Occidental) which was also borrowing on similar terms.

Project structure

```
Thomson Scottish Associates

Thomson North Sea Ltd.

Share of Piper Field

Sales contracts

Oil Buyers

Finance Share of Development Cost

Limited Guarantee of TNS obligations

Thomson Scottish Associates

Banks

Loan

Repayment from dedicated proceeds
```
Implications of the Structure

1. TNS is a wholly owned subsidiary of Thomson Scottish Associates.

2. The loan is shown as part of long term debt in the accounts of TNS and the consolidated accounts of TSA (since a merger in 1978 it appears in the group accounts of International Thomson Organisation under long term debt). A note explains the limited recourse nature of the loan.

Security for the lenders

1. Fixed and floating charge over the interest of TNS in the Piper field licence and facilities and the excess cash flow subject to clawback.

2. Special share in TNS giving banks the right to take control of TNS in the event of default.

3. Guarantee of TNS obligations under the Piper loan by TSA.

Apparent reasons for using project finance

1. Ability to raise finance - the alternatives were either to farm out or to raise expensive new equity.

2. Desire to shelter the rest of corporate assets from the effect of problems with the field.

Sources of Information

APPENDIX VI

Occidental Petroleum Corporation - Piper Field

Technical details
- see Thomson case, Appendix V.

Financial arrangements

- Amount of loan $150
- Date of loan 1974
- Lead managers Republic National Bank of Dallas; International Energy Bank

Loan terms
- borrower Piper Finance Ltd (a company owned by the managing banks).
- maturity 9 years
- interest rate 1½% over LIBOR
- repayment calculated with reference to production from the Piper field.

Risk sharing

<table>
<thead>
<tr>
<th>Risk</th>
<th>Shouldered by</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion</td>
<td>Occidental</td>
<td>Completion guarantee from parent company</td>
</tr>
<tr>
<td>Cost overrun</td>
<td>Occidental</td>
<td></td>
</tr>
<tr>
<td>Marketability</td>
<td>banks</td>
<td></td>
</tr>
<tr>
<td>Reserve</td>
<td>banks</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>not known</td>
<td></td>
</tr>
<tr>
<td>Political</td>
<td>Occidental</td>
<td>guarantee from parent company in case of loss of licence or nationalisation.</td>
</tr>
</tbody>
</table>
Project structure

1. Piper Finance Ltd - owned by the lead managing banks. Borrows from syndicate and on-lends to Occidental of Britain.

2. Occidental of Britain Inc. - a U.S. incorporated subsidiary of Occidental Petroleum Corpn.

3. Occidental Petroleum (UK) - joint holder of the production licence for Piper. Gave a working interest in the field to Occidental of Britain Inc. by which OBI bears all costs and receives all income. Piper Finance (and therefore the banks) holds a special share in Occidental Petroleum (UK). This arrangement was necessary because UK law required the holder of a production licence to be incorporated in the UK, while for US tax reasons the expenditure must be incurred by a US incorporated company.

Security

   (a) until completion.
   (b) in the event of nationalisation or loss of licence.

2. Debenture incorporating a fixed and floating charge given by OBI to Piper Finance and by Piper Finance to the banks.

3. Special share held by Piper Finance in Occidental Petroleum (UK).
Sources of Information

Companies House returns for: Occidental of Britain Inc; Occidental Petroleum (UK); and Piper Finance Ltd.
APPENDIX VII

Tricentrol Ltd. - Thistle Field

Technical details

<table>
<thead>
<tr>
<th>Location</th>
<th>UK North Sea blocks 211/18 and 211/19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date discovered</td>
<td>September 1972 and June 1974</td>
</tr>
<tr>
<td>Water depth</td>
<td>530 ft.</td>
</tr>
</tbody>
</table>

Financial arrangements

Finance was arranged by participants independently. Only Tricentrol used project finance. Initially there were plans to arrange joint finance but these collapsed because of political uncertainties.

Background

In 1974 Tricentrol’s share capital was only £11.6m. It was able to meet initial development costs from corporate loans and cash flow, but it required substantially more to meet further costs. Borrowing on a corporate basis was impossible as it would have made the gearing too heavy and so it was left with a choice between selling out, farming out or raising a non-recourse loan. The first two choices were undesirable and the third was difficult because of uncertainty over government policy. Tricentrol therefore approached the government in January 1975 for assistance in raising finance, on the basis that political uncertainties had meant that the change of a non-recourse loan had been lost. The result was a government guarantee.
First financing

Borrower: Tricentrol Thistle Development Ltd. (TTD)
Date: 1976
Amount: £60m.
Lead managers: Barclays Merchant Bank; NM Rothschild & Sons

Loan terms:
- maturity: 4 years
- interest rate: while guaranteed 1½% over LIBOR
  when guarantee released 2⅔% over LIBOR
- repayment: by end 1980
  Option to convert to a production payment
  once certain production criteria were met.

Security:
1. Debenture giving first fixed and floating charge over TTD's interest in the field.
2. Guarantee of Department of Energy expiring at the latest end 1978. In return the government received a special 5% royalty (in addition to the usual 12⅔% royalty). This royalty could increase should the cash flow fall short of target.
3. Special share held by banks in TTD.

Second financing

Borrower: Tricentrol Thistle Development Ltd.
Amount: £10m.
Date: April 1978

Limited recourse loan, unguaranteed by the government; terms unknown.
Third financing

Borrower
Tricentral Thistle Development

Amount
£60m.

Date
November 1978

Type of loan
Limited recourse project refinancing, partly used to refinance some of the government guaranteed loan

Loan terms
- maturity 5 years
- interest spread 2% over LIBOR until 31 March 1980 thereafter 1½%
- repayment final repayment due by end 1983. Loan is repayable only from the proceeds of production.

Security
1. Debenture - covered by the same debenture as the first financing but ranks before the guaranteed loan.
2. Special share in TTD.

Project Structure

[Diagram showing the project structure with nodes and arrows indicating the flow of funds and guarantees]
TTD is wholly owned by Tricentrol Ltd., though the lenders hold one special share giving them control in the event of default. TTD is therefore consolidated in the Tricentrol group accounts. The loans are shown as a deduction from Tricentrol's share of the Thistle field assets to which they relate. Only the net figure for fixed assets is shown on the face of the balance sheet. Attention is drawn to this deduction by a note to the accounts.

Sources of Information

Wilson Committee Research Report No. 2.
Companies House returns for Tricentrol Thistle Development and Tricentrol Ltd.