THE MANAGEMENT OF FOREIGN EXCHANGE EXPOSURE ON BUSINESS CONTRACTS OVERSEAS.

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DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF ASTON IN BIRMINGHAM
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THESIS SUMMARY

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This thesis is a piece of applied research. It is the result of a joint project between the University of Aston Interdisciplinary Higher Degrees Scheme and International Aeradio plc (IAL). It considers the structure and organisation of overseas business and the effects that exchange rate movements have on financial performance. It looks in detail at a series of overseas contracts and factors which affect the monitoring and performance of those contracts. From this initial research is developed a series of conceptual models which attempt to capture the effects of foreign exchange rate movements on contract costing, the monitoring of performance on overseas contracts and a measure of company wide exposure. These models are then considered in the context of real IAL generated data and circumstances. The work is finally considered in the context of a survey of other companies with a similar mode of undertaking overseas business with the aim of placing the work in a general context.

FOREIGN EXCHANGE, CURRENCY, FINANCIAL EXPOSURE, OVERSEAS CONTRACTING, INTERNATIONAL BUSINESS.

ACKNOWLEDGEMENT

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PREFACE

THE NATURE OF THE IHD RESEARCH PROCESS

The Interdisciplinary Higher Degrees Scheme (IHD) is run by the University of Aston in Birmingham to undertake applied research projects which bring together the University and outside collaborating organisations.

IHD research differs from that of conventional PhD research in a number of respects.

First, the topic of the research is usually established in advance by a third party (as in this case) prior to researcher starting work. There is no time for the student and supervisor to consider different areas of likely interest aimed at building on established academic work. For the IHD student an area of research is established because it represents a practical problem. The research task is, therefore, constrained from day one.

Secondly, the raison d'etre for research is not only the quest for new knowledge but also the solving of a problem as perceived by the collaborating organisation.

It is, therefore, unlikely (although not exclusively so) to allow for the establishment and the testing of hypotheses as is the case in conventional research but, instead, follows the high risk strategy of problem solving. "High risk" because the generation of a suitable solution that has practical value is not always easy as the chances of failure because of changes in circumstances are all too great.

Thirdly, the student is not isolated and distanced from the problem but active within it. This is likely to give the research an unusual and distinctive nature, gained from the close proximity of the researcher and the subject being researched.

Fourthly, unlike conventional PhD research an IHD project has not one but two criteria for success. It must be of academic merit, making a contribution to knowledge and have a practical value. That is,it must seek to improve upon or find a solution to the problem or circumstances which called for the research in the first instance.

The majority of the subsequent work has been conducted on the premises of the collaborating organisation and the direction and results of the work have been geared to the circumstances of this organisation. Therefore, it is important to be conscious of the position of the researcher within the organisation.

As far as the collaborating organisation was concerned the researcher had been a full-time employee working within its finance function. Overall, supervision of the work has been undertaken at Finance Director level. Whilst overall direction has been agreed upon at a high level in the organisation, day to day work has been undertaken with the front-end of the finance function.

The methodology of this thesis is a classical one in terms of the Interdisciplinary Higher Degrees Scheme run by Aston University. It is orientated towards problem solving and the generation of practical solutions.

It involved the starting point of a problem specification, shown in Appendix 1 and 2. This original specification was drafted by the collaborating organisations and required refinement and firming up by the reseacher.

The initial stage of the work involved studying the problems to assess whether they were non-trivial and to identify areas where the work would cover new ground. This involved considering the type and structure of the financial transactions which involved foreign exchange within the

company; the effects of foreign exchange movements on financial information and reveiw of the relevant literature on foreign exchange exposure and related areas.

From the initial diagnosis was developed a series of conceptual models for the type of information needed by the sponsoring organisation. This took the form of two methods for the presentation of management accounting information which better portrayed managerially important information and information more suitable for the handling of foreign exchange exposure.

A model of foreign exchange exposure on long term contracts was also postulated with the central feature of the separation of the component parts of exposure and risk. It proceeds to build quantifiable measures for both of these concepts and apply them in the context of planning, monitoring and control of exposure.

DEFINITIONS OF THE MOST COMMONLY USED TERMINOLOGY

Foreign Exchange

A general term applied to currencies other than Sterling.

Local Currency

A term applied to describe the currency of a customer of an overseas branch, subsidiary or associate.

Exposure

A term applied to sums of money either denominated in Sterling or local currency which will now or in the future have to be converted into another currency at a rate of exchange which has yet to be established or if established is subject to change.

These sums of money may be either in the form of cash, bank deposit or book-keeping values; or take the form of potential streams of income and expenditure; or assets and liabilities.

Exchange Risk

Exchange risk is similar to exposure but normally applies to adverse movements in exchange rates.

Economic Exposure

Economic exposure describes the effect of exposure over the long term, taking into account economic factors besides exchange rate movements, particularly as they effect a stream of income or expenditure.

Translation Exposure

Translation exposure describes the effect of exposure on accounting information which is translated into another currency using any one of a series of accounting rules.

Transaction Exposure

Transaction exposure describes the effect of exchange rate movements on one-off transactions in foreign currency.

Hedging

Hedging is a term used to describe techniques employed to reduce or eliminate the effects of exchange risk.

"Proprietary" and "Entity" types of organisation

In an international context a Proprietary company is an organisation which has overseas operations which are extensions of the domestic economy base, they cannot stand alone and conduct business independently. Their primary function is to generate money for the company's Head Office.

An "Entity" type of company is one in which its overseas activities have established their own base and could operate without the assistance of the Head Office. Their primary role is to build and expand in their own market and returns to the Head Office or Parent Company are essentially long term.

Long term overseas contracts

Business transactions which take the form of the supply of goods or services to an overseas customer on a continous basis.

Adapted in part from Wilhborg(80)

CHAPTER 1

1.0 INTRODUCTION

This thesis is based on work undertaken within International Aeradio PLC (IAL) for the three year period starting October 1981. The work has been sponsored by IAL and the Science and Engineering Research Council.

1.1 Aims of the Research

The main aim of the research was to provide the sponsoring organisation with a systematic framework for the planning, monitoring and control of foreign exchange exposure on its overseas contracts and related business.

It is shown that the techniques developed for this organisation, are not specific to it alone. That is, that they may be of value to other organisations who are faced with the same kind of exposure to foreign exchange risk.

As with all academic research it is argued that this piece of work makes an original contribution to learning. It represents an addition to the literature on foreign exchange exposure in an area that has not previously been given consideration. This area is, the effects of foreign exchange exposure on business conducted through the medium of long term overseas contracts. This covers a variety of areas; management accounting information, economic and financial analysis.

As the original specification for the work was made in practical terms the results must also be considered as to their practical merit.

It was perceived at the outset of the work that the results required were not those that would produce hard and fast answers but would instead provide better information for managerial decision making.

Many of the traditional definitions of exposure expressed in the literature have little practical value for the company which relies on long-term overseas contracts. Traditional definitions are orientated towards either manufacturing companies or organisations which adopt an "entity" type approach towards their overseas activities [Henderson and Peirson(77)]. The business of the sponsoring organisation differed from that tackled in the literature in that its approach was, by and large, "proprietary".

When this project was started the organisation had no formalised strategy for handling the issues raised in the research specification (Appendix 1).The way in which the research has been conducted is detailed in Chapter 2.

This research does not go into the relative merits of different types of hedging techniques. This has been adequately dealt with by other authors. Also, it does not aim at producing a mechanistic approach to the type of action to be taken. Earl (84) suggests that companies no longer look for this type of decision making tool, instead they need better information upon which to make their choices.

Since the breakdown of the Smithsonian agreement in 1973 the major currencies of the world have fluctuated wildly. There seems to be no reason to believe that in the foreseeable future this situation will change.

To companies such as IAL who depend on income derived from overseas sources in foreign currency, the effect of exchange rate movements cannot fail to have an impact on their business.

Susceptibilty to the movements of exchange rates was to the extent of 80-90 per cent of IAL's profits and turnover at the time of the drafting of the research specification (see appendix 1).

In applied research projects such as this, the nature and dynamics of the organisation which created the original research brief have a central role to play in the direction and ultimate goal of the research work. Therefore it is worth considering the background and organisation of IAL.

IAL is a public limited company incorporated in the UK. For the period of this research it has been the autonomous sudsidiary successively of two large UK based companies, first an airline and then an electronics group.

The company is primarily, although not exclusively, a service company offering aviation, communications and medical services to many parts of the world. Currently, overseas business accounts for between 80 and 90 per cent of its turnover and profits. Organisationally, it is a centralised company which operates through a series of branches and stations and associate and subsidiary companies. In terms of turnover and profits the branches and stations are more important to the parent company than the subsidiary and associate companies.

IAL was formed immediately after the Second World War to meet the needs of ex-British colonial countries who required air traffic control and communication links once the Royal Air Force had left. Initially, it was orientated towards the "importance of service" as opposed to profit as a motive for business, as stated in its first annual report in 1947.

IAL's links with its customers were through UK Government Departments with whom it held the actual contracts. Through the course of its growth and development a certain characteristics have prevailed. It has remained highly dependent on overseas trading for the bulk of its income and profits. Whilst it has attempted to diversify in the UK this has resulted in only small excursions which, while not generating considerable amounts of income has helped IAL's credibility in its overseas markets and have helped to develop a limited manufacturing base. For instance, in the area of airport operation, it has helped IAL's credibility with overseas customers to run airports in the UK.

The bulk of IAL's overseas trading activity has always taken the form of large contracts for services. IAL's string of subsidiary and associate companies have in most cases been a variety known within the company as "sweet shops", in that they concentrate within a small domestic market acting as an agent for the sale of other manufacturers' equipment and in a small number of cases acting in a "turn key" capacity building systems for customers. They also serve a secondary purpose of providing a foothold in a market that many help obtain contracts for its UK parent or provide information on potential new business. In terms of dividends returned to the UK parent company only one or two play any important role. Although this has been the case up to the present (1984), this position may well change if plans for expansion into the United States aviation and medical markets succeed. However, it is realistic to believe that IAL's dependence on long term overseas contracts will continue, although the market trend may be towards a larger number of contracts with lower values rather than a smaller number of high value contracts as has been the case up to now.

IAL operates in markets which appear to be "buyers" markets. This in part has led to most of IAL's contracts being specified in local currency terms. (Also it has been an informal company policy that payment should be received in the currency in which the bulk of the expenditure on the contract is to be incurred, thus leaving the exposure to foreign exchange risk only to the profit element of the contract).

1:2 The Organisation of IAL

For the purposes of this research the organisation of IAL can be seen to fall into two distinct parts:

a) the parent company and its branches and stations;
b) the subsidiary and associate companies of the parent.

The branches and stations are an integral part of the parent company. They are usually established to fulfil duties which relate to a specific contract or a series of contracts. The branches and stations involve negligible amounts of capital investment and aim at financing themselves from contract earnings. They are usually wound up on completion of the contract/s, if the contract is not renewed. (Table 1:1)

The overseas subsidiaries,in general, tend to be small in terms of staff turnover and profits. The UK subsidiary companies are aimed at a specific business market, which ranges from computer software to UHF radio equipment; from third-party computer maintenance to communication equipment. (Table 1:2)

The parent company itself is divided into eight operating groups. Three of these groups provide service functions whilst the other five are engaged in commercial activities, although the Personnel Group straddles the division between these two categories as it provides not only service back-up to the IAL group but also has contracts in its own right for the provision of manpower overseas for third parties.

Table 1:1

IAL BRANCHES AND STATIONS
outside of Europe

Aviation

Saudi Arabia
Sharjah (UAE)
Kuwait
Abu Dhabi (UAE)
Ras-al-Khaimah (UAE)
Bahrain
Dubai
Qatar
Bangladesh
Gambia
Malaysia
Philippines
Mozambique
Seychelles
Maldives
Zimbabwe

Commercial

Abu Dhabi
Libya
Angola
Zaire

Medical Services

Abu Dhabi
Saudi Arabia

TABLE 1:2

IAL's ASSOCIATE AND SUBSIDIARY COMPANIES BY BUSINESS GROUP

Aviation	Country of Incorporation
British Airports International Ltd (A)	UK
Products and Computers	
Park Air Electronics Ltd (S)	UK
IAL Gemini Ltd (A)	UK
Computer Field Maintenance Ltd (S)	UK
Medical Services	
IHG (International Hospitals Group)Ltd(A)	UK
IHG (Medical Services) Ltd (A)	UK
Commerial Group	
International Aeradio (Far East) Ltd (A)	Singapore
International Aeradio (North America) Ltd(S)	Canada
International Aeradio (Communications Systems) Inc(S)	United States
International Aeradio (Papua New Guinea)Ltd(S)	PNG
International Aeradio (Pakistan) Ltd(S)	Pakistan
International Aeradio (Zambia) Ltd(S)	Zambia
International Aeradio (Botswana) Pty(S)	Botswana
Aeradio Technical Services(S)	Bahrain
Albwardy IAL Ltd(S)	Dubai
ESC Kuwait(S)	Kuwait
Saudi International Aeradio Ltd(S)	Saudi Arabia
International Aeradio (East Africa) Ltd(S)	Kenya
Carribean Telecoms Ltd(S)	Trinidad
North America	
Ocean Data Systems Inc(S)	United States

(S) denotes Subsidiary. (A) denotes Associate

These groups are:

"Service" Groups:	Finance
	Personnel
	Planning & Properties
"Business" Groups:	Aviation
	Commercial
	Products & Computers
	Medical Services
	North America (est.'84)

Operationally, both the subsidiary and associate companies and the branches are divided along the same lines as the business groups.

Overseas business activity varies greatly from one group to another. In Commercial Group overseas involvement is divided into two parts, the provision of supply and installation contracts and a series of about thirty associate companies operating in just about every corner of the world. Its supply and installation contracts are administereed from the UK. The associate companies are in the main small and usually act as agencies for the supply of high technology communications equipment to developing countries. They act as agents for equipment manufacturers in Western Europe, North America and Japan. IAL has only limited control over the operation of these companies but is nonetheless keen to see them operate at a profit and provides technical and financial assistance.

The Aviation Group has three types of overseas business activity: operation and maintenance contracts, supply and installation contracts and a subsidiary company in the USA (as from 1984 part of IALs North American business Group).

The operation and maintenance contracts are basically long term in nature and centre around the Middle East. They are in many respects the bread and butter of IAL's overseas business, employing most of its overseas staff and generating a substantial part of its income.

The supply and installation contracts are one-off operations. They involve the purchase of manufactured equipment from either the UK or overseas suppliers and its installation in an overseas country. Once again many of these contracts are centered on the Middle East.

The overseas subsidiary company is located in the United States and is a relatively recent acquisition. It provides meteorological services that it sells in its own right and which also form part of some of IAL's overseas contracts.

Most of the Products and Computer Group's activities are based in the UK, including IAL's only large scale manufacturing plant. In 1984 it had no overseas branches or stations, only exports. However it makes substantial payments to component manufactures in the United States and Japan. The Groups exports of finished goods from the UK are mainly sold for payment in sterling.

The Medical Services Group is IAL's most recent Business Group. It has been in existence for

just over three years and to mid 1984 had only operated two contracts of any size, both overseas. Of these two contracts only one was of sufficient size to warrant consideration in these discussions. This main contract is similar to the operation and maintenance contracts operated by the Aviation Group, with IAL providing manpower to run a large hospital complex in the Middle East.

Turnover.

In money terms IAL's turnover has expanded rapidly over the past 10 years. Turnover has risen from £15.8 million in 1974 to £160.36 million in 1983. However, in "real" terms there has not been such a dramatic increase when UK inflation is taken into account. IAL's 1974 turnover at 1982 prices is approximately £45.9 million.

By geographical location the break-down for 1983 is shown in the Tables 1:3 and 1:4. This shows the importance of the Middle East in IAL's trading activity.

Fixed Asset Base

IAL has a slim fixed asset base which is a direct consequence of the service nature of its business. In 1983 it had fixed assets to the value of £15.7 million. It tends not to hold significant property overseas. Many Middle Eastern countries will not allow non-nationals to acquire title to property, and the nature of IAL's business is such that it does not really need to acquire property beyond office space and housing for its staff, both of which are usually for finite periods.

TABLE 1:3

IAL TURNOVER SPLIT BETWEEN UK AND OVERSEAS

(£'000,000)

Parent and subsidiaries only

In value terms	1981	1982	1983
IAL Turnover Parent & Subsidiaries	91.6	132.8	160.4
Export Sales from UK Parent & UK Subs	63.6	98.7	120.1
UK Sales Parent & UK Subs	21.2	18.2	21.8
Overseas Subs sales	6.8	15.9	18.5
	91.6	132.8	160.4
In percentage terms			
Export sales from UK Parent & UK Subs	69%	74%	75%
UK Sales Parent & UK Subs	23%	14%	14%
Overseas Subs sales	7%	12%	12%
	100%	100%	100%

Sources IAL Annual Report 1981, 1982, 1983 and 1984 and internal group accounts working papers.

TABLE 1:4

IAL GROUP TURNOVER SPLIT BY GEOGRAPHICAL LOCATION.

Parent Company and Subsidiary Companies only.

First nine months of 1983.

Location	Percent
United Kingdom	13.6
Europe	0.4
USA & Canada	10.7
Asia & Australia	5.5
Africa & Middle East	69.7
	100.0

Source: IAL Group accounts working papers

Market

IAL does not operate in any one single product market, its range of products and services are highly diverse. Two important factors with respect to its markets can be identified, the close association of IAL with the airline industry and the concentration of its business in the Middle East.

1:3 Financial linkages between the parent company and its subsidiaries

Subsidiary companies overseas operate as profit centres. The parent company's financial return from subsidiary companies comes by way of a dividend paid in local currency to the UK. To raise the initial capital required to finance a subsidiary overseas, IAL will try and raise as much money as possible within the local (non UK.) market. In other cases IAL will use UK sterling funds converted into foreign exchange to make acquisitions.

Most subsidiary companies within the IAL group purchase services or equipment from the parent company. These transactions do not take place on a cash basis but are accounted for through a "current account". A balance of expenses is held at Head Office and settled from time to time when the subsidiaries feel it most appropriate. The current account has the advantage of also allowing costs incurred by the subsidiaries on behalf of the parent company to be off-set against parent company charges. In this way cross currency transactions are kept to a minimum. Current account balances with the parent company are liable to an interest charge.

Outside this system an overseas subsidiary has linkages with its own domestic economy through the payment of wages, salaries, purchases of goods, rent charges etc, all of which are the subsidiary's responsibility.

Some overseas subsidiaries make purchases from outside their own domestic economy by way of third currency transactions.

These linkages are shown as part of Table 1:5.

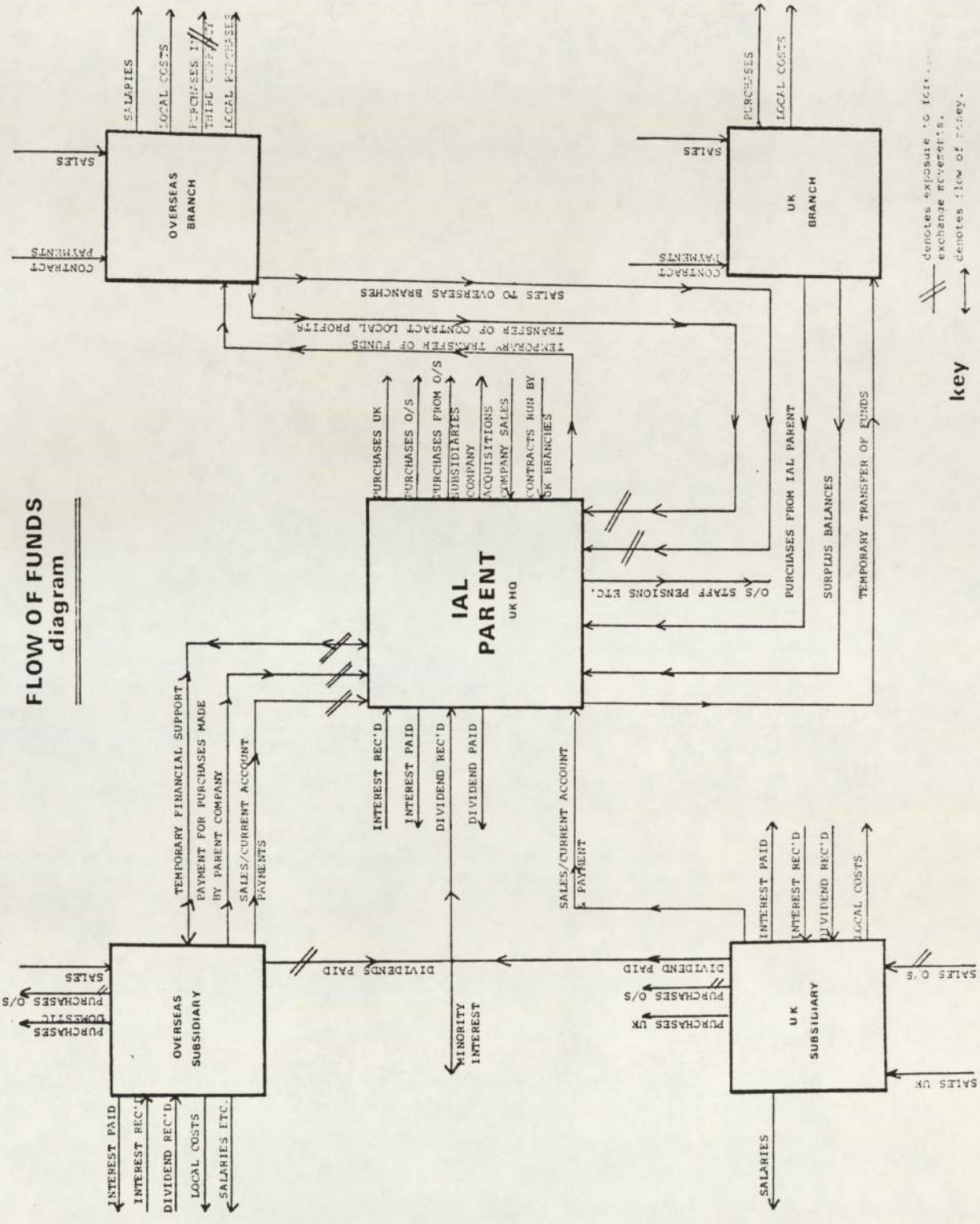
1:4 Financial linkages between the parent company and its overseas branches and stations.

The overseas branches and stations are an integral part of the Parent Company. The major difference between a branch and a station is size and the method of accounting. Branches tend to be "self accounting" i.e they produce their own financial records up to and including balance sheets, whereas stations usually keep a cash book of daily transactions which is dispatched monthly to UK Head Office where the full accounts are produced.

Money for the start-up of projects can come from one of two sources, either as an advanced payment from the customer, which will be in domestic currency, or money from the UK. In the second case sterling is converted into domestic currency and recorded in the branch's current account held at Head Office.

Payments for contractual activities are usually made in currency to the branch, which also raises the invoices for payment. The control of transfers of money to and from the Head Office and the branch is controlled by Head Office. Profits derived from

TABLE 1:5


FLOW OF FUNDS
diagram
IAL
PARENT
UK HQ
OVERSEAS
BRANCH
UK
BRANCH
OVERSEAS
SUBSIDIARY
UK
SUBSIDIARY
SALARIES
LOCAL COSTS
SALES
CONTRACT
PAYMENTS
PURCHASES
SALES TO OVERSEAS BRANCHES
TEMPORARY TRANSFER OF FUNDS
TRANSFER OF CONTRACT LOCAL PROFITS
PURCHASES UK
PURCHASES O/S
PURCHASES FROM O/S SUBSIDIARIES
COMPANY ACQUISITIONS
COMPANY SALES
CONTRACTS RUN BY UK BRANCHES
O/S STAFF PENSIONS ETC.
PURCHASES FROM IAL PARENT
SURPLUS BALANCES
TEMPORARY TRANSFER OF FUNDS
INTEREST REC'D
INTEREST PAID
DIVIDEND REC'D
DIVIDEND PAID
SALES/CURRENT ACCOUNT PAYMENT
TEMPORARY FINANCIAL SUPPORT
PAYMENT FOR PURCHASES MADE BY PARENT COMPANY
SALES/CURRENT ACCOUNT PAYMENTS
DIVIDENDS PAID
MINORITY INTEREST
PURCHASES DOMESTIC
PURCHASES O/S
PURCHASES UK
SALES O/S
SALES UK
LOCAL COSTS
SALARIES ETC.
key
denotes exposure to foreign exchange movements.
denotes flow of money.

trading are recorded on the branch's current accounts as sums due to Head Office. Any payments made by the Branch in connection with Head Office activity are charged to the Branch current account and visa versa.

1:5 The IAL Finance function

IAL has a centralised finance function based in its UK Head Office. Associate companies have full financial autonomy whilst subsidiaries retain a good degree of financial control from the centre.

Branches and stations are integral parts of the parent company and are controlled from the Centre.

All the associates and subsidiary companies who trade independently undertake their own accounting arrangements but report monthly to the UK Parent.

These reports are used in the UK financial and management accounts.

The larger overseas IAL branches are self accounting whilst the stations merely operate on a cash account basis.

IAL has a central treasury department (called the "Funds Department") in its UK Head Office. All significant movements of money are channelled through this department. The treasury department is administratively part of the finance function and unlike many other companies it is not an independent administrative unit.

The accounting activities of the finance function of IAL are divided along business group lines, with small sub-departments looking after each business group. In addition a sales and purchase ledger is run for the use of all the groups.

Other accounting functions are undertaken by financial officers within the business groups. These officers are not part of the finance department management structure. They are responsible primarily for the costing of contracts and for the interpretation of financial information to the senior management in their business group. Overseas IAL has financial managers in its larger branches who are in charge of accounting activities and a limited amount of financial decision making. These managers, are once again not part of the finance department but form part of the management structure in the business groups. These lines of communication and control are shown in Tables 1:6 and 1:7.

In the smaller overseas locations there is no finance manager but, instead, the financial activities form part of the duties of the station manager.

In financial terms IAL's overseas business falls into five types of transactions:

a) contracts with overseas customers run from the UK with payment made by the customer to the UK;

b) contracts with overseas customers run in the customer country with payment received locally;

c) one off single sales to overseas customers with payment to the UK;

d) sales and contracts both UK and overseas undertaken by UK based subsidiary and associate companies;

e) sales and contracts undertaken in their domestic market by overseas based subsidiary and associate companies.

TABLE 1:6

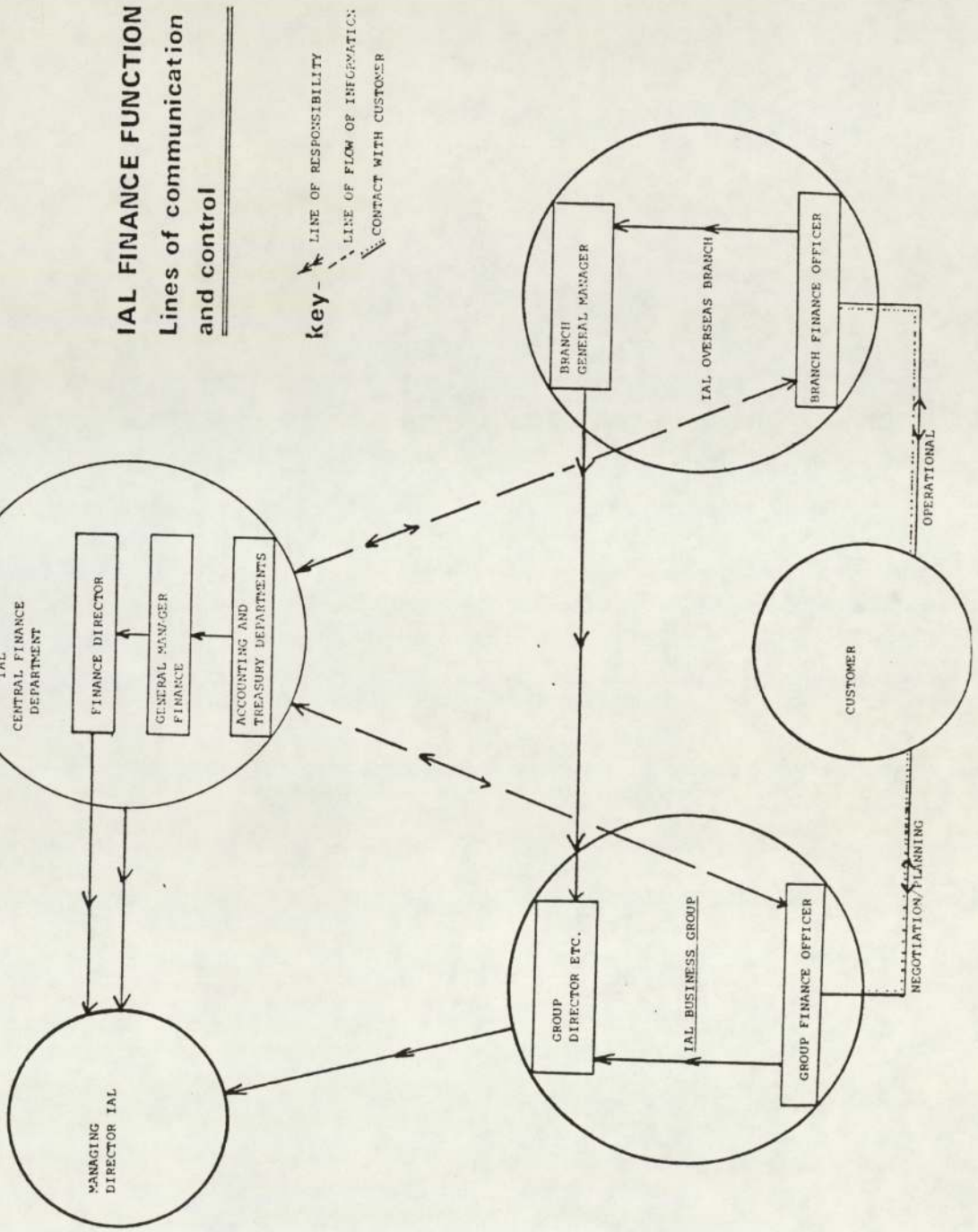
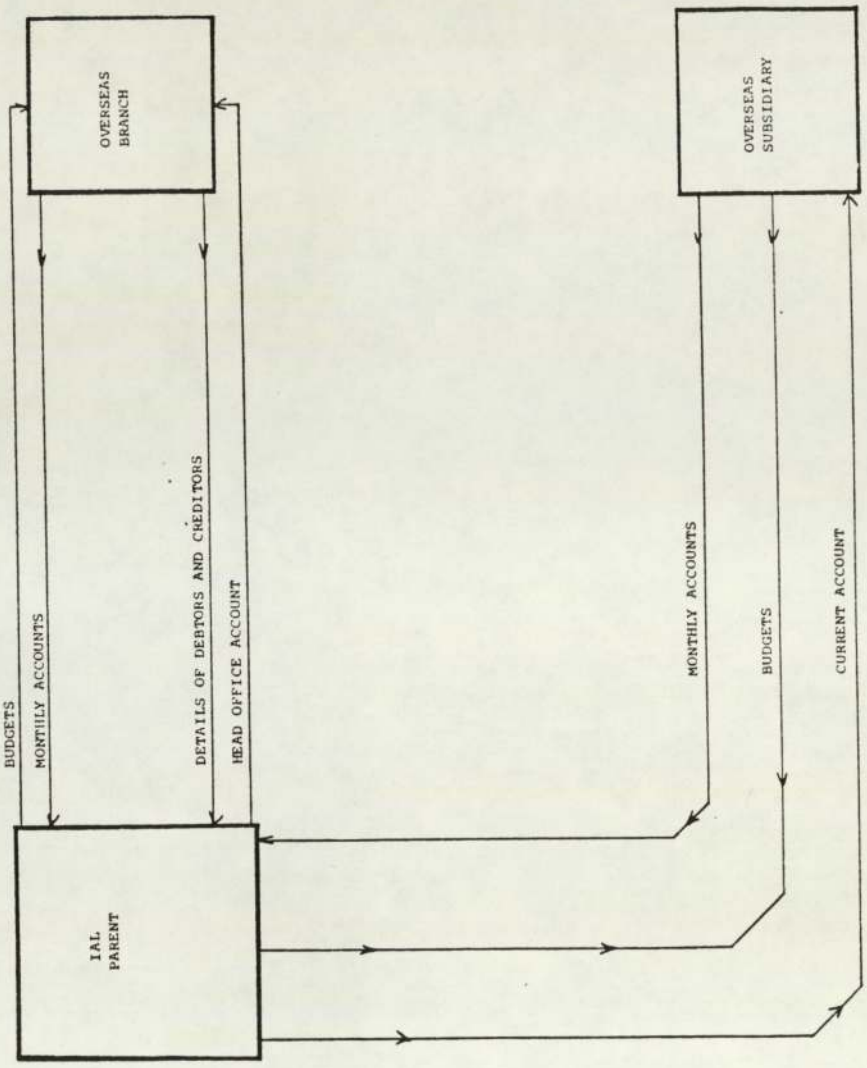

IAL FINANCE FUNCTION
Lines of communication and control
key-
LINE OF RESPONSIBILITY
LINE OF FLOW OF INFORMATION
CONTACT WITH CUSTOMER
IAL CENTRAL FINANCE DEPARTMENT
FINANCE DIRECTOR
GENERAL MANAGER FINANCE
ACCOUNTING AND TREASURY DEPARTMENTS
BRANCH GENERAL MANAGER
IAL OVERSEAS BRANCH
BRANCH FINANCE OFFICER
OPERATIONAL
CUSTOMER
NEGOTIATION/PLANNING
GROUP DIRECTOR ETC.
IAL BUSINESS GROUP
GROUP FINANCE OFFICER
MANAGING DIRECTOR IAL

TABLE 1:7

FLOWS OF INFORMATION

UK PARENT WITH OVERSEAS BRANCH AND SUBSIDIARY



In value terms the "contracts with overseas customers run in the customer's country with payment received locally represent the largest part of IAL business.

In the UK Head Office the accounting routines have only been computerised since 1982. Overseas, only IAL's largest branch has a computerised accounting system, although this picture is changing slowly.

Many of the most important financial personnel who are involved in contract costing and financial management overseas are not responsible to the Finance Director of IAL but instead they are responsible to the senior management within their own business group. Control and decision making on financial matters is exercised by individuals with different loyalties, masters and in some cases different objectives. Such a case is illustrated in Chapter 4.

IAL has no formal policy for the handling of foreign exchange exposure. Levels of acceptable risk are not set and no rules on exposure established. IAL's lack of a definitive policy does not mean that it does not take any action at all. Its current approach can best be described as "centralised ad hoc". It is centralised within the UK in that nearly all foreign exchange transactions pass through the UK bank accounts as a result of decisions taken by Head Office staff. It is "ad hoc" in that decisions are taken on a day-to-day basis with goals set on a very short-term time horizon. This short term approach means that IAL relies greatly on the spot market for currency conversions. For the duration of this research project IAL has conducted a high risk approach to foreign exchange but it has also gained high return, as the slide in the value of Sterling, principally against the US Dollar, has meant that by taking no action IAL has made windfall gains.

Exchange movements have had the following effects on IAL's profits over the last five years, as listed in its annual report.

1981	exchange gain of	£2,816,000
1982	exchange gain of	£1,844,000
1983	exchange gain of	£861,000
1984	exchange gain of	£2,386,000
1985	exchange loss of	£741,000

Chapter 2

RESEARCH DESIGN

2:1 How the research has been undertaken

As stated in the preface this is a problem solving thesis. Its objective is to take an unstructured "soft" managerial problem and through the application of academic rigour, develop and test a series of solutions.

The design of the research in this thesis can be seen to have had four distinct stages.

Stage 1 - Preliminary analysis (covered in Chapters 1 3 and 4).

Stage 2 - Development of conceptual models (covered in Chapters 5,6 and 7).

Stage 3 - The application of the conceptual models to real data (covered in Chapter 8).

Stage 4 - Consideration of the generalised nature of the work (covered in Chapter 9).

2:2 Stage 1

Stage 1 started with an investigation which was aimed at providing the researcher with background information on the nature of the research environment, IAL. Consideration was given to the background and development of the company; its trading patterns, its organisation structure, the type and extent of its overseas business; and its financial structure and linkages. The results of this work appear in Chapter 1.

Whilst the original project specification had suggested that the major problems caused by exposure to foreign exchange risk lay with long term overseas contracts, this was not taken at face value. The initial brief was expanded to look at subsidiary and associate companies only for further work in this area to be ruled out: firstly, because in terms of turnover and profit the effects of foreign exchange movements on them were not significant; secondly, because the structure of the company meant that little capital was exposed in these companies, most having small capital bases or they were financed from local sources. The only area where exposure may have caused problems was in the flow of dividend payments. Here again these appeared to be small in comparison to the sums at risk from the parent company's contracting business.

From the initial appraisal it had become clear that the best way to develop the research was to move from an aggregated corporate level to the smallest operation unit, in this case to individual contracts. Four contracts were selected and looked at in detail. The objective was to quantify how exposure to foreign exchange movements had:

a) distorted financial information;

b) resulted in changes to the ultimate sterling value of the contracts.

These four were selected on the basis of advice given by the company. It was indicated that they represented a cross-section of the type of overseas contracting business undertaken by the company. They embraced most of the features and patterns found in its contractual agreements. They covered a variety of markets both product and geographic. However, to verify

independently that these contracts were representative of IAL general business, a detailed search of IAL's records was undertaken. The aim was to identify the contracts that IAL had operated over the previous five years. These contracts were broken down by type, value and geographical location. The characteristics of this full list was compared with the characteristics of the four contracts selected for detailed study. This comparison indicated that the detailed studies had necessarily presented all the important characteristicss to be found in IAL's contracts. To clarify this point, all the current contracts as at March 1983 were looked at in more detail. A six month sample of their transactions was taken to identify relevant factors. This work confirmed the results of the detailed contract studies.

The final stage of the detailed contract analysis was to consider from a local perspective the effects of local market conditions and financial arrangements on exposure to foreign exchange risk. This took the form of a field trip to IAL's largest overseas operation in Saudi Arabia.

In addition to the investigations within the company which directly related to the identification and quantification of exposure, two other fields of preliminary work were conducted. A detailed literature review was undertaken which looked at literature on economic/transaction exposure, translation exposure and foreign exchange rate forecasting. This work is covered in Chapter 3. Consideration was given to the currencies in which IAL conducts its business, their patterns of movement, institutional linkages and markets. This work is covered in Chapter 4 and Appendix 2.

The first and most important conclusion to be drawn from this stage of the research work was that there was no working definition of "exposure" to foreign exchange risk within the company. Whilst the term "foreign exchange exposure" was freely used within the organisation it lacked definition and the tools to quantify its affects.

Second, that the conventional accounting system operated by IAL was not suitable for the tasks it was supposed to perform. It could be criticised on two main counts:

a) that it did not provide sterling information that truly related to actual economic activity taking place within the operation of the contracts and that senior management had little faith in the information it provided;

b) that it did not provide information that could be used to define or control exposure.

These points are developed in Chapter 4.

2:3 Stage 2

Stage 2 of the research work involved developing solutions to the problems and issues raised in Stage 1 The objective was to find solutions with a firm academic foundation and practical application.

This work has two distinct but interrelated strands; an accounting information strand and economic exposure assessment strand.

The accounting strand has two aspects.

a) The development of a method of presenting conventional accruals accounting information in a manner which separated real performance from exchange rate distorted performance whilst retaining the type of information currently presented.

b) The development of a way of presenting management accounting information which gave a clearer picture of real financial dynamics, whilst providing information suitable for input into an exposure handling model.

In Chapter 6 these two strands are developed into a system of non-monetary presentation of accruals financial information to be operated in tandem with a system of Cash Flow Accounting/Reporting.

The economic exposure strand involves the construction of a two phase conceptual model to capture the aspects of exposure found on long-term contracts.

Phase one. The definition of contract exposure as "potential and current net assets at risk" is used to construct a framework which relates the lateness of payments from a customer to the rate of repatriation of money to the UK and hence the time structure of exposure to foreign exchange risk.

Phase two. Investigated the properties of currency movements to find an operationally appropriate measure of exchange risk to apply to the description of exposure developed in phase one. The most appropriate measure for the quantification of risk was found to be "currency volatility" which described the relationship between currency movements and time.

It is shown that this type of framework has applications in the planning, monitoring and controlling of exposure on long-term overseas contracts.

2:5 This stage of the work showed that it was possible to build conceptual models to deal with the foreign exchange exposure problems faced by IAL.
That in the case of accounting aspects it was possible to extend work already developed by other authors to

cover the international dimension. This involved using the work of Professors Lee and Lawson on Cash Flow Accounting/Reporting and the extention of their arguments which had previously been applied to companies operating in a single economy to ones operating in an international environment.

The results of this work are presented in Chapters 5, 6 and 7.

2:4 Stage 3

The objective of Stage 3 of the research work was to apply the conceptual frameworks developed in Stage 2 to real data generated within IAL.

On the accounting front two examples are produced:

a) an examples of how a method of non-monetary presentation of management accounting information would look and how it could show the separation between real and exchange distorted performance.

b) an examples of how "Cash Flow Accounting/Reporting" could produce better information for the dual audiences of senior management and the Treasury Department of IAL.

These examples were produced using actual accounting information generated by IAL for its monthly management accounts.

From the conceptual model which created "exposure profiles", four practical developments were made:

a) Exposure profiles based on "real experiences" of overseas contracts using financial information from the original four contract studies.

b) A generalised example of the exposure profile framework looking at all possible outcomes, using data on contract payment lags from the original four contract studies and other contracts looked at later.

c) The measure of currency volatility which forms part of the "exposure profile" framework is applied to actual exchange rate movements over the period January 1974 to December 1983.

d) The exposure profile framework as applied to "corporate wide exposure" is tested as an exposure monitoring and control tool using a sample year of all IAL's overseas financial transactions.

The conclusions drawn from this stage of the work and the thesis in general are discussed in Chapter 10.

2:5 Stage 4

Stage 4 of the research is an attempt to generalise the results of this work by looking at the circumstances of other companies engaged in overseas trade. Here, the objective was to find companies who faced the same type of business environment as IAL, particularly in that they provided services from the UK through the medium of long-term contracts.

CHAPTER 3

LITERATURE REVIEW

3:1 Objective of the Review

The most basic requirement for a literature review in any piece of research is to place the work undertaken in the context of previous academic work. The way that other authors have addressed their problems is important and raises questions that the researcher should aim to answer. In particular, the objective of the review of literature in this thesis is to survey the progress of academic work on foreign exchange exposure from a variety of angles all of which to some extent have a bearing on this work.

3:2 Significance of the topics reviewed

Over the course of the last 15 years the area of foreign exchange risk and exposure has received considerable attention in academic and professional journals. Many authors have attempted to quantify the types of problems faced by international and multinational companies. This literature is extensive both in the areas of economic and accounting aspects.

3:3 Scope of the review

The work in this thesis is intended to break new ground in the generation of information for the consideration of exposure on long-term overseas contracts. The work is not intended to be too mathematical or purely narrative but instead to blend together the level of mathematical knowledge that could be expected to be possessed by accountants whilst at the same time providing the rigour necessary for its analysis to be considered worthy of academic research.

With this overall specification in mind the scope of the review is limited to those contributions from authors who have sought to provide insight into the practical aspects of foreign exchange exposure. The review is divided into three sections.

a) The literature on economic and transaction exposure on a variety of aspects from the theoretical interpretations to empirical case studies. The different aspects of particular areas have been brought together to try and illustrate themes and development of particular lines of thought.

b) A review of the literature on translation exposure is included, for although it does not have a direct bearing on the main thrust of the thesis, a good understanding of the issues and arguments put forward in this field was felt to be important. Most of the translation literature is concerned with problems associated with "financial" accounts whereas the main issues addressed in this research are concerned with "managerial" accounting information.

c) A review of the literature on foreign exchange forecasting, covering work on the basis and performance of professional forecasting services. This work is used to provide evidence of the difficulties in producing accurate forecasts of exchange rates.

The review on exchange rate forecasting literature does not contain any work on the general behaviour of exchange rates or the economic factors which influence rates.

The relative importance and value of different theories of exchange rate movements are not within the scope of this thesis. However, this does not mean that theories such as the price parity theorem, the Fisher

effect, the International Fisher effect, interest rate parity theorum [Kohlhagen (78)] are not important.

Additionally, the work on the effects of political risk, product risk and market risk as it affects international business is not covered. [Aliber (78), Eiteman and Stonehill (79)]. Whilst many authors point to the importance of these factors they are once again beyond the scope of my work.

The final section of the review brings together the aspects raised in the literature that are of particular importance to this thesis. It is suggested that it is within the context of these areas that the validity of the analysis undertaken later in the thesis should be considered.

3:4 Method of Literature Search

The literature search which forms the basis of the literature review was conducted manually, as it was considered by the reseacher a basic skill that should be learnt. It was, therefore conducted without the aid of a computer search program of the type commonly available in academic libraries.

It started with enquiries into abstracts and indicies covering publications such as Dissertation Abstract International, ANBAR, Index to Theses and Economic Abstracts.

The substantive part of the review was undertaken in the first year of the research study. It has been up dated by continuous scanning of the journals identified as important in the initial search, in conjunction with continued monitoring of abstracts and indices.

The biggest problem faced in reviewing the literature has been the acquisition of some articles and research papers produced by American Institutions. Attempts have been made to acquire copies through the British Lending Library but in many cases obtaining a copy has proved impossible.

3:5 Economic and Transaction Exposure

The only review article on the subject is Jacques (81) who defines foreign exchange risk/exposure as "the additional variability experienced by a multinational corporation in its worldwide consolidated earnings that result from unexpected currency fluctuations".

A number of authors have noted the similarity between exposure caused by inflation and exposure caused by foreign exchange movements. Lieberman (76) differentiates between "currency" and "country" exposure, where currency exposure takes no account of relative inflation rates or other economic factors. Wihlborg (80) notes the importance of inflation and currency exposure in the same way as Lieberman. Giddy (77) treats exchange risk as a feature of real cash flows of overseas operations and argues that in the long term because of the effect of other economic factors economic foreign exchange exposure is unimportant.

Shapiro (77), Wihlborg (80) and Cornell (80) all note the similarities between the risks faced by companies with respect to inflation and foreign currencies.

Rodriquez (79) takes this one stage further and develops a concept of "residual" economic exposure which is the extent to which adjustments in other operational factor "cannot fill the gaps in value created by fluctuating exchange rates".

Approaches to economic exposure which stress the importance of the relationship between foreign exchange movements and other economic factors have significance for companies whose overseas business is of the "entity" type, but they are of little help to companies such as IAL who are faced with operating conditions which are fixed for finite periods, as is shown in Chapter 4 in the studies of IAL's overseas contracts.

3:6 Empirical work

The empirical reports of how economic and transaction exposure is handled in the real world come in two types:

a) academic reports based on surveys of a number of companies;

b) anecdotal pieces written by practitioners on their own first hand experiences.

In the first category Rita Rodriques is the most prolific author. She details the results of a continuing survey undertaken at Massachusetts Institute of Technology. This work relates the experiences of a large number of US Multinationals, their use of hedging instruments, systems for monitoring exposure and types of overseas transaction, Rodriquez (78), (80), (79), (81), Rodriquez and Carter (76), Carter and Rodriquez (78). However, none of these articles or books deals with the type of

overseas operation to be found in IAL.

Jilling (76) also conducts a detailed survey of a number of US Multinationals making similar observations as Rodriquez. Soenen (77) also with similar findings to both Rodriquez and Jilling, points to the lack of good quality information in many companies upon which to base foreign exchange exposure management.

One of the most recent pieces of research is Collier and Davis (84) who make one of the few references to long term overseas contracts. They indicate that UK companies with such business arrangements adopt a policy of "automatic close". That is, they hedge all commitments immediately they become quantifiable.

The case studies also provide little insight. Hoyt (77) provides a record of the experiences of the Singer Sewing Machine Company, March (81) on the experiences of the chemical giant I.C.I., Pearl (81) on Turner and Newell and Hagemann (77) upon Volkswagen.

3:7 Strategies towards foreign exchange risk

A number of authors have sought to address the foreign exchange exposure problem from a strategic level. Folk (72) distinguishes between "adjustment strategies" and "adjustment techniques". Where "techniques" are instruments such as forward contracts and "strategies" are decision making criteria. Ankrom (74) argues on the basis of his experience in the Chrysler Corporation that top management should be integrally involved in the foreign exchange management process.

Barnett (76) attempts to outline a set of "logical constructs" for exchange risk management which switch the emphasis away from simple loss minimising towards strategies which take account of exchange movements on the firm's trading position and its appetite for risk. Sherwin (79) proposes that exposure management strategies should be derived from a clear picture of the goals expected.

Lieberman (78) advocates a "systems approach" and places faith in the acquisition and ordering of information in the most usable format. Bardsley (78) also stresses the importance of good clear information.

McRae and Walker (80) argue "inter alia" that the type of strategy is dependent on the measure of exposure used.

Two conclusions can be drawn from this work. First, that clear and appropriate information is a prerequisite of a strategy. Secondly, that different types of business organisation, and hence measures of exposure, lead to different types of managerial response.

3:8 Tactical responses towards foreign exchange risk

Two different types of "tactical" responses to the foreign exchange exposure problem can be discerned from the literature.

a) Optimal forward exchange market hedging action

These articles are aimed at making comparisons between the cost of taking no hedging action and the costs of taking action. Shulman (70), Folks (73), Wheelwright (75), Kohlhagen (78), and Shapiro and Rutenberg (74)

establish different forms of the same type of model which compare the cost of forward cover through the forward market with a measure of the probability of the likely future spot exchange rate.

However, many authors have questioned the value of any hedging action using the forward market, and argue that in the longer term the benefits from hedging are zero. Robbins and Stobaugh (72), show that the cost of hedging over a 3 year period in 7 currencies averaged about 7 per cent more expensive that a "do nothing" policy. Kohlhagen (75) found that forward cover in 6 major currencies during the peiord April 1973 to December 1974 averaged 0.65 per cent more expensive than "do nothing". Pelli (74) argued that the losses and gains from taking cover average each other out. Logue and Oldfield (77) report it "appears that corporate hedging in the foreign exchange market is at best irrelevant and at worst costly" pp 16.

Giddy (76) argues that techniques that purport to provide optimal hedging decisions in reality only determine "optimal speculative decisions". Hollis (76) is unhappy with optimal hedging strategies as the value of the model is dependent on an assessment of the future exchange rate, which takes the user into the realms of foreign exchange forecasting. Shulman (70) and Bradford (74) have also attempted to quantify the value of taking forward cover.

Calderon-Rossell (79), looks at the value of an optimal hedging model when applied to a "single transaction".

The value of this kind of literature to this project is not in the area of optimal hedging but to the extent that use can be made of surrogate measures

of the future exchange rate. Many authors have opted for a "probability" function to indicate the likelihood of any given future exchange rate. This point is developed further in Chapter 5, where a surrogate useful for the structure of risk on long-term contracts is developed.

b) Portfolio models

Instead of using techniques to assist in the decision when to use the forward exchange market, portfolio models attempt to use the differing risk/return relationships that currencies possess to reduce the risks associated with exposed currency positions.

Lietaer (70) was one of the first to advocate a portfolio approach to dealing with foreign exchange exposure. Gull (75) developed a model which refers to "composite exchange risk". Aubey and Cramer (77) deal with "Currency Cocktails".

Makins (78) addresses the question of how useful is a random mix of currencies produced by a company's trade activities in construction of a portfolio? He cites Evans (65) who demonstrated that in the stock market a portfolio of securities of five to ten embodies the bulk of diversification gains and losses. However, Makin does not recognise that only a few currencies are truly independent and whilst a company may operate in a large number of currencies this does not mean that it will find it has a sufficient diversity of independent gains and losses. Levi (79) states that the possibility of using a portfolio "is limited since in an uncertain world the cross elasticities [of currencies] will be stochastic" pp 1016. The independence of the currencies in which IAL trades is looked at in Chapter 4.

Dince and Umoh (81) using currencies in West Africa, but using synthetic values, demonstrate the merits of portfolio techniques in the "exotic" currencies where no formal forward exchange market exists.

The main problem with most of the portfolio type models is that they implicitly assume that a company has the power, and the will, to switch between different currencies to gain advantage from a portfolio. The lack to empirical evidence in this field does not help the case. However, this does not mean that portfolio approaches are completely without value. It is argued in Chapter 7 that if the rigidities of a company's business activities are recognised it is possible to develop a quasi portfolio framework with practical applications.

3:9 Related issues

A number of authors have suggested that many companies reduce their exposure to foreign exchange risk by unloading the risk onto their customers by pricing contracts in their home currency, Adams and Pearlman (73) Carse, Williams and Wood (79). This is an issue returned to in Chapter 8 when the way that IAL conducts its activities is compared with how other companies undertake overseas business.

Whether foreign exchange management in large companies should be centralised or decentralised is dealt with by Horst (71), Lietaer (70), Robbins and Stobaugh (73), Rutenberg (70), Shapiro (73), Earl (84), Lessard and Lorange (77). The only conclusion that can be drawn from this discussion is that the type of approach is dependent on the type and structure of the overseas business.

Rodriguez (78) looks at how multinational corporations have used models, both computerised and manual, for foreign exchange exposure management.

Earl (84) provides a stage model of how UK companies have responded to the problems caused by foreign exchange fluctuations. His model has four stages.

a) "Gestation", with laissez-faire" action by the company.

b) "Realisation" with "ad-hoc" action by the company.

c) "Systematisation" with "optimisation" action by the company.

d) "Reconciliation" with "compromise" action taken by the company.

IAL has passed through these first two stages but has not entered the optimisation stage. The work that follows is aimed at fitting into the final stage of Earl's work.

3:10 Translation exposure

This section of the review covers the area of foreign exchange exposure which is concerned with the effect of fluctuating exchange rates on the reporting of overseas business activity. It is commonly referred to as either "accounting" or "translation" exposure. In this review the term "translation" exposure will be used. It should not be confused with the term "conversion exposure", as is occasionally the case, as this refers to the actual physical change of money from one currency to another.

It should be stated in hindsight that much of the literature covered in this area is of limited practical value to this thesis. However, from the academic viewpoint, to leave this area undisturbed would be unacceptable. The reason for its practical irrelevance is rooted in the arena of the debate over translation exposure. Balance sheet considerations are paramount, whereas the practical benefits that are required from this work rest in the realms of cash flow management.

3:11 The subject area

The issue of translation exposure arises out of the need to translate business operations which have occurred in a currency other than the parent company's reporting currency. Jacques (81) describes it as the need for "one numeraire or reference currency" pp 88. It would be impossible to express a company's operations in a variety of currencies, hence the need to have some rules to undertake translation. The root of the problem is the change over time in the relationship between the reporting currency and the local currency. Decisions need to be taken as to what

exchange rates to use or, more precisely, the time an exchange rate is used and how it is applied to certain figures. The idea is to have a translation system which takes full account of the true underlying economic activity and equates economic exposure with translation exposure (Burn (76)).

The very nature of exchange rates is at the centre of the debate and makes the achievement of the ideal solution impossible [at least in anything less than the very long-term, Aliber and Stickney (75)]. It is argued that exchange rates do not represent a realistic measure of changes in the economic climate between two countries because they are affected by influences other than purely economic factors (see 3:5 above).

Two notable articles cover the main elements of the translation methods available namely Flower (76) and Nobes (80). These two articles represent the most thorough reviews of the subject and cover most of the technical debate.

3:12 The Theoretical Debate

There are two main strands in the theoretical debate over translation methodology. The first question is what purpose do overseas subsidiaries serve for parent companies? Here there are two schools of thought, the "proprietary" aproach and the "entity" aproach.

The "proprietary" approach views overseas operations as an integral part of the parent company's activities. The subsidiary is perceived as being in existence to produce a long-term stream of income for the parent company. Therefore, when accounts are consolidated they should reflect the state of the organisation

as one body and not as a series of isolated individual operations.

The "entity" approach views overseas operations as existing independently of the parent company within their own environment. Their purpose is more that just that of providing income for the parent but to develop and expand in their own market. Hence, consolidation is concerned with the "net investment in the overseas operation".

The second strand of the debate is concerned with the question, what information should accounts present and for what audience are they produced?

A number of authors have put forward answers to this question. Walker (78) is concerned with economic reality. Lorenson (72) and Hinton (78) argue that accounts are for accountants and the maintenance of accounting principles are of paramount importance.

Flowers (76) believes accounts should be directed at "major equity investors". Patz (77) in his definitive work on the state of translation theory adds a third issue. He points out that the nature of the exchange rate phenomena is also important. Patz is also critical of the lack of work undertaken in the area of translation theory. He points to the lack of basic accounting data available upon which to base theory. Particularly he points out that the level of empirical work has not been sufficient even to show without question what the function of overseas branches or subsidiaries really are to domestic parent companies. He concludes by arguing that until this gap in basic data is filled reconciliaion of all the theoretical issues will be difficult.

3:13 The debate over the method of translation

There are four main methods used to translate overseas operations.

a) The closing rate method

This method has been predominately used in the UK. Flowers (76) in a definitive study of translation methods and their impact, defines this method as "items in the subsidiaries accounts which are translated at the rate ruling on the balance sheet date. Profit and loss for the year is converted at the closing rate of exchange". The closing rate method has recently been embodied in the UK Accounting Standard SSAP 20.

b) Current/non current method

This method was first advocated by Dicksee (1911). It differentiates between assets and liabilities on the basis of whether they are current or historic. The closing rate at the end of the accounting period is used for all current assets and liabilities and all fixed assets are valued at the exchange rate ruling at the date of acquisition. Flowers (76) notes that literature on this method is rather scant but he assesses that the rationale for the method "is that restatement of the translated sterling amount of non-current assets and liabilities is not required to take account of essentially temporary fluctuations in rates of exchange". Olstein and O'Glove (73) undertake one of the few comparisons of the current/non-current method with another method, the monetary/non-monetary method.

Pakkala (73) reports from an American study that very few large firms had used the current/non-current

method, and even if they did, it was not adopted in the strictest form.

c) Monetary/non monetary method

The concept of the monetary/non monetary approach was developed by Hepworth (56) who, according to Nobes (80), developed the system because of the drawbacks he perceived in the current/non current approach.

In this case, items are divided into two classes, monetary and non-monetary. The non-monetary balance sheet items such as fixed assets and inventories are stated at a historic cost and converted at a historic exchange rate at the time of acquisition. Monetary items such as cash, current assets and liabilities and long term debts are valued at a current exchange rate, in this way reflecting their current value.

Nobes and Parker (81) note that the monetary/non monetary method is not materially different from the temporal principle under historic cost accounting conventions. Flowers (76) is critical of the monetary/non monetary approach because of its complexity of operation and the distortion of the relationship between local currency accounts and the parent company translated accounts.

d) The Temporal Principle

The temporal principle grew out of the work by Hepworth (56) on the monetary/non monetary approach. The principle was first advanced by Lorensen (72) who presents a detailed theoretical argument in favour of the method. His objective was to present a method which, unlike the monetary/non monetary method, was not tied to the historic cost accounting convention

and would maintain the original accounting principles under which the local currency accounts had been prepared.

As the name suggests, the nature of translation under this approach depends on the division of assets and liabilities on the basis of their nature with respect to time. Lorensen states money, receivables and payables measured at amounts promised should be translated at the foreign exchange rate in effect at the balance sheet date. "Assets and liabilities measured at money prices should be translated at the foreign exchange rate in effect at the dates to which the money prices pertain" pp 19.

Flower (76) favours the principle on theoretical grounds. Nobes (80) notes that the criticisms of the temporal principle have come from practical men and not academics. This is demonstrated in the debate over FASB Standard No 8. The debate which surrounded the implementation of Standard Number 8 by the United States Federal Accounting Standard Board highlighted a number of issues which face the use of a translation method; the effect on earnings; the effect on management of foreign exchange, and the conflict between the management of translation and economic exposure. Whilst the discussion takes place in the context of the temporal principle, the issues it raises are of a general nature, Burns (76), Shanks (76), Dukes and Shank (78), Duanploy (79), Makin (77), Cooper (78).

3:14 The conflict between economic and accounting exposure.

Concern over the conflict between economic and translation measures of exposure has been expressed by

a number of authors. The definitive work on this issue has been produced by Walker (76). He produces considerable American evidence (although the report was commissioned by the Institute of Chartered Accountants of England and Wales) to show that concernwith balance sheet exposure has been paramount above economic considerations citing the examples of Furlong (66), Korth (72), Sweeney (68), Hoyt (72), Burtle (73), Teck (74), Dufey (72) and Rodriquez (80). However, he also points to Hayes (72), Ankrom (74) and Chester May (75) as indicating that in recent years practitioners have begun to realise at least some of the weaknesses of using accounting concepts of exchange exposure as the sole criterion for action.

To Walker's list can be added Shwayder (72), Harrigan (76) and Aliber and Stickney (75) who look at both theoretical and empirical issues, concern themselves with the validity of the Purchasing Power Parity theorem and the Fisher effect.

The reason why accounting and economic models should be in conflict is answered by Earl (81) who observes that "accounting models do not look forward but only backwards. Whereas economic assessments require a forward perspective".

3:15 Inflation and Translation

Coping with price changes is a contentious issue in accounting. When combined with the need to translate accounts across exchange rates it adds another dimension to the problem.

The battle ground of the issue is fought over whether to restate and then translate accounts or translate and then restate. An additional point of contention is raised over exactly what price changes are important, whether they be specific price changes or general price level movements.

Choi (75), Pakinson (72) are typical of those who are in favour of restate then translate. Choi (75) advocates the use of specific price indicators for restating and Pakinson (72) favours general price indicators. Lorensen and Rosenfield (74) and Flower (76) favour translate then restate.

Nobes and Parker (80) present a review of the points in the debate and cite Rosenfield (71) as the authoritative analysis.

3:16 Translation by other than exchange rates

Concern has been expressed over the use of exchange rates as a means of translating accounts. The most authoritative work in the field has been undertaken by Patz (77) and Patz (81).

Patz's theoretical premise is that translation is a restatement not a measurement process. In essence, he believes the translation should be accounting neutral. His solution to the translation dilemma is based on the "entity approach". He argues that price parity translation (the term used for this kind of work) would produce more realistic results because it takes into account exposure caused by both domestic and local currency inflation. In Patz (81) he goes on to develop a methodology for implementing price parity translation. He concentrates on obtaining a reasonably accurate measure of price parity and develops a matrix

for easy translation. A criticism levelled by Clarke (77) at the use of price parity indices is that they will not be much use unless "the data to be translated is dated money amounts or their equivalent".

3:17 Conclusions: translation exposure

The most important general point raised by this literature, is that any work on the effects of foreign exchange exposure on companies should be conscious of the type of overseas operation in which the company is engaged, that is, whether it is an "entity" type of activity or a "proprietary" type of activity. The type of overseas activity will determine the type of response to foreign exchange exposure both on the economic and accounting levels. This is a point which is carried forward through much of the later work and particularly the argument for cash flow accounting presented in Chapter 6.

3:18 Foreign exchange rate forecasting

The latter part of the 1970's and early 1980's has seen a growth in work both on the development of exchange rate forecasting itself and on the assessment of the efficiency of such forecasts. Many of these contributions have been aimed at describing and defining the processes which influence exchange rates (Dornbusch (78), Murenbeeld (75) Bryant (80), Zis (83), Kohlhagen (78).

Giddy and Dufey (74) produce one of the first serious articles to look at the effectiveness of forecasting.

They conclude that because the foreign exchange market is an efficient market, exchange rate forecasting cannot be profitable. This they state conflicts with the findings of Grubel (65).

The main problem from a practical point of view with the work of Giddy and Dufey (74) is with the choice of data base on which to undertake their analysis as it was restricted (rather strangely) to a period in the 1920's and the early years of the 1970's. Later work has the benefit of being based on a foreign exchange market which has the characteristics of the current one.

Two streams of forecasting have developed.

a) Econometric techniques as they are generally known, or in the terminology of Dufey and Mirus (81) "Extrinsic" methods. Here the basis of the technique is to identify and model the fundamental causal links between economic factors which influence exchange rates. Account is taken of balance of payments, aggregate demand and supply elements and monetary components of economies.

b) Technical analysis, as it is generally known, or in the terminology of Dufey and Mirus (81) "intrinsic" methods. Here a forecast of future spot rates is derived from information on its past values. Morgan (80) pp 32 states technical forecasts "generate exchange rate forecasts by extrapolating the past sequence of currency movements into the future"...and the..."assumption is that everything that is known about a currency is expressed in its exchange rate".

Rosenberg (81) notes the most popular mechanical formulae used in technical analysis are; filter rules, crossover points on long and short term moving

averages and indices of market momentum. However, despite the presence of mechanical formulae, Marber (84) argues that technical analysis "is an art, not a science, and the art of technical analysis lies in deciding which of many indicators is giving the relevant information". If Marber is correct then any forecast is only as good as the judgement of the forecaster. This is a point that was raised by Levich (82) who points to the fact that the track record of forecasting services may change when forecasters move from one firm to another.

Ramond (81) argues that both econometric and technical analysis have a part to play in foreign exchange forecasting. Econometric analysis should be used as a tool for long term exchange rate projections, because this is where fundamental factors have the greatest influence. Technical analysis should be used for short-term projections where less substantive factors such as political pressures may, and do, override economic causality. This is a view that the evidence on forecasting performance supports to some extent.

Ensor and Antl (78) pp 197/198 look at 22 forecasting services run by banks and specialist forecasting services, and divide up the services between econometric, technical and purely judgemental. They found that of the total of 21 for whom information was available, econometric services accounted for 5, technical for 3 and 13 were purely judgemental. Despite this apparent numerical advantage of judgemental services over technical and econometric, most of the assessment of performance of different forecasting services has been conducted ignoring judgemental services. The most likely reason for this is that the judgemental services are not dependent on any defined set of characteristics and hence the results are a matter of not much more than clever guessing.

One of the biggest questions facing the assessment of the performance of forecasting services is that of finding the most suitable measure of success. Three main methods have been applied in the studies undertaken.

a) A comparison of the forecast spot rate to the forward rate with respect to out turn rate.

b) The use of the forecast spot rate as a decision tool for deriving the highest return on capital at risk.

c) A comparison of the forecast rate with the ultimate out turn rate.

Levich (81) provides a good criticism of these methods. He argues that the use of return on capital at risk is an unrealistic measure because investors cannot easily translate a set of forecasts into a series of continuous investment decisions.

That strict comparisons between the forecast rate and actual out turn rate cannot easily be made because "there is no simple and unique relationship between the magnitude of forecasts error and the cost of forecast error for the investors".

Goodman (79) looks at a series of econometric and technical services and tests their accuracy at predicting the future spot rates and the return on capital at risk. He finds that results of most econometrics based services are "poor" and likely to be of "little use for corporations trying to manage their foreign exchange exposure".

The technical services perform much better and would allow for high speculative returns. However, these services would not provide information good enough for planning as their stock-in-trade is a service of buy and sell indicators.

On average the econometric services for 3 months were not as accurate as the forward rate and for 6 months were only as good as the forward rate. Goodman (80) reinforces his previous work but also points to the fact that some currencies may be more difficult to forecast than others. This in part is an indication of the importance of political factors.

The technical services are still ahead of the econometric services in Goodman (81) using the return on capital measure. However, using their buy and sell rules to maximise returns there are periods of considerable exchange losses which if followed in the real world by a corporation could lead to bankruptcy. Whereas in Goodman (80) the Canadian Dollar and French Franc had caused the services major probems, in Goodman (81) the performance of the forecasts with respect to sterling and the Swiss Franc had been below par.

Levich has also produced a series of articles on forecasting success in 1980, 1981 and 1982.

Levich (80) concludes from an analysis of nine services, of which four were econometric and five judgemental, that "most advisory service forecasts are not as accurate as the forward rate". He also finds that what he describes as "judgemental" services (including technical analysis services) performance is much better than econometric services over the short term.

This is a finding in line with previous surveys.

His most importance conclusion is that the number of "correct" forecasts (i.e those that forecast the correct direction relative to the current forward rate) is significantly larger than would have been expected if the forecasting services "were only guessing at the direction of the future rate".

Again making a comparison with the forward rate, Levich (81), in a larger study with 12 companies and 11,000 individual forecasts found that:

a) exchange rate forecasts had not been as accurate as using the forward rate as a predictor;

b) the exchange rate forecasts were very often on the correct side of the forward rate.

Once again he finds that the "record of several forecasters is too good to be simply guessing".

In both the 1980 and 1981 studies he finds that there is a great deal of difference between the best and the worst services, and that as a group there was no statistical evidence to suggest that these services showed significant expertise. The significant track records is confined to only four of the thirteen services.

Adding a further year to his data base Levich (82) reports a deterioration in the performance of the track record of many currency forecasting services and hence calls into doubt his earlier conclusion that in general forecasters exhibited expertise.

The forecasters in his 1982 survey did not forecast as accurately as the forward rate. He suggests that even in the services which continued to produce statistically significant results, there was now no evidence to prove that these results were not the product of chance predictions. He asserts that for any given population of services it was reasonable to find that even if they all guesssed at least some would produce good results.

Levich puts forward three possible reasons for this general deterioration in track records:

a) "The successful forecasters theory", in which increased investor attention leads to a convergence of forward and forecast rates.

b) "Statistical change theory", in which changes in economic events may have temporarily confused forecasters, this may be a short lived phenomena.

c) "Random shock theory" in which it is suggested that even forecasters who have a strong track record in 7 out of 10 years must occasionally endure a bad year.

3:19 Conclusions: foreign exchange rate forecasting

The empirical evidence on the performance of forecasting services is inconclusive. It does not suggest that they are completely without value but on the other hand it does not prove that forecasters generally possess expertise.

There seems to be some merit in technical analysis over short time horizons and evidence that returns to speculators of using these buy and sell rules could prove profitable. However, such buying and selling

activity is not a realistic pattern for most corporations where finance is not liquid enough to allow for continuous currency switching and where longer term planning considerations are more important. In addition the reliance on human judgement as a major input into the technical analysis services make long term assessment of performance difficult.

Businesses such as IAL would not benefit from the types of forecast produced by technical analysis, because fundamentally IAL's requirement is for longer term forecasts.

The econometric services have in some cases provided statistically significant forecasts for the one year time period. However, there is evidence that the performance of different services varies greatly and Levich (82) shows that even here there is no evidence that guessing would not have produced comparable results.

No work seems to have been undertaken on the performance of forecasts in excess of 12 months.

3:20 General conclusions on the review of the literature

The literature raises a number of points that have a direct bearing on the research work.

The literature on the management of economic and transaction exposure appears to indicate that with only one exception, Collier and Davies (84), consideration has not been given by other authors to companies such as IAL with long term service and supply and installation contracts. The bulk of the literature is geared towards companies whose overseas operations are of the "entity" type. This is probably a product of the fact that much of the literature is

derived from work undertaken on US multinationals, where the thrust of overseas activity is towards the "entity" type of business structure.

As a consequence no conceptual framework readily presents itself for consideration of exposure on long-term overseas contracts. To some extent such exposure is similar to a type of multiple transaction exposure, in the sense that it could be considered that a series of transactions are maturing over a given time period. The main difference is that the maturity dates of the transactions are not fixed or independent but variable and interrelated, this is looked at closely in Chapter 4.

Despite the interest in the concept of portfolios of currencies to reduce exchange risk, there is no evidence that such approaches have been applied to real data. This is an area that requires further work to take in to account realistic patterns of business behaviour, this is pursued in Chapter 7.

There appears to be little value in the use of foreign exchange forecasts for businesses such as IAL. Whilst the evidence suggests that technical forecasts perform well in the short run they do not provide the kind of information required for the type of transaction undertaken by IAL. That is, the provision of short term buy and sell indicators does not help an organisation that has rigidity in the currencies in which it deals and is not in a position to buy or sell at a moments notice. On the other hand, many authors have employed surrogate measures for forecasting exchange rates, for example, in the form of probability distributions. There appears to be scope for developments in this area, and this is looked at in depth in Chapter 5.

CHAPTER 4

PRELIMINARY ANALYSIS: Contract Studies, Uses Of Management Accounting Information, and the Characteristics of IAL's Trading Currencies.

4:1 Introduction

This part of the research work investigates the nature of IAL's foreign exchange exposure problem, its magnitude and causes.

The work was undertaken in two main parts:

a) a series of general and detailed contract studies.

b) a survey into the effects of foreign exchange movements on IAL's management accounting information.

These two areas of work paved the way for the next stage, the building of conceptual models.

The chapter is concluded with a note on the market for the foreign currencies in which IAL operates and the effect of market conditions on the models developed in Chapters 5 and 7.

4:2 The analysis of four of IAL's overseas contracts

A detailed study of a number of examples of overseas business contracts was undertaken. It was decided to take a number of contracts which on the basis of advice given by IAL's management would be likely to capture most of the elements found in IAL's overseas contracts. Access to some contracts was restricted because of the sensitivity of contractual arrangements. It is firmly believed that the four contracts studied in detail are a fair representation of IAL's overseas business arrangements, and this assertion is supported with evidence.

A breakdown of the main contracts undertaken by IAL over the course of the last five to eight years is shown in Table 4:1. It shows clearly that IAL's overseas contracts fall into two categories, namely, supply and installation contracts and manpower provision contracts. These contracts are mainly undertaken by two of IAL's business groups, Commercial and Aviation.

One aim was to take a small number of contracts that would capture a variety of different contractual terms and conditions, different customers and markets and vary in operational form. Some were administered by single contract branches and others by multi-contract branches.

In looking at each of these contracts the overall aim was to identify how and why exposure manifested itself and, in particular, the effect that foreign exchange movements had on the reconciliation of budgeted profit, reported profit and actual sterling receipts.

This involved the reworking of the financial transactions that had taken place and in particular producing cash flow information that had not previously been recorded. This was not an easy task as there were difficulties in identifying and interpreting financial information from different sources within the company.

The primary objective of this investigation was to study:

a) how contract terms differed;
b) the organisational framework surrounding contracts;
c) how well the financial performance of the contracts compared with original plans;

Table 4:1

BREAK-DOWN OF IAL MAIN CONTRACTS
PERIOD 1977 - 1982

Total number of contracts identified		45
Split between i)	Manpower Provision	25
ii)	Supply and Installation	20

GEOGRAPHICAL SPLIT

Manpower Provision Contracts

	TOTAL	Number of Personnel Employed >10	<10
Middle East(Non-Saudi Arabia)	10	8	2
Saudi Arabia	4	4	0
Africa	6	1	5
Asia	5	1	4

Supply and Installation Contracts

	TOTAL	>£3m	<£3m
Middle East(Non-Saudi Arabia)	17	-	-
Saudi Arabia	0	0	0
Africa	1	0	1
Asia	2	2	0

UK and European contracts not included because UK contracts are denominated in sterling and European contracts were not significant.

d) the flows of funds within a contract and the identification of economic exposure;
e) the extent to which IAL fulfilled its corporate objective of matching local currency income and expenditure;
f) the nature of decision variables within the contracts.

It was agreed with the company, that four contracts could be identified which would suit these requirements, and would embrace a series of characteristics. These characteristics were:

a) the predominence of Aviation group contracts over those of the other groups;
b) the predominence of manpower provision contracts, over other types of contract;
c) that IAL's contract business was heavily concentrated in the middle east.

Three different contractual arrangements appeared to exist:

a) fixed price contracts, where a contract is for a specific job and a specific price;
b) man-month priced contracts, where the overall total price is determined ex-post on the basis of the number and the grades of staff provided (within an overall ceiling on manpower numbers);
c) cost-plus contract where IAL is reimbursed and a profit element is added to expenditure to make a total price to the customer.

In addition to these contractual agreements there exists a series of payment terms. These are:

a) "stage payments" or sometimes called "milestones",

where payments from the customers are triggered by the achievement of stages within the contract. This type of payment is applied to supply and installation contracts where, for example, payments are received on shipment of goods, on the starting of ground work and on the commissioning of the project;

b) monthly payments, made regularly within a set pattern and the value determined either by the amount of work done or a price fixed in the contract.

Additionally, many contracts have an advance payment where a sum is paid "up front" at the start to allow for mobilisation of manpower or the initial purchase of equipment.

The four contracts selected for analysis were:

a) a supply and installation contract with a Middle Eastern customer, paid for on a stage payment basis. It was obtained by IAL's Commercial Group;

b) a manpower provision contract with a Far Eastern customer, paid for on a man-month basis. It was obtained by IAL's Aviation Group;

c) a manpower provision contract with a long established Middle Eastern customer. Paid for on a fixed management fee and man month basis. It was obtained by IAL's Aviation Group;

d) a combined supply and installation and manpower provision contract, provided for IAL's largest single customer in IAL's largest market (the Middle East). Payment was by way of an advance payment followed by monthly instalments. It was obtained by IAL's Aviation Group.

All these contracts were negotiated for payment in local currency.

The management of the company state that it is the policy of the company to match expenditure on a contract with income in the same currency. Hence the contract should be exposed only on the profit element as this is the only part of income which is ultimately repatriated to the UK. In the context of this research it is taken that the negotiation of contracts in local currency is a fact caused by market constraints and the implementation of "stated" company policy.

In the interests of commercial security the company has asked that the contracts and the customers are not referred to by name.

4:3 Contract Number 1

This was a supply and installation contract operated by IAL's Commercial Group for an oil company customer (IAL, in fact, acted as a sub-contractor to a Japanese electronics company) in a Middle Eastern state. The contract was for a three year period and had a budgeted value of approximately three million pounds (at the exchange rate prevailing at the time of the signing of the contract).

IAL had to supply, install equipment and provide the initial maintenance for a telecommunications system for an oil field.

The stage payments were to be made on completion of specific parts of the contract by IAL and within 30 days of IAL raising invoices. The invoices were raised on the main contractor who sought reimbursement from the customer.

The contract was in three phases:

a) the purchase and supply of equipment,
b) the installation of equipment,
c) the initial maintenance of the equipment,

The purchasing of the equipment was organised by the Commercial Group's supplies department in the UK. The majority of the equipment was purchased from manufacturers in the UK. Other equipment was purchased from overseas suppliers in France, Italy and the USA. All equipment purchased from overseas suppliers was paid for in the domestic currency of the supplier, payment being transacted through a letter of credit.

A few of the items purchased were covered by forward exchange contract. However this did not apply across the board, many positions were left open.

IAL received payment for its equipment purchases in the UK with payment in the local currency of the ultimate contract customer. No forward contracts were entered into to cover these payments, even though their date of arrival in the UK was known in advance.

The installation of the equipment supplied and purchased was undertaken by a team of IAL staff. They were organised formally into a "station". The station operated a cash account, whereby its accounts remained part of the main IAL accounting system. The station made payments for expenses incurred in the contract and payments for installation were made direct to the station's bank account by the main contractor in local currency. All the costs incurred by the station were in local currency.

Outside the main contract payment schedule the station

incurred expenses which were invoiced and paid for in local currency to the station on an "at cost" basis. Small and insignificant sums were invariably involved.

The stage payments were made to the station on the fulfillment of specific parts of the contract installation schedule.

However, the payments from the main contractor did not always tie up with the expenditure on the installation. As a consequence, the station, from time to time, required the influx of funds from external sources. The funds came from three sources;

a) money was transferred from the UK by converting sterling into local currency,
b) money was transferred from another IAL branch in the region,
c) a local overdraft facility was used.

IAL's transaction exposure to foreign exchange movements was affected by the action taken in cases a) and b). In case a) IAL increased its overall exposure on the contract in that it converted sums of money from sterling into local currency, which were ultimately converted back into sterling. No forward market cover was taken on any of these transactions. In case b) the level of exposure was affected by the nature of the funds being transferred into the station. If they were surplus balances that would have otherwise been transferred back to the UK but instead were diverted for the duration of the loan, then exposure could be seen to have increased overall for IAL. On the other hand, if the funds took the form of merely a short-term cash surplus from the "lending" branch, then exposure would not have increased.

However, one major exception to this was that whilst the majority of payments were made in the manner specified by the original contract schedule, a significant number of payments for the installation part of the contract were made to IAL in the UK in the customer's local currency instead of to the station. This necessitated payments from IAL in the UK to its local station to cover the cash deficits, which resulted in another form of foreign exchange exposure for IAL. These misdirected payments were made to the UK and immediately converted to sterling at the prevailing spot rate. A few days or weeks later they were converted back into local currency and transferred to the station. This meant that IAL was exposed on the local currency for the time that it was denominated in sterling. The money was paid to the UK by the main contractor because of exchange control restrictions imposed by its own government.

In the case of c) the borrowing of local funds from a bank or other financial institution did not result in an increase or decrease in the level of exposure. All borrowings were covered by delayed income payments. However, there was a cost in borrowing money locally in the form of interest payments.

4:4 Conclusions: Contract Number 1

This was a supply and installation contract with financial transactions in a number of currencies. Economic exposure was present mainly on the contract profit elements. A majority of the costs were offset against income in the same local currency. In addition to this, transaction exposure was present on the purchases of equipment in third currencies.

Exposure was affected by the uncontrollable factor of late payments from the customer, this is shown in Table 4:2. The effect of such late payments is shown on the station's cash flow pattern in Table 4:3. An isolated uncontrollable factor affecting the level of exposure was the switch in the location of one of the final payments due to the station from the customer to the UK and a switch in the currency from local currency to sterling, caused by exchange control restrictions in the main contractor's country.

Economic exposure was affected by the controllable factors of when money was transferred to the UK and hence into sterling, or whether money passed through the station from another contract should be used locally instead of money being switched back and forth to the UK. Decision variables relating to these types of transactions are shown in Table 4:4

No foreign exchange planning was made with the exception that a few of the contract equipment purchases where hedged on an ad hoc basis using the forward markets. However, here the currency in which hedging was undertaken was linked to the currency of the customer and consequently looking at exposure in an overall context the net effect of this action was to increase the level of exposure.

Unfortunately no reliable sterling budgets were produced at the start of the contract so that no assessment was possible of how performance in sterling was affected by exchange rate movements.

4:5 Contract Number 2

This was a manpower provision contract with a Far Eastern Government's Director of Civil Aviation. The

TABLE 4:2

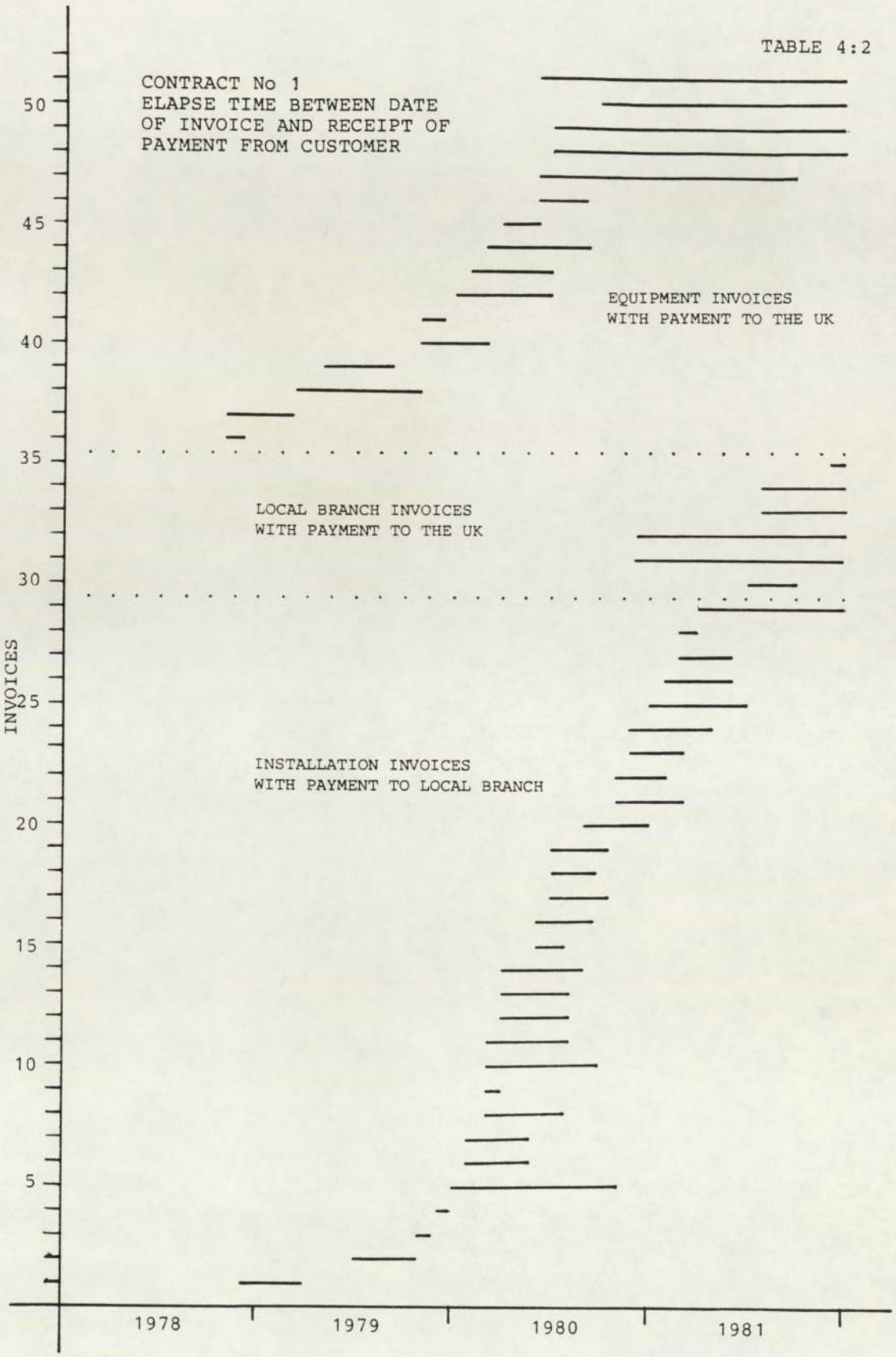

CONTRACT No 1
ELAPSE TIME BETWEEN DATE
OF INVOICE AND RECEIPT OF
PAYMENT FROM CUSTOMER
EQUIPMENT INVOICES
WITH PAYMENT TO THE UK
LOCAL BRANCH INVOICES
WITH PAYMENT TO THE UK
INSTALLATION INVOICES
WITH PAYMENT TO LOCAL BRANCH
INVOICES
50
45
40
35
30
25
20
15
10
5
1978
1979
1980
1981

TABLE 4:3

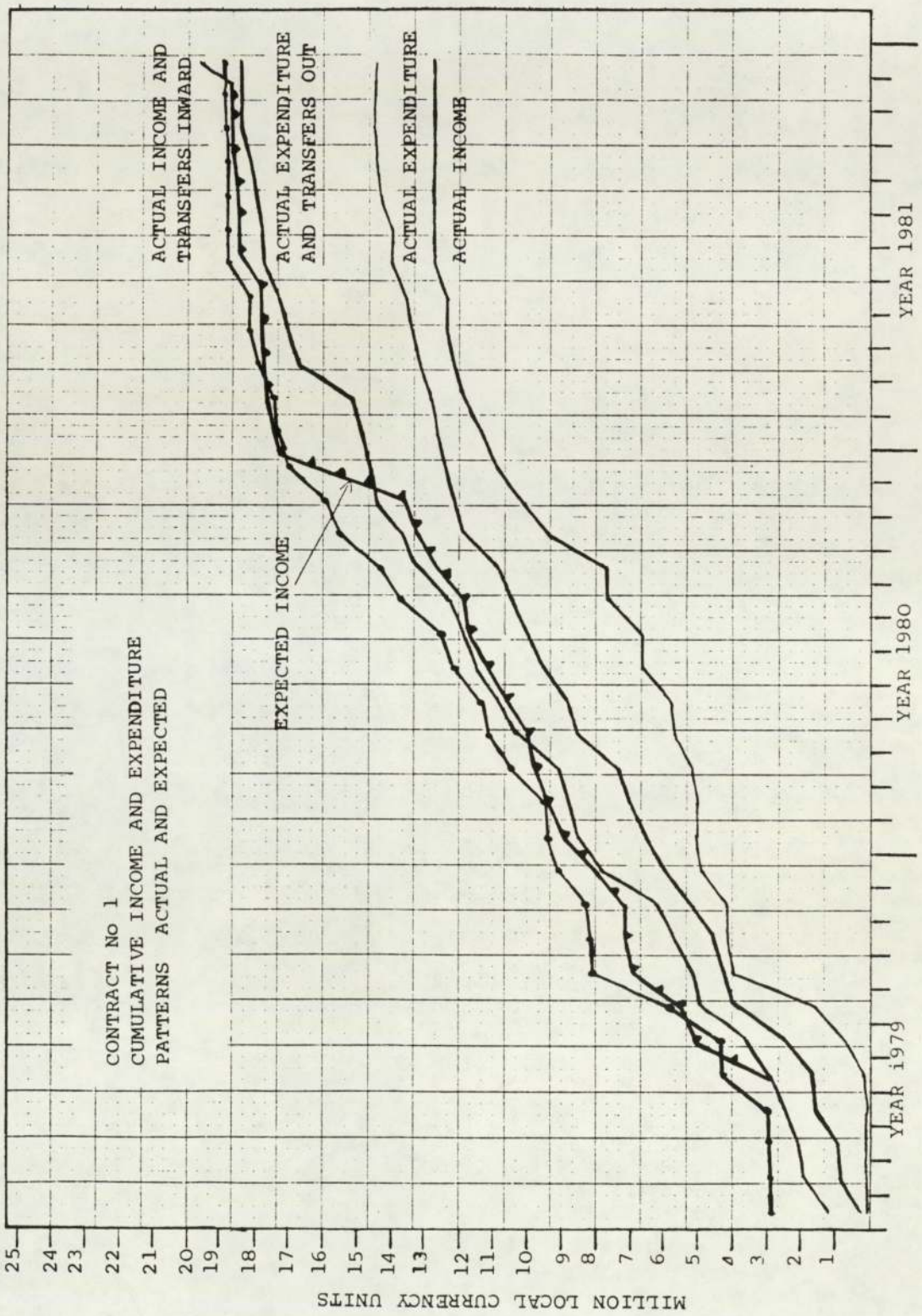

CONTRACT No 1
CUMULATIVE INCOME AND EXPENDITURE
PATTERNS ACTUAL AND EXPECTED
ACTUAL INCOME AND
TRANSFERS INWARD
ACTUAL EXPENDITURE
AND TRANSFERS OUT
ACTUAL EXPENDITURE
ACTUAL INCOME
EXPECTED INCOME
MILLION LOCAL CURRENCY UNITS
YEAR 1979
YEAR 1980
YEAR 1981

Table 4:4

CONTRACT NO 1

DECISION VARIABLES ON TRANSFER OF LOCAL CURRENCY INCOME INTO STERLING

4th Quarter 1978	1st Quarter 1979	2nd Quarter 1979	3rd Quarter 1979
A. INCOME	A. INCOME	A. INCOME	A. INCOME
a) To hedge or not to hedge income of LC 1,620,538 (Invoice 75524)	To hedge or not to hedge income of LC 810,269 (Invoice 75594)	To hedge or not to hedge income of LC 810,269 (Invoice 75626)	None
B. EXPENDITURE	B. EXPENDITURE	B. EXPENDITURE	B. EXPENDITURE
a) To hedge or not to hedge payment of	To hedge or not to hedge payments of	None	To hedge or not to hedge payments of
i) $160,936 for USA Supplier	i) $34,146 for USA Supplier		i) $ 36,067 for USA Supplier
ii) $213,430 for USA Supplier	ii) F 65,400 for French Supplier		
iii) $26,432 for USA Supplier			
iv) Fr 130,800 for French Supplier			
v) Fr 65,400 for French Supplier			
vi) Fr 25,370 for French Supplier			
viii) Fr 924,525 for French Supplier			
ix) $ 160,936 for USA Supplier			
C. TRANSFERS	C. TRANSFERS	C. TRANSFERS	C. TRANSFERS
None	Decide whether to transfer part of advance payment out of LC into Sterling dependant on cash flow forecasts.	Decide whether to return LC 1,200,000 to Branch or borrow funds locally as money required.	None

Table 4:4

CONTRACT NO 1

DECISION VARIABLES ON TRANSFER OF LOCAL CURRENCY INCOME INTO STERLING

4th Quarter 1979	1st Quarter 1980	2nd Quarter 1980	3rd Quarter 1980
A. INCOME	A. INCOME	A. INCOME	A. INCOME
To hedge or not to hedge LC810,469 & LC 632,287 (Invoice TS711-TS690)	To hedge or not to hedge LC149,526 & LC310,334 & LC149,526 & LC310,334 & LC149,526 & LC517,890 & LC324,108 (Invoices TS735, TS729 TS750,TS740,TS764, TS758, TS787)	To hedge or not to hedge LC 324,108 (Invoice TS 787)	To hedge or not to hedge LC 226707 & LC 340,059 & LC 620,668 (Invoice TS873, TS 864, TS 868)
B. EXPENDITURE	B. EXPENDITURE	B. EXPENDITURE	B. EXPENDITURE
To hedge or not to hedge a payment of i) Lira 224,165,250 for Italian Supplier	None	To hedge or not to hedge i) $ 91,850 for USA Supplier ii) $44,085 for USA Supplier	To hedge or not to hedge i) Fr 4630 for French Supplier
C. TRANSFERS	C. TRANSFERS	C. TRANSFERS	C. TRANSFERS
	i) Decide whether to transfer LC500,000 from UK to Branch ii) Decide whether to transfer LC750,000 from UK to Branch or borrow locally.		i) Decide whether to transfer LC400,000 from UK or borrow locally.

Table 4:4

CONTRACT NO 1

DECISION VARIABLES ON TRANSFER OF LOCAL CURRENCY INCOME INTO STERLING

4th Quarter 1980	1st Quarter 1981	2nd Quarter 1981	3rd Quarter 1981
A. INCOME	A. INCOME	A. INCOME	A. INCOME
To hedge or not to hedge LC124,133 & LC484,913 & LC 997,383 (Invoices TS 880 & TS 881, TS 896)	To hedge or not to hedge LC 158,697 (Invoice TS 955)		
B. EXPENDITURE	B. EXPENDITURE	B. EXPENDITURE	B. EXPENDITURE
C. TRANSFERS	C. TRANSFERS	C. TRANSFERS	C. TRANSFERS
	Decide whether to transfer out LC 1,500,000 to UK		

contract was for a period of three years. It had a value of approximately three million pounds sterling (at the exchange rate prevailing at the date of the signing of the contract).

IAL had to provide up to a maximum of 30 Air Traffic Control Officers. The cost of providing such personnel is not merely confined to salaries. Costs also include the payment of local income tax, pension contributions in the UK, UK schooling for dependants, medical expenses, air freight costs of shipping personal belongings, initial recruitment and selection, administration by a local IAL subsidiary, UK administration, third party aviation insurance, staff accommodation, local transport costs, UK technical support and local accommodation service costs. These expenses are split between the UK and local costs in the proportion of 60 per cent to 40 per cent respectively. However, for the purposes of this study only the effect of local currency transactions was considered. It is taken that UK expenses are deducted from money repatriated to the UK and hence movements in exchange rates will affect the surplus sterling equivalent left after these expenses have been paid.

The income received by IAL from the customer was on a "cost plus" man month basis, ie that IAL was paid the costs (both UK and overseas) of employing an Air Traffic Controller plus a percentage for profit. This payment sum was determined on a unit basis of one man for one month, IAL being paid only for those men on station in any given month.

It was originally hoped by IAL that they could negotiate a price which would be paid 35 per cent in sterling and 65 per cent in local currency and thus match to a large extent local currency and sterling

costs with the appropriate currency. The customer did not accept such a split currency deal and instead offered IAL either 100 per cent sterling or 100 per cent local currency. IAL opted for a 100 per cent local currency agreement.

Payment for the contract was made locally. Invoices were raised locally on the basis of the number of men employed in any given month. (Known within the company as a "roll-call" basis). Two invoices were raised each month for each of the two locations in which the Air Traffic Controllers worked, payment usually being made within 30 days of the date of invoice.

The larger of the two sites acted as the communicator with the UK and dealt with the transfer of money to the UK. This station also kept the cash book as the main record of its financial transactions, a copy of which was returned to the UK at the end of each month.

From this cash book, converted to sterling at the month-end exchange rate, was produced the monthly profit and loss account. This profit and loss account figure was taken with the record of UK expenditure to produce a figure to be included in the monthly management accounts produced by the IAL parent company.

Cash surpluses of local currency were repatriated to the UK at the discretion of the manager on station, the general policy being to transfer money on the basis of when surplus balances arose. Money was converted to sterling locally and arrived in the UK as a sterling deposit.

4:6 Conclusions: Contract Number 2

This was one of IAL's "bread and butter" manpower provision contracts. Its accounts were kept on a cash account basis as it was not sufficiently large to warrant being self accounting.

Economic exposure on the contract was purely on the station profit. Local currency income and expenditure were matched. Controllable factors affecting the level of exposure (aside from the decision on the currency of payment mentioned above), were the timing of transfers back to the UK and whether money to start up the contract should be borrowed locally or transferred in from the UK. The transfer of money back to the UK was made at the discretion of the station manager. His instructions were to transfer money back to the UK as and when surpluses arose. Money was transferred from the UK to start up the contract, effectively increasing the level of economic exposure on the contract.

There were no significant uncontrollable factors affecting economic exposure on this contract. The vast proportion of contractual payments were received on time and this is reflected in the cash flow pattern of the station shown in Table 4:5.

4:7 Contract Number 3

This was a large manpower provision contract with a Middle Eastern Government. It represented an established business link which had been operating for a considerable number of years (This contrasts with the first two contracts in this study which were "new business").

The arrangements surrounding this contract are more complex than those of the previous two contracts.

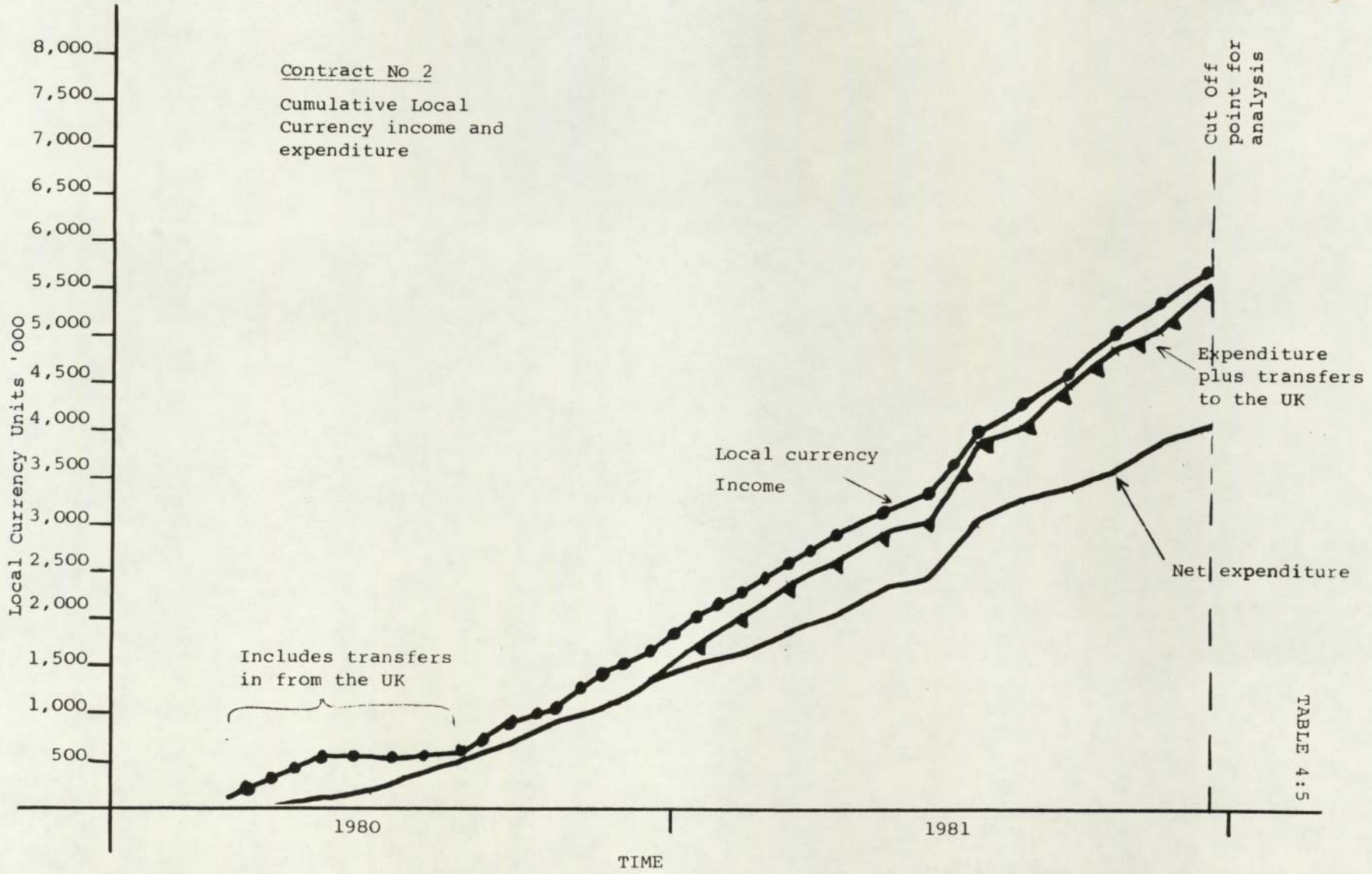

Contract No 2
Cumulative Local Currency income and expenditure
Cut Off point for analysis
Expenditure plus transfers to the UK
Local currency Income
Net expenditure
Includes transfers in from the UK
Local Currency Units '000
8,000
7,500
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
1980
1981
TIME

TABLE 4:5

Here the Branch which ran the contract also operated two other smaller contracts simultaneously. In this sub section the contract being considered will be referred to as the "main contract". The main contract was to provide manpower in the form of Air Traffic Controllers, Meteorological Officers, Electronic Engineers and other technical staff at an airport.

This contract had been renewed every three years for the last decade. Up to 1976 the contract was operated on a "cost-plus" basis. However, because of escalating UK costs the renewals in 1976 and 1979 were renegotiated on a "flat rate management fee" plus a "flat rate man-month fee" basis.

The contract had generated a continuous stream of income over a long period. There are no new set-up costs and expenditure patterns have remained roughly constant. The three year renewal of the contract undertaken in 1979 was for approximately sterling equivalent 2,500,000. Approximately 100 staff were employed on the contract.

The branch which operates the "main contract" was self accounting. This means that it produced its own accounts up to and including a monthly profit and loss account and balance sheet. This contrasts with the Far Eastern service contract which merely despatches a copy of its cash book and bank statement to the UK each month. It undertook all invoicing locally, invoices being denominated in local currency. All payments were also received locally in local currency. The vast majority of expenditure was incurred locally Items of expenditure incurred outside of the local currency are usually incurred in sterling in the UK. The largest single non-local currency item of expenditure was staff pension contributions.

The study was undertaken over the period January 1979 to December 1981 as this represented the latest three years of the contract available at the time.

In addition to handling the service contract for the main international airport, IAL had a supply and installation contract for air traffic control equipment at a new international airport in the same country. The contract had an approximate value of sterling 1,250,000 at the time of signing.

This supply and installation contract was administered from the UK where the majority of expenditure was incurred but payments were made by the main contractor (a European company) in local currency through the branch's bank account. In most cases these sums were transferred to the UK within the space of one month. In the UK they were immediately sold for sterling.

On completion of this supply and installation contract, IAL was granted a custodial maintenance contract for three months for the equipment installed by it. This was only a small contract amounting to no more than £100,000 total value. Financial transactions for this custodial maintenance contract were handled by the branch who raised invoices, received payment and paid staff salaries, all of which were denominated in local currency.

The third contract which affected the branch was also a service contract which involved IAL providing manpower for a military airbase in the locality. This was a new contract which it was intended would necessitate its own branch. However, initially, all financial transactions were passed through the main contract branch.

This was a contract worth just under £500,000 per year. It required substantial start up costs involving considerable transfers of cash from the UK.

These last two contracts were undertaken in the latter parts of 1981. The first contract terminated before the end of 1981 whilst at the start of 1982 the second contract had its own branch established.

The first year of the contract was represented by the contract making sizeble local profits and a substantial number of transfers of funds back to the UK. There were no periods of cash deficiencies and hence there was no requirement for local borrowings or transfers of money out from the UK.

In the second year the contract showed a loss of aproximately one sixth of the value of the profit made in the previous year.

This resulted in two cash deficiences and the need for two transfers of money from the UK. which amounted to a value of three times the monthly management fee. Additionally, payments for the supply and installation contract were channelled through the branch with ultimate payment being made to the UK. However, peculiarly none of these payments was used to offset the cash deficits derived from the main contract. The consequence was that local currency was on occasion paid to the UK and converted to sterling only to be converted back to local currency within a number of weeks.

In the third year, money paid to the branch and immediately passed back to the UK continued. Two additional contracts were administered by the branch. Excluding profits made on the additional contracts the

main contract appears to have made only a small profit. This necessitated the transfer of money into the branch from the UK to the same value as the money transferred out of the branch in the course of previous years.

4:8 Conclusions: Contract Number 3

The arrangements surrounding this contract were far more complex than those of the previous two contracts. This was due to the multiple contract nature of the branch.

It appears that for an early part of the duration of the contract the branch operated in cash deficit with respect to current business. However, the UK cash books do not suggest that any large sums of money were transferred from the UK to the branch and there is no evidence that money was borrowed locally. Therefore, it could be deduced that considerable amounts of cash were held over from the preceding contract to finance current business.

Economic exposure was influenced by the lack of a systematic plan for the return of funds to the UK.

This meant at times money was transferred back and forth to the UK, being converted from local currency into sterling and back again into local currency.

In this example it was possible to produce a reconcilation of the projected profit, the monitored profit as shown in the sterling management accounts and the ultimate out turn cash profit. This is shown in Table 4:6.

4:9 Contract Number 4

Table 4:6

CONTRACT NUMBER 3
RECONCILATION OF PROFIT FIGURES

A.	Projected profit as per Corporate Plan	
	1979	£441,000
	1980	£485,000
	1981	£529,000
	Total	£1,455,000
B.	Profit as per Management Accounts	
	1979	£164,000
	1980	£(24,000)
	1981	£(27,000)
	Total	£113,000
C.	Cash Profit (less depreciation) as per Branch Accounts.	
	Total in local currency	12,169

Note. Average exchange rate over three year period of the contract £1 = Local currency 8.05.

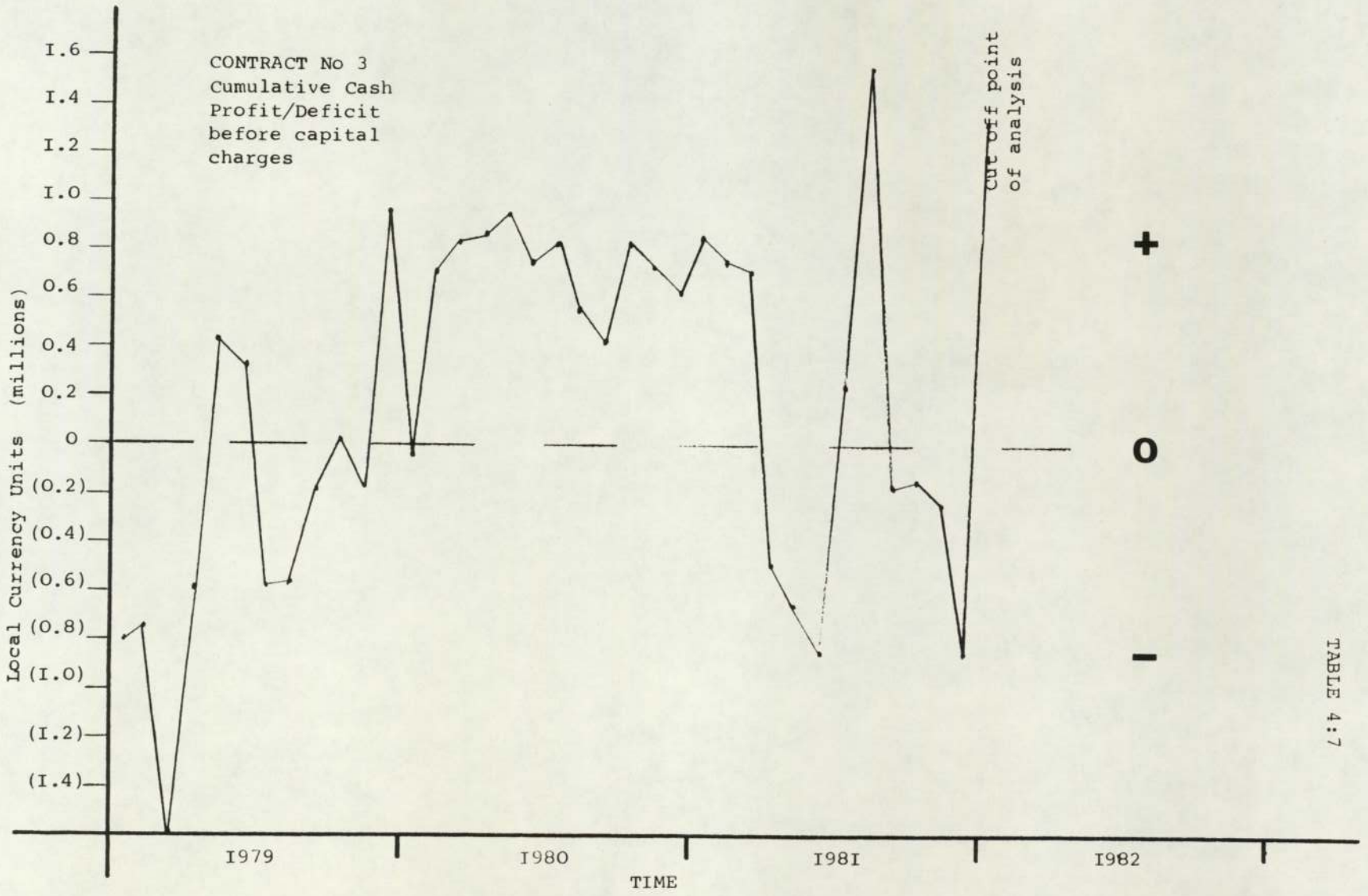

CONTRACT No 3
Cumulative Cash Profit/Deficit before capital charges
Cut off point of analysis
Local Currency Units (millions)
I.6
I.4
I.2
I.0
0.8
0.6
0.4
0.2
0
(0.2)
(0.4)
(0.6)
(0.8)
(I.0)
(I.2)
(I.4)
+
0
-
I979
I980
I98I
I982
TIME

TABLE 4:7

This contract was selected for detailed consideration because it represented a good example of the type operated by IAL in its largest overseas market. IAL has had long-standing links with the country concerned and has an established large and well organised branch. The contract represented a significant part of the branch's income. The framework in which the contract was conducted was relatively straightforward in comparison to contracts numbers 1 and number 3. It ran for six years starting in September 1976. It was subsequently renewed in October 1982 for a further two years. The period of the initial contract only is considered here. The contract was with a Middle Eastern Government for the building and operation of a Training Centre. The contract can be divided into two parts:

a) the building of the Training Centre;
b) the operating of the Training Centre.

This division had an effect on the payment terms. The building operation was financed on the basis of a need to purchase and supply building material and manpower, whereas the operational activity needed regular payments which reflected the relatively even pattern of expenditure. The payment terms were:

a) an advance payment on signing of the contract of 2.0 million local currency units;
b) a payment of 2.5 million local currency units when building materials arrived on site and a further 2.5 million local currency units completion of the building work;
c) a series of payments to the value of 15 million local currency units per annum paid monthly during the last five (or training) years of the contract.

The appearance of an "advance payment" in this contract is a new element which was not found in the other contracts.

The accounting arrangements for the contract were undertaken as part of the branch's general accounting procedures. The branch produced monthly profit and loss accounts for all its contracts as well as one for the branch as a whole and a monthly balance sheet. All these accounts were sent to the UK and formed part of the UK management accounting package.

Two points about the accounting arrangments should be highlighted.

a) That for the first fifteen months of the contract no profit and loss accounts were produced for the contract. All expenditure was quantified under work in progress. For ease of analysis these work in progress valuations have been assumed to be equal to expenditure.

b) That the UK reported profit figures for the contract did not reflect local currency profit until very late in the contract, because IAL made use of a "long-term reserve".

The cash flow pattern of the contract is shown in Table 4:8

It can be seen that expenditure figures are only shown from July 1977 onwards. This is due to the accounts not being available in the UK prior to this date.

The operation of the contract appears to have been quite smooth except that the commencement of the operation of the Training Centre had to be delayed

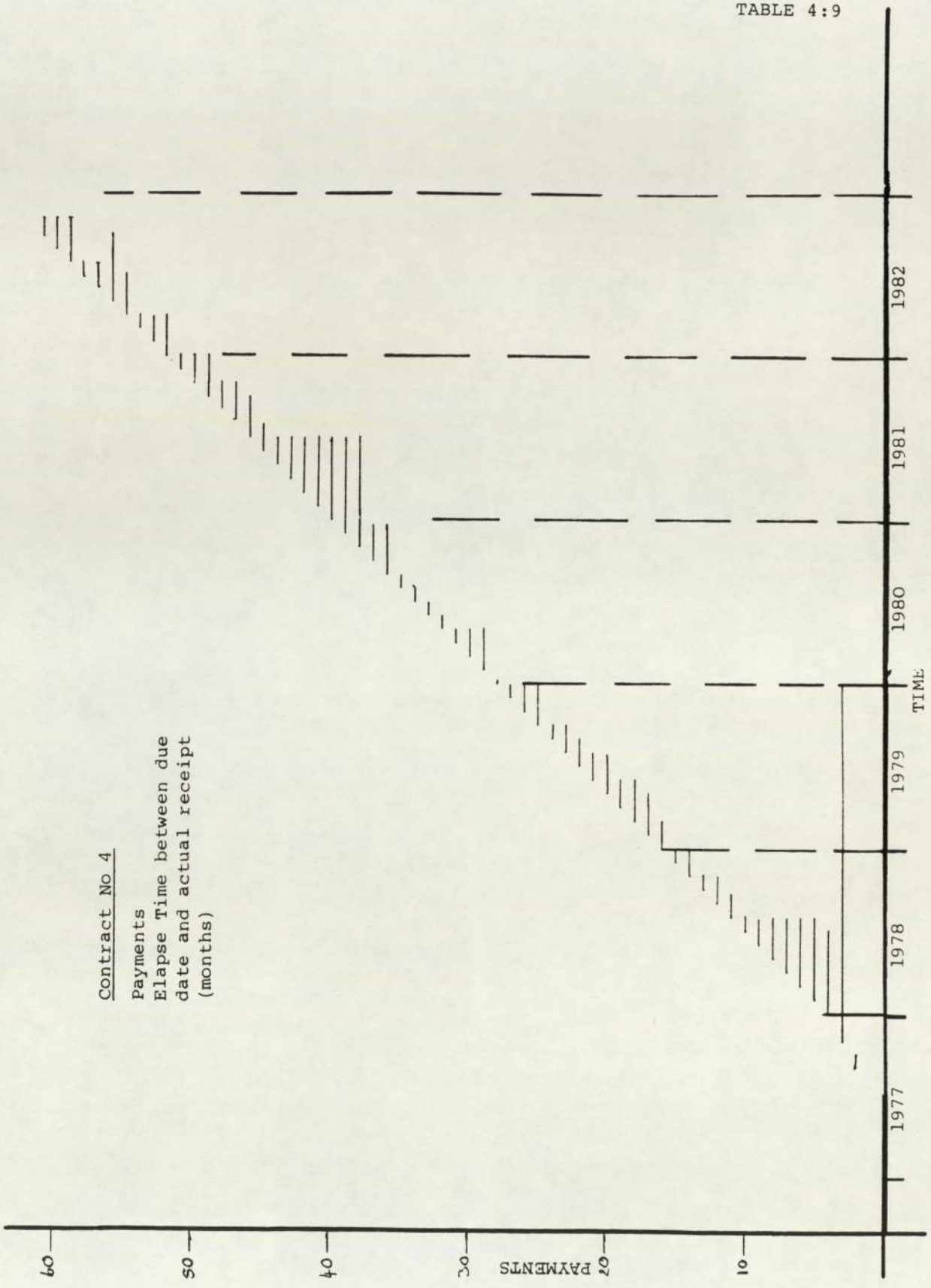
because local utility services were not connected in time. This was outside of IAL's control, but resulted in the customer requesting a rebate on the contract price to cover operational costs that IAL did not have to meet. To date part of this rebate has been made and provision has been made for a further payment. Also contract scheduled payments were not received on the due dates. This is shown in Table 4:9. The financial dynamics of the contract were considered by looking at a number of sources of financial information available in the U.K. These were:

a) local currency branch management accounts showing, contract profit and loss, a branch balance sheet, contract debtors and branch/Head Office account balances;
b) IAL's UK. Bank account cash book showing transfers to and from the branch;
c) UK. monthly management accounts;
d) UK. sterling profit calculations from local currency accounts;
e) U.K. sterling calculations long-term reserve provisions of the contract.
f) 1977-1982 IAL Five year corporate plan, exchange rate projections.

From these sources of financial information a series of results were produced which showed the effect of varying exchange rates on the reported and actual cash values of profits from the contract recorded in sterling.

To be able to quantify the value of cash receipts in sterling generated by the contract it was necessary to recalculate the local currency branch monthly accounts from an accruals to a cash basis. This involved including as income all the advance payments received

TABLE 4:9


Contract No 4
Payments
Elapse Time between due date and actual receipt (months)
60
50
40
30
20
10
PAYMENTS
1977
1978
1979
1980
1981
1982
TIME

but not taken into the profit and loss accounts. Also provision was made for those payments not received on schedule.

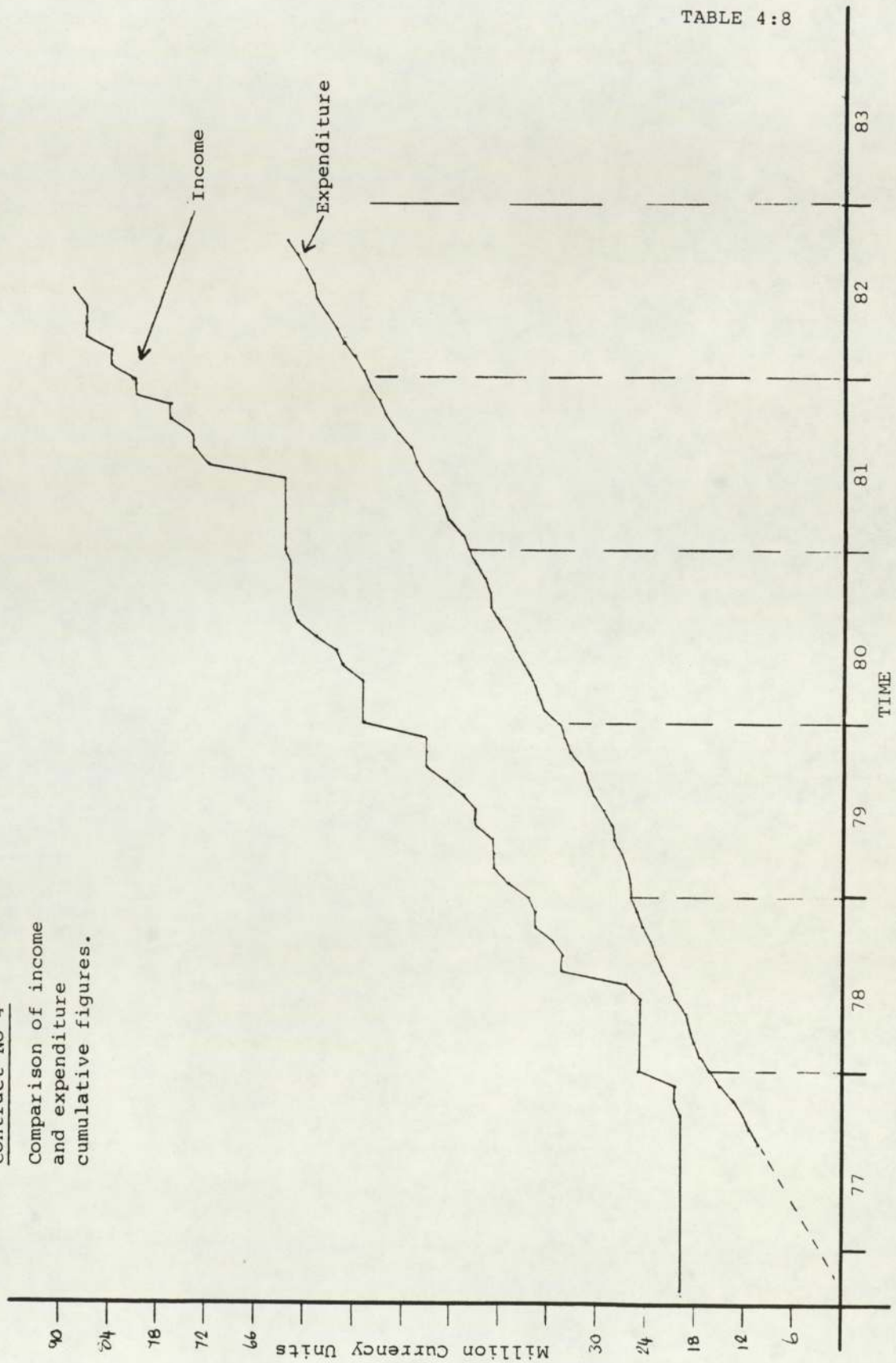
This re-drafting of the accounts to produce "cash values" showed that the contract was self financing and that cumulative income was always greater than cumulative expenditure. (See Table 4:8). It could, therefore, be concluded that the contract was only exposed to foreign exchange risk on profits.

There were no readily available figures to show the actual sterling amounts received by IAL in the UK as profit from this contract. The branch which operates the contract works on the basis of returning to the UK cash surpluses as they are generated by the branch as a whole. Therefore assumptions were employed to quantify the composition of the branch transfers and what proportion of each transfer came from this contract.

Two sets of assumptions were used to produce two sets of figures. The first assumed that in the years 1978 to 1982 the proportion of transfers from the contract represented 14 per cent of the total value of money transferred from the branch, as the contract represented 14 per cent of the branch's business.

The second assumed that the proportion of transfers to the UK from the contract was related to the rate at which the contract generated cash surpluses, as a proportion of total branch cash generation. That in 1978 26 per cent of total transfers came from this contract, 1979 20 per cent, 1980 nil, 1981 28 per cent and 1982 nil. The results of these calculations are shown in Table 4:10. In addition the average of the two is also shown and this can be taken to be the most acceptable approximation of actual sterling receipts from the

TABLE 4:8


Contract No 4
Comparison of income and expenditure cumulative figures.
Income
Expenditure
Million Currency Units
90
84
78
72
66
30
24
18
12
6
77
78
79
80
81
82
83
TIME

from the contract in the UK. The best comparison to make with the figures for actual sterling cash receipts would be with the original sterling profit budget. However, this budget was not available within IAL, so a second best comparison had to be made. This second best comparison is derived from two calculations.

a) The value of profits at the exchange rate at the start of the contract in September 1976.
b) A local currency income and expenditure projection produced by the IAL finance department for the years 1978 to 1982.

The first calculation involves the multiplication of the cumulative local currency profit by the exchange rate prevailing at the start of the contract in September 1976.

The second calculation takes the projection produced by the IAL Finance Department in local currency units and converts it to sterling using the exchange rate estimates in IAL's five year plan 1977-1982.

The results of both these calculations are shown in Table 4:10, together with their averages.

IAL has reported the progress of the contract in both its management and financial accounts. These two types of accounts have shown different sterling profit values for the contract.

The monthly management account figures have not included the long term reserve value and to facilitate ease of comparison the long-term reserve has been added to these reported figures.

The financial accounts produced at the year end have

Table 4:10

CONTRACT NUMBER 4
RECONCILATION OF PROFIT FIGURES

		£
A.	Cash sterling values	
i)	Value of Profit assuming Transfer to the U.K. at the rate of surplus generation (1978-1982)	3,809,000
ii)	Value of Profit assuming Transfer to the U.K. at a constant rate over period 1978-1982.	3,827,000
iii)	Average of A i) and ii)	3,818,000
B.	Estimate of 1976 Sterling Budget	
i)	Value of Profit as per 1978 projection using Corporate Plan exchange rates.	4,200,000
ii)	Value of Profits using September 1976 Exchange Rate.	4,381,000
iii)	Average of B i) and ii)	4,291,000
C.	Reported Sterling Values	
i)	Value of Profits as per U.K. Financial Accounts (adding in all Long-term Reserve).	3,439,000
ii)	Value of Profits as per U.K. Monthly Management accounts (adding in all Long-term Reserve)	4,528,000
D.	Hypothetical Strategies.	
i)	Value of Profits if all returned to UK at end of contract, September 1982.	4,418,000
ii)	Value of Profits if all returned to U.K. at end of each financial year.	3,728,442
iii)	Value of Profits if all surpluses returned to U.K. to keep a minimum cash balance.	3,890,000

included the long-term reserve with the exception of the residual amount left over for repayment to the customer (see Table 4:11). Once again, for ease of comparison, all the long-term reserve has been added into the figures shown in Table 4:10.

Finally, a set of hypothetical results have been produced. These represent alternative courses of action available to IAL for the transfer of money back to the UK.

a) The transfer of all profits from the contract back to the UK at the end of the contract.
b) The transfer of profits to the UK at the end of each financial year.
c) The transfer of money to the UK as surpluses are generated above 5,000,000 local currency units and assuming an overdraft facility of 2,000,000 local currency units. In this strategy cash holdings of foreign currency would have been kept to a minimum.

4:10 Conclusions: Contract Number 4

This contract represented the best example of the effects of exchange movements on the divergence between reported profits in sterling and the ultimate sterling value of overseas generated profits.

4:11 Detailed contract studies placed in the general context of IAL's overseas business.

It was important to see to what extent the contracts which had been studied in detail were a fair representation of IAL overseas business.

Table 4:1, above, showed a breakdown of IAL's

Table 4:11

CONTRACT NUMBER 4

NOTE ON THE LONG-TERM RESERVE.

There were three types of reserve operated within this contract.

a) Period 1976-1979, Income in the form of an advanced payment and the first fifteen monthly payments were not taken into a profit and loss account until 1979. All expenditure was recorded as work in progress.

b) In 1980 the surplus of income over expenditure generated by the contract, with the exception of a small residual amount, was transferred to IAL's U.K. books at a 1980 exchange rate. This became a sterling profit reserve which was allocated to reported profits in 1980, 1981 and 1982, in addition to the profits generated locally.

c) 1982 - By the end of 1982 all the reserve should have been allocated to profits. However, because of a technical problem beyond IAL's control which had involved late commencement of the training element of the contract, IAL had been requested by the customer to return a sum equal to some of the running costs saved by IAL. Thus, IAL did not include all the remaining reserve as profit in 1982, but held aside a sum pending repayment. This sum has not been deducted from any of the figures shown in this analysis for reasons of ease of comparison.

largest contracts over the course of the period 1977 to 1982. It can be concluded from this that IAL's overseas contracts fall into a number of classes. Large manpower contracts in the aviation field, smaller manpower contracts in the aviation field, and a series of supply and installation contracts for a variety of customers.

Table 4:12 shows a breakdown of IAL's overseas branches and stations as at March 1982. Appendix 3 shows a series of schedules which illustrate the business, accounting and financial arrangements for each of these branches and stations.

It can be fairly concluded that the contracts considered in detail do represent a good cross-section of IAL's business. However, a gap in this analysis is that a small supply and installation contract has not been studied. It is believed that a study of one of these contracts is not necessary. Contracts of this nature normally run for short periods and the their terms are usually involve a small number of payments. Hence they do not raise the same problems of recording. transactions or quantification of exposure.

4:12 IAL's largest overseas branch: a study of financial arrangements from a local perspective.

It was argued by the management of IAL that to gain a comprehensive picture of the circumstances under which IAL conducted its overseas business and the factors which affect the level of exposure to foreign exchange movements, it was necessary to study at first hand one of IAL's large overseas branches. This study was undertaken in the summer of 1983. It involved a

Table 4:12

BREAK-DOWN OF BUSINESS, ACCOUNTING, FINANCIAL ARRANGEMENT FOR IAL'S OVERSEAS BRANCHES AND STATIONS AS AT MARCH 1982

Branch/Station	Accounting Arrangements	Contract Payment Terms	Exposure	Type of Business	Special Features
Bahrain	P/L B/S	Annual Fee	Profit	Manpower Provision	
Dubai	C/A	Fixed Fee	Profit	Manpower Provision	
Gambia	C/A	Man/Month	None	Manpower Provision	Currency linked to sterling
Mozambique	C/A	Fixed Fee	Profit	Manpower Provision	
Nigeria	C/A	Fixed Fee	Profit	Manpower Provision	Swap with British Airways
Phillippines	C/A	Commission	Turnover	Agency	
Qatar	P/L B/S	Cost Plus	Profit	Manpower Provision & supplies	Local Overdraft interest charged to customer
Ras-Al-Khaimah	P/L B/S	Cost Plus	Profit	" "	
Seychelles	C/A	Man/Month	Profit	Manpower Provision	
Sharjah	C/A	Cost plus	Profit	Manpower Provision	
Zimbabwe	C/A	Fixed Fee	Profit	Manpower Provison	Swap

P/L = Profit and Loss Account
B/S = Balance Sheet
C/A = Cash Account

N.B Only those included which have not been discussed in the detailed analysis

detailed interview with IAL's local finance manager and a series of accounting exercises undertaken locally.

The objective was to note the factors affecting foreign exchange exposure and its management from the standpoint of an overseas branch. Particularly, this involved looking at the projections for cash surplus generation, taking into account the difficulties of undertaking business in a developing country.

The study was undertaken in one of IAL's largest overseas branch, Saudi Arabia. In 1982 Saudi Arabia represented over 50 per cent of IAL's total overseas business. The main bulk of its business has taken the form of a small number of high value contracts. There have been no more than three or four of these contracts running concurrently.

IAL's main branch in Saudi Arabia is part of the Aviation Business Group.

IAL contracts in Saudi Arabia should follow a relatively straightforward financial pattern. They involve expenditure which either relates to the provision of manpower or to the supply of equipment. In both cases the level of expenditure should be predictable for the duration of the contract. Equally, there should be a degree of certainty about its income stream as this should be in line with a schedule projected in the original contract documents. This schedule will either relate contract payments to fixed dates, say monthly, or to completion of specific aspects of the contract.

From this it follows that the generation of surpluses

of local currency denominated cash should follow predictable patterns and hence the dates for the transfer of money from the local currency to sterling.

However, whilst in theory the generation of cash surpluses and the selection of optimal dates for the transfer of sums into sterling should be straightforward, this is not ths case in practice. The divergence between the theory and the practice is caused by a number of factors, as detailed below.

IAL is not paid in cash directly from the Government Department for whom it is working. Instead, payment is made by way of a payment order received by IAL in its Jeddah office which has to be cashed by being processed through another Government Department (the Saudi Arabian Monetary Agency) a considerable distance away in the country's capital city, Riyadh. It takes a minimum of a week for the Saudi Arabian Monetary Agency to process cheques denominated for payment in Saudi Riyals and a minimum of two weeks for the processing of US Dollar denominated sums. Prior to IAL receiving a payment order there are two main reasons why payment cheques do not arrive in line with contract payment schedules:-

a) Contractual difficulties arise out of problems caused by bad contract wording, which only become apparent as the contract progresses. IAL also does work which is additional to an existing contract or is a special one off job undertaken without a written contract or a written work order. These excuses are used by the Saudis as reasons to stall payments.

b) As Saudia Arabia is an Islamic State religious festivals and holidays are the causes of major upsets

in the payment schedules. These festivals have precedence over normal business activity. The Saudi Arabian bureaucracy, as stated above, has its own bottlenecks and this leads to a compounding of the payment delays.

Further, in January of each year the Government is involved in its annual budget exercise which effectively shuts down all payment offices and in turn leads to further backlogs.

IAL has had difficulty with individuals within the Saudi administration who for one reason or another have taken a dislike to IAL and hence obstructed the payment to IAL.

The Saudi Government had cut back oil production in 1983 to such a level that it found difficulty in paying its current obligations without breaking into its reserves. It had been unwilling to use its reserves to finance current expenditure which has led to a general tightening of payment procedures and what appears to be a deliberate policy of stalling payments as long as possible.

It can be concluded that, in general, the experience of IAL has been one in which the schedule of payments expressed in contract documents has little relationship to the actual pattern of payments received. Because of the politically sensitive nature of business in Saudi Arabia little control can be exerted on the receipt of these payments.

The Saudi Arabia branch is self accounting and operates a conventional accruals accounting system.

Up until 1982 there were no detailed cash flow projections produced by the branch. These projections are now produced locally. The finance manager first drafts these projections taking into account local circumstances. They are then considered by UK management who want to see cash projections which relate to the end of year figures produced for accounting purposes. This produces a mis-match between real cash flows as they are likely to occur and the figures produced for a balance sheet. The product of this exercise is shown graphically in a comparison of the projections for 1982 for the whole branch and the actual figures as they materialised in practice shown in Tables 4:13 and 4:14. It would be wrong to assign all this divergence to this mis-match of user needs. There are other factors, such as circumstances changing and contracts not following their expected patterns, (eg in one large training contract, classes were of a different size from that budgeted. This resulted in a drop in the level of support services as they are derived from student numbers and a drop in contract income).

The branch undertook no detailed breakdown of cash flow on a contract by contract basis. This raised questions as to the quality of the projections produced locally for the branch as a whole as it seems a logical step to look at each individual contract prior to producing the branch wide figures. This also means that the cash flow position of each contract is not quantifiable at any given point. The present accounting system works on the basis of writing all debtors in a central contracts debts account.

The lack of a systematic approach to the projecting and monitoring of cash flows presents major problems in planning a system of foreign exchange management in the UK.

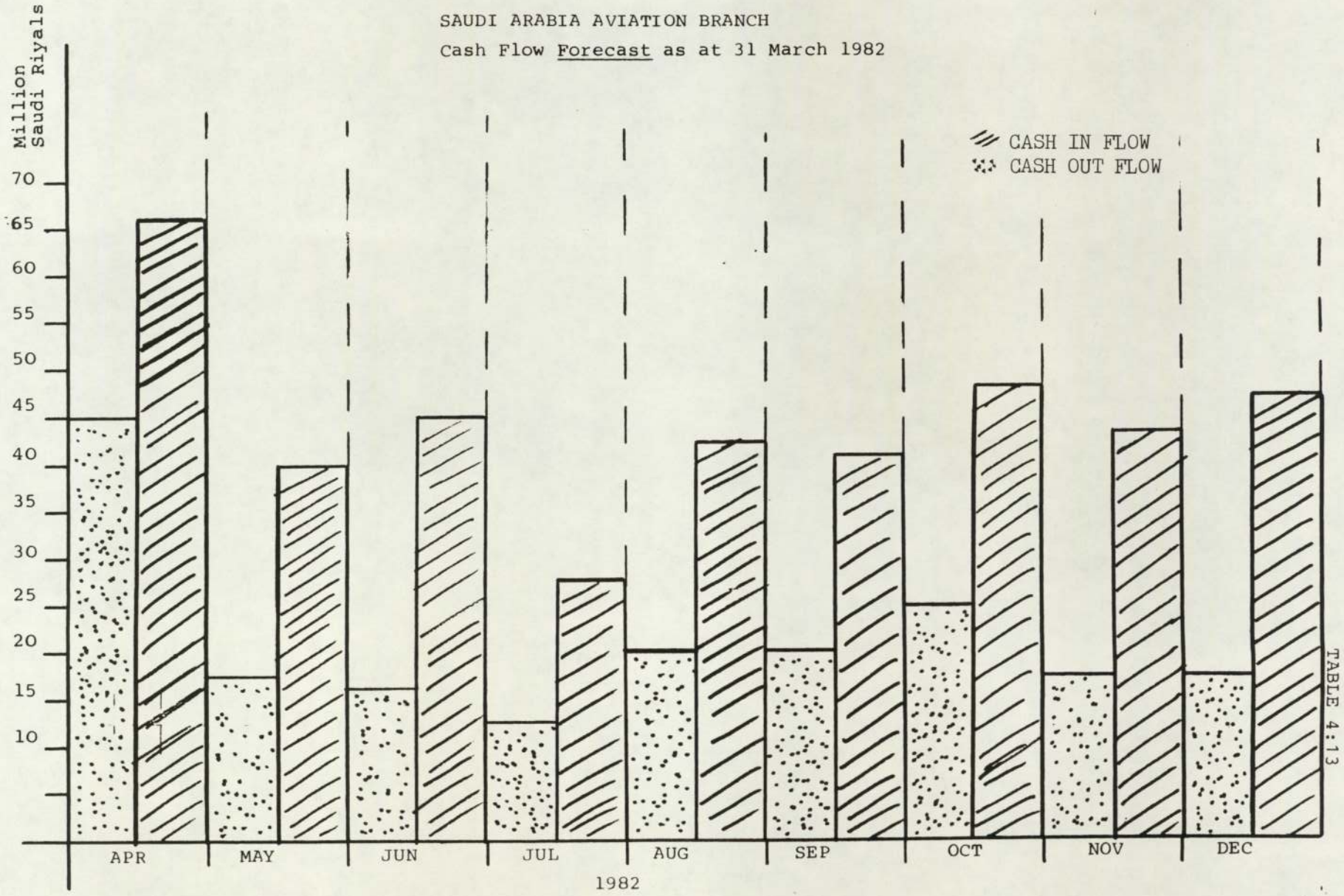

SAUDI ARABIA AVIATION BRANCH
Cash Flow Forecast as at 31 March 1982
Million Saudi Riyals
70
65
60
55
50
45
40
35
30
25
20
15
10
CASH IN FLOW
CASH OUT FLOW
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
1982

TABLE 4:13

Saudi Arabia Aviation Branch

Cash Flow Outturn (as per Bank Account)
April to December 1982

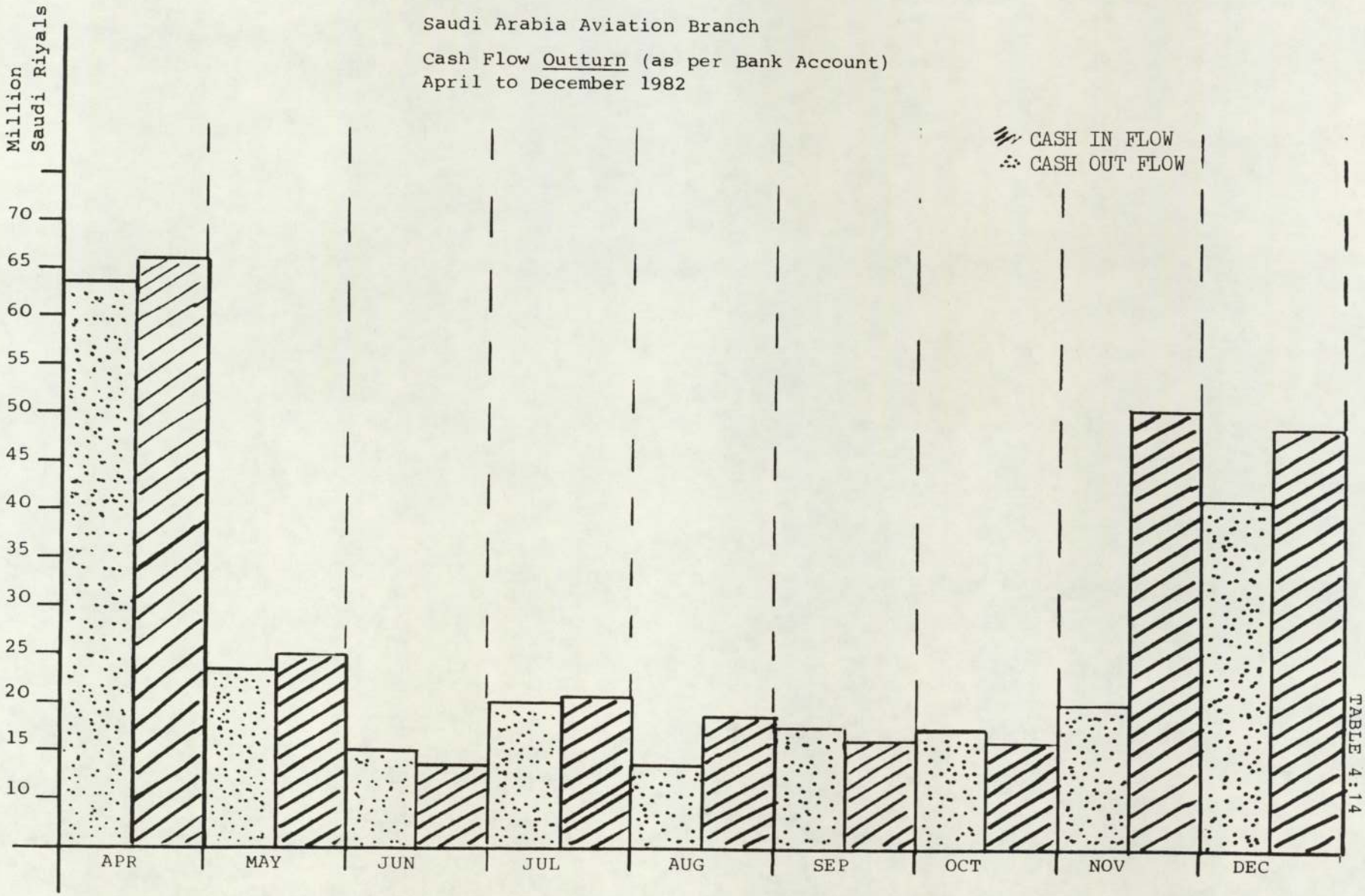


TABLE 4:14

4:13 Conclusion to be drawn from the study of an IAL overseas branch.

Two important points stand out:-

a) That the lateness of payments from a customer is the single biggest factor affecting the rate of repatriation of funds to the UK. That such late payments are the result of exogenously determined factors and because of the political nature of the customer, IAL is able to exert only limited influence over the customer. This conclusion ties in with the evidence found in the detailed contract analysis.

b) That the current system of cash flow projections does not lend itself to providing the decision relevant information necessary for the handling of foreign exchange as it is distorted by the needs of senior management in the UK. An ideal system of cash reporting should start at a contract level, instead of being pulled together at a branch level.

4:14 General Conclusion drawn from the Contract studies.

The company has no definition of foreign exchange exposure and risk and consequently has no formal strategy for handling them with in the context of their contract business. Hedging of foreign exchange exposure when it has been done has been informal and unstructured, without any systematic assessment made as to its costs and benefits.

It is informally recognised within the company that the single biggest factor affecting the repatriation of money to the UK. is the late receipt of contract payments from customers. This has been confirmed by the contract studies. It is this factor which

requires to be taken into account in any systematic approach to exposure within IAL.

These two points are taken up in Chapter 5, where a model is developed which recognises the effect of late payment from customers and relates it to the level and time structure of exposure on long term overseas contracts.

There also appears to be no systematic approach to the forecasting and monitoring of cash flow patterns on a contract by contract basis. Much of the contract studies were taken up with the reworking of financial information from an accruals to a cash flow basis. From this it is argued in Chapter 6 that in the context of economic exposure on long term contracts, it is cash flow information which holds the most relevance for management. This has implications for both how information is presented and how it is handled.

There is a divergence between the cash value of overseas business and the sterling values shown in IAL's internal management accounts (although in the published figures any differences disappear). The effect of such differences on the decisions taken by IAL's management have not shown up in the studies already undertaken. It was therefore necessary to discuss with the users of such information, IAL's senior management, what they derived from the management accounts and to what uses they put it. The results of this work are dealt with in the following section.

4:15 <u>A survey into the effects of foreign exchange rate movements on management accounting information from the perspective of IAL's senior management.</u>

This section reports on the results of a survey conducted amongst IAL's Senior Management into the uses of sterling accounting information produced by the IAL Finance Department for the reporting of business activity overseas.

The objective of the survey was to assess the uses to which management accounting information was put and to gauge whether the basis of its computation and the effect of the exchange rate movements presented were clearly understood by the people for whom this information was intended. An example of the presentation used for IAL's monthly sterling management accounts is shown in Appendix 4.

This involved looking at how effectively this information is presented and the types of decisions based upon it. Specifically of interest was the extent to which exchange rate distortions of information were taken into account and the kinds of problems these distortions caused.

It was recognised at the outset that although it was possible to identify flaws in the current system on theoretical grounds, the acid test of any management accounting system is in its usefulness to those managers to whom it is presented.

This survey was not, however, just confined to reported information. Scope was available within the framework of the discussions for the raising of other problems associated with the conduct of business in foreign currencies.

The survey was conducted amongst Directors and General Managers from each of the four business Groups within IAL.

It took the form of a series of semi-structured interviews, conducted with each group individually. Prior to the interviews each of the participants had received a copy of an introductory letter from the Finance Director indicating who would be undertaking this work and why it was being done. This also included an outline of the areas to be covered in the discussions. This is shown in Appendix 4.

The exact ground covered in each discussion varied from group to group depending on the specific nature of their overseas involvement and any particular areas of concern raised by the respondents. Those officers of the company who took part in the survey are is also shown in Appendix 4.

4:16 Results of the Survey

On the majority of issues there was uniformity in the responses, however on a number of issues there was present a wide degree of disagreement. The basic results can be summaried as follows:

IAL's UK sterling monthly accounts were only used as a coarse indicator of overseas activity. There was a feeling that the figures had been so "doctored" that they were only of use for "fire fighting", that is for providing first indications of problems. Local currency information was perceived as a more reliable indicator of performance. But, this was only looked at if sterling information showed that it warranted attention. "Normal business decisions" were taken on the basis of local currency and not sterling information, although it was impossible to tie down any respondent exactly on the type of decisions they could take which would affect their overseas operations in the short-term. Only one respondent

stated that at the end of the day he was concerned with sterling values of contracts as they appeared in management and published accounts.

Exchange rate movements and their effects on business were mainly perceived to be outside the control of IAL's management.

There were two areas where IAL might take action, in hedging foreign exchange risk and in the currency denomination of overseas business. Hedging was not considered by any of the respondents to be of central importance to their operations but the responsiblity of the finance department. Half the respondents felt that IAL had made some bad decisions on the currency denomination of its business and there was a need for better information and advice on such matters within the company.

There was substantial criticism of the way in which budget performance information was shown, particularly with respect to the manner in which budgets were adjusted to take into account exchange rate movements. It was suggested that an essentially simple exchange adjustment calculation was presented in such a way that it failed to convey a clear picture. IAL's sterling figures do not present a "real" picture, the elaborate system of accruals and reserves, as one Director put it "sometimes made the information confusing to general (that is, senior) management in the UK". It was also difficult for overseas branch and station managers to understand how their performance in local currency showed a completely different picture when reported in sterling in the UK.

All but one group were involved in the use of foreign exchange forecasting at a contract bidding stage. It

was argued that only the profit element of many of IAL's contracts were exposed to foreign exchange risk, (reinforcing the findings in sections 4:1, above), and that most of this exposure could be covered by packing the cost of contingencies and sundry other expenses. However, the extent to which such action could be taken was dependent on the price sensitivity of the customer. The amount placed in contingencies was necessarily an arbitrary sum not being based on any systematic method. Some respondents saw exchange movements as an "acceptable commercial risk" which they were willing to take as a price of doing business. In part this laissez-faire attitude could be put down to IAL's faith in "seat of the pants" judgement towards exchange rates issues which permeated many of the answers. As one respondent put it in September 1983, "IAL has not yet been caught out on exchange rates, perhaps we should be worried but the situation is not urgent".

However, an alternative view was presented by another respondent who argued that IAL had a need for a systematic basis for its foreign exchange decision making with a formal system of monitoring "to ensure that IAL took advantage of favourable exchange rates wherever possible".

The respondents were split evenly over the importance of cash to IAL's business.

The first view was that divergences between reported sterling and sterling receipts back in the UK was not the concern or within the control of the business groups.

The second view was that cash receipts in sterling should be an important element in accounting information and that it was part of the business

groups' responsibilities to maximise the amount of cash received. There was a lack of good information in IAL on currency flow forecasts and commitments and this had led to bad decisions being taken on the currency denomination of new business.

4:17 Conclusions drawn from the survey

The most important finding was that IAL's senior management did not use the company's sterling management accounts for any decision relevant purpose. Two reasons can be suggested for this. First, that the method of conversion of information from local currency to sterling was not clear, and as a consequence far more faith was placed in local currency data. Second, that the figures incorporated so many accruals and adjustments that they failed to convey any meaning.

What needed to be presented was financial information which could be easily related back to the original local currency figures. Thus the separation of "real performance" and "exchange rate distorted performance" was of importance.

If, as appeared to be the case, there was little room for management control over overseas contract performance once the contract had commenced, it was probably more beneficial to have information which showed actual activity that is, cash flows, rather than some form of adjusted meaningless information.

These accounting points are picked up again in Chapter 6.

In respect to the handling of foreign exchange risk, two points were of specific importance to this work.

First, it was recognised that profits were the area most at risk to the effects of exchange rate movements. Contingencies were packed into the price to cover exchange rate movements but were not based on any systematic measure of risk. This is an area where a positive contribution could be made, as is shown in Chapter 5.

The second point is that IAL do not monitor flows of foreign exchange in any systematic manner. This may have had detrimental effects on contract denomination decisions and the staging of the conversion of money into sterling. This raised two issues, one was how do you organise reporting so that it best identifies flows of currency and the other is how do you bring it together into a framework which allows company wide appraisal. This first issue is developed in the discussion of cash flow accounting in Chapter 6 and the second issue in Chapter 7 where the exposure profile framework is taken up to a corporate wide level.

4:18 A note on the characteristics of the currencies in which IAL trades.

The previous sections of this chapter have dealt with the effects of exchange rate movements upon IAL's business. Before going on to consider the solutions to these problems and issues raised in this chapter a series of points need to be made about the nature of the foreign exchange markets for the currencies in which IAL operates, as this has a bearing on some of the propositions developed in Chapters 5 and 7.

It has been implicitly assumed that since the breakdown of the Smithsonian agreement in 1973 the foreign exchange markets have been volatile. There is a wealth of academic and circumstantial evidence that

this has indeed been the case. However, it is not enough to leave it at this.

Of particular importance are the institutional linkages which exist between currencies. These have a direct bearing on the number of patterns of currency movements which affect IAL. Table 4:15 details the currencies in which IAL trades and the nature of these linkages.

A summary of these linkages is shown in Table 4:16. This shows that whilst 32 currencies are listed in Table 4:15 only nine patterns of movement can be expected. This has important implications for any portfolio types of approach, as it effectively reduces the diversity of risk return relationships available. The effect of this issue is returned to in Chapter 7.

The range of hedging action available to IAL is in part determined by the nature of the market for the currencies in which it conducts its business. For instance, the scope for hedging using the forward market is determined by the existence and length of the forward market in that currency. Table 4:17 details the market for IAL's business currencies and Table 4:18 provides a summary of these markets. This shows that forward markets are only available for a very small number of the currencies in which IAL works and hence the scope for hedging through this medium is limited. This in itself lends weight to the argument put forward in Chapter 7.

Data on the movements of the currencies in which IAL trades and a simple index used to compare movements appears in Appendix 2.

Table 4:16

EXCHANGE RATE LINKAGES
IAL OPERATING CURRENCIES
AS AT 30/6/84

Country	Currency	Linkage
U.A.E	Dirham	SDR (Special Drawing Rights) Margins of + or - 7.25% However, to maintain relatively stable relationship with US Dollar these margins are not always observed.
Bahrain	Dirham	SDR Margins of + or - 7.25% However, to maintain relatively stable relationship with US Dollar these margins are not always observed.
Qatar	Riyal	SDR Margins of + or - 7.25% However, to maintain relatively stable relationship with US Dollar these margins are not always observed.
Iran	Riyal	SDR US Dollar intervention currency
Kuwait	Dinar	Basket of currencies of major trading partners. US Dollar intervention currency
Libya	Dinar	US Dollar
Saudi Arabia	Riyal	SDR Margins of + or - 7.25% However, to maintain relatively stable relationship with US Dollar these margins are not always observed.
Sudan	Sudan Pound	US Dollar Two Foreign Exchange Rates i) Official ii) Free market within limits
Oman	Oman Riyal	US Dollar

Country	Currency	Linkage
Maldives	Rufiyaa	US Dollar with limited flexibility
Bangladesh	Taka	Weighted basket of currencies of major trading partners. Sterling intervention
Brunei	Dollar	No information available
Malaysia	Ringitt	Weighted basket of currencies of major trading partners. US Dollar intervention
Singapore	S. Dollar	Weighted basket of currencies of major trading partners. US Dollar intervention
Pakistan	Rupee	Managed float. US Dollar intervention
Papua New Guinea	Kina	Weighted basket of currencies of major trading partners. US Dollar intervention
Angola	Kwanza	No information available
Botswana	Pula	Pegged to a basket representing 50 per cent SDR amd 50 per cent South African Rand. US Dollar intervention
Gambia	Dalasi	Pound Sterling Margin of 1 per cent + or - .
Kenya	Shillings	SDR
Mozambique	Metical	No information avaliable
Nigeria	Naira	Managed float. US Dollar intervention
Seychelles	Rupee	SDR Sterling intervention

Country	Currency	Linkage	
South Africa	Rand	Floating US Dollar intervention	
Uganda	Shilling	Managed float US Dollar intervention	
Zaire	Zaire	Managed float.	
Zambia	Kwacha	SDR	#1982
Canada	C.Dollar	Floating US Dollar intervention	
Jamaica	J.Dollar	US Dollar	
Trinidad	TT Dollar	US Dollar	
USA	Dollar	Floating	
France	Franc	Held within European Monetary System arrangements	

"SDR" = Special Drawing Rights.
"Intervention" = Currency of intervention in the foreign Exchange.

Source: International Monetary Fund Annual Report 1982 and 1984

TABLE 4:16

SUMMARY OF EXCHANGE RATE LINKAGES
IAL TRADING CURRENCIES

	Number
i) Linked to a single major currency	
US Dollar	6
Pound Sterling	1
ii) Linked to SDR	8*
iii) Basket of major trading partners currencies or other composites	6
iv) Within European Monetary System	1
v) Adjustable in accordance with a fixed set of economic indicators	0
vi) Limited flexibility	0
vii) Intermediate flexibility	0
viii) Managed float	4
ix) Independent float	3
x) No information	3
	32

IMF Categories

* some of these currencies effectively linked to the US Dollar

Table 4:17

EXCHANGE RATE MARKETS
SPOT AND FORWARD IN LONDON
AS AT 4/1/85

Country	Currency	Spot Market	Forward Market
U.A.E	Dirham	Yes	6 Months
Bahrain	Dirham	Yes	6 Months
Qatar	Riyal	Yes	No
Iran	Riyal	No	No
Kuwait	Dinar	Yes	6 Months
Libya	Dinar	No	No
Saudi Arabia	Riyal	Yes	12 Months
Sudan	Sudan Pound	No	No
Oman	Oman Riyal	Yes	No
Maldives	Rufiyaa	No	No
Bangladesh	Taka	No	No

Country	Currency	Spot Market	Forward Market
Brunei	Dollar	Yes	No
Malaysia	Ringgit	Yes	12 Months
Singapore	S. Dollar	Yes	12 Months
Pakistan	Rupee	Yes	No
Papua New Guinea	Kina	No	No
Angola	Kwanza	No	No
Botswana	Pula	Yes	No
Gambia	Dalasi	No	No
Kenya	Shillings	Yes	No
Mozambique	Metical	No	No
Nigeria	Naira	Yes;only selling	No
Seychelles	Rupee	N/A	N/A

Country	Currency	Spot Market	Forward Market
South Africa	Rand	Yes	12 Months
Uganda	Shilling	Yes	No
Zaire	Zaire	No	No
Zambia	Kwacha	Yes	No
Canada	C.Dollar	Yes	5 Years
Jamaica	J.Dollar	Yes	No
Trinidad	TT Dollar	Yes	No
USA	Dollar	Yes	10 Years
France	Franc	Yes	5 Years

Source: Barclays Bank Foreign Exchange Dealing Room.

TABLE 4:18

EXCHANGE RATE MARKETS
SUMMARY OF FORWARD MARKETS
IAL OPERATING CURRENCIES

	Number
i) No forward market	22
ii) Six month forward market	3
iii) twelve month forward market	4
iv) greater than twelve month forward market	3
	32

4:19 Overall conclusions drawn from the preliminary investigations.

In this chapter four main problem areas have been identified. These are united by the common theme of deficiencies in accounting and economic information which results from exposure to foreign exchange movements.

In the area of accounting information the problems are confined to two issues.

a) IAL does not currently clearly distinguish between real performance of its overseas operations and that performance reported through the distortions caused by exchange rate movements. This applies to its current system of management accounting information produced by use of the conventional accruals accounting principle. The use of this method has resulted in widespread mistrust of IAL's management accounts by their users, IAL's senior management. This is taken up in Chapter 6.

b) The second criticism is more fundamental. The basis upon which IAL collects and presents its management accounting information upon its overseas activities is suspect. In particular, the collection of management information on activities which are essentially "proprietary" is currently by means of the accruals system and this accentuates the distortions to information caused by exchange rate movements.

The root cause of this problem is the lack of a clear definition of the financial objective upon which IAL should be measuring the performance of its overseas operations. IAL's senior management seem only to have a series of vague goals. This points to the importance

they place on reported sterling performance as it appears in sterling management accounting information. However, it is argued in this thesis that an objective assessment of the nature of IAL's business and the manner in which it operates, as shown in the contracts studied above, indicates that a better definition of IAL's financial objectives should be the maximisation of "the ultimate sterling value of receipts paid back to the UK" as derived from local currency sources.

In the area of management of economic exposure two criticisms can be made.

a) The company has no working definition of economic exposure for its long-term overseas contracts. Despite its involvement in overseas business for over 35 years IAL has no framework for the quantification or control of such exposure. No attempt is made to quantify risk in the planning stage of a contract bid so that decisions can be made on risk aversion tactics.

b) No attempt is made to monitor exposure and to plot the effects of any movement in exchange rate on current business either on a contract by contract or on a company wide basis. Whilst this lack of any quantified assessment has not resulted in any major losses for IAL it is an area of potentially great risk. It is argued that such a quantification of risk should form part of everyday financial activity.

These points are taken up in detail in Chapters 5, 6 and 7.

INTRODUCTION TO STAGE TWO

The development of conceptual models for the description of problem areas and the formulation of solutions.

In the previous Chapter a series of problems were identified. These showed the effects of foreign exchange movements on IAL's overseas business activity. The objective of the next three chapters is to take these problems and develop conceptual descriptions of their nature and from these advance a series of solutions.

These solutions have been considered in the context of the different phases of the life of a contract. Three stages were identified. These were:

a) Planning or budgeting, covered in Chapter 5
b) Monitoring or reporting, covered in Chapter 6
c) Control and managerial action, covered in Chapter 7.

A series of overall system specifications were taken to be of importance in the development of solutions.

The solutions should be, in information theory terminology, "transparent". The means by which solutions are applied should be easy to comprehend by the user. The use of over elaborate solutions which depend on application of sophisticated statistical techniques should be excluded. This was necessary for the proposals to have any chance of being accepted by the company.

The solutions are also attempts to transcend the boundaries between economic and translation exposure which have been present in much of the existing literature as identified by Jacques (81) pp 96 in his review article.

A practical consideration is that it is intended that any solutions should be derived from information already available within the organisation, so that wherever possible readily available information has been used as a primary source of data.

Finally, it is intended that solutions should take the form of organisationally centralised systems or models. It is not intended to debate at length the merits or demerits of such dependence on centralised answers, as this debate has been covered in Chapter 3. The most persuasive argument, however, rests with the proprietary nature of IAL.

In addition, its operations are not sufficiently large to warrant a sensible level of decentralisation nor do they represent entities that could stand alone without the UK operation.

In the context of Earl (84) this work will fall within the confines of the fourth phase of his "stage model".

The framework advocated by Mepham (80) for the construction of accounting models, which is equally applicable to financial models, has been borne in mind during this work although not strictly adhered to in the development of solutions.

CHAPTER 5

The planning and budgetary stage

5:1 Introduction

Prior to IAL obtaining an overseas contract it must progress through a stage of being asked to tender and then making a bid. As stated above this usually involves IAL bidding in a local currency where at least a sizable proportion of the costs can be offset against the income stream in the same currency.

Economic exposure is therefore in general confined to the overseas gross profit element of the contract. See Table 5:1.

It should be an objective at an early planning stage, before a bid is submitted to the customer, to assess the extent to which overseas gross profit is susceptible to foreign exchange movements and to quantify that risk. This is important as overseas gross profit is not only a contribution towards UK. sterling net profit but has a part to play in paying for UK costs.

This would give a measure of the extent to which profit could be squeezed before it became uneconomic to operate the contract, or whether the risk was such that it required hedging action.

With these points in mind a conceptual model of an IAL contract has been developed.

5:2 A framework for the consideration of foreign exchange exposure on overseas business contracts.

The model should, in the initial phase of a contract, enable evaluation and quantification of a range of likely outcomes in terms of risk to foreign exchange losses, given information on the likely commercial pattern of the contract and past knowledge of exchange rates.

Table 5:1

MAKE UP OF PROFITS ON AN OVERSEAS LONG TERM CONTRACT -- TERMINOLOGY USED.

1) Local currency income minus local currency expenditure equals "Overseas Gross Profit".

2) Overseas Gross Profit converted in sterling to become "ultimate overseas cash sterling Gross Profit".

3) "Ultimate overseas sterling cash profit"* minus UK costs and/or third currency purchases equals "Contract Net Profit".

* defined as sterling repatriated to the UK.

As a control tool it should allow for the assessment of exposure and risk, not only on a contract by contract basis but also corporate wide, so that decisions on the covering of exposed items are taken in the full knowledge of the interrelationship between exposures in different currencies.

Flows of foreign currency denominated income are more important to service companies and hence this approach has a general validity beyond the realms of IAL.

The starting point for the development of this model is the establishment of a simple description of an IAL overseas contract. From this base is added a number of complexities, derived from real world considerations.

Two elements in the consideration of this framework have been established.

a) the nature of items exposed to foreign exchange risk and how commercial factors affect their nature through time. This is developed to produce a picture of an "exposure profile", which is the time structure of "net assets at risk" over the life of a contract. (The term "exposure profile" used in this work is not the same as the foreign exchange profile used by Flexel(84) to describe a number of variables which affect risk and exposure).

b) Added to the "exposure profile" is a description of the nature of the foreign exchange risk, how it changes through time and varies from currency to currency.

5:3 A simplified model of an IAL overseas contract

A distinctive aspect of IAL's overseas business

contracts is that they have substantial elements of expenditure in the local currency of the customer. Additionally, income is usually received in the same local currency. It follows that if income and expenditure are incurred in the same currency, then the "net assets at risk" at any given point in time are confined to local currency generated surpluses (the term surpluses is probably better than profits, as this simple framework takes no account of expenditure incurred in the United Kingdom which is charged back to the overseas contract).

In their simplest form IAL's overseas contracts can be seen as a set of income and expenditure streams in local currency over a number of time periods, where any exposure generated by an income stream is covered by the negative exposure caused by the expenditure stream. Hence, "net assets" at risk are confined to the surpluses of local currency.

These surpluses will ultimately be converted to sterling, as the acquisition of a sterling income stream is the primary objective of IAL's overseas business. However, because of movements in relative exchange rates over the duration of the contract, it does not necessarily follow that the budgeted or expected value of local currency generated sterling income is always the same as that which is actually received.

At the very least it should be the objective of a foreign exchange management policy to ensure that the amount of budgeted sterling valued surpluses are, at the end of the day, the same as those actually received.

For the sake of this simple example it is assumed that income and expenditure streams in the local currency follow a predictable pattern. It is assumed that income and expenditure is the same value for each period of the contract duration, and that at the end of each time period surplus local currency sums are transferred back to the UK.

Formally, this simplified framework of a contract lasting 1 year or twelve time periods looks as follows.

In each time period the commercial activity would be;

$$P_t = Y_t - E_t$$

where; P_t = Surplus in local currency

Y_t = Income in local currency

E_t = Expenditure in local currency

and over the duration of the contract,

$$t_1\text{-}t_{12}[\pounds P_t = \pounds Y_t - \pounds E_t]$$

where P has a constant value for all values of t

The objective of undertaking the contract is to repatriate to the UK, $\pounds P_t$(which is equal to net assets at risk)

To produce sterling values, local currency values must be divided by the exchange rate, so that the value of the sterling surpluses at the end of the contract, assuming no cash has been repatriated into sterling, is:

$$\pounds[P_t/X_t] \text{ where } X_t \text{ is the exchange rate}$$

The ideal outcome would be if at the end of the Contract

$$[\lessgtr P_{t/}X_t]_e \leqslant [\lessgtr P_{t/}X_t]_a$$

where, sub script "e" denotes the expected or budgeted value at the start of the contract and sub script "a" denotes the actual value at the end of the contract.

If the values of Y_t, E_t and X_t are constant for all values of t from 1 to 12 then by definition;

$$[\lessgtr P_t X_t]_e = [\lessgtr P_t X_t]_a$$

It is only when values of Y_t, E_t and X_t in any time period change that expected and actual sterling values will diverge.

As not all income and expenditure items are incurred in the first time period, the concept of "net assets at risk" must also cover actual and potential assets at risk. In this case this would be represented by

$$\lessgtr P_{t_1 \ldots t_{12}}.$$

At the start of the contract all the potential surpluses are at risk of having their sterling values changed. However, as surpluses are repatriated to the UK the "actual and potential" assets at risk decline, in this case by the same amount each time period.

Therefore net assets at risk in time period 2 are -

$$\pounds P_{t_1 \cdots t_{12}} - P_{t_1}$$

and in period three,

$$\pounds P_{t_1 \cdots t_{12}} - (P_{t_1} + P_{t_2} t)$$

and so on until t_{12} where net assets at risk equal zero.

This is shown in graph form in Table 5:2. Here, the level of exposure declines at a constant rate through the life of the contract, the area under the line representing the level of exposure.

Using this same type of graphical exposition it is possible to show the exposure profile of a one-off foreign currency transaction, Table 5:3. Here, say, an order is placed in period 1 for payment in period 12. The net assets are at risk for all the intervening time periods.

One of the most serious problems facing IAL in the conduct of its business overseas, is the delays it faces in the receipt of payments from overseas customers.

In the terms of this simplified model this would represent an income stream which was not constant from one time period to the next.

With the income stream varying from zero in some time periods to twice or maybe three times the expected level in other time periods, this leads to problems with the repatriation of money and hence the shape of the contract "exposure profile".

EXPOSURE PROFILE: EXPOSURE DECLINING AT A CONSTANT RATE

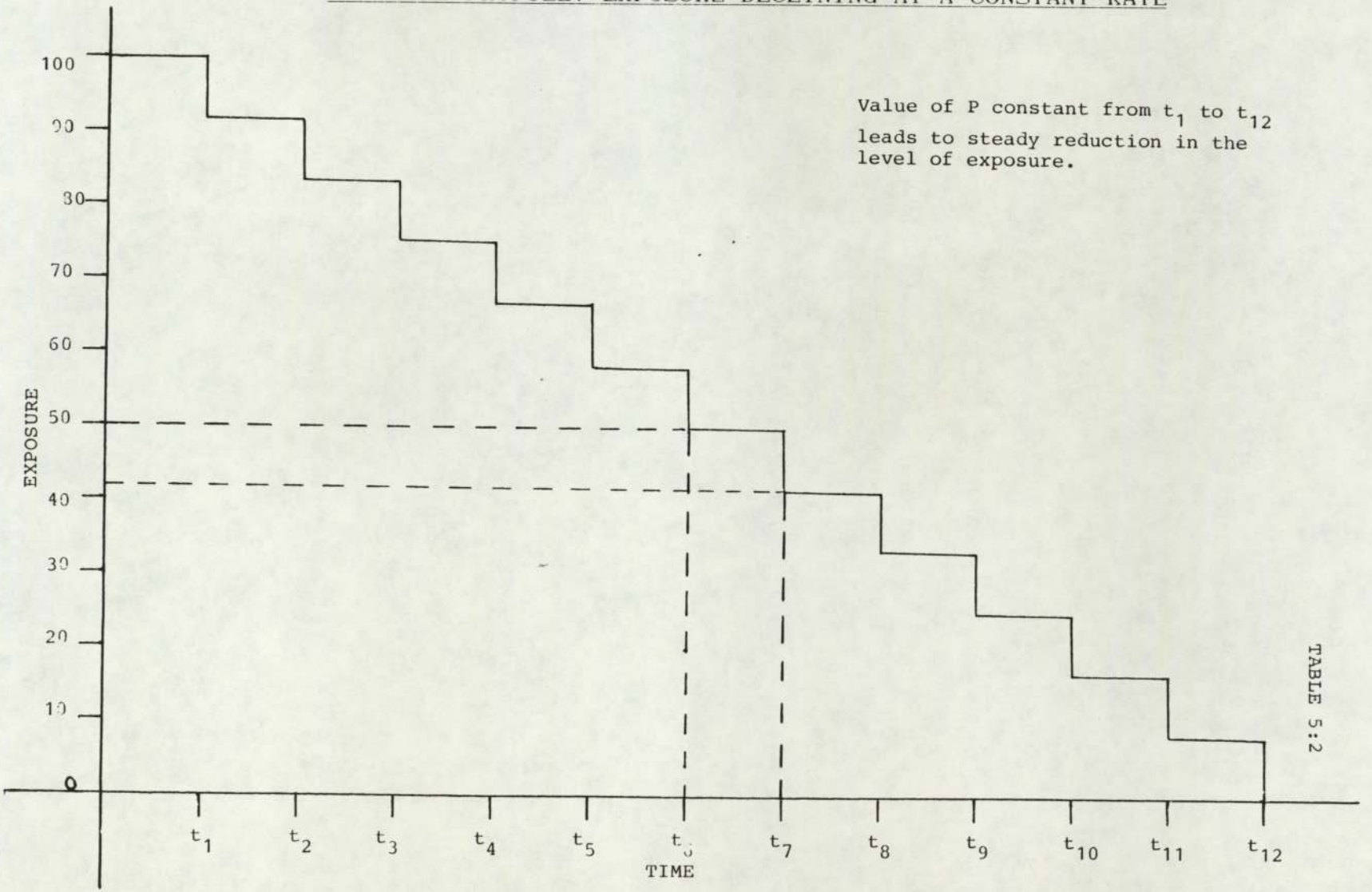


TABLE 5:2

EXPOSURE PROFILE: NET ASSETS EXPOSED FROM TIME PERIOD 1 TO 12

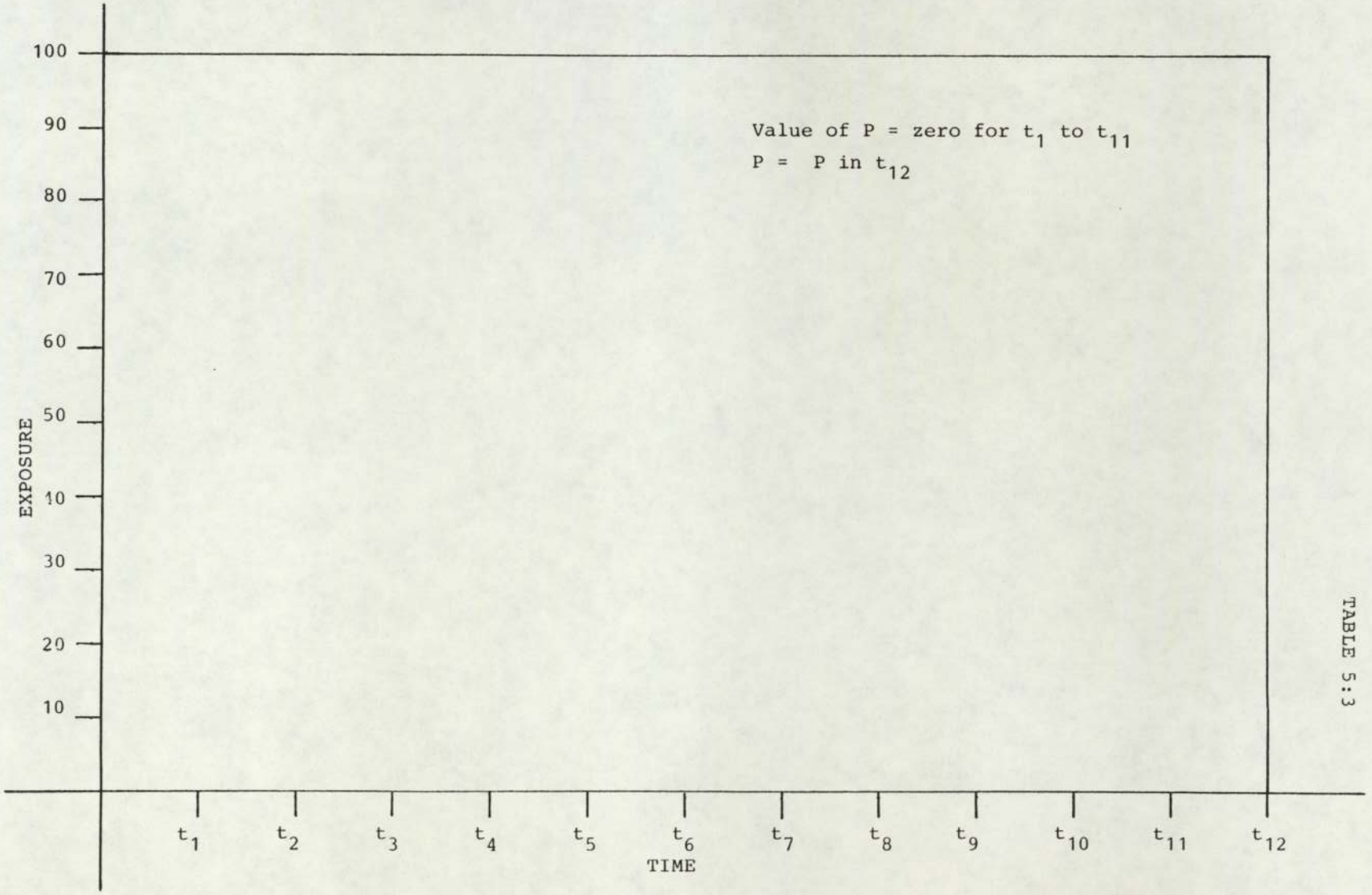


TABLE 5:3

An example of the effect of just one delayed payment is shown in Table 5:4. Here, non-receipt of a scheduled payment has resulted in the contract being funded from an external source.

In terms of the Income and Expenditure equation,

$P_t = Y_t - E_t$,

if $Y_t = 0$, P_t takes on the value of E_t and hence takes on a negative value, $P_t = -E_t$.

In this example, the delay only lasts for one time period t_6, and in the subsequent period t_7 , Y_t has twice its former value found in periods t_1 to t_5. The exposure profile resumes its former pattern from t_8 to the end of the contract, so

$Y_t = 1$ for $t = 1,2,3,4,5$ and $8,9,10,11,12$
$Y_t = 0$ for $t = 6$
$Y_t = 2$ for $t = 7$

The conclusion which can be derived from this simple example is that even a small delay has a distorting effect on the exposure profile and increases the overall level of "actual and potential" net assets at risk over the life of the whole contract, represented by the increased size of the area under the repatriation line.

This simple measure of the level of exposure can be shown to be intuitively correct and useful if two extreme cases are considered. First, the case of a contract where all the profits are amassed in the local currency and transferred to the UK in time period 1. Here as can be seen from Table 5:5 exposure is limited to only part of time period 1, even though the income and expenditure stream may continue for all twelve time periods.

EXPOSURE PROFILE: EFFECT OF ONE DELAYED PAYMENT

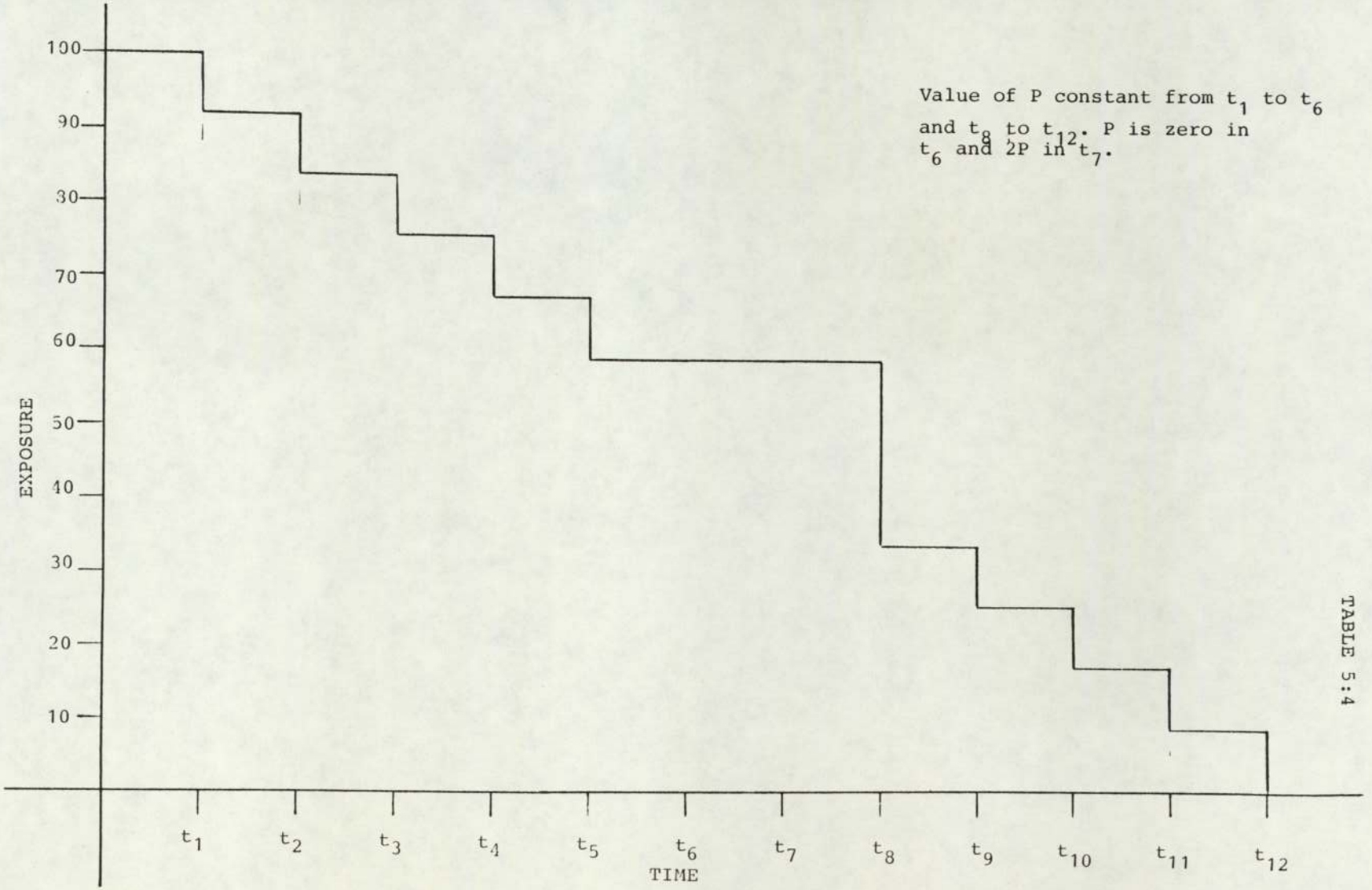
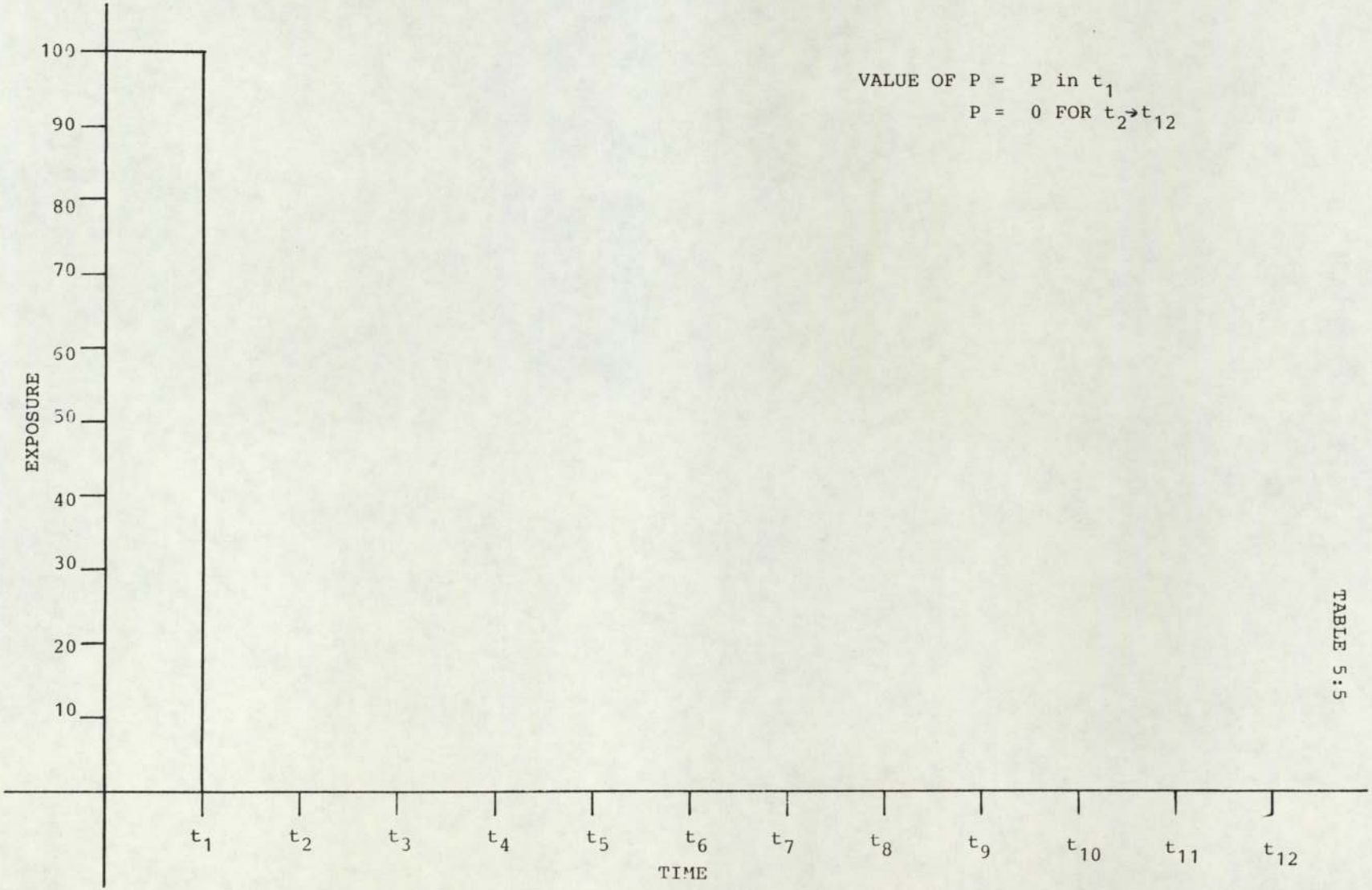


TABLE 5:4

TABLE 5:5

EXPOSURE PROFILE: ALL NET ASSETS REPATRIATED AT END OF PERIOD 1



(Whilst at first sight this may appear to be unrealistic, there have been IAL contracts where the profit has manifested itself in the very early stages of the contract usually because of the provision by the customer of a sizable advance payment).

This low level of exposure is, as would be expected, because for all periods after t_1 the net assets at risk have been converted into sterling, thus there is nothing at risk after t_1.

The second example is the case of a "one-off transaction" shown in Table 5:3. The exposure lasts for all 12 time periods and hence the assets are all risk for t_1 to t_{12}.

The problem of late receipt of a scheduled contract payment is unlikely to be confined to just one payment. It is a problem that could affect a series of time periods and payments. It is therefore important to consider the effect of such a series of lags.

It is possible from an analysis of past performance to establish a probability distribution which can act as a basis for the estimation of distortions to the exposure profile. Table 5:6 shows a series of probability mass functions for a number of payments over a four period time cycle. This shows that for each of the scheduled payments, there is a 0.125 probability that it will be received in its contracted time period, a 0.25 probability that it will be received one time period late, a 0.5 probability that it will be received two time periods late and a 0.125 probability that it will be received three months late. These have been aggregated to produce a multiperiod probability mass function which has then been applied to the expected schedule of income payments to produce a set of predictive weights as shown in Table 5:7. This information has then been related to the exposure profile and a comparison of

TABLE 5:6

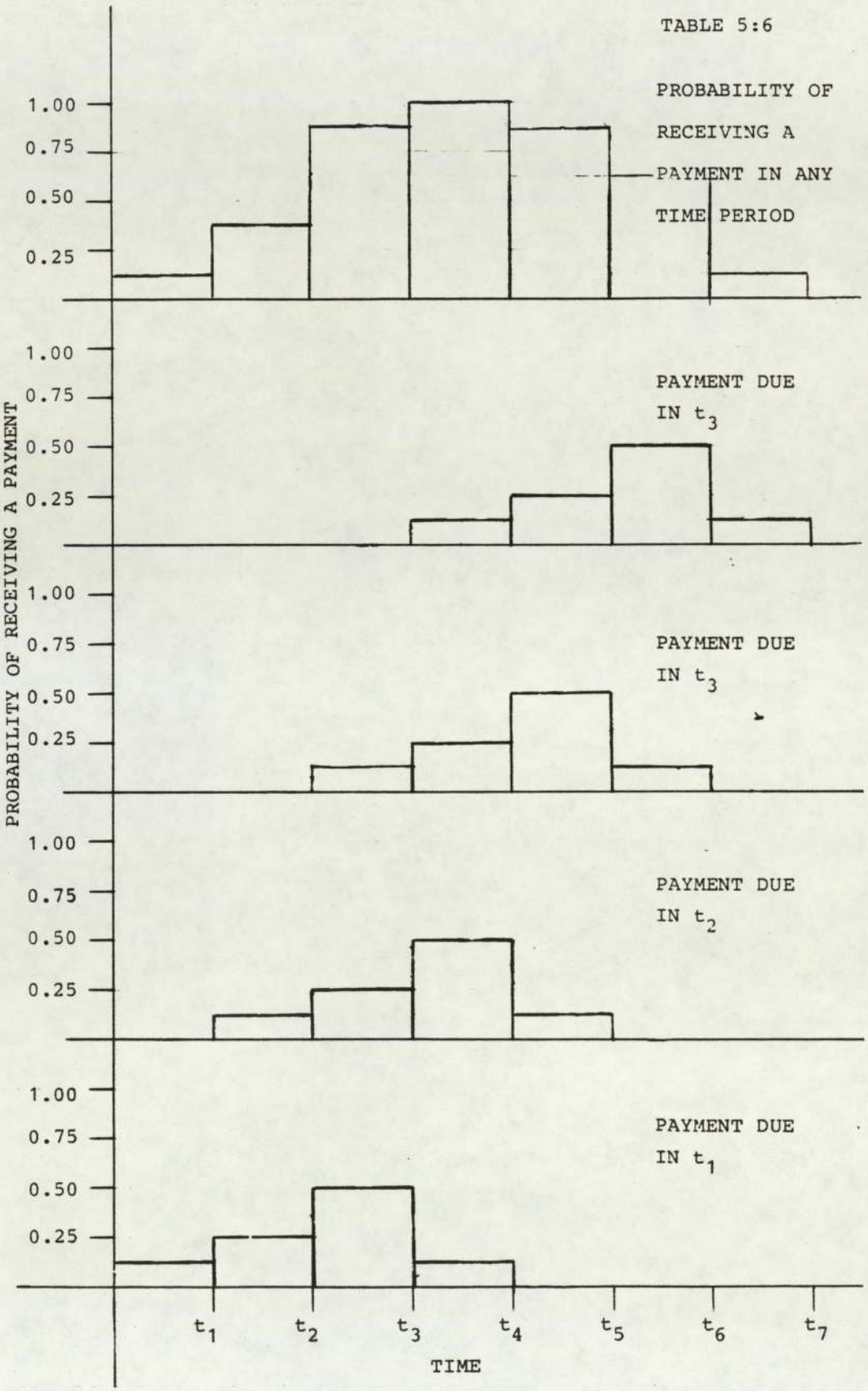

PROBABILITY OF RECEIVING A PAYMENT
1.00
0.75
0.50
0.25
PROBABILITY OF RECEIVING A PAYMENT IN ANY TIME PERIOD
PAYMENT DUE IN t_3
PAYMENT DUE IN t_3
PAYMENT DUE IN t_2
PAYMENT DUE IN t_1
t_1 t_2 t_3 t_4 t_5 t_6 t_7
TIME

Table 5:6

Changes in the level of expected exposure.
in local currency units.

a) Expected level of reduction in exposure if all payments received on schedule

t_1 exposure reduced by 25 to 75
t_2 exposure reduced by 25 to 50
t_3 exposure reduced by 25 to 25
t_4 exposure reduced by 25 to 0

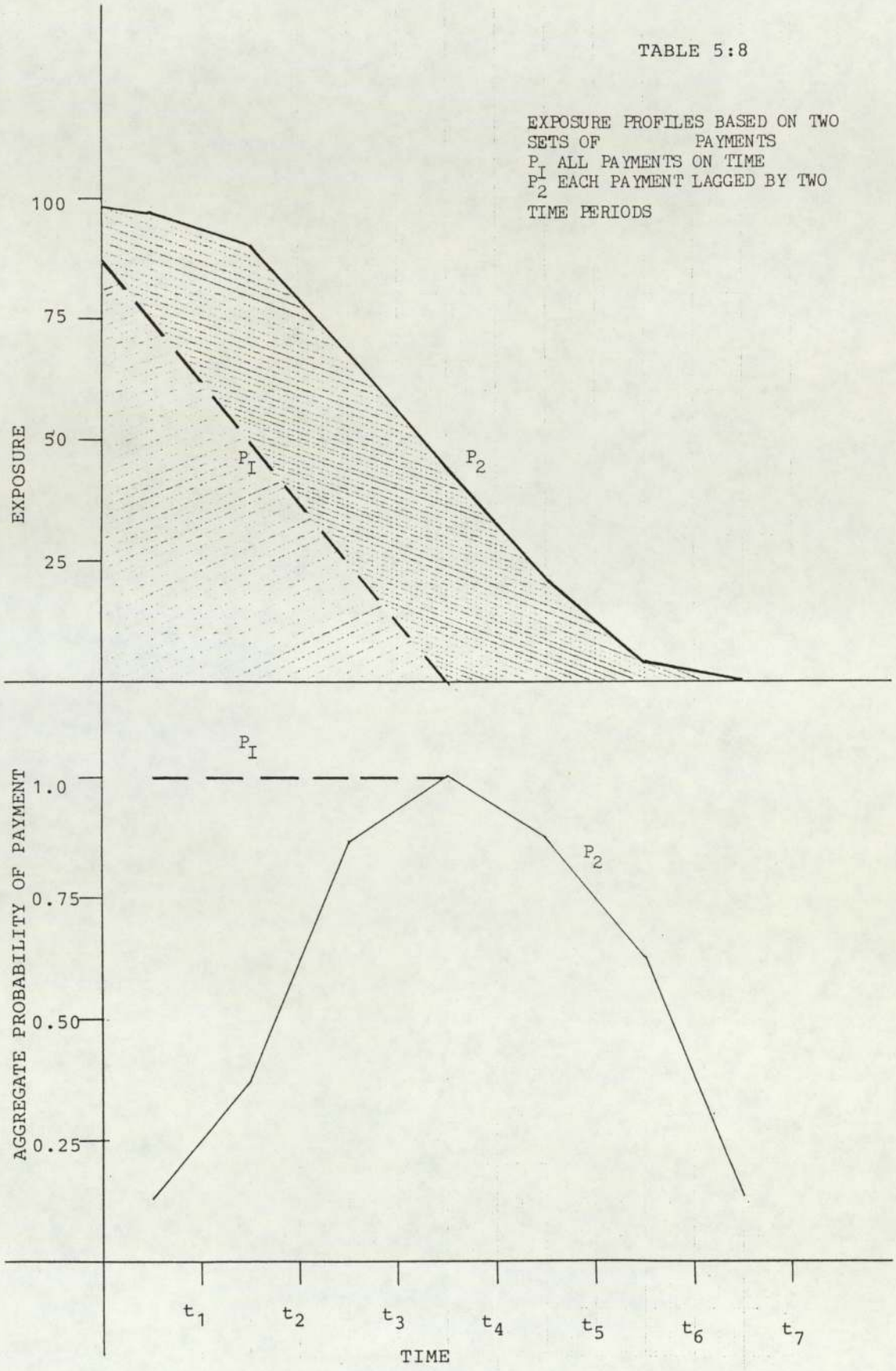
b) Forecasted level of reduction in exposure if probability of actual receipt of the payment in any given month is taken into account.

In each time period exposure is reduced by the value in a) (above) times the probability that the payment will actually be received.

t_1= 25(0.125);exposure reduced by 3.125 to 96.8
t_2= 25(0.375);exposure reduced by 9.375 to 87.5
t_3= 25(0.875);exposure reduced by 21.875 to 65.62
t_4= 25(1.00) ;exposure reduced by 25 to 40.63
t_5= 25(0.875);exposure reduced by 21.88 to 18.75
t_6= 25(0.625);exposure reduced by 15.63 to 3.125
t_7= 25(0.125);exposure reduced by 3.125 to 0

TABLE 5:8

EXPOSURE PROFILES BASED ON TWO SETS OF PAYMENTS
P_I ALL PAYMENTS ON TIME
P_2 EACH PAYMENT LAGGED BY TWO TIME PERIODS



this new "lagged" profile is made with the exposure profile that would have been apparent if all payments had been received on schedule as in Table 5:8. It can be seen that the effect of the lagged profile is to increase the area of exposure under the curve and hence the level of actual and potential net assets at risk.

Disturbances in the exposure profile need not necessarily be caused just by changes in the time pattern of the income stream; there are also likely to be fluctuations in the expenditure stream. These may be either delays in the actual spending of money or expenditure patterns being greater or lesser than anticipated (or the presence of an advance payment).

The identification of a contracts exposure profile is only the first stage in the assessment of overall risk to losses from foreign exchange movements.

5:4 A description of foreign exchange risk

The next stage is to say something about the nature of foreign exchange risk and how it changes with time. Two aspects of the nature of future exchange rates are clear:

a) that the further into the future an exchange rate is the more uncertain is its value. There is more chance of correctly estimating the exchange rate in period t_2 than in, say, t_5. In t_5 there are likely to have been a number of sucessive changes in the intervening periods (between t_2 and t_4) which cumulatively increase the uncertainty of the rate in t_5. However, the nearer one gets to t_5 greater the confidence of an appropriate prediction for t_5.

This relationship is shown in Table 5:9. From this statement it can be assumed that risk of a significant unfavourable movement in exchange rates increases over time.

b) that not all currencies have the same degree of risk attached to them. Therefore the slope of the risk/time function will be dependent on the range of the historic volatility of the currency.

This risk/time relationship can be brought together with the exposure profile to produce an indicator of overall risk as shown in Tables 5:10.

In Table 5:10 sector 1 shows a simple exposure profile, Sector 2 shows two different currencies, one with high volatility and hence sharply increasing risk overtime, whilst the second shows a much lower volatility and hence a much shallower increase in risk over time.

These two sectors are brought together in sector 3 and produce two distinct results. In sector 3 the line "AA" relates to the overall level of risk with the high risk currency. Sector 3, in essence, measures the extent of the exchange loss. Line "BB" in sector 3 relates to the same exposure profile as for "AA" but with the less volatile currency B.

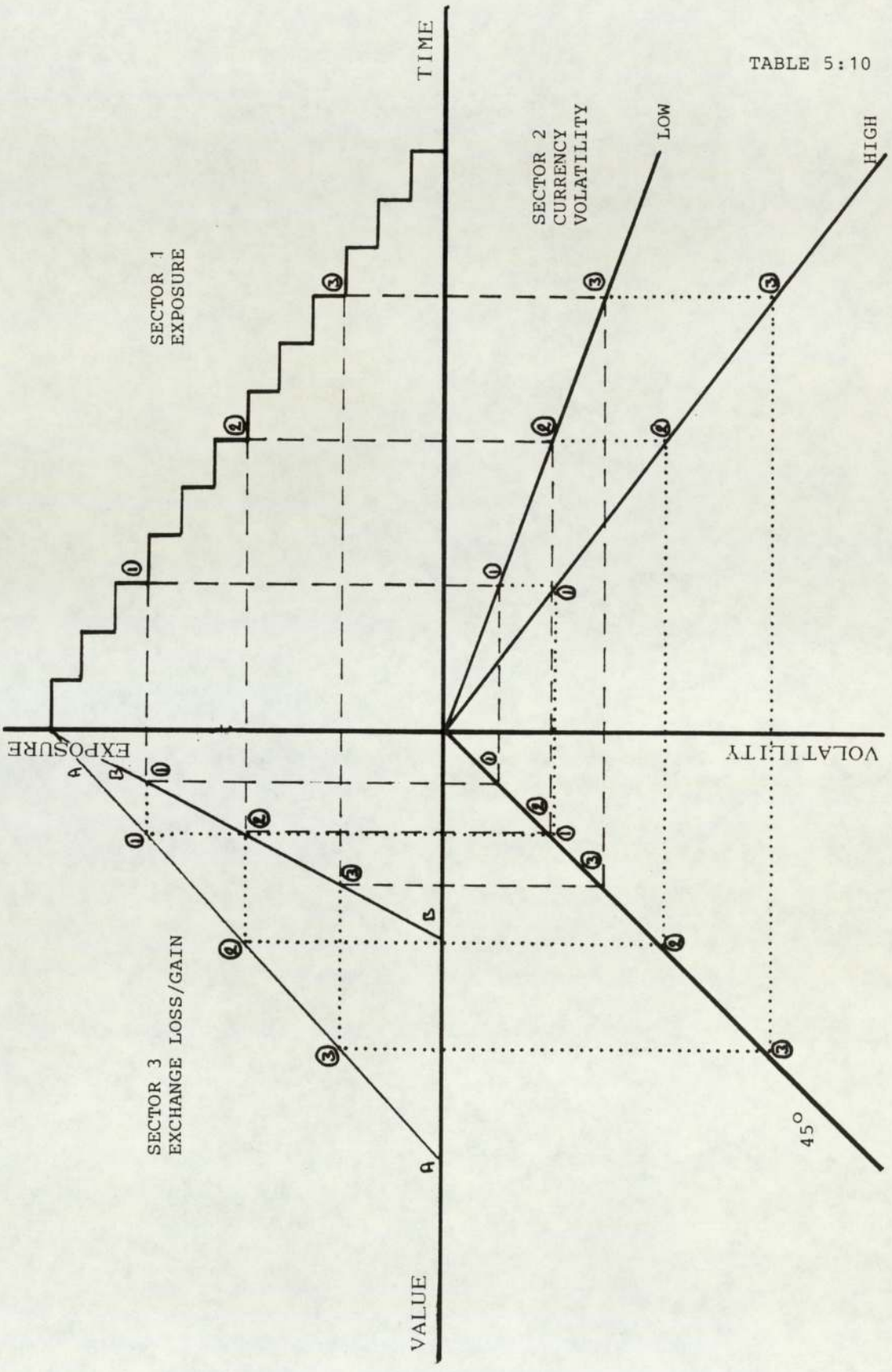
The sector in the bottom left hand corner is merely a 45 degree line which allows currency volatility and exposure to be brought together in sector 3.

TABLE 5:9

THE RELATIONSHIP BETWEEN TIME AND EXCHANGE RISK

TABLE 5:10

COMPUTATION OF EXCHANGE GAIN/LOSS FROM EXPOSURE PROFILE AND CURRENCY VOLATILITY



5:5 A measure of exchange rate volatility: the justification and foundations of a system of discounted exchange rate values

The objective of this section is to advance a measure of exchange rate volatility for a number of different and institutionally independent currencies.

It is also necessary to say why such a measure might be superior to forecasting techniques commonly practised by a number of banks and professional forecasting services.

Dealing first with the case against foreign exchange forecasting. There are two main criticisms which can be levelled at them as tools for inclusion in the exposure profile framework.

a) They are spot-rate dependent. That is any exchange rate forecast is only of use for one given date. It soon becomes obsolete. It relates to one view of future rates from a specific time standpoint.

b) That in general they are not good at predicting future rates correctly. This is basically because of the uncertainty caused by the nature of the factors involved in the determining of exchange rates, such as the level of international trade, relative interest rates, relative performance of the economies, inflation rates, political uncertainties and activities of speculators. Many

theories have been postulated on the importance of these factors, and developed into detailed descriptions of the dynamic process, such as the price parity theorem, interest rate parity, the Fisher effect etc.

Whilst it is not unreasonable to suggest that each of these theories has validity in the longer term, they rarely tell us anything about the short to medium term period where other less fundamental factors have a part to play.

A recent survey by Levich (82) has reported on the success of a number of top forecasting services. (see review in Chapter 3). It suggests that their record often amounts to little more than good guessing and only in a small number of cases are their results significantly better than chance. Additionally a report, Ensor and Antl (78), shows how many of the so called sophisticated forecasting techniques ultimately depend on human judgement of the forecaster as the main forecasting tool.

This reliance on human judgement is compounded when foreign exchange forecasts are used by management in industry, if the survey of IAL senior management report in Chapter 4 is a general indicator. This showed that forecasts produced by professional outside services are filtered for use by unskilled and untrained managers who in using a given exchange rate forecast are passing judgement on the quality that they perceive any forecast to have. The end result is a value which in practice has only a very narrow link with the original statistical analysis. The

consequence has been that IAL's ability accurately to predict exchange rates even for simple budgetary purposes has not been good. See Table 5:11

Given these two criticisms of predictive solutions the next question is what other solutions are there to the quantification of future exchange rates?

The answer is to look backwards and try to say something about past patterns of movements or volatility. (Dufey and Mirus (81) describe this type of approach as an "intrinsic model" as opposed to an "extrinsic model" which would depend on the relationship between foreign exchange rates and other economic variables). Under the assumption that past patterns, as opposed to trends of movements over relatively long-term time horizons say something about the factors which effect any currency both in the short, medium and long-term. This is the same argument as advanced by "chartists", see Morgan(81) pp 32 who states "the basis for the chartists assumption [about forecasting] is that everthing that is known about a currency is expressed in its exchange rate".

The type of statistical information needed to fit into the exposure profile framework must have three key characteristics:-

a) Ideally it needs to be spot rate independent so that it does not have to be continuously recomputed and does not require any detailed understanding of the economic circumstances at a given point of time.

TABLE 5:11

COMPARISON OF IAL ANNUAL BUDGETED EXCHANGE RATES WITH OUT TURN ACTUAL RATES

Difference between budget rate and average out turn for year expressed as a percentage of the forecast rate*.

	1981	1982	1983
UAE	+1	+21	+19
Bahrain	+10	+23	+19
Qatar	+11	+19	+19
Kuwait	+8	+16	+18
Libya	+4	+21	+20
Saudi Arabia	+10	+21	+18
Sudan	-11	+48	0
Brunei	+14	+20	+15
Malaysia	+4	+20	+21
Singapore	+13	+20	+21
Pakistan	+13	0	+16
PNG	+14	+11	+8
Maldives	-	-31	+19
Angola	0	+44	+33
Botswana	+4	+4	+29
Gambia	0	0	0
Kenya	-10	+23	+2
Mozambique	+7	+18	+9
Nigeria	+1	+7	+10
Seychelles	+12	+37	-
South Africa	-3	+1	+21
Tanzania	+10	+9	+2
Uganda	-	-9	+54
Zaire	-27	+17	Devaluation
Zambia	+1	+14	-7
Canada	+9	+16	+19
Jamaica	+13	+19	+7
Trinidad	+9	+19	+19
USA	+12	+19	+18
France	-15	-2	-

Note "-" Denotes no forecast or no trading activity. Zaire suffered a major devaluation in 1983 which made comparison between budget and outturn rate meaningless.

* forecast rate being the average rate for the next calender year, forecasted in September/October.

b) It needs to reduce the measure of volatility down to relative proportions to allow inter currency comparison.

c) It must say something about the time structure of volatility given a variety of overlapping time horizons so that it can give real values to the structure of exposed items on a continuous basis.

The advantages of a measure of volatility is that it looks at movements from a variety of different spot rates and combines them together to produce a relative measure of movements.

In the context of this work volatility means the percentage change of one spot rate against another measured for all values of the data set and given a number of time gaps between the base spot rate and the measured spot rate, see Table 5:12.

5:6 The basis of the statistical calculations

The basis of the measure of volatility has been month end exchange rates. The month end rates have been drawn from the rate published by the Financial Times on the last Tuesday in each month. These rates are used by IAL for its book-keeping purposes, for the translation of monthly management accounts and intergroup balances.

These rates are readily available in IAL and collected on a common basis.

They have validity in the planning context as in IAL contract costings are invariably built up from monthly financial data.

The essential nature of the treatment of the data is that percentage changes over a variety of time horizons are taken and then rolled forward one month. The percentage changes and the time horizon are then used to plot a regression line. This is repeated for a variety of different series of time horizons, plotting a number of regression lines.

A data frame of 120 monthly exchange rate values has been used, starting with January 1974 and finishing in December 1983.

Ten currencies were looked at, all with respect to sterling. These represent ten currencies whose institutional links are different and hence represent a good cross-section of the world's currencies. They were chosen so as to test the validity of the following technique in different circumstances.

To produce the regression lines a series of regression equations were used. The objective was to obtain the best and most realistic fit to the data.

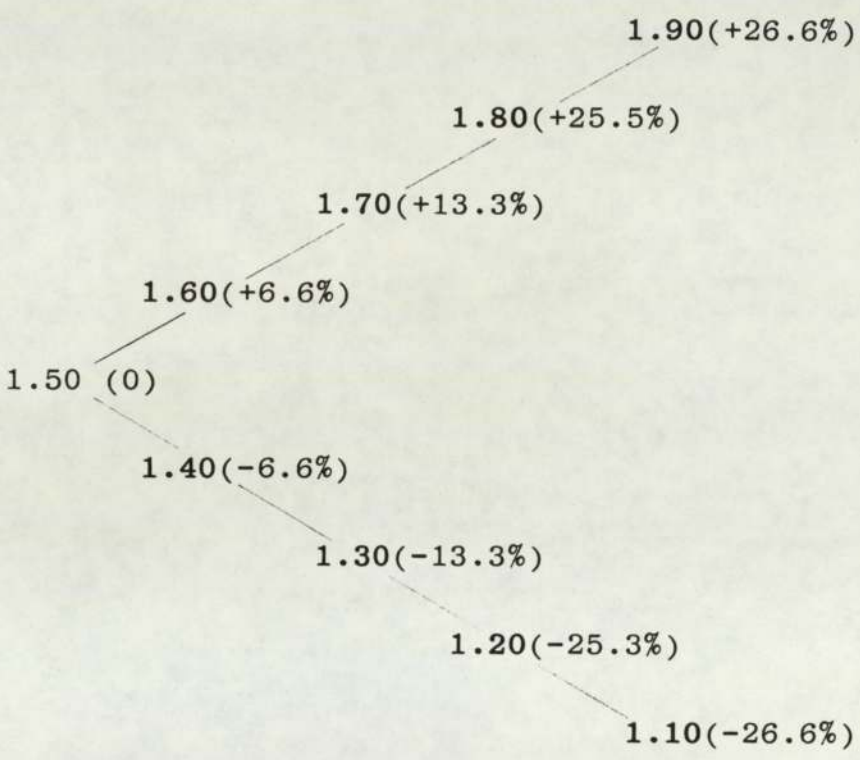
Additionally it was not enough to assume that the relationship between time and volatility was a linear one and hence semi-logarithmic and logarithmic transformations of the regression equation were also tested, see Appendix 5.

Ultimately the most realistic interpretion of the data and the one that proved the best fit, proved to be a hybrid technique which involved the calculation of a series of regression lines and the drawing of points

TABLE 5:12

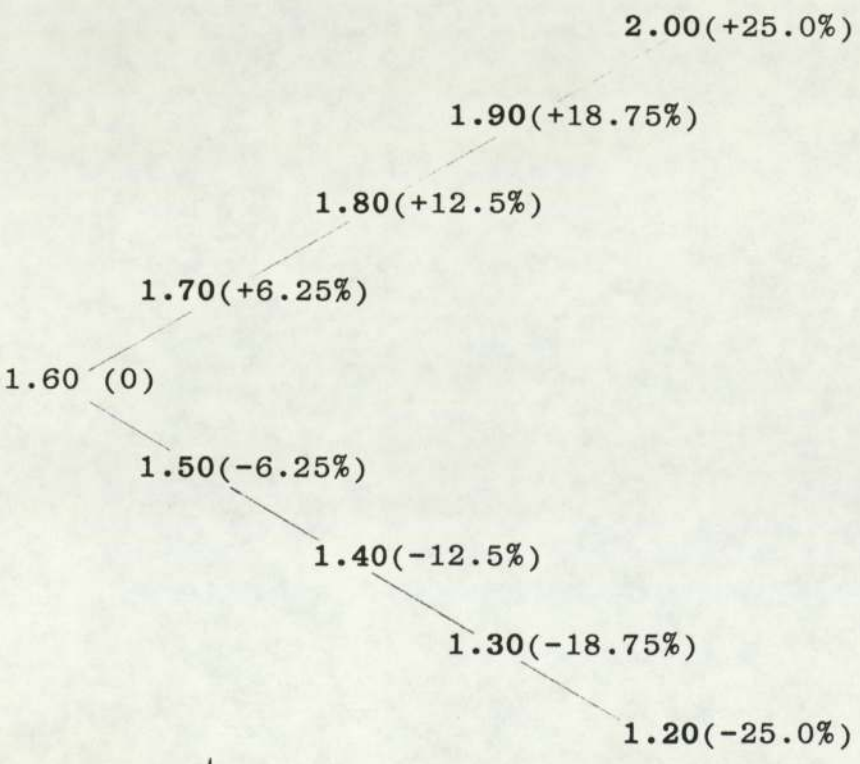
CURRENCY VOLATILITY MEASURED
FROM A MOVING SPOT RATE

PERIOD 1



SPOT RATE | POSSIBLE EXCHANGE RATES IN FUTURE TIME PERIODS

PERIOD 2



SPOT RATE | POSSIBLE EXCHANGE RATES IN FUTURE TIME PERIODS

through their terminal values to produce a curve, as there was no reason to expect that there was anything inherently linear about the relationship between volatility and time.

The calculation of a regression line using the logarithmic and semi-logarithmic transformations of the regression equation are not considered in detail here. The correlation coefficients are presented in Chapter 8. With one notable exception these are all lower than those obtained using conventional linear regression equations, the exception being the South African Rand. In general the logarithmic transformations were not considered a fruitful avenue of analysis.

Two forms of the regression equation have been used. The standard $y = a + bx$, where the regression line intercepts the "y" axis at the value of "a". The second form takes the "a" as zero, that is the regression line passes through the origin, and takes the form "$y = bx$". The final results have, however, been produced using the "$y = bx$" form. This was chosen because it makes little sense to have an initial month with an exchange rate a number of percentage points higher than it actually is. For example, it is like saying today's spot rate is $1.50 to the pound plus 10%. It is either $1.50 or it is something else,that is, say, $1.65.

The calculation of the regression lines was undertaken on a micro-computer using a program produced specifically for this purpose. The programs are reproduced in Appendix 6.

The program is basically a number of recirculating loops. The "x" values are taken from the length of the

time horizon and the "y" values are the percentage changes. For any value of "x" there will be a series of percentage changes. For example, for the time horizon 3 months there will be 117 percentage changes plotted and in the case of 36 months there will be 84 percentage changes plotted.

The reduction in the number of observations at each subsequent time horizon is a product of the nature of this technique. Within a fixed frame of data, if the interval between calculations is extended it can only use the data by reducing the number of observations for each time horizon. Whilst this is not ideal, there is no realistic way of overcoming the problem without extending the data frame and allowing the higher time horizons to fall outside of the January 1974 to December 1983 period. This would have the drawback of having the results calculated from an infinitely flexible set of data.

The program compares one month with another and then moves forward one month so that in the case of the 2 to 4 month time horizon x will in the first cycle and take on the value of 2 and y will be produced taking the percentage change between January 1978 and February 1978, then February 1978 and March 1978 until November 1983 and December 1983 are compared.

In the second loop "x" takes on the value of 3 and the difference between the months of March 1978 and January 1978 and April 1978 and February 1978 are taken until October1983 and December 1983 are compared. This cycle is completed at a value of "x" of 4, and then a regression line is calculated.

On the next cycle the same differences are recalculated for monthly intervals of from 2 to 5

months and another regression line is drawn at the end of this cycle. This process continues until the last time interval increases to 36 months and undertakes its complete cycle from 2 to 36 months. All percentage changes are treated as positive.

CHAPTER 6

The monitoring and reporting of a long-term overseas contract

6:1 Introduction

Once a contract is operating and financial transactions have started to take place two issues arise:

a) how well is the contract performing;
b) to what extent are foreign exchange movements affecting financial performance.

It has been suggested above that the criteria for the financial assessment on overseas long-term contracts should be the "ultimate cash sterling value of overseas gross profit" as returned to the UK. Hence, the goal of any accounting system should be to report this as objectively as possible. In the context of contract accounting, information should also serve the dual purpose of being useful as an input into an exposure monitoring framework. This is because changes in exposure could lead to changes in the ultimate cash sterling value of overseas gross profit.

However, whilst the importance of cash has been stressed in this work it has to recognised that the accruals system of accounting is the dominant method employed by industry. This is also true of IAL. Hence changes in accounting data presentation must recognise that any new approaches must ideally be run in tandem with a modified conventional system.

With these objectives and constraints in mind two approaches to the monitoring and reporting of overseas performance are advocated:-

a) Cash flow reporting, as a method of recording actual cash performance.

b) A non-monetary method of presenting conventional accounting information.

6:2 A specification for the accounting needs of IAL on its overseas contracts

The first point to be made is that the following specification is aimed at management accounting information and not at financial or published accounts. Information of a managerial type should be used to present decision relevant information [Amey and Eggington (73)].

It was shown in Chapter 4 in the survey of IAL Senior Management that IAL's current system does not provide decision relevant information.

Any manager in the UK wanting to find out the current "cash" position of a contract has to resort to looking into the original local currency accounts.

A complication arises when the accruals data is converted into sterling from local currency. Sums are converted at prevailing monthly rates which by the time they manifest themselves in cash receipts, the exchange rate will have changed and the "overseas gross profit" will have a different realised sterling value.

Decision relevant information is needed for the control of foreign exchange exposure. Here, the current management accounting information system gives no guide. It says nothing about what is exposed or its term structure. Whilst it could be argued that it is not necessary for management accounts to provide this kind of information as this should be the province of conventional cash flow projections, it is the belief of the researcher that because of the proprietary nature of IAL's business and the effect that exchange

movements have on ultimate sterling cash value of overseas gross profit the two issues are fundamentally interlinked.

Therefore, it is proposed that IAL should adopt a system of cash flow reporting, as suggested by Lee and Lawson, for its management accounting purposes and as an input into the exposure profile framework advocated in Chapter 5. The next section argues the case for such a system and places it in the conceptual context of the academic debate over the validity of cash flow reporting. It is suggested that Lee and Lawson's arguments in favour of cash flow accounting have not been applied before to an international company,with a business structure such as IAL's.

6:3 The case for cash flow reporting.

Over the course of the past fifteen years a number of authors have questioned the foundations and relevance of the financial information presented in conventional accruals accounting statements. The main thrust of these criticisms has come from two British authors, Professors Lee and Lawson who whilst working separately have come to roughly the same kind of conclusions (see Ashton (76) for differences between Lee and Lawson).

Lee and Lawson have not only questioned the usefulness of accrual accounting statements but also suggested major improvements that can be obtained through the use of cash flow reporting.

There is no attempt to change the basic principles on which accounting data is collected but a change in the techniques for its presentation is advocated. The bulk of the work to date on cash flow reporting has been directed towards the production of corporate

financial statements. However, the basic arguments produced for this case are equally valid when applied to managerial accounting information.

Lee (81b) states that cash flow reporting is "a system of financial reporting which describes the financial performance of an entity in cash terms. It is based on a matching of periodic cash inflows and outflows, free of credit transactions and arbitrary accounting allocations.... it is a measurement and reporting system which avoids time lags and distortions. It concentrates on the liquidity and financial management of the reporting entity, and can be conceived in terms both of actual and forecast cash transactions" pp 63.

There are four arguments against the conventional accruals system and in favour of cash flow reporting that have relevance for this work. There are other points put forward in this debate but they are not directly relevant (eg. capital market efficiency theory, comprehension of accounting information, asset valuation and taxation problems).
The four main arguments are:

a) that the accrual accounting system does not stress the importance of cash, instead it is concerned with reported profits;

b) that the accruals accounting system lacks "neutrality" and "objectivity". It depends on subjective judgement to allocate accounting items to different time periods;

c) that the accruals accounting system does not score highly on the counts of "utility" and "relevance" in that its information is not easily

comprehensible and does not meet user needs;

d) the accruals accounting system does not take account of the different purchasing power of money through time. It assumes that money has the same purchasing power from one time period to the next, (although this could also be true of cash flow analysis in certain respects.)

These arguments will be looked at in turn, both in the general academic context and how they apply in practice to IAL.

a) The importance of cash

Lawson (71c) pointed to the relationship between a company's cash generating ability and its ability to to make profits. Lee (72c) argued that cash is "the key" (pp 28) resource of a company. These two points taken together mean that the generation of profits as a financial goal is only meaningful if it is accompanied by the generation of cash, and that of the two cash is the most important as it shows to the investor the most relevant information about a company's past, present and future cash position. All business activity, it is argued, is centered around cash, it comes into all transactions at some point in the short or the long-term. As Lee(72c) puts it "Cash may be likened to the lifeblood of the company" (pp 28). Profits do not always become realised because of factors outside of a company's control, either because debtors do not come forward with payments or because management has smoothed profits to such an extent that inflation has an effect on realised values regardless of other factors.

Lawson (71) also argues that the concentration on

profits and not cash has led to a "confusion between capital and revenue" or in other words "it falsely gives the impression that certain funds which are effectively or have already become a fixed capital investment are still available for distribution or reinvestment". This gives a misleading picture to those people interested in money available for distribution to shareholders both now and in the future.

Whilst early pieces of work of Lee and Lawson were primarily concerned with the importance of cash for investors to ascertain dividends etc. in later work Lee (78) (79a) and Lawson (75a) (78) (81) and Lawson & Stark (77) (75) argue that cash flow information had a much wider audience, such as, it would help Bankers assess a company's ability to repay loans, union negotiators to assess a company's ability to stand a wage demand and governments appraise the effect of a corporate taxation policy.

To this outline case for not concentrating on reported profits but on cash generation can be added the international dimension. The nature of many of IAL's overseas service contracts is that they are primarily targeted to maximise the cash return to IAL in the United Kingdom. IAL operates in a proprietary manner, it looks upon its overseas operations as a means, not of developing and expanding its overseas activity in its own right as a separate entity, but as generating income to fuel its United Kingdom operation. It is not a multinational but a United Kingdom company that depends on international activity for the bulk of its business. Therefore the generation of cash is all important.

It is important for the company to be continuously

aware of the amount of cash its overseas operations have generated, are generating now, and will generate in the future.

Cash is a far more important criteria for success than profit. This is particularly so with some of the countries that IAL deals with where expected contract income and actual cash income are separated in time by great distances. For instance, in the case of one Saudi Arabian Contract, payments were received up to 2 years late, with 5 to 7 months lag not unusual.

The reporting of cash generation and cash flows is also of fundamental importance to the handling of foreign exchange transactions. Decisions related to the development of a foreign exchange handling policy require detailed knowledge of cash flow patterns in foreign currencies. This would facilitate hedging decisions that could be taken to optimise sterling cash receipts.

b) Neutrality and Objectivity

Both Lee and Lawson argue that the need of the accrual system for "matching" and the allocation of accounting items into accounting periods irrespective of when they actually happen in cash terms, relies on subjective accounting judgements. Lee (78) suggests that the accruals system is one that involved manipulation of historic financial flows by accelerating and decelerating cash flows. This means that the accruals system is not "neutral", it does not represent economic activity as it has taken place, but instead shows what should have happened. The use of accounting standards has helped to remedy this fundamental problem. However, Lee (79c) argues that accounting standards are a complex solution to the

problem. They are usually the result of a compromise of different accounting judgements. They only go to prove "that accountants are addicted to the complexities of the allocation system" (pp 37).

Cash flow reporting is both objective in that it reflects actual activity as and when it takes place, and neutral. It provides unambiguous measures, no matter what the measuring context according to Lee (74) and perhaps, most importantly, measures a company as a going concern.

In the IAL international context it is important to have neutral accounting information as all information has to pass through the distortion effect caused by exchange rates. Subjective information that has been the result of allocation decisions cannot in any way hope to represent economic reality over a period of time as the effect of allocation decisions becomes compounded as the relation between the reporting currencies change.

c) Utility and Relevance

Lee (72a) argues that utility and relevance are fundamental accounting concepts and that the accruals system does not, as stated above, concentrate on the right issue, namely cash, and hence its usefulness must be questioned. Lee (72c) argues that information can be useful only if it is likely to have a bearing on decisions and actions.

For investors interested in the long term performance of a company the type of income measures involved in the accrual system do not give the right type of information. Lee (78) pp 75 states "income is akin to a very flexible piece of elastic" and hence because it

is the consequence of subjective decisions its use is questionable for investors interested in dividend flows, employees seeking wage increases, lenders examining ability of the company to meet loan commitments, and tax computations.

The international dimension of this aspect is that accruals accounting information for overseas operations does not provide IAL with information of use in the handling of foreign exchange transactions or of real sterling performance.

In the case of the foreign exchange function, relevant information is that which has a bearing on the conversion of local currency to sterling. Elastic income measures are of little value as one of the main problems of IAL overseas activities is the actual receipts of income in cash.

d) Purchasing power of money

In a non-stagnant economy money changes values over time both through the effects of inflation and its value against interest rates. One monetary unit (in the domestic economic environment) of a currency is not always worth the same value from one time period to the next.

The conventional accruals accounting system does not recognise this. It treats all items as having the same value through time. Lawson (70) first pointed this out and speculated that this could lead to a consistent overstatement of profits by companies over a longer period. Lawson (81) goes on to demonstrate his case by empirical test. Not only does he show that companies have overstated their profits but also that it has a secondary effect, that of the development of a

confiscatory corporate tax system in the UK.

Because cash flow accounting does not involve any allocation decisions, it matches one set of money values with other money values of the same purchasing power. Transaction and accounting takes place in the same time period.

Exchange rate movements in the international economy are similar in nature to inflationary movements in a domestic economy. Both phenomena affect the value of money from one time period to the next.

In the international environment it is the relationship between two currencies that changes. This movement, unlike inflation, (although disinflation is not unknown) may be upwards or downwards. However the effect is the same, it results in a difference in purchasing power in terms of the reporting currency of a fixed sum of the local currency over time.

For instance, in the kind of case that affects IAL, it is usual for the conventional accruals accounting system to record income that has not been received in cash. This will result in the calculation of a profit figure which will then be converted to sterling at the prevailing rate, indicating a sum likely to be available for transfer to the UK in exchange for sterling. However, because this income has not actually been received in cash this profit is unrealised and hence it is unavailable for transfer into sterling.

By the time the actual local currency income in the form of cash has been received in a subsequent time period, the relationship between the local currency and the reporting currency may have changed. This will

lead to a sum either greater or smaller,depending on which way the exchange rate has moved, than the original reported sum available for actual transfer. An example of this simple case is shown in Table 6:1.

The use of cash flow reporting would not only overcome this problem but show up clearly the actual point at which sums are available for transfer, and help in the management of foreign exchange risk in the orthodox (ie forward market) or unorthodox techniques as advocated in Chapter 7.

6:4 The structure of cash flow reporting

The structure of a Cash flow reporting system as applied to IAL is discussed in Chapter 8.

6:5 Criticisms of cash flow reporting.

There are criticisms that have been levelled against the use of cash flow accounting. Ashton (76) pp 78-80 finds four main flaws in the Lee and Lawson system. These can generally be seen as applying to the type of stewardship financial statements that Lee and Lawson view as the primarily role of cash flow reports. These criticisms do not have the same weight when applied to managerial information and therefore are not considered here.

6:6 Cash flow accounting as an input into the exposure profile framework

The type of information generated by cash flow reporting is ideal as an input into exposure profiles. It isolates the generation of cash balances and hence provides data on the rate of repatriation and therefore the decline in exposure. It would allow

A SIMPLIFIED EXAMPLE OF DIFFERENCES BETWEEN ACCRUALS AND CASH INFORMATION CAUSED BY EXCHANGE RATE MOVEMENTS

	Local Currency to Sterling Exchange rate	Business Activity	Book Keeping Transactions Local Currency	Reported Results Sterling	Actual Cash Transactions Local Currency	Sterling/local Profit Available for transfer to UK
PERIOD 1	3:1	Income Minus Expenditure equals profit	100-90=10	33.3-30= 3.3	50-90=(40)	(13.33)
PERIOD 2	2:1	Y - E = P	100-80=20	50-40=10	100-80=20	10
PERIOD 3	3:1	Y - E = P	100-95=5	33.3-31.6=1.7	50-95=(45)	(15)
PERIOD 4	4:1	Y - E = P	100-75=25	25-18.75=6.25	200-75=125	31.25
TOTAL			400-340=60	141-120.35=21.25	400-340=60	12.92
PROFIT			60	21.25	60	12.92

TABLE 6:1

for the continuous updating of exposure profiles and provide the basic information for the approach to company wide exposure detailed in Chapter 7.

6:7 Presenting conventional accounting data to separate the effect of exchange rates from real commercial performance

It is suggested that cash flow accounting and the conventional system of management accounting information should run in tandem within IAL. This combination of information should overcome many of the criticisms of IAL's accounting system identified in Chapter 4.

Conventional accounting data within IAL serves the purpose of showing how performance will ultimately be shown in the published accounts. The assumptions which are to be used with respect to the allocation of contract profit to different years should be reflected in this type of accounting information.

6:8 Reporting overseas performance using non-monetary values and conventional accruals accounting.

This section proposes a method of presenting IAL's monthly management accounts in a way which overcomes the problem of measuring profit and turnover performance of overseas operations through the distortions caused by fluctuating exchange rates. It aims at eliminating distortions in the comparison of sterling budget performance figures caused by the use of a variety of exchange rates, and in so doing overcomes one of the criticisms levelled by IAL management in Chapter 4.

It is argued that the basic flaw in the current system is that it depends on the use of sterling currency values for comparison of performance and the computation of budget variances, such sterling values being based on varying local currency sterling relationships. Examples of the current method used to present IAL's monthly sterling management account were presented in Chapter 4.

It is argued that any change to the existing system of reporting has to fulfil a number of criteria.

a) Be simple to implement.
b) Be easy to comprehend in its finished form.
c) Retain presentation of information in sterling values.

The most important issue is to ensure that performance as it manifests itself in local currency is measured against a local currency budget and that these relationships are kept once the figures have been translated into sterling. In this way, real activity against a real plan can be assessed.

This approach would leave budget and performance evaluation calculations in the local currency in which they originated, whilst the ultimate method of presentation would stay in sterling. (Choi and Mueller (78) reporting on a survey of senior US multinational officials state "they're interested just in dollars. They don't even want to know how many pesos are in a dollar, what's an Australian dollar worth compared to the U.S. dollar, or what's sterling worth. They don't give a damn. It's strictly dollars." pp 268).

In this case it is advocated that performance be shown using a simple percentage. The advantage of using a percentage is that it is immediately comprehensible and its calculation is widely understood. But more importantly it allows for easy comparison between operations of different sizes and from one time period to another. It also leaves scope for the use of a number of different comparisons.

In addition to showing the extent to which budgets have been achieved the method illustrates the effect of exchange movements on the actual sterling figure reported in the accounts. It is proposed that the initial point of presentation is to show the sterling value of performance converted at the current exchange rate. Adjacent to this figure would be an indication of the movement in local currency/sterling values since either the original budget date or the start of the financial year (whichever is preferred). This would be shown as a simple percentage giving a favourable or unfavourable movement. It would act as an indicator of the extent to which sterling values had been affected outside of managerial control. However, like most of the information presented in IAL's accounts produced under the conventional accrual system, this would be no real gauge of "realised" losses or gains on exchange movements.

It is necessary to consider whether the use of other techniques for showing performance would be more appropriate to the isolating of real and exchange rate affected performance. It is intended to look at whether the use of conventional accounting ratios would provide a suitable alternative.

Bevan (66) suggests that conventional accounting ratios are useful yardsticks for indicating progress

and making easy comparisons of performance. The ICMA (78) states that "the main value [of ratios] is in making comparisons in [a] company profitability during a period as compared with that budgeted or achieved in a previous similar period".

A ratio is a means of measuring activity through the employment of non-monetary methods of presentation. It is easier to make comparisons with common yardsticks based on impartial measures than to make comparisons using monetary values. This principle applies not only to conventional accounting ratios but equally to the methods suggested for the presentation of IAL's management accounts. The use of non-monetary values in this system overcomes the problem of comparing monetary sums through time with differing value bases.

There are basically two types of accounting performance ratios of relevance to this piece of work (there are of course many other ratios which measure different aspects of corporate existence, but these do not apply here).

Activity ratios relate to the relationship between assets employed and turnover. In IAL's particular case these would not be of great value for comparative purposes as many of its overseas operations both large and small have slim capital bases.

The slimness of IAL's capital base in many of its overseas operations reflects the "service" nature of its business. Many of its overseas operations are in the form of manpower or equipment provision, with both manpower and equipment being exported from the UK. (Only in the USA is there a capital base with investment to any significant level).

The arguments employed against activity ratios can be equally applied to profitablity ratios. This kind of ratio is in keeping with the turnover and profit information already presented in IAL's management account package, in that it does not require comparisons with balance sheet items. However, the type of comparison that it would give would not necessarily provide information of value. This is because of the peculiar nature of many of IAL's overseas activities. Contracts are negotiated on a variety of different bases, some are cost-plus, some fixed fee, some man-month and others a combination of all these. Most of the terms are fixed in advance of commencement of the contract. Therefore, expenditure and income, with a few exceptions, should follow a predetermined course. It follows that the value of this type of presentation is questionable.

The case for the types of comparisons that IAL currently make, i.e profit and turnover performance against an annually set budget, is that it best reflects the performance that IAL should expect from its overseas activities as a "proprietary" company.

IAL's current method of making performance comparisons against an annually set budget also best allows for the incorporation of the varied nature of its contractual obligations, as it is the way in which its performance relates to the budget pattern which is the true measure of achievement.

A drawback of the approach is that it could affect the consistency of the IAL's management accounts package with overseas figures presented in one way and UK figures in another. This maybe an acceptable price to pay to improve the quality of information presented.

CHAPTER 7

Controlling foreign exchange exposure on long-term overseas contracts

7:1 Introduction

The Chapter looks at an aggregated method of controlling exposure on a corporate wide basis using a portfolio style approach which logically follows on from the exposure profile framework developed in Chapter 5.

This framework could be used in two ways.

a) It could be used as a means of establishing the level of risk and from this whether conventional hedging through the forward exchange markets should take place.

b) It could be used to form the basis of a "sub-portfolio" type of approach in which the character of exposure on long-term contracts is exploited as a means of reducing "systematic" risk. (Gull 75).

Lietear (71), Gull (75), Makin (78), Blackie (78) and Dince and Umoh (81) all develop orthordox portfolio approach to the foreign exchange handling problem. They seek to reduce the level of exposure by selecting and denominating funds in currencies selected because of their "risk" qualities. That is their susceptibility to movements against some base currency. Dince and Umoh (81) argue that their work is of importance because it allows risk reduction in parts of the world where there is no traditional hedging facility in the form of a forward market. However, their approach, like the others, depends on the active purchase of currencies if the firm does not currently trade for the sole purpose of hedging.

This would not be an appropriate or realistic course of action for IAL to take, because of its complexity and more importantly they would not countenance the holding of balances in currencies in which they did not trade. (This is not just restricted to IAL, see Chapter 9.

However this does not invalidate the notion that risk can be diluted as a result of holding a diverse portfolio of currencies. What is required is a model which uses the currencies already held and takes account of compensating movements in currencies. A series of authors have pointed to the significance of using financial models which can be used to net-out foreign exchange transactions and thus reduce risk, without needing to resort to hedging using the forward exchange market. Here the aim has been to net-out income and expenditure transactions in the same currency. No attempt appears to have been made to look at how much netting-out can be done using currencies that do not directly match up to what extent income streams or equally expenditure streams can be used to cover each other in isolation. Perhaps instead of completely netting-out compensating or partially compensating transactions they can be used in such a way as to damp the effects of foreign exchange exposure.

The aim of this is to blend together the use of exposure profiles with ideas used in foreign curency portfolios and netting-out models to produce an operationally useful control tool for IAL.

Account has to be taken of realistic constraints such as the need to stay within the confines of the currencies in which IAL operates by virtue of trade and hence are selected not because of their "risk-return" characteristics.

7:2 Using exposure profiles as a control tool

The interrelationship between different currencies and the fact that they move in different patterns, sometimes together and sometimes against each other, means that exposures in different currencies may at least in part cover each other, or may compound each other.

The "exposure profile" framework can be used to consider these interrelationships and establish what "residual exposure" is remaining once these factors have been taken into account. "Residual exposure" being that exposed sum not covered by compensating movements in the constituent currencies.

Using the same type of exposure profile established above and making a number of simple assumptions about the nature of different currencies, the results of this type of analysis are shown in Table 7:1, 7:2 and 7:3.

In Table 7:1 two contracts follow the simplified $P_t = Y_t - E_t$ format. The two contracts have the same sterling value at the date of their commencement.

They are conducted in two different currencies and last for different lengths of time, contract 1 lasting from t_0 to t_{50} and contract 2 from t_0 to t_{35}. The two currencies in which the contracts are conducted have the unusual characteristic of having a perfect negative correlation to their movements in respect of the third currency, sterling.

The level of exposure for contract 1, were contract 2 not to take place, is represented by areas A plus B. The level of exposure for contract 2 were contract 1

not to take place, is represented by area B. However, as the contracts are run concurrently the "residual" exposure, i.e that not compensated for by currency movements because of different speeds of repatriation of funds to the UK, is represented by areas A and C.

If these were the only two contracts to be operated by a company, the extent of exposure would be less than the exposure sum of the exposures on the two contracts.

Table 7:2 and 7:3 show complications to the simple example in Table 7:1. In Table 7:2 the exposure profiles of the two contracts are augmented by the introduction of a third element, namely a one-off transaction, outside the normal contract framework which manifests itself in t_{10} and is paid in t_{20}. This transaction takes place in the currency of contract 2. Its effect is to shift the currency of residual exposure from that of contract 1 to that of contract 2 from the period t_{10} to t_{20}. Table 7:3 illustrates another example of shifted exposure, this time the lack of repatriation of funds from contract 2 leads to the residual exposure shifting from currency A to currency B and back to currency A. (The lags in repatriation are due to late payment).

These simple examples show that any attempt at a simple hedging policy on a contract by contract basis does not necessarily lead to the most efficient results. Additionally, residual exposure is not necessarily confined to one currency and payment schedules and non-payments have great influence on the nature of corporate exposure.

Taking this a stage further into a multicurrency situation, say 5 currencies and 5 contracts over a

TABLE 7:1

TWO CONTRACTS IN TWO CURRENCIES.
THE TWO CURRENCIES HAVE PERFECT
NEGATIVE CORRELATION WITH RESPECT
TO THEIR MOVEMENTS
CASH IS REPATRIATED TO THE THIRD
CURRENCY AT A CONSTANT RATE.
EXPOSURE MEASURED IN TERMS
OF UNITS OF THE THIRD CURRENCY
100
CONTRACT 1
CONTRACT 2
AREA "A"
AREA "B"
AREA "C"
t_{10}
t_{20}
TIME
t_{30}
t_{40}
t_{50}

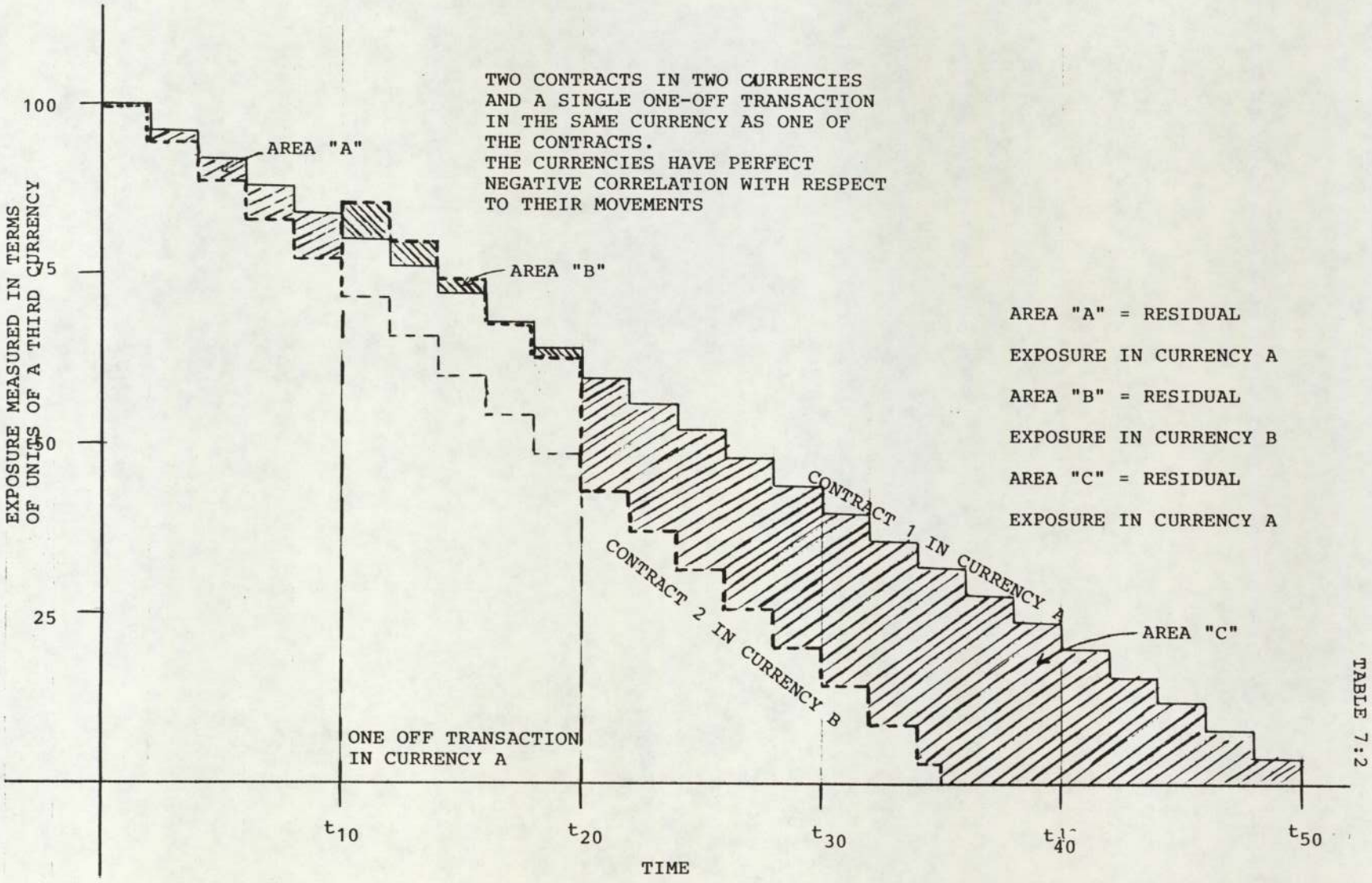

TWO CONTRACTS IN TWO CURRENCIES
AND A SINGLE ONE-OFF TRANSACTION
IN THE SAME CURRENCY AS ONE OF
THE CONTRACTS.
THE CURRENCIES HAVE PERFECT
NEGATIVE CORRELATION WITH RESPECT
TO THEIR MOVEMENTS
AREA "A" = RESIDUAL
EXPOSURE IN CURRENCY A
AREA "B" = RESIDUAL
EXPOSURE IN CURRENCY B
AREA "C" = RESIDUAL
EXPOSURE IN CURRENCY A
EXPOSURE MEASURED IN TERMS
OF UNITS OF A THIRD CURRENCY
100
75
50
25
AREA "A"
AREA "B"
AREA "C"
CONTRACT 1 IN CURRENCY A
CONTRACT 2 IN CURRENCY B
ONE OFF TRANSACTION
IN CURRENCY A
t_{10}
t_{20}
t_{30}
t_{40}
t_{50}
TIME

TABLE 7:2

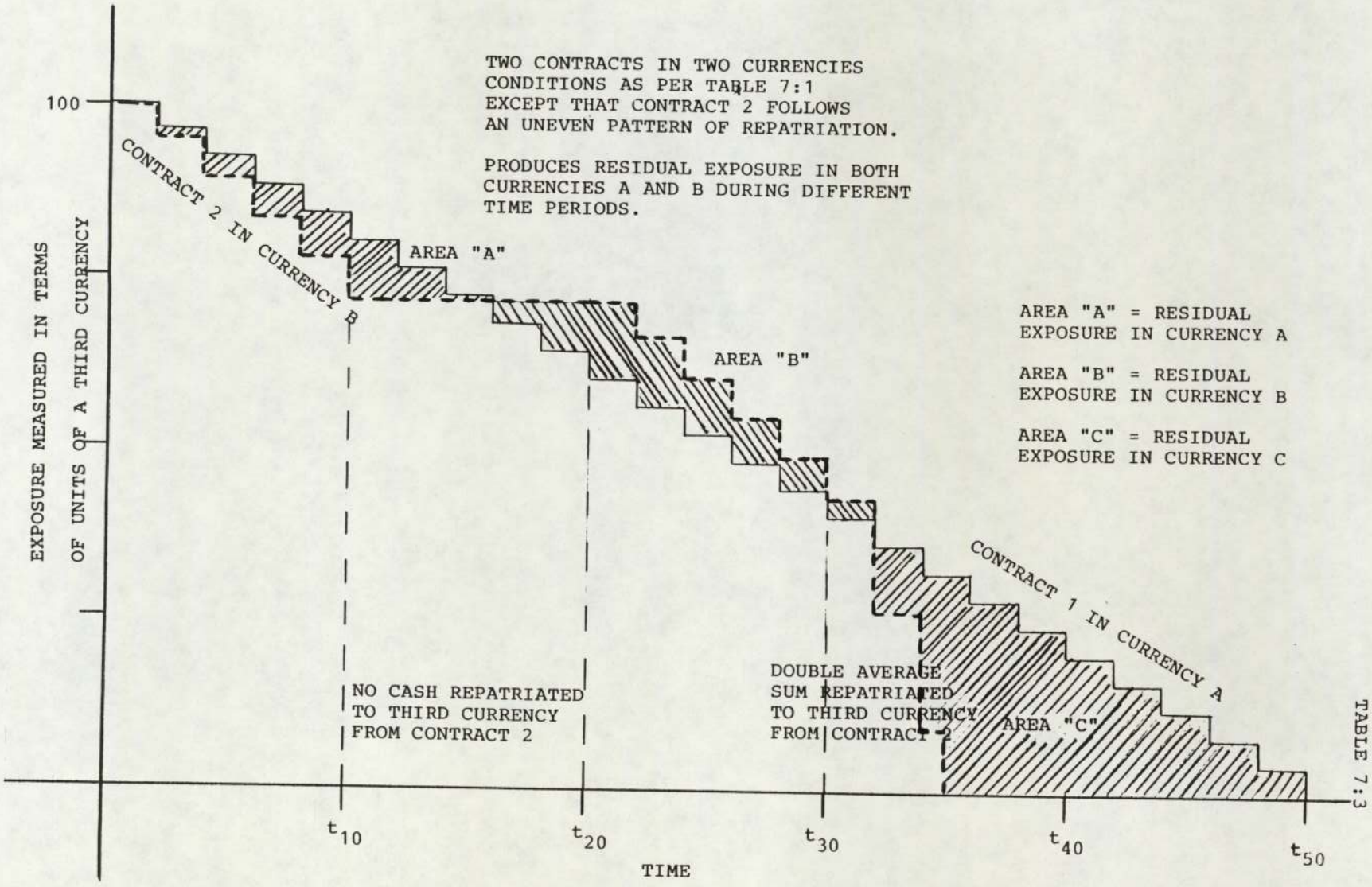

TWO CONTRACTS IN TWO CURRENCIES
CONDITIONS AS PER TABLE 7:1
EXCEPT THAT CONTRACT 2 FOLLOWS
AN UNEVEN PATTERN OF REPATRIATION.
PRODUCES RESIDUAL EXPOSURE IN BOTH
CURRENCIES A AND B DURING DIFFERENT
TIME PERIODS.
100
EXPOSURE MEASURED IN TERMS
OF UNITS OF A THIRD CURRENCY
CONTRACT 2 IN CURRENCY B
AREA "A"
AREA "B"
AREA "A" = RESIDUAL
EXPOSURE IN CURRENCY A
AREA "B" = RESIDUAL
EXPOSURE IN CURRENCY B
AREA "C" = RESIDUAL
EXPOSURE IN CURRENCY C
CONTRACT 1 IN CURRENCY A
NO CASH REPATRIATED
TO THIRD CURRENCY
FROM CONTRACT 2
DOUBLE AVERAGE
SUM REPATRIATED
TO THIRD CURRENCY
FROM CONTRACT 2
AREA "C"
t10
t20
t30
t40
t50
TIME

TABLE 7:3

one year period and working through an example using synthetic data the effect on overall exposure can be demonstrated. Each contract has the same local currency value with one unit in one currency being the same order of magnitude as for all the others. (Say one dollar = one pound = one French Franc etc). Each of the contracts starts at a different point in time but each one passes through at least a part of the year under consideration.

The rates of repatriation of money to the UK from each contract is known and constant and the same for each contract. The difference is that they are conducted in five different and independent currencies.

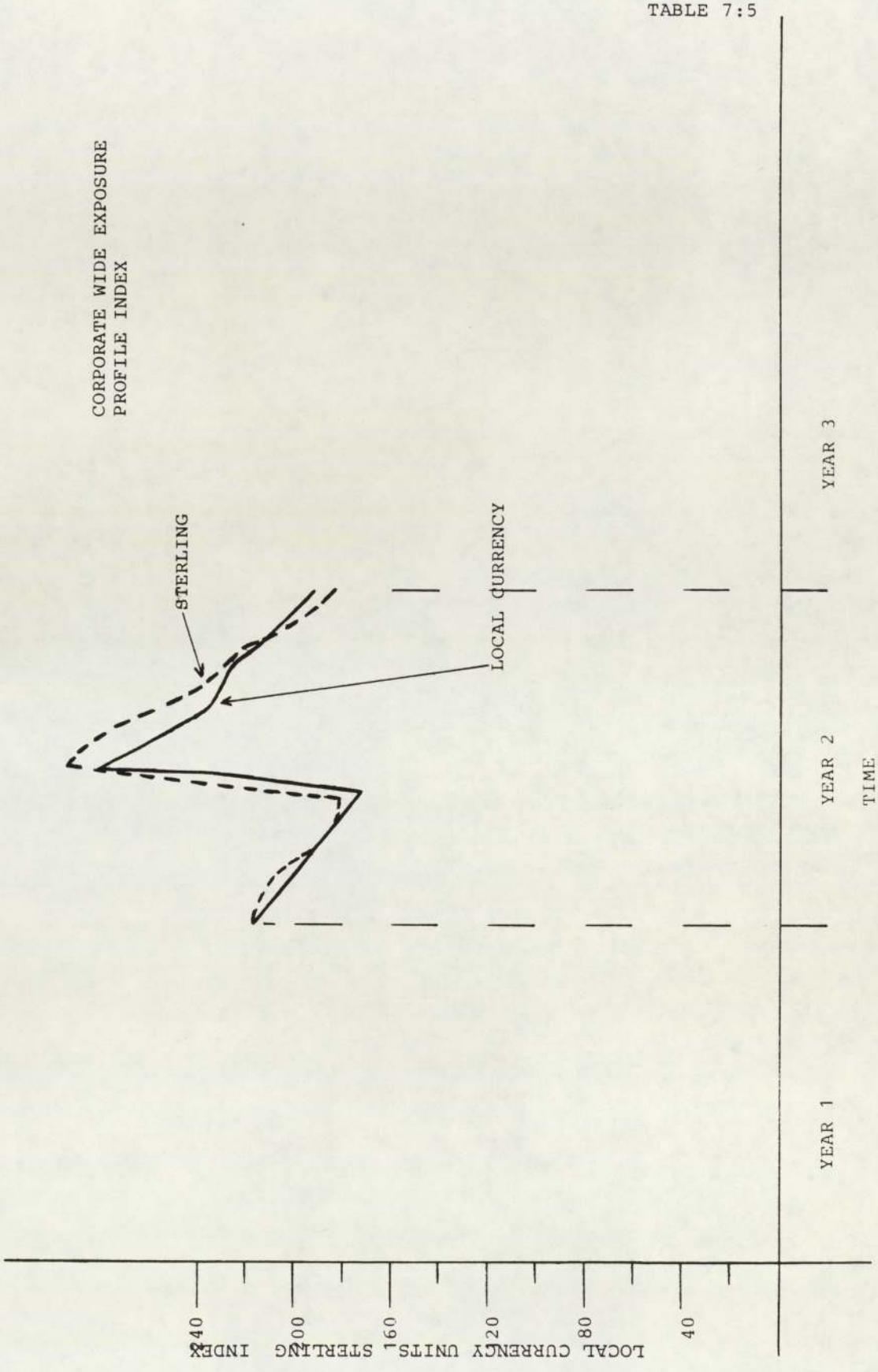
Using real exchange rates for 1982 and applying them to the synthetic contract data, Table 7:4, a measure of corporate wide exposure is provided. This measure is shown in Table 7:5. This shows, ex-post the way that the exchange rate movements have affected sterling income from these five contracts after taking into account their commercial patterns. Table 7:5 shows that for the first ten months of the year, with the exception of month 2, movements in exchange rates had a beneficial effect on the sterling value of the stream of surpluses. However, for months 11 and 12 the overall exchange rate movements had an adverse effect and resulted in less sterling than would have been expected had there been no exchange movements.

To cover this adverse trend in month 11 and 12 the company should have changed the shape of its corporate exposure profile and not repatriated money in Pakistan Rupees, so that the amount exposed in this currency stayed at 98.08 for both month 11 and 12. Whilst, in theory, it is possible to make such an ex-post adjustment to the shape of the corporate exposure

profile, in practice to use this model as a control tool divergences in the corporate exposure profile would be used as an indicator that action was becoming necessary. There would be an in built lag of between one or two time periods between the first signals of a significant divergence occurring and action being taken.

This idea is developed further and applied to a year of IAL business in Chapter 8.

TABLE 7:5


CORPORATE WIDE EXPOSURE
PROFILE INDEX
STERLING
LOCAL CURRENCY
YEAR 1
YEAR 2
YEAR 3
TIME
LOCAL CURRENCY UNITS STERLING INDEX
40
80
120
160
200
240

profile, in practice to use this model as a control tool. Divergences in the corporate exposure profile would be used as an indicator that actio was becoming necessary. There would be an in built lag of between one or two time periods between the first signals of a significant divergence occuring and action being taken.

This idea is developed further and applied to a year of IAL business in Chapter 8.

CHAPTER 8

THE APPLICATION OF CONCEPTUAL MODELS

8:1 Introduction

The aim of this chapter is to apply the conceptual models advanced in the previous three chapters to real IAL generated data and conditions. This work has been undertaken using historic data.

The applications are dealt with in the same order as they appear in the foregoing chapters.

8:2 Exposure Profiles

The application of the exposure profile framework has been undertaken in two ways. First, the framework has been applied to an IAL contract costing, using the expected probability method expressly used in Chapter 5. Second, the framework has been developed further to be applied to a simulation exercise using both hypothetical extreme cases and actual probability distributions extracted from examples of IAL contracts.

8:3 Exposure Profiles: expected probabilities of late payment.

This section details the construction of a worked example of an actual IAL contract costing and applies the concepts of exposure profile and discounted exchange rates developed in Chapter 5 to quantify the level of exposure and risk to foreign exchange movements.

This work is based on a contract costing undertaken by IAL's medical services business group for the operation of a manpower provision contract in the Middle East. This costing formed part of an unsuccessful bid made in 1984.

The contract was for a 33 month period and involved IAL supplying manpower to run a number of hospitals. It also involved IAL in purchasing in local currency medical supplies for which IAL would have received reimbursement on an "at cost" basis in the same currency.

The vast proportion of IAL's costs would have been incurred locally in local currency with payment made in the same currency (in practice, payment may have been received in US Dollars, however, for the purposes of this analysis, US Dollars and the local currency are treated as the same). The only costs not incurred locally but in sterling related to National Insurance contributions paid for the first twelve months for service overseas of UK expatriate staff. However, in the context of the overall value of the contract these were negligible.

This contract fits the simple pattern identified in Chapters 4 and 5 with local currency income and local currency expenditure generating a surplus or profit in local currency which is ultimately repatriated to the UK.

Income for the contract came in three types of payment:

a) an advance payment made at the start-up of the contract;
b) monthly contract payments for the operation of the hospitals;
c) monthly "at cost" payments for hospital supplies.

Expenditure on the contract had two main forms:

a) monthly expenditure on staff and related costs;
b) monthly expenditure on hospital supplies.

Local taxation was calculated at 45 per cent of book-keeping profit in any given year. So taxation was only due for years two and three, as year one made a loss, and was paid in March of years three and four.

Four examples of the contract costing have been calculated and appear in Appendix 7. These show:

a) the book-keeping contract costing, with income and expenditure for any given month matched up on an accruals basis;

b) cash flow costings as per the contract terms, that is payment made within 30 days of invoice, effectively a one month lag in contract payment;

c) cash flow costings as estimated by IAL at the time of the contract bid, effectively a four month lag in contract payment;

d) cash flow costings as estimated by the exposure profile framework, taking account of known patterns of payment by the customer and giving any payment an expected weight.

The probability distribution for the payment of any given contract invoice is also shown in Appendix 7. This data is based on actual IAL experience in the country concerned.

This work showed that there was likely to be a substantial mismatch between the time structure of the exposure (as would be expected from strict reading of the terms of the contract) and the outcome that the use of expected probabilities to payments produces.

Using the terms laid down in the contract IAL could have expected a cash flow that was positive for the whole of the contract period with the exception of small deficits in months 6,7 and 8. Hence, IAL could have expected to repatriate cash to the UK during the life of the contract.

On the other hand, if account is taken of past experience in the country and a cash flow and hence a repatriation schedule is constructed using the data on late payments in Appendix 7, then a quite a different picture appears. This would show that the cash flow is negative for all 3 years of the operating life of the contract and only turns positive in year 4.

This indicates that not only is the level and length of exposure severely underestimated, but that the delays in payment will have an impact on the profit and loss account through the requirement for additional interest charges to finance the cash flow deficiency.

8:4 Exposure profiles: a simulation exercise.

The objective of this work is to create a generalised model for the simulation of the effects of payment lags on the level of exposure on overseas contracts.

This has been done by constructing a computer model of the income and payment stream of an overseas contract, with a "probability switch" on the income stream.

This "probability switch" translates individual payments on the income stream from the month in which they were expected to be paid by reference to the contract payment terms to the month they might be "expected" given knowledge about the probabilty of payments in any given month in that country.

To the cash repatriation pattern that has been generated is added a "discounted exchange rate" value to give the exchange loss that could be expected from a "do-nothing" hedging policy.

The model has been developed on a WANG computer using a financial software package called FCS-EPS. The program written especially for the simulation exercise is shown in Appendix 8.

8:5 How the simulation model works

The model takes an income stream as defined by a series of invoices and applies a probability weight to each invoice to decide when it is likely to be paid. The computer generates a random number and compares this number with the probability weighting to decide whether the payment is received. This "probability switch" acts on the first invoice and then carries the same lag through all subsequent payments. Each payment is therefore not treated independently. Independent treatment would result in payments being received out of sequence and this would not accord with practical experience of customer actions.

The expenditure pattern is constant during the life of the contract assuming no variation in costs from one month to the next. Whilst this is a simplification it does not materially affect the results of the simulation exercise.

Twelve months' worth of income and expenditure data is deployed in the context of a twenty-four month time frame. This data is synthetic.

The income and expenditure streams are brought together to produce a monthly cash-flow and then a cumulative cash flow statement.

A decision rule is applied to the cumulative cash flow line which decides whether cash is switched from local currency into sterling or not. If the cumulative cash flow in any given month is positive then the cash for that month is converted into sterling.

A foreign exchange discount rate is applied to the repatriated cash line. This discount rate is also a synthetic piece of data. This gives the exchange loss taken on any one repatriation of cash. The foreign exchange loss is accumulated each time there is a cash repatriation so that at month 24 the loss over the whole contract is calculated. In this way exchange rate movements affect the exposed balance outstanding and the exchange risk is therefore directly related to the time structure of the exposure.

8:6 The results of the simulation exercise.

The model has been run using seven sets of payment probability weights and a computer facility called "Risk" has been used to generate a number of simulation trials. A series of 150 trials of the model were undertaken using each data set. According to the software operating manual this number of trials gives good results and is economical on computing time.

The results show the likelihood of a pattern of foreign exchange gains/losses given a pattern of invoice payment probabilities.

The trials have been undertaken using seven cases. These are, five cases derived from actual IAL experience and shown in Table 8:1, and two extreme cases one in which all payments are received in line with the terms of a contract (i.e. within a

Table 8:1

Data set number 3

RELATIONSHIP BETWEEN INVOICE DATE AND PAYMENT

Based on experience in years 1980,1981,1982.

Total number of payments 20

MONTHS LATE	No of Invoices	% of Total
-1 months late	1	5
0 months late	17	85
1 months late	2	10
	20	100

Table 8:1

Data set number 4

RELATIONSHIP BETWEEN INVOICE DATE AND PAYMENT

Based on experience in years 1976,1977,1978,1979,1980, 1981.

Total number of payments 62

MONTHS LATE	No of Invoices	% of Total
0 months late	0	0
1 months late	16	15.8
2 months late	18	29.0
3 months late	15	24.2
4 months late	4	6.5
5 months late	3	4.8
6 months late	3	4.8
7 months late	1	1.6
8 months late	1	1.6
9 months late	1	1.6
	62	100

Table 8:1

Data set number 5

RELATIONSHIP BETWEEN INVOICE DATE AND PAYMENT

Based on experience in years 1979,1980,1981,1982

Total number of payments 80

MONTHS LATE	No of Invoices	% of Total
0 months late	6	7.5
1 months late	32	40.0
2 months late	30	37.5
3 months late	9	11.3
4 months late	2	2.5
5 months late	1	1.3
	80	100

Table 8:1

Data set number 6

RELATIONSHIP BETWEEN INVOICE DATE AND PAYMENT

Based on experience in years 1979,1980,1981,1982,1983

Total number of payments 60

MONTHS LATE	No of Invoices	% of Total
0 months late	14	23.3
1 months late	20	33.3
2 months late	20	33.3
3 months late	20	10
	60	100

Table 8:1

Data set number 7

RELATIONSHIP BETWEEN INVOICE DATE AND PAYMENT

Based on experience in years 1978,1979,1980,1981,1982

Total number of payments 116

MONTHS LATE	No of Invoices	% of Total
0 months late	29	25
1 months late	27	23.3
2 months late	23	19.8
3 months late	7	6
4 months late	8	6.9
5 months late	11	9.5
6 months late	4	3.5
7 months late	3	2.6
8 months late	2	1.7
9 months late	1	0.1
10 months late	0	0
11 months late	0	0
12 months late	1	0.1
	116	100

month of invoice) and the other where all payments are received twelve months late.

The results appear in Appendix 8 and are summarised in Table 8:2.

In Appendix 9 three types of output are presented.

The first is a deterministic trial which shows one calculation and the lines which build up to produce the output line 2420 which represents the cumulative exchange loss.

The second set of outputs describe (according to the EPS-FCS operating manual) "a histogram representing a distribution [about the mean]. The first column shows the upper bound of each interval in value terms. The second [column] shows the cumulative percentage of the distribution associated with that value".

The third set of outputs is a "graph of cumulative probability from 0 to 1 as a horizontal axis against the upper bounds and the cumulative percentages of the sample on the vertical axis".

As would be intuitively expected the spread of exchange losses for any given pattern of payment lags is related to the spread of those lags, i.e. a set of payment lags which extends over a long period leading to a wide spread in likely exchange loss outcomes.

So in the case of data set number three where payments are at the most lagged by one month the spread of possible exchange losses is limited to two outcomes 27 and 57.5; whereas data set number six has a spread of payment lags over 9 months and the possible outcomes are spread over a wider range.

TABLE 8:2

SUMMARY OF RESULTS OF SIMULATION EXERCISE
FOR THE CALCULATION OF EXCHANGE LOSSES
USING FCS-EPS COMPUTER MODEL

DATA SET	WORST CASE	MEAN	S.D.
1	26.9	26.9	0
2	94.8	94.8	0
3	57.5	29.2	7.9
4	90.7	70.0	16.2
5	74.8	58.1	12.3
6	65.8	52.2	14.3
7	78.3	35.5	19.9

The use of graphical output allows for easy estimation of what a likely exchange loss will be, given that some of the spreads are such that the measure of standard deviation will not give the whole picture.

In a formal application this model could be re-run using not just payment patterns but also different expenditure patterns and the application of a variety of repatriation rules. The repatriation rule in this exercise has assumed that capacity for local borrowing is unconstrained, although in reality this is unlikely to be the case. Also expenditure patterns will not be static over the life of a contract. The invoice sums also will not be static as many contracts in practice have advance payments which distort cash flow and call for the application of a flexible repatriation rule which changes over the life of the contract.

8:7 Discounted Exchange rate values

In Chapter 5 the arguments for a system of discounted exchange rate values were deployed, together with an explanation of the method of their calculation. This section details the results of these calculations for nine currencies representing currencies with different patterns of institutional linkage. These linkages can be found in Table 4:15.

These currencies are:-

United States Dollar, South African Rand, French Franc, Jamaican Dollar, Pakistan Rupee, Malaysian Ringitt, Saudi Arabian Riyal, Singapore Dollar and Zambian Kwacha.

The calculations were undertaken on a program specifically written for the task. It was written

in Business Basic and run on an Apple IIe micro-computer. It calculates a regression line using the equation y=a+bx and y=bx. It also generates coefficients of correlation and coefficients of determination based on the y=a+bx equation.

The basic mechanics of how the program treats the data have been explained in Chapter 5. However, it is important to make a few additional points.

The final results have been calculated making all the percentage changes positive. Prior to settling on this treatment, two other methods of calculation were tested. First, the data was tested using both positive and negative movements and, second, treating all positive (that is adverse movements) as such but all negative movements as zero. The first was tested because this appears at first sight to accord with reality and the second because only adverse movements concern us.

Neither of these cases produced coefficients of correlation or determination which were higher than those generated by treating all movements as positive. At a theoretical level the treatment of all movements as positive has the advantage of recording the strength of movements and mapping them without regard to cyclical trends.

The results of these calculations are shown in Table 8:3.

These discounted values as shown above can be applied to the exposure profile framework. Whereas the exposure profiles show how long specific sums of money are left open to the risk of exchange movements, the discounted exchange rate values show how exchange

TABLE 8:3

MEASURE OF CURRENCY VOLATILITY
FOR CONTRACT COSTING
USING "BASIC" PROGRAM

CURRENCY	PERCENTAGE CHANGE PER MONTH	CORRELATION COEFFICIENT	COEFFICIENT OF DETERMINATION
French Franc	0.554	0.502	0.252
Pakistan Rupee	0.670	0.539	0.291
Zambian Kwacha	0.598	0.457	0.208
Singapore Dollar	0.660	0.604	0.365
Malaysian Ringitt	0.607	0.599	0.359
South African Rand	0.399	0.270	0.073
United States Dollar	0.792	0.667	0.445
Saudi Arabian Riyal	0.728	0.674	0.454

Using a data base of 120 months from January 1978 to December 1984.

movements are affected by the passage of time. They provide quantitative measures to allow monetary values to be given to foreign exchange risk on overseas contracts. It is against this value that any decisions on hedging action should be taken as it provides values for the building of contingences into the contract price.

Whilst this method of calculation has its drawbacks, as a statistical technique it is used in a "pragmatic form" to smooth the data to produce useful and meaningful results.

8:8 Accounting for overseas contract performance

In Chapter 6 two strands of thought were discussed which dealt with the improvements in the way in which performance could be monitored and assessed. This section deals with the application of these ideas to IAL data and circumstances.

8:9 Reporting overseas performance using non-monetary values and conventional accruals accounting.

In Chapter 6 the case for the presentation of IAL's management accounts in a way which clearly separated the effects of exchange rate movements on performance from performance which was a result of commercial activity was given.

Appendix 4 shows how IAL presents its management accounts and shows why IAL's management has difficulty in deciphering what the "real" performance of their overseas activities has been. Taking the case of variancies, it is not clear whether these show performance with foreign exchange movements as a variance or whether it is purely as a consequence of

trading activity. It also says nothing about the extent to which performance is distorted by uncontrollable exchange rate movements. In statement No 13 of Appendix 4 the nature of different items in the calculation become even more difficult to understand. Whether the budget or the variance has been adjusted to take account of foreign exchange movement is not at all clear. These points were raised in the survey of IAL's management in Chapter 4.

The example put forward in Table 8:4 attempts to remedy these problems by separating explicitly the real commercial performance and exchange effects.

In addition, it overcomes the problem of how best to express performance, as only sterling outturn values are used. All other financial information is given shown as percentages, explicitly showing the effects of exchange rate movements on the final sterling results.

Explanation of the Worked Example

First Column

Actual sterling cumulative turnover or profit for the year to date.

Second Column

The effect of changes in the relationship between sterling and the local currency of the overseas operation, as measured from the original budget value.

Whilst in this example the movement relates to changes away from the original budget exchange rate as set in September/October of the preceding year, this

GROUP SUMMARY

STATEMENT NO 2

JANUARY/FEBRUARY 1983

	TURNOVER					PROFIT				
	Actual £'000	Effect of Exchange Changes on sterling Results %	Month Perf %	Annual Perf %	Annual Expected perf to date %	Actual £'000	Effect of Exchange Changes on Sterling Results %	Month Perf %	Annual Perf %	Annual Expected perf to date %
Aviation	13,593	+11.5	89	16	19	1,371	+13.6	93	17	18
Commercial	5,769	+13.6	75	13	17	69	+13.6	50	2.5	5
Products and Computers	4,317	-	89	14	15	363		95	12	12
Medical Services	21,339	+18.6	74	13	17	1,357	+18.6	72	12	17
Recruitment Services	486	-	162	194	120	161	-	255	156	91
	45,504	+14.7	80	14	17	3,321	+13.2	86	16	13
Less:										
Group Administration						(444)		61	10	17
Group Development						(17)		13	2	16
Add										
Exchange Gains						30				
Interest Receivable						40		100	16	16
Investment Income						-				
Less:										
Interest Payable						(35)		97	16	17
Less:										
Goodwill Write off						(140)		100	17	17
Inter Group Sales	(8,381)	+18.5	77	14	18					
Total before tax	37,123	+13	80	13	17	2,755	+16	95	14	15

TABLE 8:4

AVIATION GROUP

STATEMENT NO 3

JANUARY/FEBRUARY 1983

	TURNOVER					PROFIT				
	Actual £'000	Effect of Exchange Changes on sterling Results %	Month Perf %	Annual Perf %	Annual Exp %	Actual £'000	Effect of Exchange Changes on Sterling Results %	Month Perf %	Annual Perf %	Annual Exp %
Operations: Overseas	8,704	+19.2	82	17	21	1,014	+19.2	80	20	26
UK	313		76	13	17	7		32	5.5	5.5
Security Systems	1,234		220	37	17	162		270	44	16
Equipment Sales	647		71	12	17	147		140	23	17
Airline Services	80		73	13	17	(13)		(108)	(19)	17
Ballbrook College	537		103	18	17	142		134	22	17
Training Services	-					(14)		233	(35)	15
Consultancy	-									
A.I.S										
Sub-Total	11,515	+14.4	88	18	20	1,445	+13.4	93	21	23
Less: Group Overheads						(141)				
						1,304				
Subsidiary Company										
O.D.S.I	2,053	+18.5	70	13	15	89	+18.5	64	4.3	6
Associated Company										
B.A.I	25		9	11	1	(22)		(300)	(15)	(5.5)
Total Aviation Group	13,593	+11.5	89	16	19	1,371	+13.6	93	17	18
Less Outside Interests						(29)				
	13,593	+14.25	89	16	19	1,342		94	19	20

TABLE 8:4

COMMERCIAL GROUP

STATEMENT NO 4

JANUARY/FEBRUARY 1983

	TURNOVER					PROFIT				
	Actual £'000	Effect of Exchange Changes on sterling results %	Month Perf %	Annual Perf to date %	Annual Expected perf to date %	Actual £'000	Effect of Exchange Changes on sterling Results %	Month Perf %	Annual Perf to date %	Annual Expected Perf to date %
Overseas Operations	-	-	-	-	17	(12)	-	(109)	(6.8)	6.3
E.S.U	2	-	50	10	19	(3)	-	100	(14.2)	(14.3)
Merchandising	74	-	97	16	17	12	-	600	2.6	0.5
Hotel Systems	2	-	2	0.3	17	(20)	-	(181)	(3.2)	1.74
Communications Systems	148	-	113	1.8	17	4	-	1.7	0.05	2.9
Supplies Services	81	-	96	16	16	21	-	150	4.2	2.8
Consultancy	-	-	-	-	17	-	-	0	-	10.5
Commission	-	-	-	-	-	7	-	77	-	-
Subsidiary Companies										
IAL Far East	372	+12.1	77	11	16	6	+12.1	76	8	11.3
IA Brunei	39	+23.1	176	16	9	3	+23.1	75	10	7.7
IAL PNG/NB	96	+19.1	75	12	16	-	+19.1	-	-	11
IA Pakistan	16	+18.2	59	13	23	1	+18.2	11	17	155
IA North America	211	+19.3	63	5	8	(124)	+19.3	10	(3.1)	(97.5)
Associated Companies										
IA Malaysia	28	+22.6	28	4	14	3	+22.6	245	14	5.6
A.T.S.	525	+17.3	103	14	13	44	+17.3	150	11	7
Albwardy IAL	163	+18.8	97	12	12	6	+18.8	119	(0.43)	(8.7)
Abu Dhabi IAL	345	+18.8	100	16	16	44	+18.8	100	16	1.59
S.I.A.L.	2,341	+18.5	100	24	24	131	+18.5	120	17	14
T.S.C. Kuwait	-	+18.1	-	-	-	-	+18.1	-	-	-
I.A East Africa	269	+ 5.0	117	14	12	-	+ 5.0	-	-	93
Aeradio Tanzania	55	+15.6	69	22	15	9	+15.6	780	33	33
IA Zambia	49	- 2.2	85	13	15	39	- 2.2	798	95	13
R Paging/E Rentals	-	-	-	-	-	-	-	-	-	-
I.A Botswana	58	+31.9	96	16	17	19	+31.9	96	16	17
Comtech	253	+18.8	91	29	32	41	+18.8	174	8	18
Cartel	441	18.6	95	32	34	35	18.6	155	122	(91)
E.C.L	201	-	82	10	12	-	-	-	-	(0.9)
Less: Group Overheads	-					(197)		120		
Total Commercial Group	5,769	13.6	86			69	13.6	58		
Less: Outside Int	-		-			(193)				

TABLE 8:4

MEDICAL SERVICES GROUP

STATEMENT NO 6

	TURNOVER				PROFIT			
	Actual £'000	Month Performance %	Annual Performance to date %	Annual Expected performance to date %	Actual £'000	Month Performance %	Annual Performance to date %	Annual Expected performance to date %
Medical Services Division	6,785	83	16	19	627	72	12	16.5
Associated Companies								
IHG (IHG)	14,383	70	12	17	713	72	12	16.6
IHG (MS)	171	48	34	16	17	179	20	11.7
Sub Total	21,339	88	13	17	1,357	72	23	16.6
Less: Outside Interests	-	-			(541)	73	12	16.6
TOTAL	21,339	88	13	17	816	72	12	16.5

Budget Exchange rate (expected) 6.20

January Rate 5.24

February Rate 5.21

Change in sterling value of local currency activity

January +18 .3%

February +19 .0%

TABLE 8:4

AVIATION GROUP - OVERSEAS STATIONS

STATEMENT NO 13

JANUARY/FEBRUARY 1983

	Actual £'000	Effect of Exchange Changes on sterling Results %	Month Performance %	Actual £'000	Effect of Exchange Changes on sterling Results %	Month Performance %
MIDDLE EAST						
Abu Dhabi Airport	1,334	+18.8	95	21	+18.8	50
Abu Dhabi Mugatora	52	+18.8	520	26	+18.8	1,300
Bahrain	749	+19.2	170	63	+19.2	165
Doha	675	+18.8	97	72	+18.8	91
Dubai	176	+18.8	95	27	+18.8	75
Kuwait	11	+18.8	5	2	+18.8	100
Ras Al Khaimah	119	+18.8	49	17	+18.8	43
Saudi - MEPA	2,500	+18.8	70	250	+18.8	68
Saudi PCA-O & M	2,300	+18.7	71	500	+18.7	77
Saudi - PCA Training	200	+18.7	106	12	+18.7	44
Sharjah	97	+18.8	82	14	+18.8	107
AFRICA AND ASIA						
Bangladesh	50	+25	76	5	+25	71
Banjul	18	0	100	4	0	133
Malaysia	296	+22	180	20	+22	200
Maldives	25	+18	83	3	+18	75
Zimbabwe	30	0	-	5	0	-
Brunei	8	+23	-	1	+23	-
Mozambique	34	+12	-	-	+12	-
Nigeria	30	+12	-	-	+12	-
NEW BUSINESS						
Less:						
O/S Staff Training	-		-	(21)		41
O/S Staff Recruitment	-		-	(7)		41
TOTAL STATIONS	8,704	19.2	82	1,014	19.2	80

TABLE 8:4

comparison could just as easily be made between the current rate and any historic or recorded rate.

For management purposes this figure shows the extent to which exchange rate fluctuations have affected reported sterling performance above and beyond the control of management.

In the case of individual locations, this calculation has been straightforward to compute as it relates to only one relationship. In the case of the group figures it has involved making adjustments to allow for different levels of trade in different locations to produce a groupwide aggregate effect.

Third Column

Monthly performance of a business activity measured against the original local currency budget, comparing local currency performance figures with a local currency quantified target.

(To make the actual calculation necessary for this example, original local currency budgets were not available. Instead, sterling monthly budgets were converted to produce local currency figures using the original budget exchange rates. Whilst this is not materially important, it explains how local currency budgets were available for this work).

For group figures the aggregate budget performance information was produced by weighting the sterling performance figures in the manner in which they were presented in the original budgets. In this way the figures are compared in sterling at the original budget exchange rate, which for this purpose is the same as making local currency comparisons. It allows individual location performance to be added together to produce a group aggregate result.

Fourth Column

Actual performance to date as set against the annual budget. Once again comparisons are made in local currency. The same process as above applies to group figures.

Fifth Column

Level of performance expected to date against the annual budget. For use in conjunction with figure shown in the fourth column.

8:10 The application of cash flow reporting

It has been argued that benefits could be derived by IAL from the implementation of a system of cash flow reporting on the basis of the case outlined in Chapter 6. This system could be applied to the reporting of overseas branches and stations to run in tandem with the present reporting method.

Table 8:5 shows the type of format tables that could be used for such a system. These have been based on the tables produced by Lee (72c) and suitably modified to take into account management needs within IAL. These tables call for not only the reporting of actual cash flows but also the presentation of forecasted information to allow for the assessment of performance. This forecasted data could take either of two forms. It could be simply the budget information that is already used by IAL which relates primarly to projected accruals information or it could be realistic cash flow forecasts based on likely performance after taking into consideration past experience.

Table 8:6 details those transactions that would be reported in the cash flow reports as they specifically relate to an IAL branch or station.

STATEMENT OF TOTAL FLOW OF BRANCH

Adapted from Lee (72)

CASH FLOW	supp sch	MONTH 1		MONTH 2		MONTH 3		MONTH 4		MONTH 5		MONTH 6	
		ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST
1) Bank and cash balances B/F													
2) Operational transactions flow	A												
3) Exception Transaction Flow	B												
4) Financial Transactions Flow	C												
5) Taxation Transactions Flow	D												
7) Net Distributable Flow													
8) Transfers into and out of branch	E												
9) Undistributed bank and cash balances													

TABLE 8:5

SUPPORT SCHEDULE A

STATEMENT OF "OPERATIONAL" TRANSACTIONS FLOW-(CONTRACTS WITHIN BRANCHES)

CASH MOVEMENTS	MONTH 1		MONTH 2		MONTH 3		MONTH 4		MONTH 5		MONTH 6	
	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST
ECONOMIC CONTRACT A												
1) Contract Income												
2) Contract Costs												
3) Labour Costs												
4) Net Cash Contribution 1 + 2 + 3												
ECONOMIC CONTRACT B												
5) Contract Income												
6) Contract Costs												
7) Labour Costs												
8) Net Cash Contribution 5 + 6 + 7												
9) General Branch Overheads 4 + 7 - 8												

TABLE 8:5

SUPPORT SCHEDULE B

STATEMENT OF EXCEPTIONAL TRANSACTIONS FLOW

CASH MOVEMENT	MONTH 1		MONTH 2		MONTH 3		MONTH 4		MONTH 5		MONTH 6	
	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST
1) Exception Flows "Inwards"												
2) Exceptional Flow "Outwards"												
Net Exceptional Flow												

SUPPORT SCHEDULE C

STATEMENT OF FINANCIAL TRANSACTIONS FLOW

CASH MOVEMENTS	MONTH 1		MONTH 2		MONTH 3		MONTH 4		MONTH 5		MONTH 6	
	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST
1) Loan Received												
2) Loan Repayments												
3) Loan Interest Payment												
Total net contribution 1 - 2 - 3												

SUPPORT SCHEDULE D

STATEMENT OF TAXATIONS FLOWS

CASH MOVEMENTS	MONTH 1		MONTH 2		MONTH 3		MONTH 4		MONTH 5		MONTH 6	
	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST
1) Taxation Paid												
2) Rebates												
Net Taxation Flow												

SUPPORT SCHEDULE E

STATEMENT OF FINANCIAL TRANSFERS

CASH MOVEMENTS	MONTH 1		MONTH 2		MONTH 3		MONTH 4		MONTH 5		MONTH 6	
	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST	ACTUAL	FORECAST
1) Transfers of Cash Received												
2) Transfers of Cash to UK												
3) Net Position												

The format Tables in Table 8:5 show the following:-

a) Main statement of total flow of a branch

This brings together the five support schedules to give an overall cash picture for any given branch or station.

b) Support Schedule A Statement of "Operational" transactions flow

This shows the break down of income and expenditure by contract as they relate to the normal operational transactions of the branch.

c) Support Schedule B Statement of Exceptional Transactions Flow

This shows any item which is not part of the usual business of the branch, say, a payment received on behalf of another branch or station, or the one off supply of equipment.

d) Support Schedule C Statement of Financial Transaction Flow

This shows loans opened and repaid, and interest paid and received.

e) Support Schedule D Statement of Taxation Flows

This shows taxes paid and rebates received.

f) Support Schedule E Statement of Financial Transfers

This shows the movement between the UK and the overseas Branch or station.

These tables break down cash flow into a series of distinct types. Table 8:6 shows how different IAL types of transaction can be fitted into the above system of cash flow reporting. Whilst these examples are shown in the context of Branches and stations they can be consolidated in whole company reports.

8:11 The application of exposure profiles as a control tool using a corporate wide multi-currency case.

In Chapter 7 a model for the controlling and monitoring of exposure on a corporate wide basis was advanced. It was presented as a sub-portfolio technique allowing for the use of different patterns of currency movements to control exposure using methods of the quantification of exposure found in the exposure profile framework, the shape of the "so-called" portfolio being controlled by the delaying of the repatriation of money from IAL's overseas operations. This section aims to take this idea and apply it to a year of IAL's business to consider the practical merit of this concept.

A model of all the foreign currency transactions and related exposures undertaken for the financial year 1983 was constructed. This incorporated all trading transactions and excluded any capital items (in IAL's case these capital items are mainly confined to investments and disinvestments in subsidiary and associate companies overseas). However, dividend payments from IAL's overseas subsidiary and associates were included as in the context of this exposure exercise these are very similar to profits repatriated to UK from overseas branches. Four types of transaction and exposure were included:-

TABLE 8:6

BRANCH CASH-FLOW ACCOUNTING

Types of Transaction

A. Contract Income in two forms

1) Advanced Payments received as large sums at start of contracts -

Included in CFA as "Exceptional Transactions"

2) Regular (monthly) contract payments

Included in CFA as an "Operational Transaction Flow"

B. Costs

Commission -

Included in CFA as an "Operational Transaction Flow" as a contract cost

Staff Costs -

Included in CFA as an "Operated Transaction Flow" as a Labour Cost

Other assorted costs*-

Included in CFA as an "Operational Transaction Flow"

C. Head Office Transactions

Transfers to and from UK to be included under section 8

"Transfers into and out of Branch"

This is to include all payments related to costs incurred by HO on behalf of Branch + costs/charges incurred by Branch on behalf of H.O.

* Travel, Housing, Motor vehicles

N.B sometimes payments for Housing includes substantial advanced payments to landlords here need for these to be treated as "exceptional items".

a) Overseas branch profits due to the UK for 1982 and not repatriated by year end 1982 and 1983 projected profits.

b) Overseas subsidiary and associate companies' dividends, due to the UK parent company in foreign currency for 1982 and any preceding year left unpaid and 1983 dividends declared during the course of the year.

c) Overseas sales from the UK in foreign currency with payment made to the UK.

d) Overseas purchases in foreign currency from the UK.

These items were calculated in the manner detailed below and placed into a matrix, which appears in Appendix 10. This matrix was constructed on an Apple IIe micro-computer software package made up of inter-related spread-sheet program called "Multi-plan". This allowed the data matrix to be manipulated to consider the effect of different patterns of repatriation on the value of the portfolio.

The data was presented in a month by month format, representing the 12 months of the year and a value for exposure carried forward from 1982.

a) Exposure calculations for overseas branches

Here, the level of exposure was calculated by taking the value of the money due to the UK at year end 1982 and adding to this the projected profit for 1983. This gave an opening balance of exposure, which showed that value of money due to the UK which could be affected by exchange rate movements in 1983. The balance at the end of 1983 was carried forward into 1984.

b) Exposure calculations for dividends from overseas subsidiary and associate companies

The opening balance of exposure is the 1982 and prior year dividends declared but as yet not repatriated to the UK. The dividend for the 1983 financial year is added to the balance of exposure when the 1983 dividend is declared. This treatment differs from that of the overseas branches because in the case of overseas branches their business is contract based and hence the exposure on money due to the UK can be forecast at the start of each financial year (if not earlier), whereas dividends are only declared after a year's trading when the level of profit has been determined.

c) Calculation of overseas purchases from the UK

This exposure has been calculated backwards from the ledger of foreign currency purchases, as most of the purchases over £4,000 are made by way of letter of credit and are established on average 4 months ahead of the actual cash transaction. Therefore, exposure is seen to arise 4 months prior to the payment and this has been represented in these calculations. The balance from 1982 is made up of exposures due to be liquidated in January, February and March 1983.

d) Calculation of overseas sales in local currency from the UK

This exposure has been calculated from the overseas sales ledger held by IAL Head Office, which has held balances of over £10,000 equivalent either at the close of 1982 or during the course of 1983.

The exposure at the start of the year comprises balances on accounts unpaid at year end 1983. To this

is added items placed on the ledger as and when the sale is transacted and the exposure is reduced when payment is received.

It is not possible to value exposure prior to it appearing on the ledger as no information is collected within IAL on forecasting in detail future sales in foreign currency.

8:10 Construction of the matrix and interpretation of results

All the values produced from the four different areas are brought together in a matrix in local currency values on a month by month basis.

These values are converted to sterling at a series of different rates reflecting two exchange rate regimes. A base line rate which is the 1982year end rate and the month-end 1983 actual rates.

The sterling values for each individual exposure is aggregated in sterling by adding together on a month by month basis and treating overseas purchases as negative. The purchases are treated as negative as they involve payments outwards and hence are a different type of exposure.

As indicated in Chapter 7 the aim of this approach to exposure is to show that changes in the pattern of repatriation of money to the UK can be used as a control tool to mitigate the effect of exposure even when this is not a properly constituted portfolio of currencies with a variety of risk return relationships. Only changes in the pattern of money due from overseas branches and overseas sales are considered. All other payments were reckoned to be

fixed and beyond the control of IAL Head Office. Few are of significant value to have great impact on the shape of the overall exposure.

The model has been used to run a series of different trials to consider the effects of different patterns of exposure and repatriation of local currency into sterling on the measure of company wide exposure.

The base line for the model is the 1983 actual exposures and patterns of repatriation converted to sterling at December 1982 exchange rates. This acts as a "real world" replacement for the local currency measure of exposure shown in Table 7:5. This is "real world" in the sense that it can be easily calculated without, and does not depend on, a simplistic assumption about the relationship between the numerical values of the currencies.

The results are shown in Table 8:7 as a summary of the output tables shown in Appendix 10. The output tables divide the matrix output into its four component parts: "OSB" overseas branches; "OSD" dividends from overseas associate and subsidiary companies; "OSP" purchases from overseas denominated in foreign currency; "OSS" overseas sales direct from the UK denominated in foreign currency.

The results of the exercise show a comparison of the 1983 data at 1983 exchange rates as compared with the year end 1982 base line. This base line can be considered as a budget line. The results are interpreted by reference to the base line. Sterling values in excess of the base line show an improvement in sterling performance and hence exchange rate movements have acted favourably over the company as a whole. Sterling values lower than the base line have had the opposite effect.

CORPORATE WIDE EXPOSURE RESULTS (ALL FIGURES STERLING)

	1982	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BASE	13906389	13243717	11411053	11895548	11374677	9894389	9552043	8126060	7258481	10435810	10855157	10980615	11335819
1983 ACTUAL	13906434	14032797	12171093	12961110	11754772	9995117	10047634	8630152	7676678	10897407	11692251	12056239	12529321
1983 LAG 1 MONTH	13906434	14564701	14003756	12961110	12197540	10174116	10226206	8965888	7801455	14830195	11888584	12205215	13288579
83 ALL LAGGED TO DEC	13906434	14564701	14543203	15379710	14491290	12849551	13185766	12127252	11295425	18506971	19551331	20226115	14384855

TABLE 8:7

The first set of results show the 1983 data on exposures and repatriation at 1983 actual exchange rates, giving an improvement over the base line for all months. This is as would be intuitively expected as the weight of the portfolio is US Dollar related currencies and the relationship between the US Dollar and Sterling improved by 12 per cent over the course of the year. The next question to address is can any action be taken to take advantage of this improvement. If cash repatriation is delayed in the "OSS" and "OSB" lines, the two lines most easily controllable and representing significant amounts of money, will this have an advantageous or detrimental effect. The second line of results shows the exercise. Here the lag in repatriation of one month shows an improvement in sterling values both against the base line and the first line of results.

The final line shows an extreme case when no repatriation from overseas on the "OSS" or "OSB" line is made until December 1983. Once again, as would be intuitively expected there is an improvement in the sterling value of the meassure of company wide exposure caused by the shift in the pattern towards the end of the year.

CHAPTER 9

The general nature of IAL's circumstances.

9:1 Introduction

The foregoing analysis has been undertaken solely within the confines of one company, IAL. Aside from general references to other companies reported in the literature review, of which only a few articles made passing remarks to business conducted through the medium of long-term overseas contracts, there is no evidence as to whether the circumstances of IAL's trade is an isolated case or that the models developed in Chapters 5, 6 and 7 have a wider application. The objective of this chapter is to remedy this deficiency.

The aim has been to answer a series of questions by looking at other organisations and addressing a different area of the academic literature. In particular, the literature on the currency denomination of overseas trade.

By looking at other companies it was hoped to answer the questions:

a) how do other companies with long-term service contracts overseas organise their activities?
b) are they faced with the same kind of exposure to foreign exchange movements?
c) how do they cope with any exposure, in what way, if any are their approaches applicable to IAL?
d) is the IAL experience of selling its services in local currency unusual?
e) how much stress is placed on the importance of cash as a criterion for success in overseas operations?

9:2 The literature on currency denomination.

Taking the literature on currency denomination of overseas business first, Reid (76) reports that contrary to Adams and Pearlman (73) in the early 1970's there had been an increasing tendency for UK companies to price long term overseas contracts in local currency rather than sterling. Carse, Williams and Wood (79) (although this work is acknowledged by the authors to be prior to the abolition of exchange controls in the UK) indicate that in the context of their work companies such as IAL have been an exception in pricing their services in local currency as opposed to sterling. This finding has been supported by Rao and Magee (80) who find that in the UK over 70 per cent of export contracts are priced in sterling (see Table 9:1). However, there is no evidence as to whether the nature of the business affects the currency denomination of business.

It can at least be concluded that there is a sizable number of companies in the UK who because of design or neccessity, find themselves having to denominate their overseas business in the currency of their customer and hence find themselves exposed to exchange rate movements.

9:3 Other companies

In searching for companies faced with the same type of business circumstances as IAL, it was first necessary to establish a simple framework of the type of characteristics that were important. This framework was that companies should have a good proportion of their business overseas, that they should provide services rather than finished manufactured goods and that they should provide these services by way of long term contracts rather than one-off sales.

TABLLE 9:1

THE PROPORTION OF EXPORT CONTRACTS INVOICED IN THE EXPORTER's CURRENCY

Austria	0.55
Belgium	0.48
Denmark	0.54
Finland	0.16
France	0.68
Japan	0.34
Netherlands	0.50
Sweden	0.66
United Kingdom	0.73
West Germany	0.87
Average	0.55
Standard Deviation	0.19

Source: Rao R.K.S and Magee S.P

"The Currency of Denomination of International Trade Contracts"

in Levich and Wilhbourg (80)

TABLE 9:2

COMPANIES APPROACHED FOR SURVEY OF TREASURERS IN UK COMPANIES WITH OVERSEAS BUSINESS

1. K.C.A International
2. Inchcape
3. I.D.C
4. Balfour Beatty Construction
5. Taylor Woodrow International
6. Simon Engineering
7. Airwork
8. Cable and Wireless
9. Trafalgar House

There appeared to be no list of such companies in existence. Enquiries were made with:

a) The Financial Times information service.
b) The British Overseas Trade Board Library.
c) Department of Trade and Industry, International Economics Section.
d) Central Statistical Office.
e) and a wide variety of trade directories.

To overcome this deficiency it was necessary to institute a search in a rather laborious manner starting from a directory of top British companies. Dunn and Bradstreets' "Key British Enterprises" was chosen as a starting point for this exercise.

A list of 51 companies, shown in Appendix 7, was produced. These companies were all approached for a copy of their annual report. 51 written requests were made and all but a very small number responded. These annual reports were looked at in detail and a list of those companies considered appropriate to approach appears in Table 9:2

The objective was to interview a senior financial official in these companies with a check-list of questions as detailed in Appendix 11. These questions were intended as a guide and it was envisaged that the ground covered in each interview would depend on the nature of the company concerned.

Nine companies were approached and four responses were received which indicated an interest in taking part in the study. One company was ruled out of the study at this stage on the grounds that its business on close

examination did not fit in with the study. The remaining three comprised a company providing similar aeronautical services as IAL and two construction companies with substantial overseas involvement.

The first company provided the similar types of airline related services as IAL. It was about half the size of IAL in terms of turnover and the number of staff employed overseas. It was organised overseas in a similar manner to IAL with a predominance of branches as opposed to subsidiaries or associate companies as vehicles for the operating of the parent overseas contracts. It was currently working in five countries in the Arabian Gulf and Africa and had no self accounting branches. All its overseas operations were run on a cash account basis with tight centralised control.

As with IAL, their fixed assets employed overseas were negligible. They were in the business of providing arms and legs behind the customers' desks. Their overseas contracts ranged from one year upwards in length. However, unlike IAL where the bulk of its business is in local currency, 50 per cent of this company's contracts were wholly denominated in sterling whilst the other half comprised split currency deals. Even in the split currency contracts the local currency element was only large enough to cover sundry local currency costs. The profit element of the contract would in general manifest itself in sterling. Contrary to IAL, the payment of staff overseas was made in sterling demoninated sums. As a consequence, with the exception of windfall unexpected surpluses in local currency, a sterling income stream was matched by a sterling expenditure stream. Exposure to foreign

exchange risk was virtually ruled out of their business. However, even in the case of windfall local currency surpluses derived from overseas contracts, the company had no policy towards handling these sums.

Their accounting was divided into two parts: local and headquarters. The local arrangements only involved the maintenance of a cash book, which was kept in local currency. All headquarters transactions were undertaken in Sterling.

Contrary to the experience of IAL, they had no problems with late payments from customers.

In conclusion their experience of dealing with overseas customers was quite different from that of IAL. They effectively removed foreign exchange exposure from their business by denominating their contracts in Sterling, or split currencies with the profit manifesting itself in sterling.

The second company was the construction division of a large conglomerate with a sizable proportion of its business overseas with a value approximately four times that of IAL's. It mainly operated in the major world currencies (such as German Mark, Swiss Franc, Japanese Yen) but it was also starting to obtain business in the same small currencies as IAL operates, i.e Malaysian Ringitt, UAE Dirhams and Saudi Arabian Riyals. They were finding that these countries were buyers markets and hence the currency denomination of the business was decided by the customer.

Their overseas organisation was similar to that of IAL's in that most of their overseas contracts were conducted through branches of the parent company. Only when local politics dictated was a local subsidiary or

associate established. Even here the parent company would act as a sub-contractor to the associate or subsidiary company and undertake the main bulk of the work.

Generally, there was tight centralised control of the overseas operations from the UK.

The policy of the company with respect to contract pricing was that contracts should have an "offshore" and an "onshore" element. This meant that most of the contracts took the form of "split currency" deals, local costs being found out of local currency denominated receipts and sterling cost and the profit elements found out of sterling denominated receipts. Even suppliers, when asked to bid and quote in local currency of the contract, had been quite willing to fix a price on this basis.

This contrasts starkly with IAL's experience of single currency deals.

Like IAL their contracts primarily involved the provision of manpower. Equipment required to undertake the construction work was purchased locally and scrapped or sold after the work had been completed so as with IAL there was no commitment to fixed assets overseas, and the cost of these items was looked at as a rental rather than an investment.

Their policy on foreign exchange exposure was simply not to take risks. This applied equally to currencies where there was a long term trend in movements which was of advantage to the company. This contrasted with IAL who informally took advantage of such movements.

Their objective, when contract pricing did not permit

split currency deals or where third currencies were involved, was to cover net exposure and add the cost of cover to the price. In the main, they used forward contracts for hedging purposes, otherwise they made small use of local loans but this was unpopular with senior management as it had an impact on the company balance sheet. They had considered portfolio types of approaches to hedge but considered these too complex.

For management accounting purposes budgets were set at the rate at which the contracts commenced or against a forward contract rate. Performance on any given contract was assessed on an accruals and cash basis depending on the audience in the company. Accruals information was seen to have its failings in the short term but in the long-term it presented the same information as cash data. This contrasted with IAL where little or no weight was placed on cash information.

Whilst the circumstances in which they conducted their business was very similar to IAL their response was quite different, particularly with respect to their zero risk policy. They spent considerable time and effort in the quantification and removal of risk, the monitoring of exposure and divergence from predictive courses. Of particular interest was the emphasis placed on looking at both cash and accruals reporting.

The third organisation was a large construction company, with overseas trade about four times the size of IAL's.

The bulk of its overseas business was run through branches, most of which were self accounting and established on the back of contract advanced payment.

Contracts were, in general, not established for fixed periods or for a complete job but instead were for a "unit of work", which could vary as the project progressed. Contracts ranged from those with a substantial manufactured element to those with only a labour content.

The Company policy was to split the contract price between local currency and sterling. The profit element would be built into the sterling costs. The overall aim was to make local currency income and expenditure net each other out. If this was not possible, as was the case of the Arabian Gulf States and Saudi Arabia, then the company would look to Export Credit Guarantee Cover (ECGD) or to the forward exchange market.

It was also their policy to cover all foreign exchange risks as and when they arose. This included the "tender to contract" stage, except for contracts with a value of less than £5 million, when the company would take a "flier". In some cases the tender to contract stage would be covered by an exchange variation clause, a clause to fix the local currency element at the date of contract signing, or set the price solely in Sterling. They had looked into the prospect of using portfolio type techniques but had discounted them as they did not appear to have a large enough number of off-setting transactions.

Monthly management accounting information was produced for each contract on an accruals basis. However, much more importance was placed on cash flow information. Contract exposure assessments were made with detailed cash-flow projections used to sell forward future profits up to eight years (in the case of US Dollar denominated business). The timing of the repatriation of money to the UK was decided solely on the basis of

what was best for the management of foreign exchange. Like the second company, and unlike IAL, they would rarely ship money out of the UK to finance overseas branches who had become short of cash. Money would always be borrowed locally except in cases where the local market was not large enough to take it. Even then cover would be sought through the forward market to cover these sums.

As with the second company the identification of exposures was decentralised. However, once again all action to cover exposure was taken centrally.

Exposure was systematically monitored twice yearly, when the level of exposure was reviewed and forecasts revised. In the periods between the twice yearly reviews monitoring only took place if the circumstances of the exposures changed dramatically. It was felt that continuous monitoring on a month by month basis would generate too much paper work.

Unlike IAL where the treasury function is submerged within the Finance Department, the treasury department within this company had no line management ties with the finance department except at Director level.

9:4 Generalised conclusions from the study of other companies

The manner in which overseas business is conducted by IAL is not unique. The use of overseas branches and the method of payment for business are similar to a number of companies.

However, major differences arise in the way in which the problem of foreign exchange exposure is handled. most companies seem to have far more flexibility in

the currencies in which they can price their business, which allows for the use of split currency or solely sterling contracts. However, one of the companies was beginning to find that such arrangements were not possible in the Middle East, thus echoing the experience of IAL.

In most cases where exposure did arise it was perceived as a problem that required remedial action. Two of the three companies were strongly risk adverse, undertaking a deliberate "cover all" strategy towards exposure.

CHAPTER 10

OVERALL CONCLUSIONS

10:1 Overall conclusions

The objective of the thesis has been to consider the problems caused by foreign exchange exposure on a company trading internationally and in particular conducting its business on long term contracts. The research has produced the following general conclusions:

a) the importance of cash;
b) the difficulty of forecasting future foreign exchange rate movements over long periods;
c) the distortion of performance information caused by accruals accounting;
d) the need for an information system which stresses cash;
e) the scope for currency exposure offsets even when exposures derive from currency flows in the same direction;
f) IAL is not unique in the problems which it faces.

10:2 Further Research

There is scope for developing the EPS-FCS based exposure profile model into a full costing model which looks at lags on expenditure as well as income streams. There is a need to build in uneven patterns of payment and consider other variables.

There are new techniques being developed in the foreign exchange markets for the costing of "currency options". These techniques may have value in the context of the exposure profile framework and be used as a substitute for the "discounted exchange rate"

measure. However consideration will need to be given as to the suitability of such models for contracting as the "currency option" pricing models are primarily aimed at costing the effect of currency volatility from a Bank's perspective, that is, they give the Bank the cost of going in and out of the market to cover against a currency option being exercised.

The work on company wide exposure needs to be looked at in the context of a company which has a wider diversity of currency movements than IAL, and which is dominated by U S Dollar currency relationships.

In the application of the exposure profile framework consideration needs to be given as to how to deal with probabiltities of payment in countries or with customers with whom there has been no previous experience.

Appendix 1

Original Project Specification
drafted by the Company

Original Project Specification
submitted to S.E.R.C.

APPENDIX 1

ORIGINAL PROJECT SPECIFICATION

IAL - FOREIGN CURRENCY EXPOSURE AND MEASUREMENT

IAL operates in some 50 countries and is involved in a similar number of foreign currencies. In 1979 turnover and profits, expressed in terms of sterling according to current methods of conversion were:-

	Turnover £000	Profits £000	
Parent Company) Subsidiaries)	60,481	6,808	
Associates	74,210	2,108	(IAL Share)
TOTAL	134,691	8,916	

Around 90% of our turnover and profits are generated outside U.K and since we are largely involved in operations where the customer insists on a contract price in local currency, whereas our profits (or losses) eventually manifest themselves in sterling, it is clear that:

a) We must attempt to minimise our exposure by ensuring that wherever possible our costs are incurred in the currency of the contract;

b) We must, in times of unpredictable fluctuations in exchange rates, buy or sell forward to quantify costed profits rather than leave our costs and margins subject to random windfall profits or losses;

c) We must monitor and measure the effects of our attempts to manage currencies on a country by country and contract by contract basis in order to

learn whether or not we are successfully implementing a) and b) above (which are stated Company policy) or whether we should change our policy.

It is not our aim to find a method of predicting the rise or fall of sterling in relation to the US$ - to which most of our overseas currencies are linked - indeed if we could do this successfully we would switch our business overnight into the money market. Rather we are seeking through painstaking analysis of transactions to establish inter alia:

a) The methods we should use to determine the relevant exchange rates for costing contracts bearing in mind that in the final analysis the price must be competitive.

b) The final outcome of each of these contracts allowing for the fact that they may be long or short term, there will almost inevitably be interim payments and there may well be significant supplies to be procured in a third or even fourth currency.

c) The most appropriate method of recording day to day accounting transactions to isolate currency management from contract management.

A.SWANN
FINANCE DIRECTOR

Original specification as submitted to S.E.R.C by IHD Aston University

Models for the assessment of the exposure of contracts to currency movements. The company operates in some 50 countries and is involved in a similar number of foreign currencies. Contracts are usually undertaken in local currencies. They may involve interim or stage payments and expenditures in a third or even fourth currency.

Contingency assessments are needed of the effects of all possible currency movements in order to facilitate:

A. Contract costing at competitive prices.

B. Minimum exposure of profits to adverse movements.

C. Monitoring and prediction of profit performance.

D. Optimise the staging of conversions.

The expectation is that new techniques of modelling allied to Finance, Accounting and Economics developed in close liaison with experienced practicioners through IHD arrangements will produce new tools for financial management. The financial Director has given explicit support to such research, agreed to make the necessary data available and participate in the development, testing and assessment of the resulting algorithms.

Appendix 2

Data on Exchange Rate Movements

IAL TRADING CURRENCIES: EXCHANGE RATES FOR YEAR 1978

(MONTH-END RATES: AVERAGE OF BUYING AND SELLING RATES)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
UAE	7.55	7.51	7.21	7.07	7.02	7.19	7.48	7.54	7.57	8.00	7.45	7.80
Bahrain	0.76	0.75	0.72	0.71	0.70	0.72	0.75	0.75	0.74	0.80	0.75	0.78
Qatar	7.55	7.51	7.21	7.10	7.02	7.19	7.48	7.54	7.57	8.00	7.45	7.80
Iran	136.00	136.00	131.00	129.00	127.00	130.00	136.00	137.00	138.00	148.00	144.50	156.23
Kuwait	0.54	0.55	0.51	0.51	0.50	0.51	0.52	0.53	0.54	0.56	0.54	0.55
Libya	0.58	0.57	0.55	0.54	0.54	0.55	0.57	0.58	0.58	0.62	0.58	0.60
Saudi Arabia	6.75	6.70	6.43	6.31	6.25	6.39	6.57	6.46	6.53	6.77	6.54	6.74
Sudan	0.68	0.67	0.65	0.64	0.63	0.75	0.77	0.78	0.79	0.84	0.78	0.82
Oman	0.67											
Maldives	7.65											
Bangladesh	27.63											
Brunei	4.53											
Fiji	1.69	1.67	1.62	1.59	1.59	1.59	1.60	1.62				
Malaysia	4.61	4.55	4.40		4.35	4.42	4.47	4.47	4.48	4.40	4.30	4.48
Singapore	4.53	4.47	4.31	4.26	4.24	4.32	4.35	4.37	4.38	4.39	4.26	4.40
Pakistan	19.22	19.08	18.45	18.10	17.95	18.32	19.06	19.23	19.39	20.60	19.17	20.05
PNG	1.42											
Angola	78.25	78.85	76.45	77.20	83.00	85.00	87.00	55.00	60.00	65.00	65.00	70.00
Botswana	1.61	1.60	1.55	1.51	1.50	1.55	1.60	1.61	1.63	1.74	1.61	1.69
Gambia	4.00	3.97	3.96	4.02	4.00	4.03	4.03	4.02	4.01	4.14	3.99	4.02
Kenya	15.47	15.22	14.61	14.44	14.40	14.40	14.66	14.83	14.81	15.00	14.72	15.03
Mozambique	62.19											
Nigeria	1.18	1.18	1.18	1.18	1.18	1.19	1.21	1.23	1.27	1.27	1.27	1.27
Seychelles	13.33	13.25	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33
South Africa	1.69	1.68	1.63	1.59	1.57	1.62	1.68	1.70	1.71	1.83	1.68	1.76
Tanzania	15.47	15.22	14.56	14.44	14.40	14.40	14.66	14.85	14.87	15.00	14.82	15.03
Uganda	15.25	15.18	14.32	14.44	14.05	14.30	14.36	14.50	14.54	14.82	14.44	14.75
Zaire	1.61	1.58	1.50	1.49	1.49	1.50	1.56	1.53	1.54	1.55	1.84	1.88
Zambia	1.45	1.44	1.53	1.49	1.49	1.53	1.54	1.57	1.55	1.60	1.55	1.57
Swaziland	1.69	1.68										
Canada	2.16	2.16	2.12	2.07	2.02	2.10	2.18	2.24	2.34	2.46	2.28	2.42
Jamaica	2.43	2.64	2.52	2.47	2.81	2.89	2.99	3.11	3.15	3.48	3.27	3.46
USA	1.95	1.93	1.87	1.82	1.81	1.87	1.93	1.95	1.97	2.10	1.95	2.04
Trinidad	4.67	4.64	4.48	4.38	4.35	4.48	4.64	4.67	4.73	5.04	4.67	4.98
France	9.22	9.27	8.52	8.42	8.44	9.37	8.43	8.42	8.54	8.39	8.59	8.50

SOURCE: FINANCIAL TIMES

IAL TRADING CURRENCIES: EXCHANGE RATES FOR YEAR 1979
(MONTH-END RATES; AVERAGE OF BUYING AND SELLING RATES)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
UAE	7.64	7.73	7.95	7.89	7.87	8.31	8.80	8.52	8.26	7.96	8.30	8.36
Bahrain	0.76	0.77	0.80	0.79	0.79	0.84	0.88	0.85	0.83	0.80	0.83	0.84
Qatar	7.64	7.73	7.95	7.89	7.72	8.18	8.67	8.41	8.16	7.84	8.16	8.23
Iran	157.30	153.90	144.00	152.10	150.30	162.00	170.04	163.32	158.13	150.65	-	156.23
Kuwait	0.55	0.55	0.57	0.57	0.57	0.60	0.63	0.62	0.60	0.59	0.61	0.61
Libya	0.59	0.60	0.61	0.61	0.61	0.65	0.68	0.66	0.65	0.62	0.65	0.66
Saudi Arabia	6.65	6.76	6.96	6.95	6.97	7.32	7.55	7.55	7.30	7.10	7.42	7.48
Sudan	0.80	0.81	0.83	0.83	0.82	0.87	1.16	1.12	1.12	1.10	1.12	1.12
Oman												
Maldives												
Bangladesh												
Brunei												
Fiji	1.66	1.68	1.73	1.75	1.73	1.82	1.88	1.85	1.82	1.79	1.88	1.87
Malaysia	4.39	4.42	4.50	4.61	4.55	4.76	4.99	4.84	4.71	4.66	4.80	4.87
Singapore	4.31	4.38	4.54	4.56	4.59	4.75	4.99	4.84	4.69	4.59	4.79	4.80
Pakistan	19.69	19.94	20.44	20.29	20.25	21.57	22.91	22.18	21.60	20.70	21.75	21.88
PNG												
Angola	65.00	70.00	60.12	60.11	60.11	60.11	64.47	67.76	67.76	65.65	62.68	62.68
Botswana	1.65	1.67	1.71	1.71	1.70	1.81	1.91	1.86	1.82	1.73	1.83	1.84
Gambia	3.99	4.02	4.03	4.03	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Kenya	14.92	15.08	15.51	15.49	15.60	16.23	17.09	16.66	16.09	15.70	16.17	16.22
Mozambique											68.30	68.55
Nigeria	1.27	1.22	1.27	1.27	1.26	1.26	1.27	1.27	1.25	1.24	1.23	1.23
Seychelles	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.60	13.40
South Africa	1.73	1.71	1.75	1.75	1.73	1.85	1.94	1.88	1.81	1.75	1.88	1.84
Tanzania	16.40	16.60	17.00	16.80	16.70	17.75	18.85	18.35	18.25	17.45	18.10	18.35
Uganda	14.60	14.73	15.00	-	-	15.00	-	16.75	15.75	15.75	16.15	16.00
Zaire	3.23	3.12	3.21	3.20	3.24	3.36	3.55	4.61	4.45	4.42	4.47	4.51
Zambia	1.56	1.57	1.63	1.64	1.65	1.68	1.73	1.71	1.69	1.60	1.70	1.70
Swaziland												
Canada	2.38	2.42	2.39	2.36	2.38	2.56	2.70	2.62	2.55	2.48	2.58	2.59
Jamaica	3.38	3.50	3.57	3.60	3.57	3.90	4.13	3.91	3.91	3.74	3.95	3.97
Trinidad	4.79	4.85	4.96	4.96	4.92	5.25	5.55	5.39	5.26	5.03	5.31	5.33
USA	1.99	2.02	2.07	2.07	2.05	2.19	2.31	2.25	2.19	2.10	2.21	2.22
France	8.52	8.61	8.93	9.04	9.11	9.35	9.84	9.56	8.95	8.88	8.90	8.92

SOURCE: FINANCIAL TIMES

IAL TRADING CURRENCIES: EXCHANGE RATES FOR YEAR 1980
(MONTH-END RATES; AVERAGE OF BUYING AND SELLING RATES)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
UAE	8.50	8.46	8.13	8.42	8.71	8.72	8.59	8.85	8.81	9.03	8.66	8.77
Bahrain	0.86	0.85	0.82	0.85	0.89	0.89	0.88	0.91	0.90	0.93	0.89	0.90
Qatar	8.36	8.27	8.00	8.32	8.55	8.57	8.51	8.74	8.69	8.91	8.59	8.69
Iran	-		157.24	-	-	-	164.31	-	-	-	170.25	172.05
Kuwait	0.62	0.62	0.60	0.62	0.63	0.63	0.63	0.64	0.64	0.66	0.64	0.65
Libya	0.67	0.67	0.64	0.67	0.69	0.70	0.69	0.71	0.71	0.72	0.69	0.71
Saudi Arabia	7.64	7.61	7.24	7.53	7.83	7.84	7.73	7.97	7.92	8.13	7.83	7.95
Sudan	1.12	-	1.10	1.13	1.17	1.17	1.83	1.92	1.91	1.95	1.88	1.91
Oman												
Maldives												
Bangladesh												
Brunei	4.91	4.91	4.93	4.95	5.00	4.98	4.99	5.12	5.04	5.08	4.99	5.00
Fiji	1.90	1.90	1.86	1.89	1.89	1.90	1.90	1.93	1.90	1.93	1.89	1.89
Malaysia	4.95	4.94	4.95	5.05	5.05	5.05	5.07	5.16	5.10	5.23	5.17	5.29
Singapore	4.91	4.91	4.93	4.95	5.00	4.98	5.00	5.12	5.04	5.08	4.94	5.00
Pakistan	22.40	22.25	21.60	22.25	23.13	23.20	23.00	23.62	23.50	24.00	23.10	23.47
PNG									1.56	1.59	1.15	1.53
Angola	62.68	62.68	62.68	62.69	66.23	66.23	66.23	70.35	70.35	70.35	70.35	70.35
Botswana	1.79	1.78	1.71	1.78	1.85	1.83	1.83	1.86	1.85	1.90	1.72	1.76
Gambia	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Kenya	16.69	16.72	16.67	16.83	17.13	17.12	17.12	17.58	17.48	18.07	17.72	17.97
Mozambique	69.70	67.80	63.80	65.31	65.37	67.25	67.35	67.60	67.60	71.45	67.90	69.70
Nigeria	1.23	1.24	1.24	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27
Seychelles	13.45	14.30	14.15	14.40	14.50	14.50	14.70	15.00	14.90	15.40	15.27	15.35
South Africa	1.87	1.81	1.75	1.80	1.82	1.81	1.79	1.82	1.80	1.83	1.77	1.78
Tanzania	18.50	18.45	17.70	18.30	19.36	19.15	18.95	19.40	19.30	19.75	18.90	19.40
Uganda	16.69	16.75	16.50	16.75	17.00	17.10	17.07	17.57	17.47	18.07	17.72	17.97
Zaire	4.61	6.66	6.60	6.69	6.77	6.76	6.79	6.93	6.95	7.18	7.04	7.10
Zambia	1.77	1.78	1.77	1.78	1.73	1.81	1.88	1.86	1.87	1.93	1.90	1.92
Swaziland												
Canada	2.65	2.56	2.58	2.69	2.71	2.71	2.71	2.78	2.80	2.85	2.80	2.85
Jamaica	4.08	4.00	3.86	4.02	4.17	4.20	4.18	4.29	4.26	4.34	4.19	4.26
Trinidad	5.48	5.38	5.19	5.41	5.61	5.66	5.62	5.78	5.74	5.85	5.64	5.74
USA	2.28	2.24	2.16	2.26	2.34	2.36	2.34	2.40	2.39	2.43	2.35	2.39
France	9.33	9.37	9.72	9.58	9.68	9.65	9.65	10.00	10.05	10.55	10.57	10.84

SOURCE: FINANCIAL TIMES

IAL TRADING CURRENCIES: EXCHANGE RATES FOR YEAR 1981
(MONTH-END RATES; AVERAGE OF BUYING AND SELLING RATES)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
UAE	8.66	7.98	8.21	7.86	7.62	7.17	6.70	6.74	6.72	6.66	7.21	7.03
Bahrain	0.89	0.82	0.84	0.81	0.78	0.74	0.69	0.69	0.69	0.68	0.74	0.72
Qatar	8.58	7.91	8.14	7.79	7.55	7.11	6.64	6.68	6.66	6.60	7.14	6.97
Iran	177.00	166.00	168.20	164.20	162.80	155.25	151.70	150.00	145.75	145.90	152.80	150.50
Kuwait	0.64	0.60	0.62	0.59	0.58	0.55	0.52	0.52	0.51	0.51	0.55	0.54
Libya	0.70	0.64	0.66	0.63	0.61	0.58	0.53	0.55	0.55	0.53	0.58	0.57
Saudi Arabia	7.86	7.25	7.49	7.19	7.03	6.66	6.22	6.28	6.24	6.20	6.71	6.55
Sudan	1.88	1.74	1.79	1.07	1.03	0.97	0.90	0.92	0.93	0.90	1.76	1.72
Oman												
Maldives											7.74	7.49
Bangladesh												
Brunei	4.88	4.59	4.67	4.54	4.43	4.15	3.94	3.98	3.91	3.79	4.01	3.90
Fiji	1.87	1.79	1.83	1.79	1.75	1.69	1.62	1.64	1.64	1.62	1.68	1.62
Malaysia	5.24	5.05	5.11	4.97	4.84	4.50	4.29	4.36	4.29	4.14	4.39	4.27
Singapore	4.88	4.59	4.67	4.54	4.43	4.15	3.94	3.98	3.91	3.79	4.01	3.90
Pakistan	23.23	21.32	21.95	21.00	20.40	19.20	17.85	18.24	18.28	17.83	19.40	18.82
PNG	1.53	1.44	1.47	1.43	1.39	1.32	1.25	1.27	1.26	1.24	1.30	1.30
Angola	72.24	72.24	67.84	66.23	66.23	65.14	65.14	65.14	65.14	65.14	62.94	62.94
Botswana	1.78	1.69	1.74	1.72	1.73	1.65	1.63	1.63	1.61	1.60	1.71	1.68
Gambia	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Kenya	18.75	18.08	18.37	17.87	17.88	17.10	16.43	16.38	18.83	18.87	19.82	19.50
Mozambique	67.80	65.60	63.20	69.64	58.95	55.45	54.80	55.35	53.85	53.35	58.65	56.35
Nigeria	1.27	1.27	1.27	1.27	1.27	1.27	1.24	1.23	1.21	1.21	1.21	1.21
Seychelles	15.80	14.25	13.08	12.70	12.65	12.15	11.78	11.65	11.35	11.30	11.47	11.60
South Africa	1.79	1.72	1.79	1.76	1.74	1.71	1.76	1.75	1.75	1.75	1.88	1.83
Tanzania	19.40	18.10	18.30	17.65	17.00	16.00	15.30	15.25	14.80	14.25	15.95	15.60
Uganda	18.75	18.08	18.37	17.85	17.87	150.00	150.00	145.00	140.00	140.00	150.00	160.00
Zaire	7.31	6.87	6.97	6.80	6.74	10.72	10.45	10.34	10.08	10.07	10.49	10.39
Zambia	1.93	1.82	1.87	1.83	1.80	1.74	1.68	1.67	1.62	1.63	1.70	1.67
Swaziland												
Canada	2.80	2.62	2.65	2.56	2.48	2.30	2.24	2.22	2.22	2.18	2.30	2.22
Jamaica	4.19	3.39	3.98	3.82	3.67	3.46	3.21	3.30	3.31	3.22	3.49	3.41
Trinidad	5.64	5.23	5.36	5.14	4.94	4.66	4.32	4.44	4.45	4.33	4.69	4.58
USA	2.35	2.18	2.23	2.14	2.06	1.94	1.80	1.85	1.86	1.81	1.95	1.91
France	11.49	11.05	11.11	11.24	11.42	11.08	10.80	10.84	10.35	10.46	10.94	10.88

SCURCE: FINANCIAL TIMES

IAL TRADING CURRENCIES: EXCHANGE RATES FOR YEAR 1982
(MONTH-END RATES: AVERAGE OF BUYING AND SELLING RATES)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
UAE	6.87	6.65	6.55	6.50	6.58	6.36	6.43	6.33	6.25	6.16	5.91	5.94
Bahrain	0.70	0.68	0.67	0.67	0.68	0.65	0.66	0.65	0.64	0.63	0.61	0.61
Qatar	6.81	6.59	6.49	6.44	6.53	6.30	6.37	6.27	6.20	6.10	5.86	5.84
Iran	150.75	148.25	147.40	146.00	146.40	146.20	146.50	146.50	145.85	144.95	137.50	135.00
Kuwait	0.53	0.52	0.51	0.51	0.51	0.50	0.50	0.50	0.50	0.49	0.47	0.47
Libya	0.55	0.54	0.53	0.53	0.53	0.51	0.52	0.51	0.50	0.50	0.48	0.48
Saudi Arabia	6.39	6.19	6.09	6.07	6.15	5.96	6.02	5.93	5.85	5.77	5.53	5.56
Sudan	1.68	1.64	1.60	1.60	1.61	1.55	1.58	1.65	1.53	1.51	2.11	2.13
Oman				0.61	0.62	0.60	0.61	0.60	0.59	0.58	0.56	0.55
Maldives	7.35	7.27	13.44	13.40	13.52	13.00	13.23	13.00	12.82	12.70	12.13	12.21
Bangladesh						38.35	38.25	38.82	38.80	38.72	38.80	38.80
Brunei	3.89	3.85	3.80	3.76	3.75	3.73	3.73	3.71	3.73	3.72	3.55	3.40
Fiji	1.67	1.65	1.64	1.62	1.64	1.62	1.65	1.64	1.64	1.63		
Malaysia	4.26	4.22	4.16	4.12	4.11	4.07	4.10	4.05	4.03	3.96	3.80	3.75
Singapore	3.89	3.85	3.80	3.76	3.75	3.73	3.73	3.71	3.73	3.72	3.55	3.40
Pakistan	18.95	19.29	19.64	20.24	20.50	20.74	21.09	20.85	20.70	20.95	20.30	20.65
PNG	1.31	1.30	1.29	1.27	1.29	1.28	1.31	1.31	1.31	1.32	1.23	1.21
Angola	62.94	62.94	62.94	62.69	62.69	62.69	62.69	62.69	51.56	51.56	50.86	48.68
Botswana	1.67	1.64	1.67	1.66	1.86	1.90	1.92	1.92	1.89	1.88	1.75	1.71
Gambia	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Kenya	19.42	19.13	19.05	18.73	18.95	18.88	18.95	18.78	18.52	18.48	17.33	20.32
Mozambique	55.15	54.25	53.55	52.80	53.65	52.25	54.35	52.70	51.55	51.30	49.90	48.10
Nigeria	1.21	1.20	1.20	1.19	1.20	1.17	1.18	1.17	1.17	1.16	1.10	1.09
Seychelles	11.74	11.50	11.45	11.35	11.40	11.37	11.39	11.41	11.35	11.28	10.68	10.58
South Africa	1.82	1.79	1.87	1.86	1.93	1.99	2.01	1.97	1.95	1.96	1.78	1.74
Tanzania	15.47	15.13	16.60	16.55	16.58	16.40	16.52	16.25	16.15	16.10	15.15	15.30
Uganda	160.00	159.00	150.00	150.00	155.00	165.00	170.00	170.00	170.90	170.00	163.10	382.50
Zaire	10.42	10.23	10.19	10.08	10.12	10.10	10.12	10.13	10.08	10.00	9.49	9.31
Zambia	1.67	1.65	1.64	1.62	1.63	1.63	1.64	1.63	1.62	1.61	1.53	1.50
Swaziland												
Canada	2.24	2.24	2.19	2.17	2.23	2.22	2119	2.13	2.10	2.06	1.99	1.99
Jamaica	3.32	3.25	3.17	3.18	3.20	3.07	3.12	3.07	3.03	3.00	2.87	2.88
Trinidad	4.47	4.37	4.27	4.26	4.30	4.13	4.20	4.13	4.07	4.04	3.86	3.88
USA	1.86	1.82	1.79	1.78	1.79	1.73	1.75	1.72	1.70	1.68	1.61	1.62
France	11.12	11.08	11.10	10.99	10.97	11.88	11.88	12.04	12.17	12.11	11.29	10.89

SOURCE: FINANCIAL TIMES

IAL TRADING CURRENCIES: EXCHANGE RATES FOR YEAR 1983
(MONTH-END RATES: AVERAGE OF BUYING AND SELLING RATES)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
UAE	5.60	5.56	5.44	5.73	5.87	5.60	5.61	5.61	5.52	5.49	5.37	5.33
Bahrain	0.58	0.57	0.56	0.59	0.60	0.58	0.58	0.57	0.56	0.56	0.55	0.55
Qatar	5.58	5.55	5.36	5.68	5.83	5.55	5.56	5.55	5.48	5.43	5.32	5.27
Iran	129.70	128.50	124.10	132.25	134.75	129.70	133.23	132.50	131.00	129.15	128.50	126.60
Kuwait	0.44	0.44	0.43	0.45	0.47	0.45	0.45	0.45	0.43	0.44	0.43	0.42
Libya	0.45	0.45	0.44	0.46	0.47	0.45	0.45	0.45	0.44	0.44	0.43	0.43
Saudi Arabia	5.24	5.21	5.11	5.39	5.52	5.33	5.27	5.31	5.23	5.20	5.08	5.08
Sudan	2.00	1.99	1.95	2.05	2.11	2.03	2.02	2.01	1.98	1.97	1.92	1.91
Oman	0.53	0.53	0.51	0.54	0.55	0.53	0.53	0.53	0.50	0.52	0.51	0.50
Maldives	11.48	11.44	11.20	11.78	12.10	11.65	10.78	11.54	11.35	11.29	11.02	10.95
Bangladesh	36.70	36.50	35.60	37.58	38.45	37.00	37.03	36.80	36.70	37.10	36.25	35.90
Brunei	3.16	3.14	3.09	3.28	3.35	3.22	3.26	3.26	3.21	3.19	3.12	3.07
Fiji												
Malaysia	3.48	3.45	3.39	3.61	3.68	3.57	3.42	3.58	3.52	3.51	3.43	3.38
Singapore	3.16	3.14	3.09	3.28	3.35	3.26	3.26	3.26	3.21	3.19	3.12	3.07
Pakistan	19.55	19.20	18.95	19.81	20.34	19.88	20.19	20.15	19.95	19.50	19.07	19.20
PNG	1.15	1.15	1.24	1.32	1.36	1.31	1.31	1.31	1.29	1.27	1.25	1.27
Angola	48.68	48.68	48.68	48.68	48.68	48.68	48.68	48.68	48.68	45.41	45.41	45.41
Botswana	1.64	1.62	1.60	1.67	1.73	1.67	1.67	1.69	1.65	1.67	1.68	1.67
Gambia	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Kenya	19.72	19.55	19.07	20.16	20.60	20.18	20.29	20.42	20.37	20.10	19.92	19.87
Mozambique	46.95	46.85	45.98	45.98	45.98	44.26	40.69	41.55	61.59	1.11	60.30	60.52
Nigeria	1.09	1.07	1.07	1.09	1.11	1.07	1.11	1.16			1.11	1.08
Seychelles	10.15											
South Africa	1.63	1.65	1.63	1.70	1.72	1.68	1.68	1.71	1.66	1.74	1.75	1.77
Tanzania	14.95	14.63	14.27	15.08	15.18	15.55	18.65	18.42	18.42	18.22	17.97	17.82
Uganda	342.00	342.00	357.50	422.50	432.50	427.50	454.94	417.00	397.50	462.00	497.50	412.00
Zaire	8.96	8.88	8.58	9.18	9.36	9.01	9.17	9.18	45.80	45.45	45.30	44.53
Zambia	1.81	1.78	1.73	1.85	1.90	1.83	1.85	1.96	1.95	1.95	2.00	2.05
Swaziland												
Canada	1.88	1.86	1.83	1.91	1.97	1.88	1.87	1.88	1.85	1.84	1.81	1.81
Jamaica	2.71	2.71	2.65	2.78	2.85	2.74	2.73	2.72	2.68	2.67	4.60	4.26
Trinidad	3.65	3.64	3.56	3.75	3.85	3.68	3.68	3.67	3.60	3.59	3.50	3.48
USA	1.52	1.52	1.48	1.56	1.60	1.54	1.53	1.53	1.58	1.50	1.47	1.45
France	10.53	10.45	10.79	11.54	12.09	11.67	12.05	12.10	12.15	11.93	12.03	12.07

SOURCE: FINANCIAL TIMES

IAL TRADING CURRENCIES: EXCHANGE INDEX VALUES FOR 1978
(BASED ON MONTH-END RATES: AVERAGE OF BUYING AND SELLING RATES) BASE:JANUARY 1978=100

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	HIGH	LOW	BASE
UAE	100	99.47	95.49	93.64	92.98	95.23	99.07	99.86	100.26	105.96	98.67	103.31	105.96	92.98	7.55
Bahrain	100	98.68	94.73	93.42	92.10	94.73	98.68	98.68	97.86	105.26	98.68	100.51	100.51	92.10	0.76
Qatar	100	99.47	95.49	94.03	92.98	95.23	99.07	99.86	100.26	105.96	98.67	103.31	105.96	92.98	7.55
Iran	100	100	96.32	94.85	93.38	95.58	100	100.73	101.47	108.82	106.25	114.87	114.87	93.38	136.00
Kuwait	100	101.85	94.44	94.44	92.59	94.44	96.29	98.14	100	103.70	100	101.85	103.70	92.54	0.54
Libya	100	98.27	94.82	93.10	93.10	94.82	48.27	100	100	106.89	100	103.44	106.89	93.10	0.58
Saudi Arabia	100	99.25	95.25	93.48	92.59	94.66	97.33	95.70	96.74	100.29	96.88	99.85	100.29	93.48	6.75
Sudan	100	98.52	95.58	94.11	92.64	110.29	113.23	114.70	116.17	123.52	114.70	120.58	123.52	92.64	0.68
Oman															0.67
Maldives															7.65
Bangladesh															27.63
Brunei															4.53
Fiji	100	98.81	95.85	94.08	94.08	94.08	94.67	95.85					100	94.08	1.69
Malaysia	100	98.69	95.44	-	94.36	95.87	96.96	96.96	97.18	95.44	93.27	97.18	100	94.36	4.61
Singapore	100	98.67	95.14	94.03	93.59	95.36	96.02	96.46	96.68	96.90	94.03	97.13	100	93.59	4.53
Pakistan	100	99.27	95.99	93.39	93.39	95.31	99.16	99.89	100.88	107.18	99.73	104.31	107.18	93.39	19.22
PNG															1.42
Angola	100	100.76	97.45	98.65	106.07	108.62	111.18	70.28	76.67	83.06	83.06	89.45	111.18	70.28	78.25
Botswana	100	99.37	96.27	93.78	93.16	96.77	99.37	100	101.24	108.07	100	104.96	108.07	93.16	1.61
Gambia	100	99.25	99.00	100.50	100.00	100.75	100.75	100.5	100.25	103.50	99.75	100.50	103.50	99.25	4.00
Kenya	100	98.38	94.44	93.34	93.08	93.08	94.76	95.86	95.73	96.96	95.15	97.15	100	93.08	15.47
Mozambique															62.19
Nigeria	100	100	100	100	100	100.84	102.54	104.23	107.62	107.62	107.62	107.62	107.62	100	1.18
Seychelles	100	99.39	100	100	100	100	100	100	100	100	100	100	100	99.39	13.33
South Africa	100	99.40	96.44	94.08	92.89	95.85	99.40	100.59	101.18	108.28	99.40	104.14	108.28	92.89	1.69
Tanzania	100	98.38	94.11	93.34	93.08	93.08	94.76	95.99	96.12	96.96	95.79	97.15	100	93.08	15.47
Uganda	100	99.54	93.90	94.68	92.13	93.77	94.16	95.08	95.34	97.18	94.68	96.72	100	92.13	15.25
Zaire	100	98.13	93.16	92.54	92.54	93.16	96.89	95.03	92.71	96.27	114.28	116.77	116.77	93.16	1.61
Zambia	100	99.31	105.51	102.75	102.75	105.51	106.20	108.27	106.89	110.34	106.89	108.27	110.34	99.31	1.45
Swaziland	100	99.40													1.69
Canada	100	100	98.14	95.83	93.51	97.22	100.92	103.70	108.33	113.88	105.55	112.03	112.03	93.51	2.16
Jamaica	100	108.64	103.70	101.64	115.63	118.93	123.04	127.98	129.62	143.20	134.56	142.38	142.38	100	2.43
Trinidad	100	99.35	95.93	95.93	93.14	95.93	99.35	100	101.28	107.92	100	106.20	107.92	93.14	4.67
USA	100	98.97	95.89	93.33	92.82	95.89	98.97	100	101.02	107.69	100	104.61	107.69	93.33	1.95
France	100	100.54	92.40	91.10	91.54	101.62	91.43	91.32	92.62	90.99	93.16	92.19	101.62	91.10	9.22

IAL TRADING CURRENCIES: EXCHANGE INDEX VALUE FOR 1979

(BASED ON MONTH-END RATES; AVERAGE OF BUYING AND SELLING RATES) BASE: JANUARY 1979=100

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	HIGH	LOW	BASE
UAE	101.19	102.38	105.29	104.50	104.23	110.06	116.55	112.84	109.40	105.43	109.93	110.72	116.55	101.19	7.55
Bahrain	100	101.31	105.26	103.94	103.94	110.52	115.78	111.84	109.21	105.26	109.21	110.52	115.78	100	0.76
Qatar	101.19	102.38	105.29	104.50	102.25	108.34	114.83	111.39	108.07	103.84	108.07	109.00	114.83	101.19	7.55
Iran	115.66	113.16	105.88	111.83	110.51	119.11	125.02	120.08	116.27	110.77	-	114.87	125.02	110.51	136.00
Kuwait	101.85	101.85	105.55	105.55	105.55	111.11	116.66	114.81	111.11	109.25	112.96	112.96	116.66	101.85	0.54
Libya	98.30	103.44	105.17	105.17	105.17	112.06	117.24	113.79	112.06	106.89	112.06	113.79	117.24	98.30	0.58
Saudi Arabia	98.51	100.14	103.11	102.96	103.25	108.44	111.85	111.85	108.14	105.18	109.92	110.81	111.85	98.51	6.75
Sudan	85.00	119.11	122.05	122.05	120.58	127.94	170.58	164.70	164.70	161.76	164.70	164.70	170.58	85.00	0.68
Oman															0.67
Maldives															7.65
Bangladesh															27.63
Brunei															4.53
Fiji	98.22	99.40	102.36	103.55	102.36	107.69	111.24	109.46	107.69	105.91	111.24	110.65	111.24	98.22	1.69
Malaysia	95.22	95.87	97.61	100	98.69	103.25	108.24	104.98	102.16	101.00	104.12	105.63	108.24	95.22	4.61
Singapore	95.14	96.68	100.22	100.66	101.32	104.85	110.15	106.84	103.53	101.32	105.73	105.96	110.15	95.14	4.53
Pakistan	102.44	103.74	106.34	105.56	105.35	112.22	119.19	115.40	112.38	107.70	113.16	113.83	115.40	102.44	15.22
PNG															1.42
Angola	83.06	89.45	76.83	76.81	76.81	76.81	82.38	86.59	86.59	83.89	80.10	79.59	86.59	76.81	78.25
Botswana	102.48	103.72	106.21	106.21	105.59	112.42	118.63	115.52	113.04	107.45	113.66	114.28	115.52	102.48	1.61
Gambia	99.75	100.50	100.75	100.75	100	100	100	100	100	100	100	100	100.75	99.75	4.00
Kenya	96.44	97.47	100.25	100.12	100.84	104.91	110.47	107.69	104.00	101.48	104.52	104.84	110.47	96.44	15.47
Mozambique											123.84	124.29	124.29	123.84	62.19
Nigeria	107.62	107.62	107.62	107.62	106.77	106.77	107.62	107.62	105.93	105.08	104.23	104.23	107.62	104.23	1.18
Seychelles	100	100	100	100	100	100	100	100	100	100	102.02	100.52	102.52	100	13.33
South Africa	102.36	101.18	103.55	103.55	102.36	109.46	114.79	111.24	107.10	103.55	111.24	108.87	114.79	101.18	1.61
Tanzania	106.01	107.30	109.89	108.59	107.95	114.73	121.84	118.61	117.97	112.79	117.00	118.61	121.84	106.01	15.47
Uganda	95.73	96.59	98.36	-	-	98.36	-	109.83	103.27	103.27	105.90	104.91	109.83	95.73	15.25
Zaire	200.62	193.78	199.37	198.75	201.24	208.69	220.49	286.33	276.39	274.53	277.63	280.12	280.12	193.78	1.61
Zambia	107.58	108.27	112.41	113.10	113.79	115.86	119.31	117.93	116.55	110.34	117.24	117.24	119.31	107.58	1.45
Swaziland															1.69
Canada	110.18	112.03	110.64	109.25	110.18	118.51	125.00	121.29	118.05	114.81	119.44	119.90	125.00	110.18	2.16
Jamaica	139.09	144.03	146.91	148.14	146.91	160.49	169.95	160.90	140.32	153.90	162.55	163.37	169.95	139.09	2.43
Trinidad	102.56	103.85	106.20	106.20	105.35	112.41	118.84	115.41	112.63	107.49	113.70	114.13	118.84	102.56	4.67
USA	102.05	103.58	106.15	106.15	105.12	112.30	118.46	115.38	112.30	107.69	113.95	113.84	118.46	102.05	1.95
France	92.40	93.38	96.85	98.04	98.80	101.40	106.72	103.68	97.07	96.31	96.52	96.74	106.72	92.40	9.22

IAL TRADING CURRENCIES:EXCHANGE INDEX VALUE FOR 1980

(BASED ON MONTH-END RATES;AVERAGE OF BUYING AND SELLING RATES)BASE:JANUARY 1980=100

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	HIGH	LOW	BASE
UAE	112.59	112.05	107.68	111.52	115.36	115.49	113.77	117.21	116.68	119.60	114.70	116.15	119.60	107.68	7.55
Bahrain	113.15	111.84	107.89	111.84	117.10	117.10	115.78	119.73	118.42	122.36	117.10	118.42	122.36	111.84	0.76
Qatar	110.77	109.53	105.96	110.19	113.24	113.50	112.71	115.76	115.09	118.01	113.77	115.09	118.01	105.96	7.55
Iran			115.61				120.81				125.18	126.50	126.50	115.61	136.00
Kuwait	114.81	122.22	111.11	114.81	116.66	116.66	116.66	118.51	118.51	122.22	118.51	120.37	122.22	111.11	0.54
Libya	115.51	115.51	110.34	115.51	118.96	120.68	118.96	122.41	122.41	124.13	118.96	122.41	124.13	115.51	0.58
Saudi Arabia	113.18	112.74	107.25	111.55	116.00	116.14	114.51	118.07	117.33	120.44	116.00	117.77	120.44	111.55	6.75
Sudan	164.70	-	161.76	166.17	172.05	172.05	269.11	282.35	280.88	286.76	276.47	280.88	286.76	161.76	0.68
Oman															0.67
Maldives															7.65
Bangladesh															27.63
Brunei	108.38	108.38	108.83	109.27	110.37	109.93	110.15	113.02	111.25	112.14	110.15	110.37	113.02	108.38	4.53
Fiji	112.42	112.42	110.05	111.83	111.83	112.42	112.42	114.20	112.42	114.20	111.83	111.83	114.20	110.05	1.69
Malaysia	107.37	107.15	107.37	109.54	109.54	109.54	109.97	110.70	110.62	113.44	112.14	114.75	114.75	107.15	4.61
Singapore	108.38	108.38	108.83	109.27	110.37	109.93	110.37	113.02	111.25	112.14	109.05	110.37	113.02	108.38	4.53
Pakistan	116.54	116.80	112.38	115.76	120.34	119.66	119.66	122.89	122.26	124.86	120.18	122.11	124.86	112.38	19.22
PNG									109.85	111.97	80.98	107.74	111.97	80.98	1.42
Angola	80.10	80.10	80.10	84.63	84.63	84.63	84.63	89.90	89.90	89.90	89.90	89.90	89.90	80.10	78.25
Botswana	111.18	110.55	106.21	110.55	114.90	113.66	113.66	115.52	114.90	118.01	106.83	109.31	118.01	106.21	1.61
Gambia	100	100	100	100	100	100	100	100	100	100	100	100	100	100	4.00
Kenya	107.88	108.08	107.75	108.79	110.73	110.66	110.66	113.63	112.99	116.80	114.54	116.16	116.80	107.75	15.47
Mozambique	112.07	109.02	102.58	105.01	105.11	108.13	108.29	108.69	108.69	114.88	109.18	112.07	114.88	102.58	62.19
Nigeria	104.23	105.08	105.08	107.62	107.62	107.62	107.62	107.62	107.62	107.62	107.62	107.62	107.62	104.23	1.18
Seychelles	100.90	107.27	106.15	108.02	108.77	108.77	110.27	112.52	111.77	115.52	114.55	115.15	115.52	106.15	13.33
South Africa	110.65	107.10	103.55	106.50	107.69	107.10	105.91	107.69	106.50	108.28	104.73	105.32	110.65	103.55	1.69
Tanzania	119.58	119.26	114.41	118.29	125.14	123.78	122.49	125.40	124.75	127.66	122.17	125.40	127.66	114.41	15.47
Uganda	109.44	109.83	108.19	109.83	111.47	112.13	111.93	115.21	114.55	118.49	116.19	117.83	116.19	108.19	15.25
Zaire	286.33	413.66	409.93	415.52	420.49	419.87	424.37	430.43	431.67	445.96	437.26	440.99	445.96	286.32	1.61
Zambia	122.06	122.75	122.06	122.75	119.31	124.82	125.51	128.27	128.96	133.10	131.03	132.41	113.10	119.31	1.45
Swaziland															1.69
Canada	125.23	118.51	119.44	124.53	125.46	125.46	125.46	128.70	129.62	131.94	129.62	131.94	131.94	118.51	2.16
Jamaica	167.90	164.60	158.84	165.43	171.60	172.83	172.01	176.54	175.30	178.60	172.42	175.30	176.54	164.60	2.43
Trinidad	117.34	115.20	111.13	115.84	120.12	121.19	120.34	123.76	122.91	125.26	120.77	122.91	125.26	111.13	4.67
USA	116.92	114.87	110.76	115.89	120.00	121.02	120.00	123.07	122.56	124.61	120.51	122.56	124.61	110.76	1.95
France	101.19	101.60	105.42	103.90	104.98	104.66	104.66	108.45	109.00	114.42	114.64	117.57	117.57	101.19	9.22

IAL TRADING CURRENCIES:EXCHANGE INDEX VALUE FOR 1981

(BASED ON MONTH-END RATES;AVERAGE OF BUYING AND SELLING RATES)BASE:JANUARY 1981=100

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	HIGH	LOW	BASE
UAE	114.70	105.69	108.74	104.10	100.92	94.96	88.74	89.27	89.00	88.21	95.49	93.11	114.70	89.00	7.55
Bahrain	117.10	107.89	110.52	102.63	102.63	97.36	90.78	90.78	90.78	89.47	97.36	94.73	117.10	90.78	0.76
Qatar	113.64	104.76	107.81	103.17	100	94.17	87.94	88.47	88.21	87.41	94.56	92.31	113.64	87.41	7.55
Iran	130.14	122.05	123.67	120.73	119.70	114.15	111.54	110.29	107.16	107.27	112.35	110.66	130.14	107.16	136.00
Kuwait	118.51	111.11	114.81	109.25	107.40	101.85	96.29	96.29	94.44	94.44	101.85	100	118.51	94.44	0.54
Libya	120.68	110.34	113.79	108.62	105.17	100	91.37	94.82	94.82	91.37	100	98.27	120.68	91.37	0.58
Saudi Arabia	116.44	107.40	110.96	106.51	104.14	98.66	92.14	93.03	92.44	91.85	99.40	97.03	116.44	92.14	6.75
Sudan	276.47	255.88	263.23	157.35	151.47	142.64	132.35	135.29	136.76	132.35	258.82	252.94	276.47	132.35	0.68
Oman															0.67
Maldives											101.17	100	101.17	100	7.65
Bangladesh															27.63
Brunei	107.72	101.32	103.09	100.22	97.79	91.61	86.97	87.85	86.31	83.66	88.52	86.09	107.72	83.66	4.53
Fiji	110.65	105.91	108.28	105.91	103.55	100	95.85	97.04	97.04	95.84	99.40	95.85	110.65	95.84	1.69
Malaysia	113.66	109.54	110.84	107.80	104.98	97.61	93.05	94.57	93.05	89.80	95.22	92.62	113.66	92.62	4.61
Singapore	107.72	101.32	103.09	100.20	97.79	91.61	86.97	87.85	86.31	83.66	88.52	86.09	107.72	83.66	4.53
Pakistan	120.86	110.92	114.20	109.26	106.13	99.89	92.87	94.90	95.10	92.76	100.93	97.90	120.86	92.76	19.22
PNG	107.74	101.40	103.52	100.70	97.88	92.95	88.02	89.43	88.73	87.32	91.54	91.54	107.74	88.02	1.42
Angola	93.08	92.31	86.69	84.63	84.63	83.24	83.24	83.24	83.24	83.24	80.43	80.43	93.08	80.43	78.25
Botswana	110.55	104.96	108.07	106.83	107.45	102.48	101.24	101.24	100	99.37	106.21	104.34	110.55	99.37	1.61
Gambia	100	100	100	100	100	100	100	100	100	100	100	100	100	100	4.00
Kenya	119.58	116.87	118.74	115.51	115.57	110.53	106.20	105.88	121.71	121.97	128.11	126.05	128.11	105.88	15.47
Mozambique	109.02	105.48	101.62	112.46	94.79	89.16	88.11	89.00	86.58	85.78	94.30	90.60	109.02	85.78	62.19
Nigeria	107.62	107.62	107.62	107.62	107.62	107.62	105.08	104.23	102.54	102.54	102.54	102.54	107.62	102.54	1.18
Seychelles	118.52	106.90	98.12	95.27	94.89	91.14	88.37	87.39	85.14	84.77	86.04	87.02	118.52	84.77	13.33
South Africa	105.91	101.77	105.91	104.14	102.45	101.18	104.14	103.55	103.55	103.55	111.24	108.28	111.24	101.18	1.69
Tanzania	125.40	117.00	118.29	114.09	109.89	103.42	98.90	98.57	95.66	92.11	103.10	100.84	125.40	92.11	15.47
Uganda	122.95	118.55	120.45	117.04	117.18	983.60	983.60	950.81	918.03	918.03	983.60	1049.18	1049.18	117.04	15.25
Zaire	454.03	426.70	432.91	422.36	422.36	665.83	649.06	642.23	626.08	625.46	651.55	645.34	665.83	422.36	1.61
Zambia	133.10	125.51	128.96	126.20	124.13	120.00	115.86	115.17	111.72	112.41	117.24	115.17	133.10	111.72	1.45
Swaziland															1.69
Canada	129.62	121.29	122.68	118.51	114.81	106.48	103.70	102.77	102.77	100.92	106.48	105.09	129.62	100.92	2.16
Jamaica	172.42	139.50	163.78	157.20	151.02	139.91	132.09	135.80	136.21	132.51	143.62	140.32	172.42	132.09	2.43
Trinidad	120.77	111.99	114.77	110.06	105.78	99.78	92.50	95.07	95.28	92.71	100.42	98.07	120.77	92.71	4.67
USA	120.51	111.79	114.35	109.76	105.64	99.48	92.30	94.87	95.38	92.82	100	97.94	120.51	92.30	1.95
France	124.62	119.84	120.49	121.90	123.86	120.17	117.13	117.57	112.25	113.44	118.65	118.00	124.62	112.25	9.22

IAL TRADING CURRENCIES:EXCHANGE INDEX VALUE FOR 1982

(BASED ON MONTH-END RATES;AVERAGE OF BUYING AND SELLING RATES)BASE:JANUARY 1982=100

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	HIGH	LOW	BASE
UAE	90.99	88.07	86.75	86.09	87.15	84.23	85.16	83.84	82.78	81.58	78.27	78.67	90.99	82.78	7.55
Bahrain	92.10	89.47	88.15	88.15	89.47	85.52	86.84	85.52	84.21	82.89	80.26	80.26	92.10	84.21	0.76
Qatar	90.19	87.28	85.96	85.29	86.49	83.44	84.37	83.04	82.11	80.79	77.61	77.35	90.19	82.11	7.55
Iran	110.84	109.00	108.38	107.64	107.64	107.50	107.72	107.72	107.24	106.58	101.10	99.26	110.84	107.24	136.00
Kuwait	98.14	96.14	94.44	94.44	94.44	92.59	92.59	92.59	92.59	90.74	87.03	87.03	98.14	92.59	0.54
Libya	94.82	93.10	91.37	91.37	91.37	87.93	89.65	87.93	86.20	86.20	82.75	82.75	94.82	86.20	0.58
Saudi Arabia	94.66	91.70	90.22	89.92	91.11	88.29	89.18	87.85	86.66	85.48	81.92	82.37	94.66	86.66	6.75
Sudan	247.05	241.17	235.29	235.29	236.76	227.94	232.35	242.64	225.00	222.05	310.29	313.23	247.05	225.00	0.68
Oman				91.04	92.53	89.55	91.04	89.55	88.05	86.56	83.58	82.08	92.53	88.05	0.67
Maldives	96.07	95.03	175.68	175.16	176.73	169.93	172.94	169.93	167.71	166.01	158.56	159.60	176.73	95.03	7.65
Bangladesh						138.79	138.43	140.49	140.42	140.13	140.42	140.42	140.42	138.43	27.63
Brunei	85.87	84.98	83.88	83.00	82.78	82.11	82.33	81.89	82.33	82.11	78.36	75.05	85.87	81.89	4.53
Fiji	98.81	97.63	97.04	95.85	97.04	95.85	97.63	97.04	97.04	96.44			98.81	95.85	1.69
Malaysia	92.40	91.54	90.23	89.37	89.15	88.28	88.93	87.85	87.41	85.90	82.42	81.34	92.40	87.41	4.61
Singapore	85.87	84.98	83.88	83.00	82.78	82.33	82.33	81.89	82.33	82.11	78.36	75.05	85.87	81.89	4.53
Pakistan	98.59	100.36	102.18	105.30	106.65	108.11	109.72	108.48	107.70	109.00	105.61	107.44	109.72	98.59	19.22
PNG	92.25	92.25	90.84	89.43	90.84	90.14	92.25	92.25	92.25	92.95	86.61	85.21	92.25	89.43	1.42
Angola	80.43	80.43	80.43	80.11(e)	80.11	80.11	80.11	80.11	65.89	65.84	64.99	62.21	80.43	65.89	78.25
Botswana	103.72	101.86	103.71	103.10	115.52	118.01	119.25	119.25	117.39	116.77	108.69	106.21	119.25	101.86	1.61
Gambia	100	100	100	100	100	100	100	100	100	100	100	100	100	100	4.00
Kenya	125.53	123.65	123.14	121.07	122.49	122.04	122.49	121.39	119.71	119.45	112.02	131.35	125.53	119.71	15.47
Mozambique	88.67	87.23	86.10	84.90	86.26	84.49	88.03	84.74	82.89	82.48	80.23	77.34	88.67	82.89	62.19
Nigeria	102.54	101.69	101.69	100.84	101.69	99.15	100	99.15	99.15	98.30	93.22	92.37	102.54	99.15	1.18
Seychelles	88.07	86.27	85.89	85.14	85.52	85.29	85.44	85.59	85.14	84.62	80.12	79.36	88.07	85.14	13.33
South Africa	107.69	105.91	110.65	110.05	114.20	115.38	118.93	116.56	115.38	115.97	105.32	102.95	118.93	105.91	1.69
Tanzania	100	97.80	107.30	106.98	107.17	106.01	106.78	105.04	104.39	104.07	97.93	98.90	107.30	97.80	15.47
Uganda	1049.18	1042.62	983.60	983.60	1016.29	1081.96	1098.90	1114.75	1114.75	1114.75	1069.50	2508.19	1114.75	983.60	15.25
Zaire	647.20	635.40	632.91	626.08	628.52	627.32	628.57	629.19	626.08	621.11	589.44	578.26	647.20	626.08	1.61
Zambia	115.17	113.79	113.10	111.72	112.41	112.41	113.10	112.41	111.72	111.03	105.51	103.44	115.17	111.72	1.45
Swaziland															1.69
Canada	103.70	103.70	101.38	100.46	103.24	102.77	101.38	98.61	97.22	95.37	92.12	92.12	103.70	97.22	2.16
Jamaica	136.62	133.74	130.45	130.86	131.68	126.33	128.39	126.33	124.69	123.45	118.10	118.51	136.62	124.69	2.43
Trinidad	95.71	93.57	91.43	91.22	92.07	88.43	89.99	88.43	87.15	86.50	82.65	83.08	95.71	87.15	4.67
USA	95.38	93.33	91.79	91.28	91.79	88.71	89.74	88.20	87.17	86.15	82.56	83.07	95.38	87.17	1.95
France	120.60	120.17	120.39	119.19	118.98	128.85	128.85	130.58	131.99	131.34	122.45	118.11	131.99	118.98	9.22

IAL TRADING CURRENCIES:EXCHANGE INDEX VALUE FOR 1983

(BASED ON MONTH-END RATES;AVERAGE OF BUYING AND SELLING RATES)BASE:JANUARY 1983=100

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	HIGH	LOW	BASE
UAE	74.17	73.64	72.05	75.89	77.74	74.17	74.30	74.30	73.11	72.72	71.13	70.60	77.74	71.13	7.55
Bahrain	76.31	75.00	73.68	77.63	78.94	76.31	76.31	75.00	73.68	73.68	72.37	72.37	78.94	72.37	0.76
Qatar	73.90	73.50	70.99	75.23	77.22	73.50	73.64	73.51	72.58	71.92	70.46	69.80	77.22	69.80	7.55
Iran	95.36	94.48	91.25	97.24	99.08	95.37	97.96	97.43	96.32	94.96	94.49	93.09	99.08	91.25	136.00
Kuwait	81.48	81.48	79.62	83.33	87.03	83.33	83.33	83.33	79.63	81.48	79.63	77.78	87.03	77.78	0.54
Libya	77.58	77.58	75.80	79.31	81.03	77.58	77.58	77.58	75.86	75.86	74.14	74.14	81.03	74.14	0.58
Saudi Arabia	77.62	77.18	75.70	79.85	81.77	78.96	78.07	78.66	77.48	77.04	75.26	75.26	81.77	75.26	6.75
Sudan	294.11	292.64	286.76	301.47	310.29	298.52	297.05	295.58	293.30	289.71	282.35	280.88	310.29	280.85	0.68
Oman	79.10	79.10	76.11	80.59	82.08	79.10	79.10	79.10	74.63	77.61	76.12	74.63	82.08	74.63	0.67
Maldives	150.06	149.54	146.40	153.98	158.17	152.29	140.91	150.85	148.37	147.58	144.05	143.14	158.17	140.91	7.65
Bangladesh	132.82	132.10	128.84	136.01	139.16	133.91	134.02	133.19	132.83	134.27	131.20	129.93	139.16	128.84	27.63
Brunei	69.75	69.31	68.21	72.40	73.95	71.08	71.96	71.96	70.86	70.42	68.87	67.77	73.95	67.77	4.53
Fiji															
Malaysia	75.48	74.83	73.53	78.30	79.82	77.44	74.19	77.66	76.36	76.14	74.40	73.32	79.82	73.32	4.61
Singapore	69.75	69.31	68.21	72.41	73.95	71.96	71.9	71.96	70.86	70.42	68.87	67.77	73.95	67.77	4.50
Pakistan	101.71	99.89	98.59	103.06	105.83	103.43	105.04	104.83	103.80	101.46	99.22	99.90	105.83	99.22	19.22
PNG	80.98	80.98	87.32	92.95	95.77	92.25	92.25	92.25	90.85	89.44	88.03	89.44	95.77	80.98	1.42
Angola	62.21	62.21	62.21	62.21	62.21	62.21	62.21	62.21	62.21.	58.03	58.03	58.03	62.21	58.03	78.25
Botswana	101.86	100.62	99.32	103.73	107.45	103.73	103.73	104.97	102.48	103.73	104.35	103.73	107.45	99.32	1.61
Gambia	100	100	100	100	100	100	100	100	100	100	100	100	100	100	4.00
Kenya	127.47	126.37	123.27	130.31	133.35	130.44	131.16	131.99	131.67	129.93	128.77	128.44	133.35	123.27	15.47
Mozambique	75.04	75.33	73.93	73.93	73.94	71.17	65.43	66.81	99.04	97.99	96.96	97.31	99.04	65.43	62.19
Nigeria	92.37	90.67	87.28	92.37	94.07	90.67	94.07	98.31	96.61	94.07	94.07	91.53	98.31	87.28	1.18
Seychelles	76.14														13.33
South Africa	96.44	97.63	96.44	100.59	101.78	99.41	99.41	101.18	98.22	102.96	103.55	104.73	104.73	96.44	1.69
Tanzania	96.63	94.57	92.24	97.48	98.13	100.52	120.56	119.07	119.07	117.78	116.16	115.19	120.56	92.24	15.47
Uganda	2242.62	2242.62	2344.26	2770.49	2836.06	2803.27	2983.21	2734.42	2606.56	3029.51	3262.30	2632.59	2983.21	2242.62	15.25
Zaire	556.52	551.55	532.91	570.19	581.36	559.63	569.56	570.18	2844.72	2822.98	2813.66	2765.84	2844.72	532.91	1.61
Zambia	112.42	110.55	107.45	127.58	131.03	126.20	127.58	135.17	134.48	134.48	137.93	141.38	141.38	107.45	1.45
Swaziland															1.63
Canada	87.03	86.11	92.12	88.42	91.20	87.04	86.57	87.03	85.65	85.19	83.80	83.80	92.12	83.80	2.16
Jamaica	111.52	111.52	109.05	114.40	117.28	112.75	112.34	111.94	110.29	109.88	189.30	175.31	189.30	109.05	2.43
Trinidad	78.15	77.94	76.23	80.29	82.44	78.80	78.80	78.58	77.09	76.87	74.95	74.52	80.29	74.52	4.67
USA	77.94	77.94	75.89	80.00	82.05	78.97	78.46	78.46	76.92	76.92	75.38	74.36	82.05	74.36	1.95
France	114.20	113.34	117.02	125.16	131.12	126.57	130.69	131.23	131.78	129.39	130.48	130.91	131.78	113.34	9.22

Currency index values: High and low values 1978-1983

Base 100 = January 1978

Currency	1978 high	1978 low	1979 high	1979 low	1980 high	1980 low	1981 high	1981 low	1982 high	1982 low	1983 high	1983 low
Saudi Riyal	100.29	93.28	111.85	98.51	120.44	111.55	116.44	92.14	94.66	86.66	81.77	75.26
Malaysian Ringitt	100.00	94.36	108.24	95.22	114.75	107.15	113.66	92.62	92.40	87.41	79.82	73.32
Singapore Dollar	100.00	93.59	110.15	95.14	113.02	108.38	107.72	83.66	85.87	81.89	73.95	67.77
Pakistan Rupee	107.18	93.39	115.40	102.44	124.86	112.38	120.86	92.76	109.76	98.59	105.83	99.22
South African Rand	108.28	92.89	114.79	101.18	110.65	103.55	111.24	101.18	118.93	105.91	104.73	96.44
Zambian Kwacha	110.34	99.31	119.31	107.58	113.10	119.31	133.10	111.72	115.17	111.72	141.38	107.45
US Dollar	107.69	93.33	118.46	102.05	124.61	110.76	120.51	92.30	95.38	87.17	82.05	74.36
French Franc	101.62	92.10	106.72	91.40	117.57	101.19	124.62	112.25	131.99	118.98	131.78	113.34

COEFFICIENT OF VARIANCE: CURRENCIES

Currency	1978 C.of V. mean	1978 C.of V. initial	1979 C.of V. mean	1979 C.of V. initial	1980 C.of V. mean	1980 C.of V. initial	1981 C.of V. mean	1981 C.of V. initial	1982 C.of V. mean	1982 C.of V initial	1983 C.of V. mean	1983 C.of V. initial	78 to 83 C.of V. mean	78 to 83 C.of V. initial
Saudi Riyal	2.58	4.03	4.15	8.97	2.93	3.41	7.79	15.00	4.05	7.73	2.36	2.37	13.15	13.06
Malaysian Ringgit	1.84	4.04	3.83	7.67	2.10	3.47	8.11	13.81	3.61	5.96	2.56	2.65	12.25	12.57
Singapore Dollar	1.90	4.24	4.03	9.05	1.27	2.05	8.31	15.10	3.61	5.96	2.56	2.87	14.67	15.52
Pakistan Rupee	3.89	3.95	4.58	8.68	2.90	3.88	8.55	16.49	3.21	8.03	2.29	2.36	7.77	10.56
South African Rand	4.09	4.12	3.98	5.86	1.64	3.86	2.57	2.80	4.62	6.12	2.62	4.74	5.30	7.40
Zambian Kwacha	3.08	6.15	3.24	6.99	3.53	5.12	5.53	10.74	2.92	4.37	4.85	6.66	8.39	20.51
US Dollar	4.16	4.21	4.55	8.95	3.23	3.92	8.66	16.37	4.21	7.67	2.77	2.79	14.37	14.33
French Franc	11.4	15.12	4.13	7.06	3.90	7.52	2.90	5.33	4.23	5.32	5.32	11.83	12.08	17.66

Note: Two types of Calculation undertaken. I) Conventional calculation with spread about the mean. II) Unconventional calculation showing spread about the initial exchange rate value as last week in January of each year and January 1978 to the calculations in the final columns.

SHAPE OF DISTRIBUTION OF EXCHANGE RATES 1978 - 1983
(using monthly rates)

Currency	Mean in Currency Value	Standard Deviation	Coefficient of Variance	Test of Skewness	Test of Kurtosis	C of V against Initial Exchange rate	Initial Exchange rate
Saudi Riyal	6.58	0.865	13.152%	(0.0806)	1.970	13.06%	6.75
Malaysian Ringitt	4.39	0.538	12.250%	(0.295)	2.14	12.57%	4.61
Singapore Dollar	4.19	0.616	14.699%	(0.300)	1.88	15.52%	4.53
Pakistan Rupee	20.47	1.591	7.770%	0.432	2.31	10.56%	19.22
South African Rand	1.77	0.94	5.304%	0.388	2.98	7.40%	1.69
Zambian Kwacha	1.71	0.143	8.395%	0.279	2.24	20.52%	1.45
US Dollar	1.94	0.279	14.37%	(0.037)	1.92	14.33%	1.95
French Franc	10.27	1.24	12.08%	(0.075)	1.705	17.65%	9.22
				0 +1 skewed to Right	3.00 is a normal distribution		
				-1 0 skewed to Left			

Appendix 3

Overseas Branches Details of Types of Contracts

NIGERIA

Currency: Naira

Type of Contract: Manpower provision (Aviation)

Description: IAL provides approximately ten Electronic and Electrical Engineers at Lagos Airport and Kano Airport.

Financial Arrangement

A station cash account is operated. A copy of the cash book is sent to the UK at the end of each month. Lagos acts as the main station with Kano acting as the smaller sub-station.

A swap arrangement operates with British Airways. Surplus funds are transferred to British Airways for their local use in Nigeria. Equivalent sums in sterling are then paid to IAL by British Airways in the UK. The sterling equivalent sums being calculated on the basis of month-end exchange rate. The sterling equivalent of Nairas being valued in the month in which transfer to B.A.was made. These arrangements are to overcome local exchange control problems.

Exposure IAL is exposed purely on Profit as income and expenditure is matched in the local currency.

PHILIPPINES

Currency: Peso

Type of Business: Agency for Japanese manufactured teleprinters (Commercial)

Description: An IAL representative sells Japanese manufactured teleprinters using the IAL name. IAL receives a commission on each sale.

Financial Arrangements

IAL finances its representative by transferring money from the UK on a monthly basis to meet local expenses. The representative derives his income from the receipt of a commission paid locally on the sale of the equipment. Customers for the equipment make payment directly to the manufacturer. IAL receives its commission in the UK (from a Hong Kong based company) in US Dollars. This money accounts for IAL's profit and expenses money transferred to the Philippines.

Transfers from the UK are made on a regular monthly basis, with one exception. In January 1982 an addition payment to cover rent paid in advance on premise was made.

A dual set of accounts are maintained. The local currency cash book is not translated into sterling at a month end exchange rate in the same manner as all other overseas statements. Instead only the actual sterling value of payments received and transfers made is recorded.

Exposure

IAL is exposed on the sums it transfers to Manila, until it receives payment of commission in the UK.

SEYCHELLES

Currency: Seychelles Rupee

Type of Business: Manpower Provision Contract (Aviation)

Description: IAL provides two members of staff as metrological officers.

Financial Arrangements

A station cash account is operated and a copy of the cash book returned to the UK at the end of each month.

Payment is received locally monthly, one month in arrears from the Seychelles Government. In addition to the main monthly contract payment IAL receives payment for accommodation it rents for contract staff.

The contract income is sufficient to finance all local running expenses and payments are received regularly leading to no cash short falls. No transfers are made from the UK. Surplus money is returned to the UK as and when available locally.

SHARJAH

Currency: UAE Dirham

Type of Business: Manpower provision contract (Aviation)

Description: IAL provides Air Traffic Control Officers, Metrological Officers and Mechanical and Electronic Engineers at Sharjah International Airport.

Financial Arrangements

The branch has been operated on a cash account basis since February 1981. A copy of the cash book is returned to the UK at the end of each month.

The station receives payment for its operation from the D.C.A on the basis of an annual budget for expenditure plus a management fee. Payment of a fixed sum is made monthly on the basis of this budget. At the end of each financial year. the surplus of the budgeted payment over the actual agreed expenditure is repaid to the D.C.A.

From the sample period it can be seen that IAL was a net debtor to the D.C.A for all but one month,when the D.C.A payment was received late.

IAL is only exposed on its profits from the contract as the contract does not require any external funding.

ZIMBABWE

Type of contract: Manpower Provision
(Aviation)

Description: I.A.L provides six members of staff at the airport in the form of Air Traffic Control Officers.

Financial Arrangements

Only Financial transactions take the form of salaries. All salaries are not paid locally but instead paid by IAL into UK bank accounts. Staff on location receive money in the form of cash advances to meet local needs. All the expenses and cash advances are made by IAL from money borrowed locally from British Airways. British Airways then invoices IAL in the UK for the sterling equivalent of the locally used funds. This is effectively a swap arrangement which overcomes exchange control problems in the local currency.

The contract has operated since 1st January 1982.

Accounting arrangements

No cash account or branch account is operated.

BAHRAIN

Currency: B Dinars

Type of Business: Manpower provision contract(Aviation) and Commercial Sales Office

Description: IAL provides Air Traffic Control Officers, Metrological Officers and Electronic Engineers at Bahrain International Airport. Also a small number of IAL Personnel in the form of Electronic Sales Engineers at a Commercial Group Sales Office.

Financial Arrangements

The branch is sufficiently large to warrant the preparation of its own branch accounts, to the level of a balance sheet and a profit and loss account.

The contract value is agreed annually and payments made monthly. The branch holds a Head Office account which details transactions between IAL Southall and Bahrain.

Exposure

The Head Office branch account balance acts as a good measure of the sums exposed and comprises, the contract profit, known as station excess, expenses incurred by H.O.on behalf of the branch, negative items such as those incurred by the station on behalf of the station.

MOZAMBIQUE

Currency: Meticals

Type of Business: Manpower provision Contract (Aviation)

Description: IAL provides six Electronic Engineers at two locations, Beira and Mupato.

Financial Arrangements

A station cash account is operated. A copy of the station cash book is returned to the UK at the end of each month. One of the stations Mupato, operates as the main station for financial purposes. Beira acts as a sub-station. Transactions between the UK and Mozambique take place through Mupato.

Contract payments do not appear to be made on a regular basis from the customer. Instead large sums are received periodically. No transfers are made from the UK to the station. Hence all local currency expenses are covered by locally derived income.

Exposure

IAL is only exposed on profit. Quantification of the value of exposed profit is difficult to access, because of the erratic nature of contract income payments. During the sample period only one contract payment was received.

THE GAMBIA

Currency: Dalasi

Type of Business: Manpower provision contract (Aviation)

Description: IAL provides three members of staff, two Air Traffic Control Officers and one Electronic Engineer at Banjul Airport.

Financial Arrangements

A cash account is operated and a copy of the cash book is sent to the UK at the end of each month.

Payment for the contract is made on a man-month basis.

Invoices are raised locally for payment. The contract is valued for payment part in local currency and part in sterling. The Dalasi element being paid locally and the sterling element in the UK.

Exposure

The critical factor in accessing the exposure on this contract is the nature of the Gambian currency. Whilst transfers have been made from the UK, to cover short-falls in domestic funds these are not important. The Gambian Dalasi is liked to the Pound Sterling at a fixed parity. This means effectively that the sums committed in Gambian Dalasi can be considered as sterling sums.

DUBAI

Currency: UAE Dirhams

Type of Business: i) Manpower provision contract (Aviation)
ii) Commercial Supplies

Description: i) IAL provides personnel in the form of 17 Air Traffic Control Officers, 12 metrological Officers and 6 Mechanical/Electronic Engineers iii) a small commercial group station comprising two Sales Engineers and three Electronic Engineers.

Financial Arrangements

A station cash account is operated. A copy of the cash book is returned to the UK at the end of each month. Payment for the contract is made locally by the Dubai Government on the basis of invoices raised by the branch. The contract payment schedules calls for invoices to be paid within 30 days of presentation.

The branch is self-financing from contract income. Transfers are made to the UK when surpluses arise.

All but a few minor costs are incurred and paid locally. The Branch runs sufficient surpluses at times to warrant money being placed in a local time deposit account. Payment for equipment sales is made locally and the cost of the equipment charged against sums remitted to the UK.

Exposure

Exposure is limited to profits only. This is held to a minimum with regular payments to the UK of surplus funds.

RAS-AL-KHAIMAH

Currency: UAE Dirham

Type of Business: Manpower provision and supplies contract (Aviation)

Description

IAL provides air traffic control officers, mechanical and electronic engineers at the international airport. Also IAL supplies equipment and spares for use at the airport.

Financial Arrangements

The branch prepares its own accounts to the level of profit and loss and balance sheet.

The contract is financed on a cost-plus basis. IAL invoices the customer for the value of the monthly running costs and adds an administration fee at the rate of 21 per cent for the manpower costs and 3 per cent for the equipment supplied.

Exposure

The branch does not require any funding from the UK. Exposure is mainly confined to profits. Addition exposure arises from the purchase of supplies outside of the country which are paid for in local currency.

QATAR

Currency: Qatar Riyal

Type of Business: Manpower provision contract with equipment supplies (Aviation)

Description

IAL provides air traffic controllers, metrologiacl officers and mechanical/ electronic engineers at Doha International Airport. IAL also provides quanties of supplies and fuels which fall outside of the main financial provisions of the Contract.

Financial Arrangements

The branch is sufficiently large to warrant the preparation of its own Profit and loss and balance sheet locally.

The main contract is on a cost-plus basis. IAL receives an administration fee of 20 per cent of the operating costs in any given month. The administration fee is not chargable on the supplies provided.

An unusual feature of the branch is that it runs a continuous overdraft at its local bank. Overdraft interest is chargable as a contract running cost. In addition the customer runs a special loan account upon which IAL draws for running costs of the contract. These two arrangements allow the Branch to repatriate money to the UK regularly even when contract payment are not received on the due dates.

Exposure

Local cost and revenues are matched with no money transferred in from the UK. Exposure is therefore only on local profit.

Appendix 4

List of IAL Senior Managers who part
in Accounts User Survey

Survey question check list

Sample of IAL's Management Accounts

Participants in the survey of uses of management accounting information

In the case of each business group the involvement of Senior Management was slightly different.

Aviation Group	- The Group's Director (a non-IAL main Board Director)
Commercial Group	- The Group's Director (a non-IAL main Board Director) and all three of the Groups General Managers.
Products and Computers Group	The Group's Director (an IAL main Board Director) and one of the Group's General Managers.
Medical Services Group	The Group's only General Manager

Outline of questions for survey of IAL Senior Management on the use of sterling management accounting information

General Aim - to consider how useful the current system of sterling Management Account reporting is to the UK Management of IAL.

Questions

1. What information presented in the UK Management Accounts is relevant to your business activity?

2. Over what aspects of overseas business activity do you have control?

3. What decisions do you take on the basis of information presented in the UK Management Accounts?

4. Do you take into account the effects of exchange rate changes on reported sterling figures? If so in what way?

5. Do you have a clear appreciation of how sterling budget variances are calculated for overseas business?

6. Do you participate in the construction of budget exchange rate forecasts? If so, what is your input into the process?

7. Do you know the way in which sterling budgets for overseas operations are calculated?

8. As a consequence of the accounting system used by IAL the reported sterling value of profits as shown in Management Accounting information is not always the same as the ultimate sterling cash profits received in the UK. Do you consider this important and if so in what ways do you take it into account when considering sterling performance?

9. Do you have any suggestions as to ways in which the presentation of accounting information for sterling monthly management accounts could be improved?

STATEMENT NO. 2
MONTH FEBRUARY 1983

INTERNATIONAL AERADIO plc GROUP

GROUP SUMMARY

TURNOVER

CUMULATIVE			ANNUAL		PROFIT CUMULATIVE			ANNUAL
Actual	Variance	Exchange Adjustment to Budget	Budget		Actual	Variance	Exchange Adjustment to Budget	Budget
£'000	£'000	£'000	£'000		£'000	£'000	£'000	£'000
13,593	(1,905)	1,575	74,730	Aviation	1,371	(71)	149	6,999
5,769	(1,756)	890	39,843	Commercial	69	(68)	18	2,371
4,317	(630)	122	31,343	Products & Computer Services	363	(20)	2	3,054
21,339	(7,524)	4,608	140,556	Medical Services	1,357	(528)	317	9,443
486	186	-	2,505	Recruitment Services	161	98	-	103
,504	(11,629)	7,195	288,977		3,321	(589)	486	21,970
				Less:				
				Group Administration	444-	276	-	4,325-
				Group Development	17-	109	-	756-
				Add:				
				Exchange Gains	30	-	(20)	300
					2,890	(204)	466	17,189
				Add:				
				Interest Receivable	40	-	-	239
				Investment Income	-	-	-	101
				Less:				
				Interest Payable	35-	1	-	215-
					2,895	(203)	466	17,314
				Less:				
				Goodwill write-off	140-	-	-	840-
8,381-	2,098	(1,307)	50,470-	Intra Group Sales	-	-	-	-
				TOTAL BEFORE TAX	2,755	(203)	466	16,474
				Less:				
				Taxation	1,554-	(143)	(157)	7,310-
				Outside Interests	350-	138	(81)	3,587-
37,123	(9,531)	5,888	238,507		851	(208)	228	5,577

STATEMENT NO. 2
MONTH FEBRUARY 1983

INTERNATIONAL AERADIO plc GROUP

GROUP SUMMARY

TURNOVER

CUMULATIVE			ANNUAL	
Actual	Variance	Exchange Adjustment to Budget	Budget	
£'000	£'000	£'000	£'000	
13,593	(1,905)	1,575	74,730	Aviation
5,769	(1,756)	890	39,843	Commercial
4,317	(630)	122	31,343	Products & Computer Services
21,339	(7,524)	4,608	140,556	Medical Services
486	186	-	2,505	Recruitment Services
,,504	(11,629)	7,195	288,977	
				Less:
				Group Administration
				Group Development
				Add:
				Exchange Gains
				Add:
				Interest Receivable
				Investment Income
				Less:
				Interest Payable
				Less:
				Goodwill write-off
8,381-	2,098	(1,307)	50,470-	Intra Group Sales
				TOTAL BEFORE TAX
				Less:
				Taxation
				Outside Interests
37,123	(9,531)	5,888	238,507	

PROFIT

CUMULATIVE			ANNUAL
Actual	Variance	Exchange Adjustment to Budget	Budget
£'000	£'000	£'000	£'000
1,371	(71)	149	6,999
69	(68)	18	2,371
363	(20)	2	3,054
1,357	(528)	317	9,443
161	98	-	103
3,321	(589)	486	21,970
444-	276	-	4,325-
17-	109	-	756-
30	-	(20)	300
2,890	(204)	466	17,189
40	-	-	239
-	-	-	101
35-	1	-	215-
2,895	(203)	466	17,314
140-	-	-	840-
-	-	-	-
2,755	(203)	466	16,474
1,554-	(143)	(157)	7,310-
350-	138	(81)	3,587-
851	(208)	228	5,577

STATEMENT NO. 3
MONTH FEBRUARY 1983

INTERNATIONAL AERADIO plc GROUP

AVIATION GROUP

TURNOVER

CUMULATIVE			ANNUAL	
Actual	Variance	Exchange Adjustment to Budget	Budget	
£'000	£'000	£'000	£'000	
8,704	(1,303)	1,159	41,783	Operations: Overseas
313	(97)	-	2,464	UK
1,234	677	-	3,340	Security Systems
647	(253)	-	5,400	Equipment Sales
80	(29)	-	655	Airline Services
537	27	-	3,058	Bailbrook College
-	(65)	-	390	Training Services
-	(3)	-	20	Consultancy
-	(2)	-	15	AIS
				SUB-TOTAL
				Less: Group Overheads
11,515	(1,048)	1,159	57,125	
				SUBSIDIARY COMPANY
2,053	(613)	416	15,109	ODSI
				ASSOCIATED COMPANY
25	(244)	-	2,496	BAI
13,593	(1,905)	1,575	74,730	TOTAL AVIATION GROUP (to Statement No. 2)
				Less:
				Outside Interests
13,593	(1,905)	1,575	74,730	

PROFIT

CUMULATIVE			ANNUAL
Actual	Variance	Exchange Adjustment to Budget	Budget
£'000	£'000	£'000	£'000
1,014	(171)	127	4,134
7	(15)	-	128
162	102	-	365
147	42	-	628
13-	(25)	-	70
142	36	-	634
14-	(20)	-	40
-	(3)	-	15
-	(1)	-	10
1,445	(55)	127	6,024
141-	48	-	1,131-
1,304	(7)	127	4,893
89	(50)	22	1,961
22-	(14)	-	145
1,371	(71)	149	6,999
29-	25	(9)	908-
1,342	(46)	140	6,091

STATEMENT NO. 4
MONTH FEBRUARY 1983

INTERNATIONAL AERADIO plc GROUP

COMMERCIAL GROUP

TURNOVER					PROFIT			
CUMULATIVE			ANNUAL		CUMULATIVE			ANNUAL
Actual	Variance	Exchange Adjustment to Budget	Budget		Actual	Variance	Exchange Adjustment to Budget	Budget
£'000	£'000	£'000	£'000		£'000	£'000	£'000	£'000
-	(30)	-	175	Overseas Operations	12-	(23)	-	67
2	(2)	-	21	E.S.U.	3-	-	-	18-
74	(2)	-	450	Merchandising	12	10	-	10
2	(104)	-	630	Hotel Systems	20-	(31)	-	66
148	(1,158)	-	7,833	Communications Systems	4	(220)	-	1,346
81	(3)	-	500	Supplies Services	21	7	-	80
					2	(257)	-	1,551
-	(26)	-	152	Consultancy	-	(16)	-	101
-	-	-	-	Commission	7	(2)	-	55
307	(1,325)	-	9,761		9	(275)	-	1,707
				SUBSIDIARY COMPANIES				
372	(157)	101	2,657	IA Far East	6	(3)	2	62
39	17	4	193	IA Brunei	3	1	-	26
96	(31)	20	675	IAL PNG/NB *	-	(7)	1	54
16	(11)	4	101	IA Pakistan	1	(9)	2	5
211	(126)	56	3,333	IA North America	124-	14	(22)	120-
734	(308)	185	6,959		114-	(4)	(17)	27
				ASSOCIATED COMPANIES				
28	(72)	19	556	IA Malaysia	3	2	-	18
525	4	84	3,297	ATS	44	14	5	356
163	(5)	27	1,173	Albwardy - IAL	6	13	(1)	69
345	-	55	1,770	Abu Dhabi - IAL *	44	-	7	238
2,341	-	374	8,054	SIAL *	131	-	21	783
-	-	-	300	TSC - Kuwait	-	-	-	10
269	39	11	1,835	IA East Africa	-	15	(1)	15
55	17	5	215	Aeradio Tanzania	9	8	-	3
49	(9)	(1)	392	IA Zambia	39	34	-	208
-	-	-	1,394	R. Paging/E. Rentals	-	-	-	70
58	-	12	273	IA Botswana *	19	-	4	90
251	(25)	44	729	Comtech	41	17	4	114
441	(27)	75	1,154	Cartel *	35	58	(4)	21
201	(45)	-	1,981	ECL	-	1	-	114
4,728	(123)	705	23,123		371	162	35	2,109
5,769	(1,756)	890	39,843		266	(117)	18	3,843
				Less:				
				Group Overheads	197-	49	-	1,472-
				TOTAL COMMERCIAL GROUP (to Statement No. 2)	69	(68)	18	2,371
				Less:				
				Outside Interests	193-	(83)	(19)	1,152-
5,769	(1,756)	890	39,843		124-	(151)	(1)	1,219

* Estimated Results

STATEMENT NO. 6
MONTH FEBRUARY 1983

INTERNATIONAL AERADIO plc GROUP

MEDICAL SERVICES GROUP

TURNOVER

CUMULATIVE			ANNUAL		PROFIT CUMULATIVE			ANNUAL
Actual	Variance	Exchange Adjustment to Budget	Budget		Actual	Variance	Exchange Adjustment to Budget	Budget
£'000	£'000	£'000	£'000		£'000	£'000	£'000	£'000
,785	(1,401)	1,307	36,295	Medical Services Division	627	(263)	158	4,416
				ASSOCIATED COMPANIES				
383	(6,211)	3,288	103,835	IHG (IHG)	713	(272)	157	4,959
171	88	13	426	IHG (MS)	17	7	2	68
14,554	(6,123)	3,301	104,261		730	(265)	159	5,027
21,339	(7,524)	4,608	140,556	TOTAL MEDICAL SERVICES GROUP (to Statement No. 2)	1,357	(528)	317	9,443
				Less:				
				Outside Interests	541-	196	(118)	3,720-
21,339	(7,524)	4,608	140,556		816	(332)	199	5,723

STATEMENT NO. 13
MONTH JAN/FEB 83

INTERNATIONAL AERADIO plc
AVIATION GROUP - OVERSEAS STATIONS

	Gross Income			Net Income		
	Actual	Budget	Variance	Actual	Budget	Variance
	£'000	£'000	£'000	£'000	£'000	£'000
MIDDLE EAST						
Abu Dhabi Airport	1334	1167	167	21	35	(14)
Abu Dhabi Mugatara	52	8	44	26	2	24
Bahrain	749	367	382	63	33	30
Doha	675	587	88	72	67	5
Dubai	176	154	22	27	30	(3)
Kuwait	11	11	-	2	2	-
Ras Al Khaimah	119	203	(84)	17	33	(16)
Saudi - MEPA	2500	3015	(515)	250	308	(58)
Saudi - PCA O & M	2300	2710	(410)	500	546	(46)
Saudi - PCA Training	200	158	42	12	23	(11)
Sharjah	97	92	5	14	10	4
AFRICA & ASIA						
Bangladesh	50	53	(3)	5	6	(1)
Banjul	18	18	-	4	3	1
Malaysia	296	134	162	20	8	12
Maldives	25	25	-	3	3	-
Zimbabwe	30	30	-	5	5	-
Brunei	8	-	8	1	-	1
Mozambique	34	-	34	-	-	-
Nigeria	30	-	30	-	-	-
NEW BUSINESS	-	116	(116)	-	12	(12)
Less:						
O/S Staff Training	-	-		21-	51-	30
O/S Staff Recruitment	-	-		7-	17-	10
TOTAL STATIONS	6704	6648	(144)	1014	1058	(44)

Appendix 5

Discounted Exchange Rate Values
"Basic" Computer Program Listing
Log and Semi Log Transformations
of the Regression Equation

```
 4  HOME
 5  PRINT "THIS CALCULATES PERCENTAGE CHANGES AND PLOTS A REGRESSION LINE"
 6  REM  "THIS 3-36 MONTHS WITH LOGS"
 7 A$ = " U.S.DOLLARS"
 20  REM  "A=number of time periods "
 21 A = 72
 25  DIM CUR(A)
 26  DIM DUR(A)
 27  DIM EUR(A)
 28  DIM FUR(A)
 29  FLASH
 31 F = 36
 32 F = F - 1
 33  HOME
 36 E = 2
 37  HOME
 38  NORMAL
 40  REM "THIS READS DATA AND STORES IT INCUR(A)"
 42  FOR I = 1 TO A
 44  READ B
 46 CUR(I) = B
 48  NEXT I
 50  REM  "MAIN LOOP STARTS HERE "
 51  HOME
 52  FOR Z = 1 TO 36
 55 F = F + 1
 59  REM  "QQ=number of obserations"
 60  IF F = 13 THEN QQ = 786
 61  IF F = 14 THEN QQ = 845
 62  IF F = 15 THEN QQ = 903
 63  IF F = 16 THEN QQ = 960
 64  IF F = 17 THEN QQ = 1016
 65  IF F = 18 THEN QQ = 1071
 66  IF F = 19 THEN QQ = 1125
 67  IF F = 20 THEN QQ = 1178
 68  IF F = 21 THEN QQ = 1230
 69  IF F = 22 THEN QQ = 1281
 70  IF F = 23 THEN QQ = 1331
 71  IF F = 24 THEN QQ = 1380
 72  IF F = 25 THEN QQ = 1428
 73  IF F = 26 THEN QQ = 1475
 74  IF F = 27 THEN QQ = 1521
 75  IF F = 28 THEN QQ = 1566
 76  IF F = 29 THEN QQ = 1610
 77  IF F = 30 THEN QQ = 1653
 78  IF F = 31 THEN QQ = 1695
 79  IF F = 32 THEN QQ = 1736
 80  IF F = 33 THEN QQ = 1776
 81  IF F = 34 THEN QQ = 1815
 82  IF F = 35 THEN QQ = 1853
 83  IF F = 36 THEN QQ = 1889
 84  IF F = 3 THEN QQ = 141
 85  IF F = 4 THEN QQ = 210
 86  IF F = 5 THEN QQ = 278
 87  IF F = 6 THEN QQ = 345
 88  IF F = 7 THEN QQ = 411
 89  IF F = 8 THEN QQ = 476
 90  IF F = 9 THEN QQ = 541
 91  IF F = 10 THEN QQ = 604
 92  IF F = 11 THEN QQ = 666
```

```
 93  IF F = 12 THEN QQ = 726
200  REM "CALCULATION MAIN ROUTINE"
201  FOR C = E TO F
208  PRINT A$
209  PR£ 0
210  PRINT "TIME HORIZON  ";C
215  PRINT "OUT OF A TOTAL OF ";F
220  FLASH
230  PRINT "DO NOT TURN THIS COMPUTER OFF. THANK YOU"
248 G = A - C
249  REM  "CALCULATES PERCENTAGE CHANGE"
250  FOR I = 1 TO G
260 P = ((I + C) - 1)
270  IF P > A GOTO 350
280 S = CUR(I)
290 T = CUR(P)
300 V = T / S
310 U = (V * 100) - 100
320 V = U ^ 2
330 X =  SQR (V)
340 DUR(I) = X + 0.000001
350  NEXT I
399  REM  "CALCULATES SIGMA VALUES"
400  FOR I = 1 TO G
410 HH = HH + C
420 II = II + DUR(I)
425 FUR(Z) = FUR(Z) +  LOG (DUR(I) + .000001)
430 CC = C ^ 2
440 DD = DD + CC
450 EUR(I) = (DUR(I)) ^ 2
460 EE = EE + EUR(I)
470 JJ = C * DUR(I)
480 KK = KK + JJ
490  NEXT I
498  NORMAL
490  NEXT I
498  NORMAL
610  FOR I = 1 TO G
620 FA = ( LOG (C) -  LOG (19.5)) * DUR(I)
630 FB = FB + FA
631 FC = ( LOG (C) -  LOG (19.5)) ^ 2
632 FD = FD + FC
634 FG = ( LOG (DUR(I))) / QQ
635 FH = FH + FG
637 FI = ( LOG (C)) / QQ
638 FJ = FJ + FI
640  REM  "SEMI LOG TRANS"
655 H = C - 2
670 GA = (H - 12.5) * DUR(I)
671 GB = GB + GA
672 GC = (H - 12.5) ^ 2
674 GD = GD + GC
680  REM "LOG C.OF C."
681 HA =  LOG (C)
682 ZA = ZA + C
683 ZD = ZD + (C ^ 2)
684 HB = HB + HA
685 ZC = ZC + (C * ( LOG (DUR(I))))
686 HC =  LOG (DUR(I))
687 HD = HD + HC
689 HE =  LOG ((DUR(I)) ^ 2)
690 HF = HF + HE
```

```
692 HG =  LOG (C * DUR(I))
693 HI = HI + HG
695 HJ =  LOG (C ^ 2)
697 HK = HK + HJ
700  NEXT I
999  HOME
1000  NEXT C
4999  REM "PRINT ROUTINE"
5000  REM  "HEADING PRINTING"
5010 B$ = "JAN 1978 TO DEC 1983"
5015  PR£ 1
5020  PRINT "CURRENCY                                    ";A$
5030  PRINT "****************************************"
5040  PRINT "START AND END OF TIME PERIOD  ";B$
5050  PRINT "NUMBER OF TIME PERIODS";A
5060  PRINT "****************************************"
5070  HOME
5100  REM "REGRESSION INFORMATION OUTPUT"
5110  PRINT "CALCULATION BASED ON TIME PERIODS  ";E"TO";F
5120  PRINT "NUMBER OF OBSERVATIONS EQUALS";QQ
5130 PP = (QQ * KK) - (HH * II)
5140 RR = PP / ((QQ * DD) - (HH ^ 2))
5150  PRINT "THE VALUE OF .b. IS  ";RR
5160 SS = (II - (RR * HH)) / QQ
5170  PRINT "THE VALUE OF .a. IS  ";SS
5180 ZB = (HH * II) / (HH ^ 2)
5190  PRINT "THE VALUE OF .b. WITH .a.  EQUAL TO ZERO IS  ";ZB
5200 TT = ((QQ * KK) - (HH * II))
5210 UU = TT /  SQR (((QQ * DD) - (HH ^ 2)) * ((QQ * EE) - (II ^ 2)))
5220  PRINT "PRODUCT MOMENT COEFFICIENT OF CORRELATION IS  ";UU
5230 XX = (((QQ * KK) - (HH * II)) ^ 2)
5240 YY = XX / (((QQ * DD) - (HH ^ 2)) * ((QQ * EE) - (II ^ 2)))
5250  PRINT "COEFFICIENT OF DETERMINATION IS  ";YY
5600  REM  "LOG CALCULATION"
5601 FE = FB / FD
5602 FK = FH - (FE * FJ)
5603 FL =  EXP (FK)
5680  PRINT "LOG TRANS REG  A=   ";FL"   AND B=  ";FE
5699  REM  "SEMI-LOG REG"
5700 GE = GB / GD
5702 GF = FH - (GE * 12.5)
5704  PRINT "SEMI LOG REG  A=   "; EXP (GF)"  AND  B=   "; EXP (GE)
5840  REM  "LOG C OF C"
5842  PRINT "SIGMA LOG X =  ";HB
5844  PRINT "SIGMA LOG Y =  ";HD
5846  PRINT "SIGMA LOG Y^2 = ";HF
5848  PRINT "SIGMA LOG XY  = ";HI
5850  PRINT "SIGMA LOG X^2 = ";HK
5851  PRINT "SIGMA SEMI LOG X =  ";ZA
5852  PRINT "SIGMA SEMI LOG X^2= ";ZD
5853  PRINT "SIGMA SEMI LOG XY =  ";ZC
5999  PRINT "========================================"
6000  REM  "THIS CLEARS VARIABLES"
6010 HH = 0
6020 II = 0
6025 CC = 0
6030 DD = 0
6035 EE = 0
6040 KK = 0
```

```
 6045 JJ = 0
 6050 SS = 0
 6055 RR = 0
 6060 PP = 0
 6065 ZB = 0
 6070 TT = 0
 6075 UU = 0
 6080 XX = 0
 6085 YY = 0
 6100 AP = 0
 6110 AQ = 0
 6120 AR = 0
 6130 AS = 0
 6150 AU = 0
 6160 AV = 0
 6170 AW = 0
 6180 AX = 0
 6190 AY = 0
 6200 AZ = 0
 6210 BA = 0
 6220 FA = 0
 6230 FB = 0
 6231 FC = 0
 6232 FD = 0
 6233 FE = 0
 6234 FG = 0
 6235 FH = 0
 6236 FI = 0
 6237 FJ = 0
 6238 GA = 0
 6239 GB = 0
 6240 GC = 0
 6241 GD = 0
 6242 GE = 0
 6243 GF = 0
 6244 HA = 0
 6245 HB = 0
 6246 HC = 0
 6247 HD = 0
 6248 HE = 0
 6249 HF = 0
 6250 HG = 0
 6251 HI = 0
 6252 FK = 0
 6253 FL = 0
 6254 GH = O
 6255 GI = 0
 6256 GJ = 0
 6258 HJ = 0
 6260 HK = 0
 7000  DATA  1.95,1.93,1.87,1.82,1.81,1.87,1.93,1.95,1.97,2.1,1.95,2.04
 7010  DATA  1.99,2.02,2.07,2.07,2.05,2.19,2.31,2.35,2.19,2.1,2.21,2.22
 7020  DATA  2.28,2.24,2.16,2.26,2.34,2.36,2.34,2.40,2.39,2.43,2.35,2.39
 7030  DATA  2.35,2.18,2.23,2.14,2.06,1.94,1.8,1.85,1.86,1.81,1.95,1.91
 7040  DATA  1.86,1.82,1.79,1.78,1.79,1.73,1.75,1.72,1.7,1.68,1.61,1.62
 7050  DATA  1.52,1.52,1.48,1.56,1.60,1.54,1.53,1.53,1.58,1.5,1.47,1.45
10000  NEXT Z
11200  END
```

Appendix 6

Discounted Exchange Rate Values
"Basic" Computer Program Listing

```
 2  PR£ 1
 3  PRINT "QUICK ONE TWENTY NO LOG"
 4  PR£ 0
 5  PRINT "THIS CALCULATES PERCENTAGE CHANGES AND PLOTS A REGRESSION LINE"
 6  REM  "THIS 2-36 MONTH NO LOG"
 7 A$ = "U.S.DOLLARS"
 20  REM  "A=NUMBER OF ITEMS OF DATA"
 21 A = 120
 25  DIM CUR(A)
 26  DIM DUR(A)
 29  FLASH
 30  REM  "F=FIRST TIME HORIZON"
 31 F = 36
 33  HOME
 36 E = 2
 37  HOME
 38  NORMAL
 42  FOR I = 1 TO A
 44  READ B
 46 CUR(I) = B
 48  NEXT I
 51  HOME
 52 Z = 36
 201  FOR C = E TO F
 202 FM = FM + (C - 1)
 203 QQ = ((A * (C - 1)) - FM)
 208  PRINT A$
 209  PR£ 0
 210  PRINT "TIME HORIZON  ";C
 215  PRINT "OUT OF A TOTAL OF ";F
 220  FLASH
 230  PRINT "DO NOT TURN THIS COMPUTER OFF. THANK YOU"
 248 G = A - C
```

```
250  FOR I = 1 TO G
260 P = ((I + C) - 1)
270  IF P > A GOTO 350
280 S = CUR(I)
290 T = CUR(P)
300 V = T / S
310 U = (V * 100) - 100
320 V = U ^ 2
330 X =  SQR (V)
340 DUR(I) = X + 0.000001
350  NEXT I
400  FOR I = 1 TO G
410 HH = HH + C
420 II = II + DUR(I)
430 CC = C ^ 2
440 DD = DD + CC
450 AP = (DUR(I)) ^ 2
460 EE = EE + AP
470 JJ = C * DUR(I)
480 KK = KK + JJ
490  NEXT I
498  NORMAL
999  HOME
5000  IF C = 2 THEN  GOTO 6000
5010 B$ = "JAN 1978 TO DEC 1983"
5015  PR£ 1
5020  PRINT "CURRENCY                                    ";A$
5030  PRINT "****************************************"
5040  PRINT "START AND END OF TIME PERIOD  ";B$
5050  PRINT "NUMBER OF TIME PERIODS";A
5060  PRINT "****************************************"
5070  HOME
5110  PRINT "CALCULATION BASED ON TIME PERIODS  ";E" TO ";C
```

```
5120  PRINT "NUMBER OF OBSERVATIONS EQUALS";QQ
5130 PP = (QQ * KK) - (HH * II)
5140 RR = PP / ((QQ * DD) - (HH ^ 2))
5150  PRINT "THE VALUE OF .b. IS  ";RR
5160 SS = (II - (RR * HH)) / QQ
5170  PRINT "THE VALUE OF .a. IS  ";SS
5180 ZB = (HH * II) / (HH ^ 2)
5190  PRINT "THE VALUE OF .b. WITH .a.  EQUAL TO ZERO IS  ";ZB
5200 TT = ((QQ * KK) - (HH * II))
5210 UU = TT /  SQR (((QQ * DD) - (HH ^ 2)) * ((QQ * EE) - (II ^ 2)))
5220  PRINT "PRODUCT MOMENT COEFFICIENT OF CORRELATION IS  ";UU
5230 XX = (((QQ * KK) - (HH * II)) ^ 2)
5240 YY = XX / (((QQ * DD) - (HH ^ 2)) * ((QQ * EE) - (II ^ 2)))
5250  PRINT "COEFFICIENT OF DETERMINATION IS  ";YY
6000  NEXT C
6900  REM "DATA STARTS HERE"
6970  DATA  2.20,2.29,2.39,2.44,2.39,2.38,2.39,2.32,2.33,2.33,2.32,2.35
6980  DATA  2.40,2.42,2.40,2.35,2.33,2.19,2.18,2.11,2.04,2.08,2.04,2.02
6990  DATA  2.03,2.02,1.92,1.83,1.76,1.77,1.79,1.77,1.67,1.59,1.65,1.70
6999  DATA  1.72,1.72,1.72,1.72,1.72,1.72,1.74,1.74,1.75,1.84,1.82,1.92
7000  DATA  1.95,1.93,1.87,1.82,1.81,1.87,1.93,1.95,1.97,2.1,1.95,2.04
7010  DATA  1.99,2.02,2.07,2.07,2.05,2.19,2.31,2.35,2.19,2.1,2.21,2.22
7020  DATA  2.28,2.24,2.16,2.26,2.34,2.36,2.34,2.40,2.39,2.43,2.35,2.39
7030  DATA  2.35,2.18,2.23,2.14,2.06,1.94,1.80,1.85,1.86,1.81,1.95,1.91
7040  DATA  1.86,1.82,1.79,1.78,1.79,1.73,1.75,1.72,1.7,1.68,1.61,1.62
7050  DATA  1.52,1.52,1.48,1.56,1.6,1.54,1.53,1.53,1.58,1.5,1.47,1.45
11200  END
```

Appendix 7

Exposure Profiles: expected probabilities
of late payment exercise

Delays in payment

Based on 1978-1983 Branch experience of payment of contract invoices.

	No of invoices	Percentage
0 months late	29	16.3
1 months late	43	24.1
2 months late	41	23.0
3 months late	22	12.4
4 months late	12	6.7
5 months late	14	7.9
6 months late	7	3.9
7 months late	4	2.2
8 months late	3	1.7
9 months late	2	1.1
10 months late	0	0
11 months late	0	0
12 months late	1	1.1
	178	100

YEAR 1 BOOK KEEPING

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Expenditure													
Sub total			75,595	82,689	86,738	76,054	50,249	52,574	52,574	52,575	52,574	67,412	658,694
Adjust for Agents Commission 4 month lag				2,325	2,325	2,325	2,325						
a)				85,014	89,063	78,739	52,574						
INCOME													
Adv Paid 1/33 paid in 3 of yr 1				6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	59,805
Monthly contract payment				59,807	59,806	59,807	59,806	59,806	59,806	59,806	59,806	59,806	538,256
b)				66,452	66,451	66,452	66,451	66,451	66,451	66,451	66,451	66,451	
c) Profit loss (c=b-a)			(75,595)	(18,562)	(22,612)	(12,287)	13,877	13,877	13,877	13,876	13,877	(961)	(60,633)

YEAR 1 TAX 45% OF YEAR 1 PROFIT

TO BE PAID IN MARCH OF YEAR 2

REINBURSABLES EXCLUDED AS
HAVE NO IMPACT ON PROFIT

PROFIT YR 1 = (60,633)

TAX YR 1 = 0

YEAR 2 BOOK KEEPING

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Expenditure													
a) sub total table 1	51,858	51,858	51,858	50,195	50,195	50,195	50,195	50,195	50,195	50,195	50,195	65,713	622,847
INCOME													
Adv Paid 1/36 paid In 3 of yr 1	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	79,740
Monthly contract payment	59,806	59,806	59,807	59,807	59,807	59,807	59,807	59,806	59,806	59,806	59,806	59,806	717,672
b)	66,451	66,451	66,452	66,452	66,452	66,452	66,452	66,451	66,451	66,451	66,451	66,451	
c) Profit loss (c=b-a)	14,593	14,953	14,594	16,257	16,257	16,257	16,257	16,256	16,256	16,256	16,256	738	174,570

YEAR 2 TAX 45% OF YEAR 2 PROFIT — PROFIT YR 2 = 174,570 CUMULATIVE TOTAL 189,532

TO BE PAID IN MARCH OF YEAR 3 — TAX YR 2 = 78,556 CUMULATIVE TOTAL 85,285

YEAR 3 BOOK KEEPING

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Expenditure													
a) sub total table 1	72,291	52,001	81,456	52,000	52,002	52,000	52,001	52,000	52,001	52,239	52,239	68,096	690,326
INCOME													
Adv Paid 1/36 paid in 3 of yr 1	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	6,645	79,740
Monthly contract payment	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	717,684
b)	66,452	66,452	66,452	66,452	66,452	66,452	66,452	66,452	66,452	66,452	66,452	66,452	
c) Profit loss (c=b-a)	(5,839)	14,451	(15,004)	14,452	14,450	14,452	14,451	14,452	14,451	14,213	14,213	(1,644)	107,098

YEAR 3 TAX 45% OF YEAR 3 PROFIT — PROFIT YR 3 = 107,098 — 221,035

TO BE PAID IN MARCH OF YEAR 4 — TAX YR 3 = 48,194 — 146,985

YEAR 1 CASH FLOW AS PER CONTRACT PAYMENT TERMS 30 DAYS FROM INVOICE (IE 1 MONTH LAG)

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
EXPENDITURE													
As per a) of book keeping			75,595	82,689	89,063	78,739	52,574	52,574	52,575	52,574	52,574	67,412	656,369
INCOME													
Advance Payment			219,291										219,291
Monthly payment					59,807	59,806	59,807	59,806	59,806	59,806	59,806	59,806	478,456
CASH SURPLUS/DEF			143,696	(82,689)	(29,256)	(18,933)	7,233	7,232	7,232	7,231	7,232	(7,606)	41,372
NO TAX PAID IN CASH			0										
AFTER TAX			143,696	(82,689)	(29,256)	(18,933)	7,233	7,232	7,232	7,231	7,232	(7,606)	
CASH BALANCE CUMULATIVE			143,696	61,007	31,751	12,818	20,051	27,283	34,515	41,746	48,978	41,372	
REIMBURSABLES													
EXPENDITURE				(52,582)	(27,789)	(27,789)	(27,789)	(27,789)	(27,789)	(27,789)	(27,791)	(27,791)	(274,898)
INCOME					52,582	27,789	27,789	27,789	27,789	27,789	27,789	27,791	247,107
				(52,582)	24,793	0	0	0	0	0	(12)	0	(27,791)
CASH BALANCE CUMULATIVE OPERARING & REIMBURSABLES			143,696	8,425	3,962	(14,971)	(7,738)	(506)	6,726	13,957	21,187	13,581	

YEAR 2 CASH FLOW AS PER CONTRACT PAYMENT TERMS 30 DAYS FROM INVOICE (IE 1 MONTH LAG)

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
EXPENDITURE													
As per a) of book keeping	51,858	51,858	51,858	50,195	50,195	50,195	50,195	50,195	50,195	50,195	50,195	65,713	622,847
INCOME													
Advance Payment													
Monthly payment	59,806	59,806	59,806	59,807	59,807	59,807	59,807	59,807	59,806	59,806	59,806	59,806	717,678
CASH SURPLUS/DEF	7,948	7,948	7,948	9,612	9,612	9,612	9,612	9,612	9,611	9,611	9,611	(5,907)	94,830
Tax Yr 1 as per book keeping table			0										
AFTER TAX	7,948	7,948	7,948	9,612	9,612	9,612	9,612	9,612	9,611	9,611	9,611	(5,907)	
CASH BALANCE CUMULATIVE	49,320	57,268	65,216	74,828	84,440	94,052	103,664	113,276	122,887	132,498	142,109	136,202	
REIMBURSABLES													
EXPENDITURE	(26,211)	(26,209)	(26,244)	(26,209)	(26,212)	(26,212)	(26,212)	(26,211)	(26,214)	(26,211)	(26,212)	(26,215)	(314,572)
INCOME	27,791	26,211	26,209	26,244	26,209	26,212	26,212	26,212	26,211	26,214	26,211	26,212	317,148
	1,580	2	(35)	35	(3)	0	0	1	(3)	3	(1)	(3)	1,576
CASH BALANCE CUMULATIVE OPERARING & REIMBURSABLES	23,109	31,059	38,972	48,619	58,228	67,840	77,452	87,065	96,673	106,287	115,897	109,987	

YEAR 3 CASH FLOW AS PER CONTRACT PAYMENT TERMS 30 DAYS FROM INVOICE (IE 1 MONTH LAG)

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
EXPENDITURE													
As per a) of book keeping	72,291	52,001	81,456	52,000	52,002	52,000	52,001	52,000	52,001	52,239	52,239	68,096	690,326
INCOME													
Advance Payment													
Monthly payment	59,806	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	717,684
CASH SURPLUS/DEF	(12,485)	7,806	(21,649)	7,807	7,805	7,807	7,806	7,807	7,806	7,568	7,568	(8,289)	27,357
Tax yr 2 as per book keeping table			(78,556)										
AFTER TAX	(12,485)	7,806	(100,205)	7,807	7,805	7,807	7,806	7,807	7,806	7,568	7,568	(8,289)	
CASH BALANCE CUMULATIVE	123,717	131,523	31,318	39,125	46,930	54,737	62,543	70,350	78,156	85,724	93,292	85,003	
REIMBURSABLES													
EXPENDITURE	(27,302)	(27,303)	(27,303)	(27,303)	(27,302)	(27,302)	(27,304)	(27,304)	(27,306)	(27,304)	(27,306)	(27,306)	(327,647)
INCOME	26,215	27,302	27,303	27,303	27,302	27,302	27,302	27,304	27,304	27,306	27,304	27,306	326,555
CASH BALANCE	(1,087)	(1)	0	0	0	0	(2)	0	(2)	2	(2)	0	(1,092)
CUMULATIVE OPERARTING & REIMBURSABLES	96,415	104,220	4,015	11,822	19,627	27,434	35,238	43,045	50,849	58,419	65,985	57,696	

YEAR 4 CASH FLOW AS PER CONTRACT PAYMENT TERMS 30 DAYS FROM INVOICE (I E 1 MONTH LAG)

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
EXPENDITURE													
As per a) of book keeping less agents commission lagged one month	2,325											2,325	1,971,867
INCOME													
Advance Payment													219,291
Monthly payment	59,806											59,806	1,973,624
CASH SURPLUS/DEF	57,481	0	0										
Tax yr 3 as per book keeping tables			48,194										221,048
AFTER TAX	57,481	0	(48,194)										
CASH BALANCE CUMULATIVE	142,484		94,290										
REIMBURSABLES													
EXPENDITURE	0												
INCOME	27,306												917,117
	142,483	142,483	94,289										918,116

YEAR 1 CASH FLOW AS PER EXPOSURE PROFILE CALCULATIONS

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
OPERATIONAL													
Expenditure			75,595	82,689	86,738	76,054	50,249	52,574	52,574	52,575	52,574	67,412	649,034
less agents commission			-	-	-	-	-	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	11,625
			75,595	82,689	86,738	76,054	50,249	50,249	50,249	50,249	50,249	65,087	637,408
Adjust Agents Commission					376	934	1,469	1,755	1,908	2,092	2,183	2,234	12,951
INCOME													
Advance Payment			35,526	52,631	50,437	26,973	14,473	17,323	8,552	4,824	3,728	2,412	216,879
Monthly Payment					9,688	24,041	37,796	45,152	49,099	53,824	56,156	57,472	333,228
			(40,069)	(30,058)	(26,989)	(25,974)	551	10,471	5,494	6,307	7,452	(7,437)	(100,252)
CUMULATIVE (Operational)			(40,069)	(70,127)	(97,116)	(123,090)	(122,539)	(112,068)	(106,574)	(100,267)	(92,815)	(100,252)	
REIMBURSABLES													
EXPENDITURE				(52,582)	(27,789)	(27,789)	(27,789)	(27,789)	(27,789)	(27,789)	(27,791)	(27,791)	
INCOME													
Payment Type A					8,518	12,620	12,094	6,468	3,470	4,154	2,051	1,157	
B						4,502	11,172	17,564	20,983	22,817	25,012	26,096	
C													
D													
E													
INCOME TOTAL					8,518	17,122	23,266	24,032	24,453	26,971	27,063	27,253	
				(52,582)	(19,271)	(10,667)	(4,523)	(3,757)	(3,336)	(818)	(728)	(538)	(96,200)
CUMULATIVE OPERATIONAL PLUS REIMBURSABLES			(40,069)	(122,709)	(168,969)	(205,610)	(209,582)	(202,868)	(200,710)	(195,221)	(188,497)	(196,472)	

YEAR 2 CASH FLOW AS PER EXPOSURE PROFILE CALCULATIONS

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Expenditure	51,858	51,858	51,858	50,195	50,195	50,195	50,195	50,195	50,195	50,195	50,195	65,713	622,574
less agents commission	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	27,900
which is linked to payments terms	49,533	49,533	49,260	47,870	47,870	47,870	47,870	47,870	47,870	47,870	47,870	63,388	594,674
Adjust Agents Commission	2,274	2,300	2,300	2,300	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	27,774
	51,807	51,833	51,560	50,170	50,195	50,195	50,195	50,195	50,195	50,195	50,195	65,713	622,448
INCOME													
Advance Payment	0	0	2,412										2,412
Monthly Payment	58,489	59,148	59,148	59,058	59,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	714,299
	6,682	7,315	10,000	8,888	9,612	9,612	9,612	9,612	9,612	9,612	9,612	(5,906)	94,263
CUMULATIVE	(93,570)	(86,255)	(76,255)	(67,367)	(57,755)	(48,143)	(38,531)	(28,919)	(19,307)	(9,695)	(83)	(5,989)	
REIMBURSABLES													
EXPENDITURE	(26,211)	(26,209)	(26,244)	(26,209)	(26,212)	(26,212)	(26,212)	(26,211)	(26,214)	(26,211)	(26,212)	(26,215)	
INCOME													
Payment Type A	894	578	0	0	578								
B	26,707	22,677	16,313	9,921	6,502	4,974	2,779	1,695	1,084	612	306	306	
C	4,247	10,538	16,547	19,791	21,521	23,591	24,613	25,190	25,636	25,924	25,924	21,677	
D													
E				4,251	6,299	6,036	3,228	1,732	2,073	1,024	577	446	
INCOME TOTAL	31,848	33,793	32,860	33,963	34,830	34,601	30,620	28,617	28,793	27,560	26,807	22,429	
	5,637	7,584	6,616	7,754	8,618	8,389	4,408	2,406	2,579	1,349	595	(3,786)	52,119
CUMULATIVE OPERATIONAL PLUS REINBURSABLES	(184,103)	(169,204)	(152,588)	(135,946)	(117,716)	(99,715)	(85,695)	(73,677)	(61,486)	(50,525)	(40,318)	(50,010)	

YEAR 3 CASH FLOW AS PER EXPOSURE PROFILE CALCULATIONS

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Expenditure	72,291	52,001	81,456	52,000	52,002	52,000	52,001	52,000	52,001	52,239	52,289	68,096	690,326
less agents commission	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(2,325)	(27,900)
	69,966	49,686	79,141	49,685	49,687	49,685	49,686	49,685	49,686	49,924	49,924	65,761	
Add rephased Agents Commission	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	27,900
TOTAL EXPENDITURE	72,291	52,001	81,456	52,000	52,002	52,000	52,001	52,000	52,001	52,239	52,239	68,096	690,326
INCOME													
Advance Payment													
Monthly Payment	59,807	59,807	59,807	59,807	89,807	59,807	59,807	59,807	59,807	59,807	59,807	59,807	717,684
	(12,484)	7,806	(21,649)	7,807	7,805	7,807	7,806	7,807	7,806	7,568	7,568	(8,289)	27,358
CUMULATIVE TAX	(18,473)	(10,667) (78,556)	(32,316)	(24,509)	(16,704)	(8,897)	(1,091)	6,716	14,522	22,090	29,658	21,369	
REIMBURSABLES													
	D	D	D	D	D	D	D	D	D	D	D	D	
EXPENDITURE	(27,302)	(27,303)	(27,303)	(27,303)	(27,302)	(27,302)	(27,304)	(27,304)	(27,306)	(27,304)	(27,306)	(27,306)	
INCOME													
Payment Type A	0												
B	306												
C	15,674	9,645	6,421	4,691	2,621	1,599	1,022	576	288	288	288		
D		4,424	10,977	17,257	20,615	22,417	24,574	25,639	26,240	26,704	27,004	27,004	
E	209	0	0	289									
	(11,033)	(13,234)	(9,905)	(5,066)	(4,066)	(3,286)	(1,708)	(1,089)	(778)	(312)	(14)	(302)	(50,793)
CUMULATIVE OPERATIONAL PLUS REINBURSABLES	(73,527)	(78,955)	(110,509)	(107,768)	(104,029)	(99,508)	(93,410)	(86,692)	(79,664)	(72,408)	(64,854)	(73,445)	
AFTER TAX			(189,065)	(186,324)	(182,585)	(178,064)	(171,966)	(165,248)	(158,220)	(150,964)	(143,410)	(152,001)	

YEAR 4 CASH FLOW AS PER EXPOSURE PROFILE CALCULATIONS

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	YEAR 5 1	TOTAL
Expenditure														
Adjusted Agents Commission	2,375	1,950	1,392	859	571	418	240	149	92	52	26	26	26	8,176
TOTAL EXPENDITURE	2,375	1,950	1,392	859	571	418	240	149	92	52	26	26	26	8,176
INCOME														
Advance Payment														
Monthly Payment	59,807	50,119	35,766	22,011	14,655	10,708	5,983	3,651	2,335	1,318	659	659	659	208,330
	57,432	48,169	34,374	21,152	14,084	10,290	5,743	3,502	2,243	1,266	633	633	633	200,154
CUMULATIVE	78,801	126,970	161,344	182,496	196,580	206,870	212,613	216,115	218,358	219,624	220,257	220,890	221,523	
TAX			(48,194)											48,194
REIMBURSABLES														
EXPENDITURE														
INCOME														
Payment Type A														
B														
C														
D														
E	27,004	22,880	16,322	10,047	6,689	4,887	2,730	1,665	1,064	600	300	300	300	
	27,004	22,880	16,327	10,047	6,689	4,887	2,730	1,665	1,064	600	300	300	300	94,793
CUMULATIVE OPERATIONAL PLUS REINBURSABLES	10,991	82,040	132,741	163,940	184,713	199,890	208,363	213,530	216,837	218,703	219,636	220,569	221,502	221,502
AFTER TAX	(67,565)	(3,484)	5,991	37,190	57,963	73,140	81,613	86,780	90,087	91,953	92,886	93,819	94,752	94,752

YEAR 1 CASH FLOW AS PER IAL LAG ASSUMPTIONS

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
EXPENDITURE													
As per a) of book keeping			75,595	82,689	86,738	76,054	50,249	52,574	52,574	52,575	52,574	67,412	649,034
INCOME													
Advance Payment & Monthly payment			219,291					59,806	59,807	59,806	59,807	59,806	518,323
CASH SURPLUS/DEF			143,696	(82,689)	(86,738)	(76,054)	(50,249)	7,232	7,232	7,231	7,233	(7,606)	(130,712)
TAX(based on book keeping)													
CASH BALANCE CUMULATIVE			143,696	61,007	(25,731)	(101,785)	(152,034)	(144,802)	(137,570)	(130,339)	(123,106)	(130,712)	
REIMBURSABLES													
EXPENDITURE				(52,582)	(27,789)	(27,789)	(27,789)	(27,789)	(27,789)	(27,789)	(27,791)	(27,791)	
INCOME								52,582	27,789	27,789	27,789	27,789	
				(52,582)	(27,789)	(27,789)	(27,789)	24,793	0	0	(2)	(2)	(111,160)
CASH BALANCE CUMULATIVE OPERATING & REIMBURSABLES			143,696	8,425	(106,102)	(209,945)	(287,983)	(255,958)	(248,726)	(241,495)	(234,264)	(241,872)	

YEAR 2 CASH FLOW AS PER IAL LAG ASSUMPTIONS

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
EXPENDITURE	(51,858)	(51,858)	(51,858)	(50,195)	(50,195)	(50,195)	(50,195)	(50,195)	(50,195)	(50,195)	(50,195)	(65,173)	(622,847)
INCOME	59,806	59,806	59,806	59,806	59,806	59,806	59,806	59,807	59,807	59,807	59,807	59,807	717,672
CASH SURPLUS/DEF	7,948	7,948	7,948	9,611	9,611	9,611	9,611	9,612	9,612	9,612	9,612	(5,906)	94,830
TAX(based on book keeping)													
CASH BALANCE CUMULATIVE	(122,764)	(114,816)	(106,868)	(97,257)	(87,646)	(78,035)	(68,424)	(58,812)	(49,200)	(39,588)	(29,976)	(35,882)	
REIMBURSABLES													
EXPENDITURE	(26,211)	(26,209)	(26,244)	(26,209)	(26,212)	(26,212)	(26,211)	(26,211)	(26,214)	(26,211)	(26,212)	(26,215)	
INCOME	27,789	27,789	27,791	27,791	26,211	26,209	26,214	26,209	26,212	26,212	26,211	26,211	
	1,578	1,580	1,547	1,582	(1)	(3)	3	2	2	1	1	(4)	6,288
CASH BALANCE CUMULATIVE OPERATING & REIMBURSABLES	(232,346)	(222,818)	(213,323)	(202,130)	(192,520)	(182,912)	(173,304)	(163,690)	(154,076)	(144,463)	(134,850)	(140,760)	

YEAR 3 CASH FLOW AS PER I AL LAG ASSUMPTI ONS

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
EXPENDI TURE	(72,291)	(52,001)	(81,456)	(52,000)	(52,002)	(52,000)	(52,001)	(52,000)	(52,001)	(52,239)	(52,239)	(68,096)	(690,326)
I NCOME	59,806	59,806	59,806	59,806	59,806	59,807	59,807	59,807	59,807	59,807	59,807	59,807	717,679
CASH SURPLUS/DEF	(12,485)	7,805	(21,650)	7,806	7,804	7,807	7,806	7,807	7,806	7,568	7,568	(8,289)	27,353
TAX(based on book keeping)			(78,556)										
CASH BALANCE CUMULATI VE	(48,367)	(40,562)	(140,768)	(132,962)	(152,158)	(117,351)	(109,545)	(101,738)	(93,932)	(86,364)	(78,796)	(87,085)	
REI MBURSABLES													
EXPENDI TURE	(27,302)	(27,303)	(27,303)	(27,302)	(27,302)	(27,302)	(27,304)	(27,304)	(27,306)	(27,304)	(27,306)	(27,306)	
I NCOME	26,214	26,211	26,212	26,215	27,302	27,303	27,303	27,302	27,302	27,304	27,304	27,304	
	(1,088)	(1,092)	(1,091)	(1,087)	0	1	(1)	(2)	(4)	0	(2)	(2)	(4,368)
CASH BALANCE CUMULATI VE OPERATI NG & REI MBURSABLES	(154,333)	(147,620)	(248,917)	(242,198)	(234,394)	(226,586)	(218,781)	(210,976)	(203,174)	(195,606)	(188,040)	(196,331)	

YEAR 4 CASH FLOW AS PER IAL LAG ASSUMPTIONS

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
EXPENDITURE	(2,331)	(2,331)	(2,332)	(2,333)									9,327
INCOME	59,807	59,807	59,807	59,807									239,228
CASH SURPLUS/DEF	57,476	57,476	57,475	57,474									229,901
TAX(based on book keeping)			(48,194)										
CASH BALANCE CUMULATIVE	(29,609)	27,867	37,148	94,622									
REIMBURSABLES													
EXPENDITURE													
INCOME	27,306	27,304	27,306	27,306									
	27,306	27,304	27,306	27,306									
CASH BALANCE CUMULATIVE OPERATING & REIMBURSABLES	(111,549)	(26,769)	9,818	94,598									

Appendix 8

Exposure Profiles: Simulation Exercise
EPS-FCS Program Listing

```
  1 CLEAR (50,1000)
  2 CLEAR (1100,2340)
  3 CLEAR (2410,2420)
  5 'INVOICE'
 10 'PROB'
 50 'R0' = RAND(1.0)
 60 IF ('R0' LE 'PROB' COL1.) GOTO 500
 65 500 = 0.
 80 'R1' = RAND(1.0)
 90 IF ('R1' LE 'PROB' COL2.) GOTO 520
 95 520 = 0.
110 'R2' = RAND(1.0)
120 IF ('R2' LE 'PROB' COL3.) GOTO 540
125 540 = 0.
140 'R3' = RAND(1.0)
150 IF ('R3' LE 'PROB' COL4.) GOTO 560
155 560 = 0.
170 'R4' = RAND(1.0)
180 IF ('R4' LE 'PROB' COL5.) GOTO 580
185 580 = 0.
200 'R5' = RAND(1.0)
210 IF ('R5' LE 'PROB' COL6.) GOTO 600
215 600 = 0.
230 'R6' = RAND(1.0)
240 IF ('R6' LE 'PROB' COL7.) GOTO 620
245 620 = 0.
260 'R7' = RAND(1.0)
270 IF ('R7' LE 'PROB' COL8.) GOTO 640
275 640 = 0.
290 'R8' = RAND(1.0)
300 IF ('R8' LE 'PROB' COL9.) GOTO 660
305 660 = 0.
320 'R9' = RAND(1.0)
330 IF ('R9' LE 'PROB' COL10.) GOTO 680
335 680 = 0.
350 'R10' = RAND(1.0)
360 IF ('R10' LE 'PROB' COL11.) GOTO 700
365 700 = 0.
380 'R11' = RAND(1.0)
390 IF ('R11' LE 'PROB' COL12.) GOTO 720
395 720 = 0.
410 'R12' = RAND(1.0)
420 IF ('R12' LE 'PROB' COL13.) GOTO 740
425 740 = 0.
440 'R13' = RAND(1.0)
450 IF ('R13' LE 'PROB' COL14.) GOTO 760
455 760 = 0.
470 'R14' = RAND(1.0)
480 IF ('R14' LE 'PROB' COL15.) GOTO 780
485 780 = 0.
500 'PAYMENT L0' = 'INVOICE'
510 GOTO 1000
520 'PAYMENT L1' = 'INVOICE' LAG1.
530 GOTO 1000
540 'PAYMENT L2' = 'INVOICE' LAG2.
```

```
 550 GOTO 1000
 560 'PAYMENT L3' = 'INVOICE' LAG3.
 570 GOTO 1000
 580 'PAYMENT L4' = 'INVOICE' LAG4.
 590 GOTO 1000
 600 'PAYMENT L5' = 'INVOICE' LAG5.
 610 GOTO 1000
 620 'PAYMENT L6' = 'INVOICE' LAG6.
 630 GOTO 1000
 640 'PAYMENT L7' = 'INVOICE' LAG7.
 650 GOTO 1000
 660 'PAYMENT L8' = 'INVOICE' LAG8.
 670 GOTO 1000
 680 'PAYMENT L9' = 'INVOICE' LAG9.
 690 GOTO 1000
 700 'PAYMENT L10' = 'INVOICE' LAG10.
 710 GOTO 1000
 720 'PAYMENT L11' = 'INVOICE' LAG11.
 730 GOTO 1000
 740 'PAYMENT L12' = 'INVOICE' LAG12.
 750 GOTO 1000
 760 'PAYMENT L13' = 'INVOICE' LAG13.
 770 GOTO 1000
 780 'PAYMENT L14' = 'INVOICE' LAG14.
 790 GOTO 1000
1000 'LAGGED PAYMENT' = 500 SUM 780
1050 'EXPENDITURE'
1100 'CASH FLOW' = 'LAGGED PAYMENT' - 'EXPENDITURE'
1200 'CCF' = 'CASH FLOW' THRU24.
1210 'TRS 1'
1220 IF ('CCF' COL1. GTO.0) 'TRS 1' = 'CCF' COL1.
1230 'CR TRS 1' = 'CCF' - 'TRS 1'
1240 'TRS 2'
1250 IF ('CR TRS 1' COL2. GTO.0) 'TRS 2' = 'CR TRS 1' COL2.
1260 'CR TRS 2' = 'CR TRS 1' - 'TRS 2'
1270 'TRS 3'
1280 IF ('CR TRS 2' COL3. GTO.0) 'TRS 3' = 'CR TRS 2' COL3.
1290 'CR TRS 3' = 'CR TRS 2' - 'TRS 3'
1300 'TRS 4'
1310 IF ('CR TRS 3' COL4. GTO.0) 'TRS 4' = 'CR TRS 3' COL4.
1320 'CR TRS 4' = 'CR TRS 3' - 'TRS 4'
1330 'TRS 5'
1340 IF ('CR TRS 4' COL5. GTO.0) 'TRS 5' = 'CR TRS 4' COL5.
1350 'CR TRS 5' = 'CR TRS 4' - 'TRS 5'
1360 'TRS 6'
1370 IF ('CR TRS 5' COL6. GTO.0) 'TRS 6' = 'CR TRS 5' COL6.
1380 'CR TRS 6' = 'CR TRS 5' - 'TRS 6'
1390 'TRS 7'
1400 IF ('CR TRS 6' COL7. GTO.0) 'TRS 7' = 'CR TRS 6' COL7.
1410 'CR TRS 7' = 'CR TRS 6' - 'TRS 7'
1420 'TRS 8'
1430 IF ('CR TRS 7' COL8. GTO.0) 'TRS 8' = 'CR TRS 7' COL8.
1440 'CR TRS 8' = 'CR TRS 7' - 'TRS 8'
1450 'TRS 9'
1460 IF ( 'CR TRS 8' COL9. GTO.0) 'TRS 9' = 'CR TRS 8' COL9.
1470 'CR TRS 9' = 'CR TRS 8' - 'TRS 9'
```

```
1480 'TRS 10'
1490 IF ( 'CR TRS 9' COL10. GTO.0) 'TRS 10' = 'CR TRS 9' COL 10.
1500 'CR TRS 10' = 'CR TRS 9' - 'TRS 10'
1510 'TRS 11'
1520 IF ('CR TRS 10' COL11. GTO.0) 'TRS 11' = 'CR TRS 10' COL11.
1530 'CR TRS 11' = 'CR TRS 10' - 'TRS 11'
1540 'TRS 12'
1550 IF ( 'CR TRS 11' COL12. GTO.0) 'TRS 12' = 'CR TRS 11' COL12.
1560 'CR TRS 12' = 'CR TRS 11' - 'TRS 12'
1570 'TRS 13'
1580 IF ( 'CR TRS 12' COL13. GTO.0) 'TRS 13' = 'CR TRS 12' COL13.
1590 'CR TRS 13' = 'CR TRS 12' - 'TRS 13'
1600 'TRS 14'
1610 IF ( 'CR TRS 13' COL14. GTO.0) 'TRS 14' = 'CR TRS 13' COL14.
1620 'CR TRS 14' = 'CR TRS 13' - 'TRS 14'
1630 'TRS 15'
1640 IF ('CR TRS 14' COL15. GTO.0) 'TRS 15' = 'CR TRS 14' COL15.
1650 'CR TRS 15' = 'CR TRS 14' - 'TRS 15'
1670 'TRS 16'
1680 IF ('CR TRS 15' COL16. GTO.0) 'TRS 16' = 'CR TRS 15' COL16.
1690 'CR TRS 16' = 'CR TRS 15' - 'TRS 16'
1700 'TRS 17'
1710 IF ('CR TRS 16' COL17. GTO.0) 'TRS 17' = 'CR TRS 16' COL17.
1720 'CR TRS 17' = 'CR TRS 16' - 'TRS 17'
1730 'TRS 18'
1740 IF ('CR TRS 17' COL18. GTO.0) 'TRS 18' = 'CR TRS 17' COL18.
1750 'CR TRS 18' = 'CR TRS 17' - 'TRS 18'
1760 'TRS 19'
1770 IF ('CR TRS 18' COL19. GTO.0)  'TRS 19' = 'CR TRS 18' COL19.
1780 'CR TRS 19' = 'CR TRS 18' - 'TRS 19'
1790 'TRS 20'
1800 IF ('CR TRS 19' COL20. GTO.0) 'TRS 20' = 'CR TRS 19' COL20.
1810 'CR TRS 20' = 'CR TRS 19' - 'TRS 20'
1820 'TRS 21'
1830 IF ( 'CR TRS 20' COL21. GTO.0) 'TRS 21' = 'CR TRS 20' COL21.
1840 'CR TRS 21' = 'CR TRS 20' - 'TRS 21'
1850 'TRS 22'
1860 IF ('CR TRS 21' COL22. GTO.0) 'TRS 22' = 'CR TRS 21' COL22.
1870 'CR TRS 22' = 'CR TRS 21' - 'TRS 22'
1880 'TRS 23'
1890 IF ('CR TRS 22' COL23. GTO.0) 'TRS 23' = 'CR TRS 22' COL23.
1900 'CR TRS 23' = 'CR TRS 22' - 'TRS 23'
1995 'TRS 24'
1996 IF ('CR TRS 23' COL24. GTO.0) 'TRS 24' = 'CR TRS 23' COL24.
1997 'CR TRS 24' = 'CR TRS 23' - 'TRS 24'
2000 'CIS 1' = 'TRS 1' COL1. FOR 1.
2010 'CIS 2' = 'TRS 2' COL2. FOR 2.
2020 'CIS 3' = 'TRS 3' COL3. FOR 3.
2030 'CIS 4' = 'TRS 4' COL4. FOR 4.
2040 'CIS 5' = 'TRS 5' COL5. FOR 5.
2050 'CIS 6' = 'TRS 6' COL6. FOR 6.
2060 'CIS 7' = 'TRS 7' COL7. FOR 7.
2070 'CIS 8' = 'TRS 8' COL8. FOR 8.
2080 'CIS 9' = 'TRS 9' COL9. FOR 9.
2090 'CIS 10' = 'TRS 10' COL10. FOR 10.
2100 'CIS 11' = 'TRS 11' COL11. FOR 11.
```

```
2110 'CIS 12' = 'TRS 12' COL12. FOR 12.
2120 'CIS 13' = 'TRS 13' COL13. FOR 13.
2130 'CIS 14' = 'TRS 14' COL14. FOR 14.
2140 'CIS 15' = 'TRS 15' COL15. FOR 15.
2150 'CIS 16' = 'TRS 16' COL16. FOR 16.
2160 'CIS 17' = 'TRS 17' COL17. FOR 17.
2170 'CIS 18' = 'TRS 18' COL18. FOR 18.
2180 'CIS 19' = 'TRS 19' COL19. FOR 19.
2190 'CIS 20' = 'TRS 20' COL20. FOR 20.
2200 'CIS 21' = 'TRS 21' COL21. FOR 21.
2210 'CIS 22' = 'TRS 22' COL22. FOR 22.
2220 'CIS 23' = 'TRS 23' COL23. FOR 23.
2230 'CIS 24' = 'TRS 24' COL24. FOR 24.
2300 'PHASED CIS' = 2000 SUM 2230
2399 'DISCOUNT INPUT'
2400 'DISCOUNT VALUES' = 'DISCOUNT INPUT'/100000.
2410 'FX LOSS' = 'PHASED CIS' * 'DISCOUNT VALUES'
2420 'CUMULATIVE FX LOSS' = 'FX LOSS' THRU24.
```

Appendix 9

Exposure Profiles: Simulation Exercise
Computer Output

Key to Output

Line		
5	"Invoice"	Value of invoice to customer in any given month.
10	"Prob"	Probability of payment in any given month. Input data based on past experience.
1000	"Lagged Payment"	Month in which payment invoiced in line 5 is received.
1050	"Expend-iture"	Pattern of expenditure
1100	"Cash Flow"	Lagged Payment less expenditure
1200	"CCF"	Cumulative Cash Flow (cumulative line 1100)
2300	"Phased CIS"	If line 1200 is positive in any given month then the value is said to be converted into Sterling
2400	"Discount Value"	Exchange rate discount values based on model developed in Chapter 5
2410	"FX Loss"	Line 2300 times line 2400
2420	"Cumulat-ive FX Loss"	Line 2410 cumulative

DATA SET NO.1

	1	2	3	4	5	6	7	8	9	10	11	12	13
5 INVOICE	830	830	830	830	830	830	830	830	830	830	830	830	0
10 PROB	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1000 LAGGED PAYMENT	830	830	830	830	830	830	830	830	830	830	830	830	0
1050 EXPENDITURE	750	750	750	750	750	750	750	750	750	750	750	750	0
1100 CASH FLOW	80	80	80	80	80	80	80	80	80	80	80	80	0
1200 CCF	80	160	240	320	400	480	560	640	720	800	880	960	960
2300 PHASED CIS	80	80	80	80	80	80	80	80	80	80	80	80	0
2400 DISCOUNT VALUES	.0043	.0086	.0130	.0173	.0216	.0259	.0302	.0346	.0389	.0432	.0475	.0518	.0562
2410 FX LOSS	0	1	1	1	2	2	2	3	3	3	4	4	0
2420 CUMULATIVE FX LOS	0	1	2	3	5	7	10	12	16	19	23	27	27

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	14	15	16	17	18	19	20	21	22	23	24
5 INVOICE	0	0	0	0	0	0	0	0	0	0	0
10 PROB	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1000 LAGGED PAYMENT	0	0	0	0	0	0	0	0	0	0	0
1050 EXPENDITURE	0	0	0	0	0	0	0	0	0	0	0
1100 CASH FLOW	0	0	0	0	0	0	0	0	0	0	0
1200 CCF	960	960	960	960	960	960	960	960	960	960	960
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	0
2400 DISCOUNT VALUES	.0605	.0648	.0691	.0734	.0778	.0821	.0864	.0907	.0950	.0994	.1037
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	0
2420 CUMULATIVE FX LOS	27	27	27	27	27	27	27	27	27	27	27

DATA SET NO.1

```
2420 CUMULATIVE FX LO Column  24 Mean      26.9568   S.D          0

     Upper   Cumul
     Bound     %

   26.9568     0.0
   26.9568   100.0    ********************************************************************************

  Min. Observation      26.9568
  Max. Observation      26.9568
  * Scale is times 1/2
```

```
2420 CUMULATIVE FX LO Column  24 Mean      26.9568   S.D          0

     Upper   % of
     Bound  Sample

   26.9568   100.0                                              *
   26.9568     0.0 *
                   ..................................................
    Probability    .0   .1   .2   .3   .4   .5   .6   .7   .8   .9  1.0
```

DATA SET NO. 2

	1	2	3	4	5	6	7	8	9	10	11	12	13
5 INVOICE	830	830	830	830	830	830	830	830	830	830	830	830	0
10 PROB	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000	1.000
1000 LAGGED PAYMENT	0	0	0	0	0	0	0	0	0	0	0	830	830
1050 EXPENDITURE	750	750	750	750	750	750	750	750	750	750	750	750	0
1100 CASH FLOW	-750	-750	-750	-750	-750	-750	-750	-750	-750	-750	-750	80	830
1200 CCF	-750	-1500	-2250	-3000	-3750	-4500	-5250	-6000	-6750	-7500	-8250	-8170	-7340
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	0	0	0
2400 DISCOUNT VALUES	.0043	.0086	.0130	.0173	.0216	.0259	.0302	.0346	.0389	.0432	.0475	.0518	.0562
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	0	0	0
2420 CUMULATIVE FX LOS	0	0	0	0	0	0	0	0	0	0	0	0	0

	14	15	16	17	18	19	20	21	22	23	24
5 INVOICE	0	0	0	0	0	0	0	0	0	0	0
10 PROB	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1000 LAGGED PAYMENT	830	830	830	830	830	830	830	830	830	830	0
1050 EXPENDITURE	0	0	0	0	0	0	0	0	0	0	0
1100 CASH FLOW	830	830	830	830	830	830	830	830	830	830	0
1200 CCF	-6510	-5680	-4850	-4020	-3190	-2360	-1530	-700	130	960	960
2300 PHASED CIS	0	0	0	0	0	0	0	0	130	830	0
2400 DISCOUNT VALUES	.0605	.0648	.0691	.0734	.0778	.0821	.0864	.0907	.0950	.0994	.1037
2410 FX LOSS	0	0	0	0	0	0	0	0	12	82	0
2420 CUMULATIVE FX LOS	0	0	0	0	0	0	0	0	12	95	95

DATA SET NO.2

```
2420 CUMULATIVE FX LO Column  24 Mean       94.824   S.D          0

     Upper    Cumul
     Bound      %

    94.824     0.0
    94.824   100.0    ********************************************************************************

  Min. Observation       94.824
  Max. Observation       94.824
  * Scale is times 1/2
```

```
2420 CUMULATIVE FX LO Column  24 Mean       94.824   S.D          0

     Upper    % of
     Bound  Sample

    94.824   100.0                                                *
    94.824     0.0 *
                   ..................................................
    Probability    .0   .1   .2   .3   .4   .5   .6   .7   .8   .9  1.0
```

DATA SET NO.3

	1	2	3	4	5	6	7	8	9	10	11	12	13
5 INVOICE	830	830	830	830	830	830	830	830	830	830	830	830	0
10 PROB	.900	.100	1.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	0	0	830	830	830	830	830	830	830	830	830	830	830
1050 EXPENDITURE	750	750	750	750	750	750	750	750	750	750	750	750	0
1100 CASH FLOW	-750	-750	80	80	80	80	80	80	80	80	80	80	830
1200 CCF	-750	-1500	-1420	-1340	-1260	-1180	-1100	-1020	-940	-860	-780	-700	130
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	0	0	130
2400 DISCOUNT VALUES	.0043	.0086	.0130	.0173	.0216	.0259	.0302	.0346	.0389	.0432	.0475	.0518	.0562
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	0	0	7
2420 CUMULATIVE FX LOS	0	0	0	0	0	0	0	0	0	0	0	0	7

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	14	15	16	17	18	19	20	21	22	23	24
5 INVOICE	0	0	0	0	0	0	0	0	0	0	0
10 PROB	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	830	0	0	0	0	0	0	0	0	0	0
1050 EXPENDITURE	0	0	0	0	0	0	0	0	0	0	0
1100 CASH FLOW	830	0	0	0	0	0	0	0	0	0	0
1200 CCF	960	960	960	960	960	960	960	960	960	960	960
2300 PHASED CIS	830	0	0	0	0	0	0	0	0	0	0
2400 DISCOUNT VALUES	.0605	.0648	.0691	.0734	.0778	.0821	.0864	.0907	.0950	.0994	.1037
2410 FX LOSS	50	0	0	0	0	0	0	0	0	0	0
2420 CUMULATIVE FX LOS	57	57	57	57	57	57	57	57	57	57	57

DATA SET NO.3

2420 CUMULATIVE FX LO Column 24 Mean 29.1675 S.D 7.8922

Upper Bound	Cumul %	
25	0.0	
29	92.7	**********
33	92.7	
37	92.7	
41	92.7	
45	92.7	
49	92.7	
53	92.7	
Limit	100.0	*****

Min. Observation 26.9568
Max. Observation 57.4992
* Scale is times 1/2

2420 CUMULATIVE FX LO Column 24 Mean 29.1675 S.D 7.8922

Upper Bound	% of Sample	
25	100.0	*
29	7.3	*
33	7.3	*
37	7.3	*
41	7.3	*
45	7.3	*
49	7.3	*
53	7.3	*

Probability .0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0

DATA SET NO.4

	1	2	3	4	5	6	7	8	9	10	11	12	13
5 INVOICE	830	830	830	830	830	830	830	830	830	830	830	830	0
10 PROB	.000	.158	.290	.242	.065	.048	.048	.016	.016	.016	1.000	.000	.000
1000 LAGGED PAYMENT	0	0	830	830	830	830	830	830	830	830	830	830	830
1050 EXPENDITURE	750	750	750	750	750	750	750	750	750	750	750	750	0
1100 CASH FLOW	-750	-750	80	80	80	80	80	80	80	80	80	80	830
1200 CCF	-750	-1500	-1420	-1340	-1260	-1180	-1100	-1020	-940	-860	-780	-700	130
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	0	0	130
2400 DISCOUNT VALUES	.0043	.0086	.0130	.0173	.0216	.0259	.0302	.0346	.0389	.0432	.0475	.0518	.0562
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	0	0	7
2420 CUMULATIVE FX LOS	0	0	0	0	0	0	0	0	0	0	0	0	7

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	14	15	16	17	18	19	20	21	22	23	24
5 INVOICE	0	0	0	0	0	0	0	0	0	0	0
10 PROB	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	830	0	0	0	0	0	0	0	0	0	0
1050 EXPENDITURE	0	0	0	0	0	0	0	0	0	0	0
1100 CASH FLOW	830	0	0	0	0	0	0	0	0	0	0
1200 CCF	960	960	960	960	960	960	960	960	960	960	960
2300 PHASED CIS	830	0	0	0	0	0	0	0	0	0	0
2400 DISCOUNT VALUES	.0605	.0648	.0691	.0734	.0778	.0821	.0864	.0907	.0950	.0994	.1037
2410 FX LOSS	50	0	0	0	0	0	0	0	0	0	0
2420 CUMULATIVE FX LOS	57	57	57	57	57	57	57	57	57	57	57

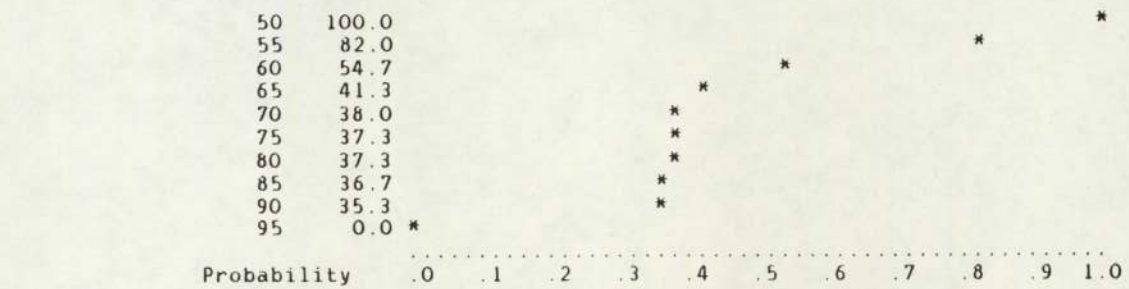
DATA SET NO.4

2420 CUMULATIVE FX LO Column 24 Mean 70.0125 S.D 16.1562

Upper Bound	Cumul %	
50	0.0	
55	18.0	**********
60	45.3	*************************
65	58.7	********
70	62.0	**
75	62.7	
80	62.7	
85	63.3	*
90	64.7	**
95	100.0	**********************

Min. Observation 53.136
Max. Observation 90.6768
* Scale is times 2

2420 CUMULATIVE FX LO Column 24 Mean 70.0125 S.D 16.1562



DATA SET NO.5

	1	2	3	4	5	6	7	8	9	10	11	12	13
5 INVOICE	830	830	830	830	830	830	830	830	830	830	830	830	0
10 PROB	.075	.400	.375	.113	.025	.013	1.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	0	830	830	830	830	830	830	830	830	830	830	830	830
1050 EXPENDITURE	750	750	750	750	750	750	750	750	750	750	750	750	0
1100 CASH FLOW	-750	80	80	80	80	80	80	80	80	80	80	80	830
1200 CCF	-750	-670	-590	-510	-430	-350	-270	-190	-110	-30	50	130	960
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	50	80	830
2400 DISCOUNT VALUES	.0043	.0086	.0130	.0173	.0216	.0259	.0302	.0346	.0389	.0432	.0475	.0518	.0562
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	2	4	47
2420 CUMULATIVE FX LOS	0	0	0	0	0	0	0	0	0	0	2	7	53

3:39PM Oct 17,1986

	14	15	16	17	18	19	20	21	22	23	24
5 INVOICE	0	0	0	0	0	0	0	0	0	0	0
10 PROB	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	0	0	0	0	0	0	0	0	0	0	0
1050 EXPENDITURE	0	0	0	0	0	0	0	0	0	0	0
1100 CASH FLOW	0	0	0	0	0	0	0	0	0	0	0
1200 CCF	960	960	960	960	960	960	960	960	960	960	960
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	0
2400 DISCOUNT VALUES	.0605	.0648	.0691	.0734	.0778	.0821	.0864	.0907	.0950	.0994	.1037
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	0
2420 CUMULATIVE FX LOS	53	53	53	53	53	53	53	53	53	53	53

DATA SET NO.5

2420 CUMULATIVE FX LO Column 24 Mean 58.0876 S.D 12.2529

Upper Bound	Cumul %	
33	8.0	**********
38	8.0	
43	8.0	
48	8.0	
53	8.0	
58	70.0	**********
63	74.7	*******
68	75.3	*
73	75.3	
78	100.0	**********

Min. Observation 26.9568
Max. Observation 74.088
* Scale is times 1

2420 CUMULATIVE FX LO Column 24 Mean 58.0876 S.D 12.2529

Upper Bound	% of Sample	
33	92.0	*
38	92.0	*
43	92.0	*
48	92.0	*
53	92.0	*
58	30.0	*
63	25.3	*
68	24.7	*
73	24.7	*
78	0.0	*

Probability .0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0

DATA SET NO.6

	1	2	3	4	5	6	7	8	9	10	11	12	13
5 INVOICE	830	830	830	830	830	830	830	830	830	830	830	830	0
10 PROB	.233	.333	.333	.100	1.000	.000	.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	0	830	830	830	830	830	830	830	830	830	830	830	830
1050 EXPENDITURE	750	750	750	750	750	750	750	750	750	750	750	750	0
1100 CASH FLOW	-750	80	80	80	80	80	80	80	80	80	80	80	830
1200 CCF	-750	-670	-590	-510	-430	-350	-270	-190	-110	-30	50	130	960
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	50	80	830
2400 DISCOUNT VALUES	.0043	.0086	.0130	.0173	.0216	.0259	.0302	.0346	.0389	.0432	.0475	.0518	.0562
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	2	4	47
2420 CUMULATIVE FX LOS	0	0	0	0	0	0	0	0	0	0	2	7	53

1:43PM Oct 17,1986

	14	15	16	17	18	19	20	21	22	23	24
5 INVOICE	0	0	0	0	0	0	0	0	0	0	0
10 PROB	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	0	0	0	0	0	0	0	0	0	0	0
1050 EXPENDITURE	0	0	0	0	0	0	0	0	0	0	0
1100 CASH FLOW	0	0	0	0	0	0	0	0	0	0	0
1200 CCF	960	960	960	960	960	960	960	960	960	960	960
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	0
2400 DISCOUNT VALUES	.0605	.0648	.0691	.0734	.0778	.0821	.0864	.0907	.0950	.0994	.1037
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	0
2420 CUMULATIVE FX LOS	53	53	53	53	53	53	53	53	53	53	53

DATA SET NO.6

2420 CUMULATIVE FX LO Column 24 Mean 52.1862 S.D 14.2899

Upper Bound	Cumul %	
27	22.0	**********
32	22.0	
37	22.0	
42	22.0	
47	22.0	
52	22.0	
57	49.3	**********
62	71.3	**********
67	100.0	**********

Min. Observation 26.9568
Max. Observation 65.7936
* Scale is times 2

2420 CUMULATIVE FX LO Column 24 Mean 52.1862 S.D 14.2899

Upper Bound	% of Sample	
27	78.0	
32	78.0	
37	78.0	
42	78.0	
47	78.0	
52	78.0	
57	50.7	
62	28.7	
67	0.0	

Probability .0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0

DATA SET NO.7

	1	2	3	4	5	6	7	8	9	10	11	12	13
5 INVOICE	830	830	830	830	830	830	830	830	830	830	830	830	0
10 PROB	.250	.233	.198	.060	.069	.095	.035	.026	.017	.001	.000	.000	.001
1000 LAGGED PAYMENT	0	0	830	830	830	830	830	830	830	830	830	830	830
1050 EXPENDITURE	750	750	750	750	750	750	750	750	750	750	750	750	0
1100 CASH FLOW	-750	-750	80	80	80	80	80	80	80	80	80	80	830
1200 CCF	-750	-1500	-1420	-1340	-1260	-1180	-1100	-1020	-940	-860	-780	-700	130
2300 PHASED CIS	0	0	0	0	0	0	0	0	0	0	0	0	130
2400 DISCOUNT VALUES	.0043	.0086	.0130	.0173	.0216	.0259	.0302	.0346	.0389	.0432	.0475	.0518	.0562
2410 FX LOSS	0	0	0	0	0	0	0	0	0	0	0	0	7
2420 CUMULATIVE FX LOS	0	0	0	0	0	0	0	0	0	0	0	0	7

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	14	15	16	17	18	19	20	21	22	23	24
5 INVOICE	0	0	0	0	0	0	0	0	0	0	0
10 PROB	1.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	830	0	0	0	0	0	0	0	0	0	0
1050 EXPENDITURE	0	0	0	0	0	0	0	0	0	0	0
1100 CASH FLOW	830	0	0	0	0	0	0	0	0	0	0
1200 CCF	960	960	960	960	960	960	960	960	960	960	960
2300 PHASED CIS	830	0	0	0	0	0	0	0	0	0	0
2400 DISCOUNT VALUES	.0605	.0648	.0691	.0734	.0778	.0821	.0864	.0907	.0950	.0994	.1037
2410 FX LOSS	50	0	0	0	0	0	0	0	0	0	0
2420 CUMULATIVE FX LOS	57	57	57	57	57	57	57	57	57	57	57

DATA SET NO.7

2420 CUMULATIVE FX LO Column 24 Mean 35.4828 S.D 19.8688

Upper Bound	Cumul %	
12	0.0	
20	30.0	**********
28	60.0	**********
36	60.0	
44	60.0	
52	60.0	
60	89.3	**********
68	95.3	**********
76	99.3	**********
84	100.0	**

Min. Observation 13.4784
Max. Observation 78.2352
* Scale is times 2

2420 CUMULATIVE FX LO Column 24 Mean 35.4828 S.D 19.8688

Upper Bound	% of Sample	
12	100.0	*
20	70.0	*
28	40.0	*
36	40.0	*
44	40.0	*
52	40.0	*
60	10.7	*
68	4.7	*
76	0.7	*
78.2352	0.7	*

Probability .0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0

DATA SET NO.8

	14	15	16	17	18	19	20	21	22	23	24
5 INVOICE	0	0	0	0	0	0	0	0	0	0	0
10 PROB	.039	1.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1000 LAGGED PAYMENT	830	0	0	0	0	0	0	0	0	0	0
1050 EXPENDITURE	0	0	0	0	0	0	0	0	0	0	0
1100 CASH FLOW	830	0	0	0	0	0	0	0	0	0	0
1200 CCF	960	960	960	960	960	960	960	960	960	960	960
2300 PHASED CIS	830	0	0	0	0	0	0	0	0	0	0
2400 DISCOUNT VALUES	.0605	.0648	.0691	.0734	.0778	.0821	.0864	.0907	.0950	.0994	.1037
2410 FX LOSS	50	0	0	0	0	0	0	0	0	0	0
2420 CUMULATIVE FX LOS	57	57	57	57	57	57	57	57	57	57	57

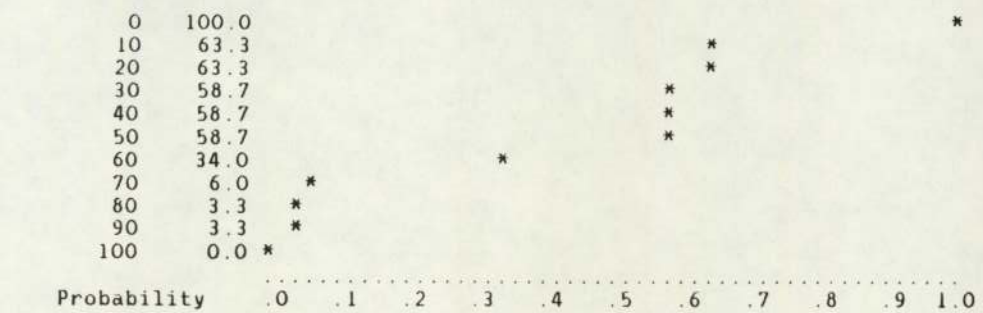
DATA SET NO.8

2420 CUMULATIVE FX LO Column 24 Mean 38.3409 S.D 31.1476

Upper Bound	Cumul %	
0	0.0	
10	36.7	**********
20	36.7	
30	41.3	*******
40	41.3	
50	41.3	
60	66.0	**********
70	94.0	**********
80	96.7	****
90	96.7	
100	100.0	*****

Min. Observation 0
Max. Observation 98.9712
* Scale is times 1

2420 CUMULATIVE FX LO Column 24 Mean 38.3409 S.D 31.1476



Appendix 10

Application of Exposure Profiles as a Control Tool Using a Corporate Wide Multi-Currency Case

Basic Data

Basic Data Converted into Sterling:-

Broken down into

a) Overseas Branches
b) Overseas Dividends
c) Overseas Sales
d) Overseas Purchases

CORPORATE WIDE EXPOSURE DATA 1983 IN CURRENCY

		FROM 1982	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 1984
ABU DHABI	MOVEMENT		-4700000					-3000000					-2950000	-990000	
	BALANCE	12587008	7887008	7887008	7887008	7887008	7887008	4887008	4887008	4887008	4887008	4887008	1937008	947008	947008
BAHRAIN	MOVEMENT		-208224			-87981			-134316			-98150			
	BALANCE	648671	440447	440447	440447	352466	352466	352466	218150	218150	218150	120000	120000	120000	120000
DOHA	MOVEMENT														
	BALANCE	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000
DUBAI	MOVEMENT			-585000			-200000	-300000	-450000	-700000			-200000	150000	
	BALANCE	3214889	3214889	2629889	2629889	2629889	2429889	2129889	1679889	979889	979889	979889	779889	929889	929889
KUWAIT	MOVEMENT														
	BALANCE	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620
R-A-K	MOVEMENT		-760000					-700000			-600000		-600000		
	BALANCE	3508450	2748450	2748450	2748450	2748450	2748450	2048450	2048450	2048450	1448450	1448450	848450	848450	848450
SAUDI ARABIA	MOVEMENT			-9000000		-1500000	-800000				-20000000			-4000000	
	BALANCE	48334000	48334000	39334000	39334000	37834000	37034000	37034000	37034000	37034000	17034000	17034000	17034000	13034000	13034000

CORPORATE WIDE EXPOSURE DATA 1983 IN CURRENCY

IAL FAR EAST	MOVEMENT							-35777					-47160	79690	
	BALANCE	123999	123999	123999	123999	123999	123999	88222	88222	88222	88222	88222	41062	120752	120752
IA PAKISTAN	MOVEMENT													20000	
	BALANCE	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	80000	80000
IA NORTH AMERRICA	MOVEMENT														
	BALANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATS AMAL	MOVEMENT		-19600			-68600								68600	
	BALANCE	88200	68600	68600	68600	0	0	0	0	0	0	0	0	68600	68600
ELECTRONIC R ENTALS	MOVEMENT													8000	
	BALANCE	0	0	0	0	0	0	0	0	0	0	0	0	8000	8000
CARTEL	MOVEMENT													18000	
	BALANCE	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	30000	30000
COMTECH	MOVEMENT														
	BALANCE	7750	7750	7750	7750	7750	7750	7750	7750	7750	7750	7750	7750	7750	7750
IA ZAMBIA	MOVEMENT														
	BALANCE	38100	38100	38100	38100	38100	38100	38100	38100	38100	38100	38100	38100	38100	38100

CORPORATE WIDE EXPOSURE DATA 1983 IN CURRENCY

RADIO PAGING	MOVEMENT														
	BALANCE	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250	5250
ALBWARDY IAL	MOVEMENT					-18130									
	BALANCE	18130	18130	18130	18130	0	0	0	0	0	0	0	0	0	0
SIAL	MOVEMENT								-500000					100000	
	BALANCE	500000	500000	500000	500000	500000	500000	500000	0	0	0	0	0	100000	100000
ABU DHABI	MOVEMENT												-216535		
	BALANCE	216535	216535	216535	216535	216535	216535	216535	216535	216535	216535	216535	0	0	0
CAP GEMINI	MOVEMENT													1012331	
	BALANCE	0	0	0	0	0	0	0	0	0	0	0	0	1012331	1012331

OVERSEAS PURCHASES 4 MONTHTHS LAG

CORPORATE WIDE EXPOSURE DATA 1983 IN CURRENCY

AUSTRALIAN $	-MOVEMENT		-273				-355	-735	-31		-137		-339		
	MOVEMENT			355	735	31	0	137	0	339	0	0	0		
	BALANCE	273	0	355	1090	1121	766	168	137	476	339	339	0	0	0
BELGIUM FR	-MOVEMENT		-4446163	-6389085	-3259653	-8532450	-5750930	-6777458	-7705979	-5326568	-19507599	-8775241	-5130750	-4445349	
	MOVEMENT		8532450	5750930	6777458	7705979	5326568	19507599	8775241	5130750	4445349	0	0	0	0
	BALANCE	14094901	18181188	17543033	21060838	20234367	19810005	32540146	33609408	33413590	18351340	9576099	4445349	0	0
CANADIAN $	-MOVEMENT		-133	-1525	-49860	-609	0	-730	-2530	0	-1512	-720	-200	-70	0
	MOVEMENT		609	0	730	2530	0	1512	720	200	70	0	0	0	0
	BALANCE	51518	51994	50469	1339	3260	3260	4042	2232	2432	990	270	70	0	0
DANISH KR	-MOVEMENT							-5489	-4405	0	0	-1441	0	0	0
	MOVEMENT				5489	4405	0	0	1441	0	0	0	0	0	0
	BALANCE	0	0	0	5489	9894	9894	4405	1441	1441	1441	0	0	0	0

CORPORATE WIDE EXPOSURE DATA 1983 IN CURRENCY

GERMAN MK	-MOVEMENT		-81703	-1756	-38485	-5387	-5775	-44756	-333619	-45641	-37170	-59898	-70200	-31830	
	MOVEMENT		5387	5775	44756	333619	45641	37170	59898	70200	31830	0			
	BALANCE	121944	45628	49647	55918	384150	424016	416430	142709	167268	161928	102030	31830	0	0
DUTCH G	-MOVEMENT		-2325	-4644	-14199	-68668	-81099	-342575	-21962	0	-76286	-24384	-7008	-422	
	MOVEMENT		68668	81099	342575	21962	0	76286	24384	7008	422	0	0	0	
	BALANCE	21168	87511	163966	492342	445636	364537	98248	100670	107678	31814	7430	422	0	0
FINNISH MK	-MOVEMENT		-2407	0	-670	-7140	-926	0	0	0	-2488	-6588	0	-2909	0
	MOVEMENT		7140	926	0	0	0	2488	6588	0	2909	0	0	0	0
	BALANCE	3077	7810	8736	8066	926	0	2488	9076	9076	9497	2909	2909	0	0
FRENCH FR	-MOVEMENT		-200242	-76915	-35973	-1358232	-48636	-40592	-40885	-80982	-40423	-1306012	-46057	-149937	
	MOVEMENT		1358232	48636	40592	40885	80982	40423	1306012	46057	149937				
	BALANCE	313130	1471120	1442841	1447460	130113	162459	162290	1427417	1392492	1502006	195994	149937	0	0
ITALIAN L	-MOVEMENT		0	0	-51700000	-26368000	-64967000	-304000	0	-270000	-24000	0	0	-1147000	0
	MOVEMENT		26368000	64967000	304000		270000	24000	0	0	1147000	0	0	0	0
	BALANCE	51700000	78068000	143035000	91639000	65271000	574000	294000	294000	24000	1147000	1147000	1147000	0	0

CORPORATE WIDE EXPOSURE DATA 1983 IN CURRENCY

JAPANESE Y	-MOVEMENT	0	0	0	0	0	-9080	0	0	0	-17810000	0	-13500	0	
	MOVEMENT	0	9080	0	0	0	0	17810000	0	13500	0	0	0	0	
	BALANCE	0	9080	9080	9080	9080	0	17810000	17810000	17823500	13500	13500	0	0	0
SWEDISH KR	-MOVEMENT					-3458									
	MOVEMENT		3458	0	0	0									
	BALANCE	0	3458	3458	3458	0	0	0	0	0	0	0	0	0	0
NORWEGIAN KR	-MOVEMENT		-4194		-6172	-1125	-348	0			-200				
	MOVEMENT		1125	348	0	0	0	200	0	0	0				
	BALANCE	10366	7297	7645	1473	348	0	200	200	200	0	0	0	0	0
SWISS FR	-MOVEMENT		-927	-726	-169407	-88	-202736	-16208	-276	-9121	-1474	-2152	-221261	-1343	
	MOVEMENT		88	202736	16208	276	9121	1474	2152	221261	1343	0	0	0	
	BALANCE	171060	170221	372231	219032	219220	25605	10871	12747	224887	224756	222604	1343	0	0
US DOLLARS	-MOVEMENT		-15686	-111244	-76469	-43989	-164735	-67640	-149228	-211872	-52606	-152959	-169170	-325214	
	MOVEMENT		43989	164735	67640	149228	211872	52606	152959	169170	325214	0	0	0	
CHECK	BALANCE	-19089	9214	62705	53876	159115	206252	191218	194949	152247	424855	271896	102726	-222488	-222488
IRISH ₤	-MOVEMENT									-6221		-7130			
	MOVEMENT						6221		7130						
	BALANCE	0	0	0	0	0	6221	6221	13351	7130	7130	0	0	0	0

CORPORATE WIDE EXPOSURE DATA 1983 IN CURRENCY

NIGERIA	-MOVEMENT					-97010									
	MOVEMENT			16625	16613		39978	17678						525	
	BALANCE	79989	79989	96614	113227	16217	56195	73873	73873	73873	73873	73873	73873	74398	74398
ABU DHABI	-MOVEMENT							-123021							
	MOVEMENT								24717						
	BALANCE	146193	146193	146193	146193	146193	146193	23172	47889	47889	47889	47889	47889	47889	47889
BAYINDIRLIK US $	-MOVEMENT		0				-242116								
	MOVEMENT		0		103980										
	BALANCE	123220	123220	123220	227200	227200	-14916	-14916	-14916	-14916	-14916	-14916	-14916	-14916	-14916
DCA KUWAIT	-MOVEMENT			-18373				-10524	9909		-9469				
	MOVEMENT					10524									
	BALANCE	18373	18373	0	0	10524	10524	0	9909	9909	440	440	440	440	440
SIAL	-MOVEMENT						-6975657		-5941756	-3830331					
	MOVEMENT				2050678			545280			785394	1811752	833658	3931061	
	BALANCE	10333667	10333667	10333667	12384345	12384345	5408688	5953968	12212	-3818119	-3032725	-1220973	-387315	3543746	3543746
SIAT	-MOVEMENT		-3567											-613	
	MOVEMENT						17244								
	BALANCE	28448	24881	24881	24881	24881	42125	42125	42125	42125	42125	42125	42125	41512	41512
CATHAY P	-MOVEMENT					-313800									
	MOVEMENT		313800											278759	

CORPORATE WIDE EXPOSURE DATA 1983 IN CURRENCY

	BALANCE	0	313800	313800	313800	0	0	0	0	0	0	0	0	278759	278759
HOTEL GEORGE	-MOVEMENT							-4620	-19125						
	MOVEMENT						2400				15800	19500	2940		
	BALANCE	19000	19000	19000	19000	19000	21400	16780	-2345	-2345	13455	32955	35895	35895	35895
NOVOTEL PARIS	-MOVEMENT							-20020	-22925						
	MOVEMENT			1216		3120	2400								
	BALANCE	35999	35999	37215	37215	40335	42735	22715	-210	-210	-210	-210	-210	-210	-210
THOMPSON CSF	-MOVEMENT														
	MOVEMENT										10523332				
	BALANCE	123037	123037	123037	123037	123037	123037	123037	123037	123037	10646369	10646369	10646369	10646369	10646369

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

		FROM 82	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 84
ABU DHABI	LC BALANCE	648671	440447	440447	440447	352466	352466	352466	218150	218150	218150	120000	120000	120000	120000
	FXR RATE	5.94	5.6	5.56	5.44	5.73	5.87	5.6	5.61	5.61	5.52	5.49	5.37	5.33	
	# BALANCE	109203.87	78651.25	79217.086	80964.522	61512.391	60045.315	62940.357	38885.918	38885.918	39519.928	21857.923	22346.369	22514.071	
BAHRAIN	LC BALANCE	648671	440447	440447	440447	352466	352466	352466	218150	218150	218150	120000	120000	120000	120000
	FXR RATE	0.608	0.58	0.57	0.56	0.59	0.6	0.58	0.58	0.57	0.56	0.55	0.55	0.55	
	# BALANCE	1066893.1	759391.38	772714.04	786512.5	597400	587443.33	607700	376120.69	382719.3	389553.57	218181.82	218181.82	218181.82	
DOHA	LC BALANCE	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000	4828000
	FXR RATE	5.84	5.58	5.55	5.36	5.68	5.83	5.55	5.56	5.55	5.48	5.43	5.32	5.27	
	# BALANCE	826712.33	865232.97	869909.91	900746.27	850000	828130.36	869909.91	868345.32	869909.91	881021.9	889134.44	907518.8	916129.03	
DUBAI	LC BALANCE	3214889	3214889	2629889	2629889	2629889	2429889	2129889	1679889	979889	979889	979889	779889	929889	929889
	FXR RATE	5.94	5.6	5.56	5.44	5.73	5.87	5.6	5.61	5.61	5.52	5.49	5.37	5.33	
	# BALANCE	541227.1	574087.32	473001.62	483435.48	458968.41	413950.43	380337.32	299445.45	174668.27	177516.12	178486.16	145230.73	174463.23	
KUWAIT	LC BALANCE	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620	21620
	FXR RATE	0.46	0.44	0.44	0.43	0.45	0.47	0.45	0.45	0.45	0.43	0.44	0.43	0.42	
	# BALANCE	47000	49136.364	49136.364	50279.07	48044.444	46000	48044.444	48044.444	48044.444	50279.07	49136.364	50279.07	51476.19	
R-A-K	LC BALANCE	3508450	2748450	2748450	2748450	2748450	2748450	2048450	2048450	2048450	1448450	1448450	848450	848450	848450
	FXR RATE	5.94	5.6	5.56	5.44	5.73	5.87	5.6	5.61	5.61	5.52	5.49	5.37	5.33	
	# BALANCE	590648.15	490794.64	494325.54	505229.78	479659.69	468219.76	365794.64	365142.6	365142.6	262400.36	263834.24	157998.14	159183.86	
SAUDI ARABIA	LC BALANCE	48334000	48334000	39334000	39334000	37834000	37034000	37034000	37034000	37034000	17034000	17034000	17034000	13034000	13034000
	FXR RATE	5.56	5.24	5.21	5.11	5.39	5.52	5.33	5.27	5.31	5.23	5.2	5.08	5.08	
	# BALANCE	8693165.5	9224045.8	7549712.1	7697456	7019295	6709058	6948217.6	7027324.5	6974387.9	3256979	3275769.2	3353149.6	2565748	
SUB TOTAL		11874850	12041340	10288017	10504624	9514879.9	9112847.2	9282944.3	9023308.9	8853758.4	5057269.9	4896400.2	4854704.5	4107696.2	

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

		FROM 82	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 84
IAL FAR EAST	LC BALANCE	123999.00	123999.00	123999.00	123999.00	123999.00	123999.00	88222.00	88222.00	88222.00	88222.00	88222.00	41062.00	120752.00	120752.00
	FXR RATE	3.40	3.16	3.14	3.09	3.28	3.35	3.26	3.26	3.26	3.21	3.19	3.12	3.07	
	# BALANCE	36470.29	39240.19	39490.13	40129.13	37804.57	37014.63	27061.96	27061.96	27061.96	27483.49	27655.80	13160.90	39332.90	
IA PAKISTAN	LC BALANCE	60000.00	60000.00	60000.00	60000.00	60000.00	60000.00	68000.00	60000.00	60000.00	60000.00	60000.00	60000.00	80000.00	80000.00
	FXR RATE	20.65	19.55	19.20	18.95	19.81	20.84	19.88	20.19	20.15	19.95	19.50	19.07	19.20	
	# BALANCE	2905.57	3069.05	3125.00	3166.23	3028.77	2879.08	3018.11	2971.77	2977.67	3007.52	3076.92	3146.30	4166.67	
IA NORTH AMERICA	LC BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FXR RATE	1.99	1.88	1.86	1.83	1.91	1.97	1.88	1.87	1.88	1.85	1.84	1.81	1.81	
	# BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ATS AMAL	LC BALANCE	88200.00	68600.00	68600.00	68600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	68600.00	68600.00
	FXR RATE	0.61	0.58	0.57	0.56	0.59	0.60	0.58	0.58	0.57	0.56	0.55	0.55	0.55	
	# BALANCE	145065.79	118275.86	120350.88	122500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124727.27	
ELECTRONIC R	LC BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8000.00	8000.00
	FXR RATE	1.74	1.63	1.65	1.63	1.70	1.72	1.68	1.68	1.71	1.66	1.74	1.75	1.77	
	# BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4519.77	
CARTEL	LC BALANCE	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	30000.00	30000.00
	FXR RATE	3.88	3.65	3.65	3.56	3.75	3.85	3.68	3.68	3.67	3.60	3.59	3.50	3.48	

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

		FROM 82	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 84
IAL FAR EAST	LC BALANCE	123999.00	123999.00	123999.00	123999.00	123999.00	123999.00	88222.00	88222.00	88222.00	88222.00	88222.00	41062.00	120752.00	120752.00
	FXR RATE	3.40	3.16	3.14	3.09	3.28	3.35	3.26	3.26	3.26	3.21	3.19	3.12	3.07	
	# BALANCE	36470.29	39240.19	39490.13	40129.13	37804.57	37014.63	27061.96	27061.96	27061.96	27483.49	27655.80	13160.90	39332.90	
IA PAKISTAN	LC BALANCE	60000.00	60000.00	60000.00	60000.00	60000.00	60000.00	60000.00	60000.00	60000.00	60000.00	60000.00	60000.00	80000.00	80000.00
	FXR RATE	20.65	19.55	19.20	18.95	19.81	20.84	19.88	20.19	20.15	19.95	19.50	19.07	19.20	
	# BALANCE	2905.57	3069.05	3125.00	3166.23	3028.77	2879.08	3018.11	2971.77	2977.67	3007.52	3076.92	3146.30	4166.67	
IA NORTH AMERICA	LC BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FXR RATE	1.99	1.88	1.86	1.83	1.91	1.97	1.88	1.87	1.88	1.85	1.84	1.81	1.81	
	# BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ATS AMAL	LC BALANCE	88200.00	68600.00	68600.00	68600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	68600.00	68600.00
	FXR RATE	0.61	0.58	0.57	0.56	0.59	0.60	0.58	0.58	0.57	0.56	0.55	0.55	0.55	
	# BALANCE	145065.79	118275.86	120350.88	122500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124727.27	
ELECTRONIC R	LC BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8000.00	8000.00
	FXR RATE	1.74	1.63	1.65	1.63	1.70	1.72	1.68	1.68	1.71	1.66	1.74	1.75	1.77	
	# BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4519.77	
CARTEL	LC BALANCE	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	30000.00	30000.00
	FXR RATE	3.88	3.65	3.65	3.56	3.75	3.85	3.68	3.68	3.67	3.60	3.59	3.50	3.48	
	# BALANCE	3092.78	3287.67	3287.67	3370.79	3200.00	3116.88	3260.87	3260.87	3269.75	3333.33	3342.62	3428.57	8620.69	

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

COMTECH	LC BALANCE	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00	7750.00
	FXR RATE	2.88	2.71	2.71	2.65	2.78	2.85	2.74	2.73	2.72	2.68	2.67	4.60	4.26	
	# BALANCE	2690.97	2859.78	2859.78	2924.53	2787.77	2719.30	2828.47	2838.83	2849.26	2891.79	2902.62	1684.78	1819.25	
IA ZAMBIA	LC BALANCE	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00	38100.00
	FXR RATE	1.49	1.81	1.78	1.73	1.85	1.90	1.83	1.85	1.96	1.95	1.95	2.00	2.05	
	# BALANCE	25570.47	21049.72	21404.49	22023.12	20594.59	20052.63	20819.67	20594.59	19438.78	19538.46	19538.46	19050.00	18585.37	
RADIO PAGING	LC BALANCE	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00	5250.00
	FXR RATE	1.74	1.63	1.65	1.63	1.70	1.72	1.68	1.68	1.71	1.66	1.74	1.75	1.77	
	# BALANCE	3017.24	3220.86	3181.82	3220.86	3088.24	3052.33	3125.00	3125.00	3070.18	3162.65	3017.24	3000.00	2966.10	
ALDWARDY IAL	LC BALANCE	18130.00	18130.00	18130.00	18130.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FXR RATE	5.94	5.60	5.56	5.44	5.73	5.87	5.60	5.61	5.61	5.52	5.49	5.37	5.33	
	# BALANCE	3052.19	3237.50	3260.79	3332.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SIAL	LC BALANCE	500000.00	500000.00	500000.00	500000.00	500000.00	500000.00	500000.00	0.00	0.00	0.00	0.00	0.00	100000.00	100000.00
	FXR RATE	5.56	5.24	5.21	5.11	5.39	5.52	5.33	5.27	5.31	5.23	5.20	5.08	5.08	
	# BALANCE	89928.06	95419.85	95969.29	97847.36	92764.38	90579.71	93808.63	0.00	0.00	0.00	0.00	0.00	19685.04	

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

ABU DHABI	LC BALANCE	216535.00	216535.00	216535.00	216535.00	216535.00	216535.00	216535.00	216535.00	216535.00	216535.00	216535.00	0.00	0.00	0.00
	FXR RATE	5.94	5.60	5.56	5.44	5.73	5.87	5.60	5.61	5.61	5.52	5.49	5.37	5.33	
	# BALANCE	36453.70	38666.96	38945.14	39804.23	37789.70	36888.42	38666.96	38598.04	38598.04	39227.36	39441.71	0.00	0.00	
CAP GEMINI	LC BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1012331.00	1012331.00
	FXR RATE	10.88	10.53	10.45	10.79	11.54	12.09	11.67	12.05	12.10	12.15	11.93	12.03	12.07	
	# BALANCE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	83871.67	
TOTAL		348247.07	328327.45	331874.99	338318.95	201058.03	196302.97	192589.68	98451.06	97265.64	98644.60	98975.38	43470.55	308294.72	

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

SIAT	LC BALANCE	28448.00	24881.00	24881.00	24881.00	24881.00	42125.00	42125.00	42125.00	42125.00	42125.00	42125.00	42125.00	41512.00	41512.00
	FXR RATE	1.62	1.52	1.52	1.48	1.56	1.60	1.54	1.53	1.53	1.58	1.50	1.47	1.45	
	$ BALANCE	17560.49	16369.08	16369.08	16811.49	15949.36	26328.13	27353.90	27532.68	27532.68	26661.39	28083.33	28656.46	28628.97	
CATHY P	LC BALANCE	0.00	313800.00	313800.00	313800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	278759.00	278759.00
	FXR RATE	10.46	10.02	10.02	9.93	10.75	11.31	11.14	10.98	11.15	12.65	11.65	11.40	11.27	
	$ BALANCE	0.00	31317.37	31317.37	31601.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24734.61	
HOTEL GEORGE V	LC BALANCE	19000.00	19000.00	19000.00	19000.00	19000.00	21400.00	16780.00	-2345.00	-2345.00	13455.00	32955.00	35895.00	35895.00	35895.00
	FXR RATE	1.62	1.52	1.52	1.48	1.56	1.60	1.54	1.53	1.53	1.58	1.50	1.47	1.45	
	$ BALANCE	11728.40	12500.00	12500.00	12837.84	12179.49	13375.00	10896.10	-1532.68	-1532.68	8515.82	21970.00	24418.37	24755.17	
NOVOTEL PARIS	LC BALANCE	35999.00	35999.00	37215.00	37215.00	40335.00	42735.00	22715.00	-210.00	-210.00	-210.00	-210.00	-210.00	-210.00	-210.00
	FXR RATE	1.62	1.52	1.52	1.48	1.56	1.60	1.54	1.53	1.53	1.58	1.50	1.47	1.45	
	$ BALANCE	22221.60	23683.55	24483.55	25145.27	25855.77	26709.38	14750.00	-137.25	-137.25	-132.91	-140.00	-142.86	-144.83	
THOMPSON CSF	LC BALANCE	123037.00	123037.00	123037.00	123037.00	123037.00	123037.00	123037.00	123037.00	123037.00	10646369.00	10646369.00	10646369.00	10646369.00	10646369.00
	FXR RATE	1.62	1.52	1.52	1.48	1.56	1.60	1.54	1.53	1.53	1.58	1.50	1.47	1.45	
	$ BALANCE	75948.77	80945.39	80945.39	83133.11	78869.87	76898.13	79894.16	80416.34	80416.34	6738208.23	7097579.33	7242427.89	7342323.45	
TOTAL		2200031.51	2359202.15	2346697.71	2879286.64	2639925.91	1211745.63	1313453.65	195955.95	-528273.08	6258440.76	6978427.15	7285463.20	8187161.53	

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

		FROM 82	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 84
NIGERIA	LC BALANCE	79989.00	79989.00	96614.00	113227.00	16217.00	56195.00	73873.00	73873.00	73873.00	73873.00	73873.00	73873.00	74398.00	74398.00
	FXR RATE	1.09	1.09	1.07	1.07	1.09	1.11	1.07	1.11	1.16	1.14	1.12	1.11	1.07	
	₤ BALANCE	73384.40	73384.40	90293.46	105819.63	14877.98	50626.13	69040.19	66552.25	63683.62	64800.88	65958.04	66552.25	69530.84	
ABU DHABI	LC BALANCE	146193.00	146193.00	146193.00	146193.00	146193.00	146193.00	23172.00	47889.00	47889.00	47889.00	47889.00	47889.00	47889.00	47889.00
	FXR RATE	5.94	5.60	5.56	5.44	5.73	5.87	5.60	5.61	5.61	5.52	5.49	5.37	5.33	
	₤ BALANCE	24611.62	26105.89	26293.71	26873.71	25513.61	24905.11	4137.86	8536.36	8536.36	8675.54	8722.95	8917.88	8984.80	
BAYINDIRLIK US$	LC BALANCE	123220.00	123220.00	123220.00	227200.00	227200.00	-14916.00	-14916.00	-14916.00	-14916.00	-14916.00	-14916.00	-14916.00	-14916.00	-14916.00
	FXR RATE	1.62	1.52	1.52	1.48	1.56	1.60	1.54	1.53	1.53	1.58	1.50	1.47	1.45	
	₤ BALANCE	76061.73	81065.79	81065.79	153513.51	145641.03	-9322.50	-9685.71	-9749.02	-9749.02	-9440.51	-9944.00	-10146.94	-10286.90	
DCA KUWAIT	LC BALANCE	18373.00	18373.00	0.00	0.00	10524.00	10524.00	0.00	9909.00	9909.00	440.00	440.00	440.00	440.00	440.00
	FXR RATE	0.46	0.44	0.44	0.43	0.45	0.47	0.45	0.45	0.45	0.43	0.44	0.43	0.42	
	₤ BALANCE	39941.30	41756.82	0.00	0.00	23386.67	22391.49	0.00	22020.00	22020.00	1023.26	1000.00	1023.26	1047.62	
SIAL	LC BALANCE	10333667.00	10333667.00	10333667.00	12384345.00	12384345.00	5408688.00	5953968.00	12212.00	-3818119.00	-3032725.00	-1220973.00	-387315.00	3543746.00	3543746.00
	FXR RATE	5.56	5.24	5.21	5.11	5.39	5.52	5.33	5.27	5.31	5.23	5.20	5.08	5.08	
	₤ BALANCE	1858573.20	1972073.85	1983429.37	2423550.88	2297652.13	979834.78	1117067.17	2317.27	-719043.13	-579870.94	-234802.50	-76243.11	697587.80	

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

		FROM 82	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 84
AUSTRALIAN $	LC BALANCE	273.00	0.00	355.00	1090.00	1121.00	766.00	168.00	137.00	476.00	339.00	339.00	0.00	0.00	0.00
	FXR RATE	1.64	1.57	1.58	1.70	1.80	1.81	1.77	1.73	1.70	1.67	1.63	1.60	1.61	
	LC BALANCE	166.46	0.00	224.68	641.18	622.78	423.20	94.92	79.19	280.00	202.99	207.98	0.00	0.00	
BELGIUM FR	LC BALANCE	14094901.00	18181188.00	17543033.00	21060838.00	20234367.0	19810005.00	32540146.00	33609408.00	33413590.00	18351340.00	9576099.00	4445349.00	0.00	0.00
	FXR RATE	75.85	73.15	72.65	71.50	76.55	80.43	80.28	80.11	80.47	80.45	79.95	80.30	80.70	
	LC BALANCE	185825.99	248546.66	241473.27	294557.17	264328.77	246301.19	405333.16	419540.73	415230.40	228108.64	119776.10	55359.27	0.00	
CANADIAN $	LC BALANCE	51518.00	51994.00	50469.00	1339.00	3260.00	3260.00	4042.00	2232.00	2432.00	990.00	270.00	70.00	0.00	0.00
	FXR RATE	1.99	1.88	1.86	1.83	1.91	1.97	1.88	1.87	1.88	1.85	1.84	1.81	1.81	
	LC BALANCE	25888.44	27656.38	27133.87	731.69	1706.81	1654.82	2150.00	1193.58	1293.62	535.14	146.74	38.67	0.00	
DANISH KR	LC BALANCE	0.00	0.00	0.00	5489.00	9894.00	9894.00	4405.00	1441.00	1441.00	1441.00	0.00	0.00	0.00	0.00
	FXR RATE	13.55	13.13	13.11	12.74	13.67	14.39	14.40	14.40	14.45	14.13	14.18	14.29	14.34	
	LC BALANCE	0.00	0.00	0.00	430.85	723.77	687.56	305.90	100.07	99.72	101.98	0.00	0.00	0.00	
GERMAN MK	LC BALANCE	121944.00	45628.00	49647.00	55918.00	384150.00	424016.00	416430.00	142709.00	167268.00	161928.00	102030.00	31830.00	0.00	0.00
	FXR RATE	3.84	3.75	3.68	3.60	3.85	4.03	4.00	3.98	4.00	3.98	3.93	3.96	3.95	
	LC BALANCE	31756.25	12167.47	13491.03	15532.78	99779.22	105214.89	104107.50	35856.53	41817.00	40685.43	25961.83	8037.88	0.00	

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

FINNISH MK	LC BALANCE	3077.00	7810.00	8736.00	8066.00	926.00	0.00	2488.00	9076.00	9076.00	9497.00	2909.00	2909.00	0.00
	FXR RATE	8.55	8.22	8.16	8.11	8.47	8.77	8.67	8.58	8.57	8.51	8.44	8.44	8.43
	LC BALANCE	359.88	950.12	1070.59	994.57	109.33	0.00	286.97	1057.81	1059.04	1115.98	344.67	344.67	0.00
FRENCH FR	LC BALANCE	313130.00	1471120.00	1442841.00	1447460.00	130113.00	162459.00	162290.00	1427417.00	1392492.00	1502006.00	195994.00	149937.00	0.00
	FXR RATE	10.88	10.53	10.45	10.79	11.54	12.09	11.67	12.05	12.10	12.15	11.93	12.03	12.07
	LC BALANCE	28780.33	139707.50	138070.91	134148.29	11274.96	13437.47	13906.60	118457.84	115081.98	123621.89	16428.67	12463.59	0.00
ITALIAN L	LC BALANCE	51700000.00	78068000.00	143035000.00	91639000.00	65271000.00	574000.00	294000.00	294000.00	24000.00	1147000.00	1147000.00	1147000.00	0.00
	FXR RATE	2214.00	2143.00	2126.00	2143.00	2287.00	2386.00	2377.00	2368.00	2389.00	2407.00	2390.00	2395.00	2401.00
	LC BALANCE	23351.40	36429.30	67278.93	42762.02	28540.01	240.57	123.69	124.16	10.05	476.53	479.92	478.91	0.00
JAPANESE Y	LC BALANCE	0.00	9080.00	9080.00	9080.00	9080.00	0.00	17810000.00	17810000.00	17823500.00	13500.00	13500.00	0.00	0.00
	FXR RATE	380.00	365.00	360.00	354.50	371.25	382.00	375.06	368.12	369.00	357.00	350.00	343.00	336.50
	LC BALANCE	0.00	24.88	25.22	25.61	24.46	0.00	47485.74	48380.96	48302.17	37.82	38.57	0.00	0.00
NORWEGIAN KR	LC BALANCE	10366.00	7297.00	7645.00	1473.00	348.00	0.00	200.00	200.00	200.00	0.00	0.00	0.00	0.00
	FXR RATE	11.41	10.83	10.85	10.69	11.09	11.43	11.34	11.26	11.20	11.08	11.04	10.97	11.18
	LC BALANCE	908.50	673.78	704.61	137.79	31.38	0.00	17.64	17.76	17.86	0.00	0.00	0.00	0.00

CORPORATE WIDE EXPOSURE DATA 1983
CURRENCY CONVERTED INTO STERLING

SWEDISH KR	LC BALANCE	0.00	3458.00	3458.00	3458.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	FXR RATE	11.82	11.36	11.31	11.12	11.70	12.05	11.93	11.82	11.81	11.78	11.69	11.63	11.61	
	LC BALANCE	0.00	304.40	305.75	310.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DUTCH G	LC BALANCE	500000.00	500000.00	500000.00	500000.00	500000.00	500000.00	500000.00	0.00	0.00	0.00	0.00	0.00	100000.00	100000.00
	FXR RATE	4.25	4.12	4.07	4.05	4.33	4.54	4.49	4.45	4.48	4.49	4.41	4.43	4.44	
	LC BALANCE	117647.06	121359.22	122850.12	123456.79	115473.44	110132.16	111358.57	0.00	0.00	0.00	0.00	0.00	22522.52	
SWISS FR	LC BALANCE	171060.00	170221.00	372231.00	219032.00	219220.00	25605.00	10871.00	12747.00	224887.00	224756.00	222604.00	1343.00	0.00	0.00
	FXR RATE	3.25	3.06	3.12	3.09	3.22	3.34	3.28	3.22	3.26	3.23	3.23	3.18	3.17	
	LC BALANCE	52633.85	55627.78	119304.81	70884.14	68080.75	7666.17	3314.33	3958.70	68983.74	69691.78	68917.65	422.33	0.00	
US DOLLARS	LC BALANCE	79989.00	79989.00	96614.00	113227.00	16217.00	56195.00	73873.00	73873.00	73873.00	73873.00	73873.00	73873.00	74398.00	74398.00
	FXR RATE	1.62	1.52	1.52	1.48	1.56	1.60	1.54	1.53	1.53	1.58	1.50	1.47	1.45	
	LC BALANCE	49375.93	52624.34	63561.84	76504.73	10395.51	35121.88	47969.48	48283.01	48283.01	46755.06	49248.67	50253.74	51308.97	
IRISH #	LC BALANCE	0.00	0.00	0.00	0.00	0.00	6221.00	6221.00	13351.00	7130.00	7130.00	0.00	0.00	0.00	0.00
	FXR RATE	1.16	1.12	1.11	1.14	1.21	1.27	1.27	1.27	1.27	1.27	1.25	1.27	1.27	
	LC BALANCE	0.00	0.00	0.00	0.00	0.00	4898.43	4898.43	10512.60	5614.17	5614.17	0.00	0.00	0.00	
TOTAL		516694.09	696071.83	795495.63	761118.59	601091.17	525778.33	741352.91	687562.94	746072.76	516947.41	281550.78	127399.06	73831.49	

RESULTS 1983 DATA 1982 BASE LINE EXCHANGE RATES

CONSOLIDATED

	FROM 1982	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OSB TOTAL	11874850	11369376	9652185	9652185	9222884	9045329	8876979	8557695	8439850	4741717	4563763	4429083	3734911
OSD TOTAL	348193	315956	315956	315956	200075	200075	189568	99640	99640	99640	99640	49336	306805
OSP TOTAL	516861	669616	761110	724946	606687	555283	774191	721998	782825	545742	286355	127669	69539
OSS TOTAL	2200207	2228001	2204022	2652353	2558405	1204268	1259687	190723	-498184	6140195	6478109	6629865	7363642
GRAND TOTAL	13906389	13243717	11411053	11895548	11374677	9894389	9552043	8126060	7258481	10435810	10855157	10980615	11335819

RESULTS 1983 DATA 1983 ACTUAL EXCHANGE RATES

CONSOLIDATED

	FROM 1982	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 84
OSB TOTAL	11874850.01	12041339.73	10288016.65	10504623.59	9514879.92	9112847.17	9282944.31	9023308.91	8853758.39	5057269.92	4896400.18	4854704.52	4107696.24	
OSD TOTAL	348247.07	328327.45	331874.99	338318.95	201058.03	196302.97	192589.68	98451.06	97265.64	98644.60	98975.38	43470.55	308294.72	
OSP TOTAL	516694.09	696071.83	795495.63	761118.59	601091.17	525778.33	741352.91	687562.94	746072.76	516947.41	281550.78	127399.06	73831.49	
OSS TOTAL	2200031.51	2359202.15	2346697.71	2879286.64	2639925.91	1211745.63	1313453.65	195955.95	-528273.08	6258440.76	6978427.15	7285463.20	8187161.53	
GRAND TOTAL	13906434.51	14032797.50	12171093.72	12961110.60	11754772.68	9995117.44	10047634.73	8630152.98	7676678.20	10897407.87	11692251.92	12056239.22	12529321.00	

RESULTS 1983 DATA LAGGED ONE MONTH 1983 EXCHANGE RATES

CONSOLIDATED

	FROM 1982	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 84
OSB TOTAL	11874850.01	12573243.77	12120679.69	10504623.59	9957647.85	9291846.25	9461515.74	9359044.37	8978535.57	8990057.35	5092732.68	5003680.32	4866955.22	
OSD TOTAL	348247.07	328327.45	331874.99	338318.95	201058.03	196302.97	192589.68	98451.06	97265.64	98644.60	98975.38	43470.55	308294.72	
OSP TOTAL	516694.09	696071.83	795495.63	761118.59	601091.17	525778.33	741352.91	687562.94	746072.76	516947.41	281550.78	127399.06	73831.49	
OSS TOTAL	2200031.51	2359202.15	2346697.71	2879286.64	2639925.91	1211745.63	1313453.65	195955.95	-528273.08	6258440.76	6978427.15	7285463.20	8187161.53	
GRAND TOTAL	13906434.51	14564701.54	14003756.76	12961110.60	12197540.61	10174116.52	10226206.16	8965888.44	7801455.38	14830195.30	11888584.43	12205215.01	13288579.98	

RESULTS 1983 DATA LAGGED TO DECEMBER 1983 EXCHANGE RATES

CONSOLIDATED

	FROM 1982	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INTO 84
OSB TOTAL	11874850.01	12573243.77	12660125.96	12923223.72	12251397.46	11967287.16	12421075.67	12520408.82	12472505.64	12666833.70	12755479.54	13024580.39	5963230.94	
OSD TOTAL	348247.07	328327.45	331874.99	338318.95	201058.03	196302.97	192589.68	98451.06	97265.64	98644.60	98975.38	43470.55	308294.72	
OSP TOTAL	516694.09	696071.83	795495.63	761118.59	601091.17	525778.33	741352.91	687562.94	746072.76	516947.41	281550.78	127399.06	73831.49	
OSS TOTAL	2200031.51	2359202.15	2346697.71	2879286.64	2639925.91	1211745.63	1313453.65	195955.95	-528273.08	6258440.76	6978427.15	7285463.20	8187161.53	
GRAND TOTAL	13906434.51	14564701.54	14543203.03	15379710.74	14491290.22	12849557.43	13185766.09	12127252.90	11295425.45	18506971.65	19551331.29	20226115.09	14384855.71	

Appendix 11

List of UK Companies with overseas Business

Outline Questions For Survey of Treasurers in International Business

UK COMPANIES WITH TOTAL SALES IN EXCESS OF £20,000,000 AND WITH EXPORTS (1982)

1. A.F.A Minerva
2. Airwork
3. Arbathnot Latham Holdings PLC
4. Armitage Shanks Group
5. Avon Rubber
6. Bailey N G & Co
7. Balfour Kilpatrick
8. British and Commonwealth Shipping Co Ltd
9. British Aerospace
10. British Electric Traction Co Ltd
11. British Nuclear Fuels
12. British Syphon Industries
13. Brown and Jackson
14. Davies and Newman Holdings
15. Cable & Wireless
16. Dew G & Co
17. Geest Holdings
18. Grand Metropolitan
19. Hawker Siddeley Power Engineering
20. Holliday Hall and Co
21. Honeywell Control Systems
22. Hoskyns John & Co
23. Hotpoint
24. Howard Davis
25. Humphreys and Glasgow
26. Hunting Associated Industries
27. IBM (United Kingdom)

28. IDC Group
29. ITT Creed
30. K.C.A International
31. L.C.P Holdings
32. Laing John PLC
33. Mowlem
34. Newarthill
35. Nuttall Edmund
36. Parsons Ralph M Co
37. Pontins
38. Simon-Carves
39. Steel Brothers Holdings
40. Taylor Woodrow International
41. Trusthouse Forte
42. Tunnel Holdings
43. Town and City Properties
44. Trafalgar House
45. R.M.C Group
46 Rank Organisation
47. S.G.B Group
48. Plessey
49. Lucas Industries
50. G.E.C
51. Inchcape

Outline Questions for survey of Treasurers in International Businesses

A. Questions divided into four sections

i) Description of environment

ii) Who takes decisions on control of Foreign Exchange Exposure

iii) Types of action taken to control Exposure

iv) Accounting information: interface between control of Exposure and the Accounting System

B. The Questions

1. The Environment

a) What is the value in terms of sterling of your overseas business?

b) What proportion of your total turnover is this? Say overthe last 5 years.

c) Approximately how many currencies does this mean you trade in?

d) To what extent are your overseas business transactions, payments to overseas supplies or receipts from overseas customers.

e) i) Do you have any overseas branches or subsidiaries?

ii) What type of financial linkage do they have with the Parent Company? How were their
iii) financial bases established, expatriated money or locally raised finance?

f) What approximate values of foreign currency assets and liabilities does your company have currently? Has this picture changed greatly over the last 5 years?

g) Do you have links or business with countries where the repatriation of money to the UK is difficult?

h) i) Do you have any long-term contracts with overseas customers?

ii) If so what proportion of your total business do these account for?

2. Who takes decisions on control of Foreign Exchange Exposure

a) Do you preception foreign exchange exposure as a problem? If so, in whatway?

b) At what level within your organisation are decisions on foreign exchange matters made?

i) In the controlling of exposure by export hedging tools

ii) In the denomination of currencies for overseas business.

c) Would you describe your system of control of exposure as centralised or decentralised? In either case in what way?

3) Types of Action

a) What types of action do you take to limit foreign exchange exposure?

i) for fixed assets/liabilities

ii) Income and payments

ie i) Optimal hedge strategy
ii) Selective hedging
iii) A portfolio approach
iv) Netting Out
v) Swap Transactions
vi) Denominate all transactions in sterling
vii) Another approach

b) i) Do you use models to control exposure?

ii) If so are they manual or computer?

iii) Were they developed "in-house" or purchased from outside?

c) Are you willing to invest in currencies, other than those you trade in directly? So as to offset unfavourable movements in the currencies in which you do business?

d) To what extent do you use bodies such as the Export Credit Guarantees departments to shield your company from the effects of Foreign Exchange movements?

e) i) In what way do exchange rate forecasts fit into your management of foreign exchange?

ii) What type of exchange rate forecasts do you use? ie in house, professional

iii) What time horizon is important for these forecasts?

4. Information needs/conflicts

a) How do you collect data on the level of your exposure to foreign exchange movements?

How regular are your information inputs and how often are decisions then taken?

b) What account do you take of information present in your company's accounts when looking at foreign exchange exposure?

c) What ramifications are there of your management of exposure on conventional accounting data?

d) Do you have any special arrangements for accounting for Exposure on long-term overseas contracts?

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