The foreign exchange risk management of multinational corporations and financial innovations

This item was submitted to Loughborough University's Institutional Repository by the/an author.

Additional Information:

- A Master's Thesis. Submitted in partial fulfilment of the requirements for the award of Master of Philosophy at Loughborough University.

Metadata Record: https://dspace.lboro.ac.uk/2134/28004

Publisher: © Martin Glaum

Rights: This work is made available according to the conditions of the Creative Commons Attribution-NonCommercial-NoDerivatives 2.5 Generic (CC BY-NC-ND 2.5) licence. Full details of this licence are available at: http://creativecommons.org/licenses/by-nc-nd/2.5/

Please cite the published version.
This item was submitted to Loughborough University as an MPhil thesis by the author and is made available in the Institutional Repository (https://dspace.lboro.ac.uk/) under the following Creative Commons Licence conditions.

For the full text of this licence, please go to:
http://creativecommons.org/licenses/by-nc-nd/2.5/
THE FOREIGN EXCHANGE
RISK MANAGEMENT OF
MULTINATIONAL CORPORATIONS
AND FINANCIAL INNOVATIONS

by
Martin Glaum

A Master's Thesis
submitted in partial fulfilment
of the requirements of the award of
Master of Philosophy
of the Loughborough University of Technology
31.03.1989

Copyright by Martin Glaum 1989
ACKNOWLEDGEMENTS

Official regulations require a thesis which is to be submitted for an academic title to have a single author. Nonetheless, the author cannot - and does not want to - deny the many valuable contributions of other people who have helped to prepare and complete this thesis.

I am grateful to The British Council which provided generous financial support during the research. Studying abroad is expensive and the more so when additional costs are incurred by tuition fees and expenditures necessary for conducting the research. Without the support of The British Council I would not have been able to study in the UK.

Amongst my academic teachers of the Justus-Liebig-Universitaet in Giessen (West Germany) I would like to thank Prof. E. Pausenberger and Prof. H. Demmler for their inspiring introduction to the fields of International Management and Economic Theory respectively. Both of them also encouraged my aim to study abroad and provided valuable help in securing financial support.

A research student can consider himself fortunate if he is assigned a Research Supervisor who is interested in the student; who is accessible and always has an open door to discuss all minor and major problems as they arise; who is able to offer advice and guidance without stifling the student's own initiative; and who is capable of combining criticism with encouragement. In all these respects I was an extremely lucky student, and my major acknowledgement therefore goes to my supervisor, Ms. Penny Belk, to whom I am greatly indebted.

I am also grateful to my Director of Research, Prof. J. Sizer, who in spite of the many other demands on his time was always available for me. Without his assistance I would not have been able to undertake the empirical study for the research project. My thanks also go to the other members of staff of the Department of Management Studies at Loughborough University of Technology. In particular, I would like to name B. Howcroft who also helped in the organisation of the research interviews, M. Aitkenhead, V. Wong,
A. Higson, P. Lawrence, C. McEvoy, Prof. J. Saunders, J. Whittaker and J. Wilson, whose openness and friendliness made me feel at home in the department. In addition, I am indebted to Prof. D. Llewellyn, Prof. J. Presley and Prof. B. Tew from the Department of Economics and the Banking Centre of the university, and Prof. G. Franke from the University of Konstanz (West Germany). Their comments proved helpful and clarifying to my work.

Sincere thanks go to all the managers in companies and banks who were generous with their time and offered most interesting insights into the practical application of the concepts and theories I was studying.

The success of a research project is determined by the wider social environment as well as the immediate academic setting. In this respect, I was very lucky to find not only colleagues but also friends in my fellow research students at the department. Many thanks to Julie, Maxine, Andy, Gary, Jean-Louis, Mohamed, Morteza and Richard. Finally, I would like to thank my family and my friends at home for their moral support during the research.
This thesis is concerned with the foreign exchange risk management of multinational corporations (MNCs). It aims to ascertain whether and to what extent MNCs can make efficient use of financial innovations in order to achieve their exchange risk management objectives.

The first part of the thesis outlines the basic concepts and problems of corporate exchange risk management. This overview over the theory of exchange risk management is complemented by an empirical study on the practices of UK MNCs.

The second part of the thesis looks at the process of financial innovation in international financial markets. It seeks to analyse the determinants of financial innovation and presents major new financial instruments and techniques which have emerged over recent years in international financial markets.

In the third part of the thesis, four financial innovations are looked at in detail. It is discussed whether currency futures, currency options, currency swaps and debt-equity swaps can be usefully employed in the foreign exchange risk management of MNCs. The purpose of this discussion is to find out in what situations the use of the new hedging instruments and techniques is advantageous relative to that of the traditional exchange risk management tools. This theoretical analysis is again supplemented by a report on how UK MNCs currently employ the four innovations.
### CONTENTS STRUCTURE

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgements</td>
<td>I</td>
</tr>
<tr>
<td>Abstract</td>
<td>III</td>
</tr>
<tr>
<td>Contents Structure</td>
<td>IV</td>
</tr>
<tr>
<td>Contents</td>
<td>VI</td>
</tr>
<tr>
<td>List of Figures</td>
<td>XI</td>
</tr>
<tr>
<td>List of Tables</td>
<td>XIII</td>
</tr>
<tr>
<td>List of Abbreviations</td>
<td>XIV</td>
</tr>
</tbody>
</table>

**Part A: Introduction**

I. Foreword  
II. Methodology

**Part B: The management of foreign exchange risk in multinational corporations**

I. Introduction  
II. The basic concepts of foreign exchange risk  
III. The approaches to foreign exchange risk management  
IV. Techniques and instruments for the management of foreign exchange risk  
V. The management of foreign exchange risk in UK multinational corporations: An empirical study

**Part C: The process of financial innovation in international financial markets**

I. Introduction  
II. The nature of financial innovation  
III. Theories of financial innovation  
IV. The determinants of financial innovation  
V. Recent innovations in international financial markets: An overview
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgements</td>
<td>I</td>
</tr>
<tr>
<td>Abstract</td>
<td>III</td>
</tr>
<tr>
<td>Contents Structure</td>
<td>IV</td>
</tr>
<tr>
<td>Contents</td>
<td>VI</td>
</tr>
<tr>
<td>List of Figures</td>
<td>XI</td>
</tr>
<tr>
<td>List of Tables</td>
<td>XIII</td>
</tr>
<tr>
<td>List of Abbreviations</td>
<td>XIV</td>
</tr>
<tr>
<td>Part A: Introduction</td>
<td>1</td>
</tr>
<tr>
<td>I. Foreword</td>
<td>1</td>
</tr>
<tr>
<td>II. Methodology</td>
<td>3</td>
</tr>
<tr>
<td>1. Research hypothesis, research objective and research method</td>
<td>3</td>
</tr>
<tr>
<td>2. The sample of the empirical study</td>
<td>4</td>
</tr>
<tr>
<td>3. Presentation and limitations of the empirical study</td>
<td>5</td>
</tr>
<tr>
<td>Part B: The management of foreign exchange risk in multinational corporations</td>
<td>7</td>
</tr>
<tr>
<td>I. Introduction</td>
<td>7</td>
</tr>
<tr>
<td>II. The basic concepts of foreign exchange risk</td>
<td>9</td>
</tr>
<tr>
<td>1. The nature of foreign exchange risk</td>
<td>9</td>
</tr>
<tr>
<td>2. The concepts of foreign exchange exposure</td>
<td>12</td>
</tr>
<tr>
<td>(a) The discussion: An overview</td>
<td>12</td>
</tr>
<tr>
<td>(b) The traditional approach: Accounting exposure</td>
<td>14</td>
</tr>
<tr>
<td>(c) The concept of cash flow exposure</td>
<td>21</td>
</tr>
<tr>
<td>(d) The Adler &amp; Dumas concept: Exposure as a regression coefficient</td>
<td>27</td>
</tr>
<tr>
<td>3. Summary: Foreign exchange risk and exposure</td>
<td>33</td>
</tr>
</tbody>
</table>
III. The approaches to foreign exchange risk management

1. The alternatives: An overview
2. The traditional approach
3. The market efficiency approach, part one:
   The neoclassical equilibrium framework
4. The market efficiency approach, part two:
   The arguments of the school of capital market theory
5. The market imperfections approach

IV. Techniques and instruments for the management of foreign exchange risk

1. Techniques and instruments for the strategic management of exchange risk
2. Techniques and instruments for the tactical management of exchange risk
   (a) Exposure reducing or preventing exchange risk management techniques
   (b) Exposure neutralising exchange risk management techniques and instruments

V. The management of foreign exchange risk in UK multinational corporations: An empirical study

1. Introduction
2. Accounting exposure management
3. Transaction exposure management
4. Economic exposure management
5. The use of currency forecasts
6. The companies' exchange risk management objectives
Part C: The process of financial innovation in international financial markets

I. Introduction

II. The nature of financial innovation
   1. Defining 'innovation'
   2. The differences between real sector and financial sector innovation
   3. A taxonomy of financial innovation

III. Theories of financial innovation
   1. An overview
   2. The theory of constraint
   3. The theory of demand for characteristics

IV. The determinants of financial innovation
   1. An overview
   2. Microeconomic determinants of financial innovation
   3. Meso-economic determinants of financial innovation
      (a) Regulatory change
      (b) A worldwide trend towards deregulation
      (c) The increasing competition between financial markets
      (d) The increasing competition within financial markets
      (e) The growing internationalisation of finance
      (f) The increasing global integration of financial markets
      (g) High levels of interest rates and increased market volatility
      (h) The increasing sophistication of market participants
4. Macroeconomic determinants of financial innovation
   (a) Increasing wealth 131
   (b) Changes in the economic and political environment of the financial system 131
   (c) Technological progress in the real sector of the economy 137

5. Summary 142

V. Recent innovations in international financial markets: An overview 145
1. Introduction 145
2. Innovations in specific financial markets: The Euromarkets 146
   (a) The Euromoney market 147
   (b) The Euroloan market 147
   (c) The Eurobond market 148
   (d) Euro-Certificates of Deposit 153
   (e) Euronotes 163
   (f) Euro-Commercial Paper 153
3. Innovations of new financial markets: Futures and options 154
   (a) Financial futures contracts 154
   (b) Financial option contracts 155
   (c) Other instruments 156
4. Innovations of combined products 157
   (a) Euronote facilities 157
   (b) Multiple component facilities 158
   (c) Transferable loan facilities 159
5. The splitting up of existing instruments 160
6. New arbitraging instruments: The swap markets 161
   (a) Capital market swaps 161
   (b) LDC debt swap market 163
Part D: The use of specific financial innovations in the exchange risk management of multinational corporations

I. Introduction

II. The decision factors for the choice of the exchange risk management tool
   1. Introduction
   2. The cost of hedging
   3. Availability
   4. Flexibility
   5. Other decision factors

III. Financial innovations for the tactical management of foreign exchange risk: Currency futures and currency option contracts
   1. Currency futures contracts
   2. Currency option contracts
      (a) The mechanics of currency options
      (b) Currency option contracts versus forward exchange contracts, part one: The case of uncertain exposures
      (c) Currency option contracts versus forward exchange contracts, part two: The case of certain exposures
      (d) The use of currency options by UK MNCs: An empirical study

IV. Financial innovations for the strategic management of foreign exchange risk: Currency swaps and debt-equity swaps
   1. Currency swaps
   2. Debt-equity swaps

Part E: Recommendations for further research

Part F: Conclusions

Appendices

Bibliography
LIST OF FIGURES

Figure 1: Methods for translating foreign currency denominated financial statements 17

Figure 2: The concept of cash flow exposure: Competition effect and conversion effect as the effects of exchange rate changes on a MNC’s profits 25

Figure 3: The Adler & Dumas concept of foreign exchange exposure 29

Figure 4: Foreign exchange exposure concepts 35

Figure 5: The neoclassical equilibrium relationships in international financial markets 41

Figure 6: The case for corporate exchange risk management 52

Figure 7: A classification system for financial innovations in international markets 96

Figure 8: Financial products as bundles of characteristics 103

Figure 9: The efficiency frontier and the efficiency substitution effect 104

Figure 10: Microeconomic determinants of financial innovation 111

Figure 11: Meso-economic determinants of financial innovation: Forces of structural change in national and international financial markets 114

Figure 12: External macroeconomic forces leading to structural changes in the financial system 130
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Technological advances in the real sector of the economy and the process of financial innovation</td>
<td>138</td>
</tr>
<tr>
<td>14</td>
<td>The determinants of financial innovation</td>
<td>144</td>
</tr>
<tr>
<td>15</td>
<td>The unsymmetric risk pattern of currency option contracts</td>
<td>186</td>
</tr>
<tr>
<td>16</td>
<td>The risk-return structures of a forward contract and a currency option contract</td>
<td>191</td>
</tr>
<tr>
<td>17</td>
<td>A currency option straddle</td>
<td>195</td>
</tr>
<tr>
<td>18</td>
<td>An application of the principal-agent theory to the corporate hedging decision</td>
<td>198</td>
</tr>
<tr>
<td>19</td>
<td>The payment structures of a currency swap and a series of forward exchange contracts</td>
<td>214</td>
</tr>
</tbody>
</table>
### LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>The companies' exchange risk management objectives</td>
<td>76</td>
</tr>
<tr>
<td>Table 2</td>
<td>&quot;Market Menagerie&quot;</td>
<td>152</td>
</tr>
<tr>
<td>Table 3</td>
<td>Companies and interview partners</td>
<td>XV</td>
</tr>
<tr>
<td>Table 4</td>
<td>Banks and interview partners</td>
<td>XVII</td>
</tr>
<tr>
<td>Table 5</td>
<td>The multinational corporations: Turnover, assets and employees</td>
<td>XVIII</td>
</tr>
<tr>
<td>Table 6</td>
<td>The multinational corporations: Internationalisation profiles</td>
<td>XIX</td>
</tr>
</tbody>
</table>
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AER</td>
<td>American Economic Review</td>
</tr>
<tr>
<td>BIS</td>
<td>Bank for International Settlements</td>
</tr>
<tr>
<td>bn</td>
<td>billion</td>
</tr>
<tr>
<td>BoEQB</td>
<td>Bank of England Quarterly Bulletin</td>
</tr>
<tr>
<td>BZ</td>
<td>Boersenzeitung</td>
</tr>
<tr>
<td>Conn</td>
<td>Connecticut</td>
</tr>
<tr>
<td>CJWB</td>
<td>Columbia Journal of World Business</td>
</tr>
<tr>
<td>ed.</td>
<td>editor</td>
</tr>
<tr>
<td>eds.</td>
<td>editors</td>
</tr>
<tr>
<td>e.g.</td>
<td>exempli gratia</td>
</tr>
<tr>
<td>EMS</td>
<td>European Monetary System</td>
</tr>
<tr>
<td>esp.</td>
<td>especially</td>
</tr>
<tr>
<td>et al.</td>
<td>et alia</td>
</tr>
<tr>
<td>etc.</td>
<td>et cetera</td>
</tr>
<tr>
<td>FASB</td>
<td>Financial Accounting Standards Board</td>
</tr>
<tr>
<td>FT</td>
<td>Financial Times</td>
</tr>
<tr>
<td>HB</td>
<td>Handelsblatt</td>
</tr>
<tr>
<td>HBR</td>
<td>Harvard Business Review</td>
</tr>
<tr>
<td>ILL.</td>
<td>Illinois</td>
</tr>
<tr>
<td>i.e.</td>
<td>id est</td>
</tr>
<tr>
<td>JIBS</td>
<td>Journal of International Business Studies</td>
</tr>
<tr>
<td>JMCB</td>
<td>Journal of Money, Credit and Banking</td>
</tr>
<tr>
<td>LDC</td>
<td>Less Developed Countries</td>
</tr>
<tr>
<td>Liffe</td>
<td>London International Financial Futures Exchange</td>
</tr>
<tr>
<td>LP</td>
<td>Linear Programming</td>
</tr>
<tr>
<td>m</td>
<td>million</td>
</tr>
<tr>
<td>Mass.</td>
<td>Massachusetts</td>
</tr>
<tr>
<td>Mich.</td>
<td>Michigan</td>
</tr>
<tr>
<td>MIR</td>
<td>Management International Review</td>
</tr>
<tr>
<td>MNC</td>
<td>Multinational corporation</td>
</tr>
<tr>
<td>N.J.</td>
<td>New Jersey</td>
</tr>
<tr>
<td>No.</td>
<td>Number</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>OPEC</td>
<td>Organization of Petroleum Exporting Countries</td>
</tr>
</tbody>
</table>
p - page
pp - pages
Penn. - Pennsylvania
SSAP - Statement of Standard Accounting Practice
Virg - Virginia
WiSt - Wirtschaftswissenschaftliches Studium
WISU - Das Wirtschaftsstudium
Zfgk - Zeitschrift für das gesamte Kreditwesen
PART A: INTRODUCTION

I. FOREWORD

During the last two decades - and especially after the abandonment of the Bretton Woods system of fixed exchange rates - companies have been confronted with extremely volatile foreign exchange markets. For this reason, the management of risks accruing from unforeseen changes in the rates of exchange has become a very important corporate management task. This holds especially for multinational corporations (MNCs), which because of their investments in overseas operating subsidiaries are particularly susceptible to exchange rate fluctuations.

Over the same period of time significant structural changes in national and international financial markets have spurred the innovation of a whole range of new financial instruments and techniques. A considerable proportion of these so-called "financial innovations" have been supplied by the markets to help companies cope with the increased risks in financial markets.

Whilst the field of corporate foreign exchange risk management has produced a wealth of literature over recent years, the area of financial innovation has so far largely been the domain of political and monetary economists. These authors have been interested primarily in the effects of financial innovation on the stability of the money supply and with related problems in conducting monetary policies. Consequently the area is still relatively unexplored by management literature. In particular, little or nothing has been written in a systematic way on the use and the usefulness of new financial instruments and techniques in corporate exchange risk management.

The present thesis is intended to fill this gap. The purpose of the thesis is to analyse to what extent financial innovations can be employed efficiently in the exchange risk management of MNCs. In order to achieve this purpose the thesis will be divided into three main parts. Part B will outline the basic concepts and theories of
corporate exchange risk management. By outlining the problems corporate treasurers face in the tactical and strategic management of foreign exchange risk, the foundations will be laid for the subsequent discussion of the usefulness of financial innovations.

Part C will concern itself with the process of financial innovation in international financial markets. It will develop a taxonomic framework for the analysis of the phenomenon and will then explain the emergence of new financial products as a consequence of micro-, meso, and macroeconomic determinants working in the financial industry and in the economy in general. Following this, an overview will be presented of recent innovations in international financial markets.

Finally, Part D will comprise an in-depth analysis of the usefulness of specific financial innovations in the exchange risk management of MNCs. Out of the great number of new financial products, four innovations will be selected as the most plausible additions to the existing range of exchange risk management tools. The usefulness of the new instruments in tactical and strategic exchange risk management will be analysed through a comparison with the traditional instruments.

The thesis will close with recommendations for further research and some concluding remarks.
II. METHODOLOGY

1. Research hypothesis, research objective and research method

The thesis is based primarily on an extensive study of the literature on corporate exchange risk management and financial innovation. Through comparisons and deductions it will be analysed in what ways the new exchange risk management tools could and should be used in the treasuries of MNCs.

The basic hypothesis underlying this analysis is that the emergence of financial innovations has altered the set of alternatives available to the corporate exchange risk manager. Since some of the innovations are successful in financial markets, they can be expected to have some genuine relative advantage over established financial instruments. It follows that efficient MNCs have to change their exchange risk management behaviour and adapt to the new situation.

Therefore it is the aim of the analysis to ascertain, firstly, which financial innovations can be used in corporate exchange risk management and, secondly, in what situations their application is advisable as compared to that of the traditional tools.

To assist and complement the literature analysis, an empirical study was undertaken. In a series of personal interviews, senior financial managers of 17 major UK industrial companies were asked about their companies' foreign exchange risk management and the use of financial innovations within their companies. The interviews were normally conducted at the level of the MNCs' treasurer, and all interviews were based on the same predetermined structure of open-ended questions.

The interviews with the MNCs were supplemented by five interviews with managers working with financial innovations in banks. In addition, one interview was conducted with the Bank of England to gain information on debt-equity swaps in connection with third world debt, and the possible use of this technique by MNCs.
The interview partners in the companies and the banks are listed in Appendix 1.

2. The sample of the empirical study

The sample consists of 17 companies. Appendix 2 provides two tables to characterize the sample companies. Table 5 gives the turnover, total assets and the number of employees as a measure of their absolute size. The relative importance of the sample companies can be illustrated by the fact that 16 out of the 17 companies are amongst the biggest 200 UK industrial companies. 1

Table 6 shows the degrees of internationalisation of the companies. Although not all numbers were available and differences exist, the internationalisation profiles show UK MNCs to be highly diversified into overseas markets. This high degree of cross-border activities should illustrate the importance of foreign exchange risk for the companies concerned.

Two final points have to be made as regards the sample. Firstly, by definition, Hertz (Europe) Ltd. is not an independent company but the subsidiary of an American company. However, as the regional headquarters for Europe it enjoys a high degree of managerial independence. Hertz was included in the sample because it was known to use financial innovations on a considerable scale. 2

Secondly, in the strictest sense of the definition, Jaguar plc is not an MNC since it owns no significant overseas production facilities. However, its large exposures to foreign exchange risk - exports account for about 78% of its turnover - make Jaguar an interesting interview partner for this study.

---

1 See The Times 1000 1987.
3. Presentation and limitations of the empirical study

The findings of the empirical study will be presented in Part B and Part D. In Part B they have been made into a separate chapter which contrasts with the foregoing theoretical discussion. In Part D the empirical results have been added where appropriate to assist the analysis.

The results reported consist of an analysis of tape recordings and notes taken during and after the research interviews. Word by word quotes will be given where appropriate. These quotes will have been edited only in as much as necessary to prevent the identification of the interview partners or their companies.

No company names are given throughout the text; companies are named as Company A, Company B, etc., but a company named Company A in one section will not necessarily be identical to Company A in another section. Thereby it is hoped to respect the confidentiality of the data supplied by the companies taking part in the research.

The interpretation of the results of the study is subject to two limitations imposed by the scale of the empirical study and the research method used. Firstly, the study does not claim to be a representative study of UK MNCs. A sample of only 17 companies makes such a pretension impossible.

The second limitation derives from the research method used. The technique of personal interviews based on a predetermined structure of open-ended questions was chosen, because with the non-quantitative nature of the study it seemed the only appropriate method to produce the wide-ranging and intuitive answers and personal opinions aimed for. The use of personal interviews also reduces the risk of misunderstandings and other factors which may lead to useless results if alternative methods to gather information are used (e.g. postal questionnaires).

However, the technique has its limitations and drawbacks which it is necessary to recognize. In personal interviews the danger exists that the interviewer may exert a bias on the answers of the interview partners. The researcher must be aware of this danger and
try to avoid it as much as possible by careful preparation. Secondly, the answers gained from the interviews are the answers of the individuals interviewed. As such, they are naturally subjective and need not always be identical with the attitudes and policies of the respective company.

The above limitations have to be borne in mind during the presentation of the results. This thesis does not contain a study representative of UK MNCs. It contains the results of interviews with senior financial managers of 17 of the biggest UK industrial companies.
I. INTRODUCTION

The field of foreign exchange risk management has received a considerable amount of interest over recent years from academics as well as from practitioners. However, most of the literature which has been written on the subject is concerned only with particular aspects of exchange risk management, for instance, with the tactical, day-to-day management of a company's exposure, or with the application of certain instruments and techniques. Mostly these aspects are not integrated into a larger economic framework, and one shortcoming following from this is that quite often authors fail to address the important long term implications exchange rate changes have on the overall competitive situation of corporations.

A second shortcoming is that because the literature on the subject has emerged over a relatively short period of time, no clear and accepted terminology has yet evolved. At the moment, a confusing variety of terms is used by different authors to describe the same matters.

The purpose of this thesis is to address the shortcomings identified above; it will, that is to say, present a comprehensive taxonomic and economic framework for the analysis of the relevant questions of corporate exchange risk management. In doing so it will lay the necessary foundations for the subsequent analysis of the use of financial innovations in corporate exchange risk management.

At the outset, Chapter II will explain the basic concepts of foreign exchange risk. Here the term "exchange risk" itself will be defined and the merits of different foreign exchange exposure concepts found in the literature will be discussed. As will be seen below, the correct definition of a company's foreign exchange exposure is of great importance for the understanding of the nature of foreign exchange risk.
Chapter III then puts the questions of corporate exchange risk management into a broad macroeconomic framework. Using this framework, the chapter addresses itself to the questions of whether foreign exchange risk really exists, and, if so, whether there really is a need for companies to manage it actively.

Finally, in Chapter IV the various techniques and instruments for exchange risk management will be explained. This chapter is divided into two parts, the first of which discusses the tools available to the corporation for the strategic management of foreign exchange risk. The more conventional instruments and techniques for the tactical management of exchange risk will be presented in Section IV.2.
II. THE BASIC CONCEPTS OF FOREIGN EXCHANGE RISK

1. The nature of foreign exchange risk

Despite the large amount of literature on foreign exchange risk which has emerged during the last few years, there is no generally accepted definition of the term "exchange risk" itself.\(^1\) Some authors who write on the subject do not give an explicit definition at all. Others use a number of different terms which, to make matters worse, frequently mean different things with different authors.\(^2\)

In order to come to a precise definition of exchange risk it has to be established first what is meant by "risk". Here already the first area of disagreement is to be found. Greene & Serbein admit:

"There are many ways in which the word 'risk' is used and for that reason there is no single definition of the term which is universally employed"\(^3\)

and Weston & Brigham add that "risk has different meanings in different contexts".\(^4\) In particular one can identify two ways of defining risk. The first, which is the most widely used, defines risk in accordance with the colloquial meaning of the word\(^5\) as the "probability of the occurrence of unfavourable outcomes."\(^6\) The second takes risk as a statistical concept and defines it as "the spread of possible outcomes around some expected value".\(^7\) This thesis is concerned with the effects that foreign exchange risk can have on the values of an MNC's cash flows or its assets and liabilities. As will be shown below, these effects can result in

---

7 Levich & Wihlborg (1990), p8. See also Weston & Brigham (1981), p33; Soares-Kemp (1984), p4/2; de Haan (1983), p13; in detail Jokisch (1987), pp20-22. Some authors try to reconcile the two different definitions; the former, loss-orientated definition they apply to "pure risk", while the latter is called "speculative risk". Both are said to be subdivisions of the general term "risk" (for which no further definition is given), see Baglini (1976), p2; Greene & Serbein (1978), p3.
gains as well as losses, and by the same token foreign exchange risk management may aim at making profits as well as preventing losses. In this context a definition of risk which takes into account the loss-side only is clearly inappropriate. In this thesis risk is therefore taken to mean the possibility of alternative outcomes.

The term "risk management" now describes the complex of making decisions concerning risks and the subsequent implementation of these decisions. Prerequisites for systematic decision making under risk are firstly the estimation of risks, i.e. the identification of the possible outcomes and the consequences associated with them, and the estimation of the probabilities for all outcomes, and secondly the evaluation of risks, that is, the "determining [of] the significance or value of the ... estimated risks to those concerned or affected by the decision." 10

Risk estimation and risk evaluation are, therefore, integral parts of risk management.

Risk exists because our knowledge of the future is limited. In the literature on risk theory a distinction is sometimes made between the terms "risk" and "uncertainty". The former is then applied to situations in which estimates as to the probability distribution of future occurrences can be made, whereas the latter is applied to situations in which such estimates are not feasible. In this thesis, risk and uncertainty will be used interchangeably, since it is assumed that it is always possible to make (subjective) probability estimations. 12

Another term which is sometimes used in a rather confusing way is "chance". Some of the authors who define risk as the probability of future losses put chance in juxtaposition and define it as the

---

10 Royal Society Study Group (1983), p23; see also p149; Kettell (1979), pp150-152.
11 See, for instance, Oxelheim (1985), p68. This distinction is, however, not totally undisputed among statisticians, see Moore (1983), p33; Jokisch (1987), pp16-17.
12 This is common practice in the finance literature; see, for example, Weston & Brigham (1981), p93.
probability of future gains. In the context of the above given definition of risk this view has, of course, to be rejected; if the word chance is used, it will have the same meaning as "probability" (or "odds").

It is now possible to apply the foregoing risk definition to exchange rate changes. Future exchange rates are uncertain; they cannot be predicted. Hence the future values of assets, liabilities or future cash flow streams denominated in foreign currencies or otherwise affected by exchange rate changes are also uncertain. Foreign exchange risk shall now be defined as the probability of changes, for better or worse, in the home currency value of an asset, liability or cash flow stream caused by unexpected future exchange rate changes.

Some aspects of this definition are worth emphasising. Firstly, it is assumed throughout this thesis that the company is managed on behalf of its owners, that is, with the main objective of maximizing its value on a risk-adjusted basis. It is furthermore assumed that shareholders are interested in their income and wealth only in terms of their home currency, which is identical to the currency of the country in which the parent company of the MNC is situated. Therefore exchange risk is defined as the variability in the home currency values of assets, liabilities and cash flows.

Secondly, only unexpected future exchange rate changes give rise to exchange risk. Future changes in the relevant currency rates which are known for certain will be reflected already in the value of the underlying asset, liability or cash flow. Thirdly, exchange risk is not confined to assets, liabilities and cash flows which are denominated in foreign currencies. As will be shown below, foreign exchange risk may also affect purely domestically orientated companies which do not operate in foreign markets at all. Fourthly, and perhaps needless to say, exchange risk is only one of many risks

17 Consequently, definitions of exchange risk or exposure which are geared only towards foreign currency denominated positions, see for example, Walker (1978), p3 and Holland (1988), p64, have to be rejected as inappropriate; for a more detailed discussion see Section II.2.(c).
which businesses face. Exchange risk can, therefore, correctly be called "the additional variability" of the values of a company's assets, liabilities or cash flows. Throughout the discussion on the management of foreign exchange risk it is assumed that other risks are being dealt with in an appropriate way.

Finally, the above expression of "the underlying asset, liability or cash flow" to the exchange risk may have hinted that it is equally important to define what it is that the company has at risk. The exchange risk itself, which here is seen as a statistical concept, has to be distinguished from the actual values a company has at risk at any one time, in other words, its foreign exchange risk "exposure". However, the discussion about the correct definition of exchange risk exposure is rather complex and has long been a bone of contention in academic literature; it will, therefore, be dealt with in Section II.2.

2. The concepts of foreign exchange exposure

(a) The discussion: An overview

The management of foreign exchange risk in general and the question of the most appropriate definition of foreign exchange exposure in particular have been topics for discussion in academic circles as well as in practice for only some 15 years.

Before the 1970s, that is, before the abandonment of the Bretton Woods system of fixed exchange rates, foreign exchange risk was not
a matter of great concern to MNCs.\textsuperscript{21} Due to the prevailing exchange rate regime currency rates were relatively stable, and with the then comparatively lower level of internationalisation MNCs were able to deal with their foreign currency problems by applying some relatively simple accounting rules.\textsuperscript{22} Thus, foreign exchange exposure was seen mainly in an accounting context.\textsuperscript{23}

The shortcomings of the accounting exposure concept became apparent during the 1970s when exchange rates began to fluctuate wildly. This led to two consequences: Firstly, a discussion started between academics and within the accounting profession about the most appropriate accounting exposure concept. In the UK and in the US this discussion resulted in some rather hectic changes in the relevant accounting standards. Secondly, the accounting concept as such came under criticism from an American school of academics who advocated a cash flow concept of foreign exchange exposure.\textsuperscript{24} It had already been acknowledged previously that a "real" transaction exposure was involved when business transactions necessitated the conversion of currencies. However, in a seminal paper in 1972, Dufey showed that exchange rate changes affected companies - and even companies that do not engage in cross-border business at all - in a much broader and also more complex way.\textsuperscript{25} The "economic exposure" concept that hopes to describe these effects is today generally accepted as being the most appropriate exposure concept for use in corporate exchange risk management.

The different concepts of accounting and cash flow exposures will be outlined and discussed in detail in the following sections.\textsuperscript{26}

\begin{itemize}
\item \textsuperscript{21} "Until April 1971, the subject of foreign exchange was considered interesting but arcane and of minor relevance by many US corporate financial managers." Barnett (1976), p87; similarly Ross Jackson (1983), p108; Oxelheim (1985), p1; Logue & Oldfield (1977), p16.
\item \textsuperscript{22} In those instances where readjustments of exchange rates took place they had in most cases been heralded by long-lasting fundamental balance of payments disequilibria. Instead of being a source of risk such exchange rate readjustments often provided a possibility for risk-free profits from so-called "one-way-bets"; see Jacque (1979), p168; Tran (1979), pp1 & 5.
\item \textsuperscript{24} The beginnings of this discussion can be seen in Shulman (1970).
\item \textsuperscript{25} See Dufey (1972).
\item \textsuperscript{26} Some authors, e.g. Eliteman & Stonehill (1986), p157, introduce a "tax exposure" as another exposure in its own right. Although it is important to recognise that tax factors are of paramount importance in business practice - this point was stressed by all of the corporate treasurers in the research interviews - from a theoretical point of view this seems to be a technical problem rather than creating the need for another exposure concept; see Levich &
\end{itemize}
Additionally, a more recent proposal by Adler & Dumas argues that exposure is a coefficient which measures the sensitivity of an MNC’s home currency returns to changes in exchange rates. This proposal will be critically analysed in the final section of this chapter.

(b) The traditional approach: Accounting exposure

Accounting exposure\(^{27}\) (balance sheet or translation exposure) is an exposure concept that can only be applied to MNCs. It arises in the process of compiling consolidated group statements.\(^{28}\)

The foreign subsidiaries of an MNC are normally legal entities in themselves.\(^{29}\) They are therefore required to prepare balance sheets and profit and loss statements according to local laws and regulations. These financial statements are obviously stated in the local currencies of the subsidiaries and they have to be translated into the parent company’s home currency before a single group statement can be consolidated.\(^{30}\)

Two exchange rates have to be distinguished in this context: (i) the historical exchange rates which were effective when each transaction was recorded in the subsidiaries’ books; and (ii) the current exchange rate (closing rate) which prevails at the balance sheet date.\(^{31}\) If the exchange rate fluctuates then the home currency values of those items that are translated at the current rate change over the reporting period. The risk element now lies in the possibility that the home currency values of an MNC’s foreign currency denominated assets and liabilities may change - and may thus affect...
the group's reported earnings\textsuperscript{32} - due to exchange rate changes since the times those items were acquired or since the last balance sheet date.\textsuperscript{33}

Some items of the subsidiaries' statements may always be translated at their historical exchange rates. Obviously their home currency value does not change when currency rates fluctuate. An MNC's accounting exposure, therefore, consists of all its foreign currency denominated assets and liabilities which are translated at the current exchange rate.\textsuperscript{34}

Different methods for translating foreign currency denominated financial statements have been developed through discussions both within the accounting profession and by academics. The US has usually been the leading country for these developments, with the UK following their example.\textsuperscript{35}

The four principal translation methods are the following:\textsuperscript{36}

- Current-noncurrent method; under this method accounts are grouped according to maturity. Current assets and liabilities, i.e. those due to mature within one year or less, are translated at the closing rate while non-current assets and liabilities, including owners' equity, are translated at historical exchange rates. This method was generally accepted in the US and in the UK until the beginning of the 1970s.

- Monetary-nonmonetary method; this method takes the view that accounts should be translated according to their nature rather
than to their maturity. Monetary items are translated at the current rate, nonmonetary assets and liabilities, including owners' equity, at the historical rates.

The monetary-nonmonetary method was developed during the late 1950s and 1960s to counter criticisms of the current-noncurrent method in the US.

- Temporal method\(^{37}\); with the temporal method the foreign subsidiary's statement is translated in such a way as if it had been compiled in the parent company's home currency in the first place. The subsidiary is treated like a subordinate business unit of the parent company.\(^{38}\) This is achieved by translating each item using the exchange rate of the date to which the item relates. All monetary items will be translated using the current rate, since this rate reflects their value at the balance sheet date. Nonmonetary accounts which are carried forward at historical cost are to be translated using the appropriate historical exchange rates. In the case of revaluations the currency rate prevailing at the date of revaluation will be used; if assets are carried at current market prices (e.g. inventory), the current exchange rate would again be used.

US MNCs were required to use the temporal method by the "Statement of Financial Accounting Standards No 8" (FASB 8), issued by the Financial Accounting Standards Board in 1975. FASB 8 met with strong criticism from MNCs, the accounting profession and from academics and was replaced in 1981 by FASB 52.\(^{39}\) FASB 52 is practically identical to its UK counterpart, the "Statement of Standard Accounting Practice No 20" (SSAP 20).\(^{40}\)

---

37 Under the historical cost accounting system, which is practised in most countries, the temporal method closely resembles the monetary-nonmonetary method; it has, therefore, been called a variation or specification of this method; see Eiteman & Stoneman (1986), p170. On the other hand, if a system of current value accounting was used, the temporal method would produce the same results as the closing rate method (explained below); see Arpan & Radebaugh (1981), p103.


40 See Buckley (1986), p111.
Figure 1

Methods for translating foreign currency denominated financial statements

Translation methods

- methods using a uniform rate of exchange for translating all accounts
  - closing rate method
    - "pure" closing rate method
    - "modified" closing rate method
  - current method
  - noncurrent method
  - monetary method
  - nonmonetary method
  - temporal method
- methods using different rates of exchange for translating different accounts
- Closing rate method; here the closing rate is used to translate all balance sheet items, except for owners' equity, for which the historical rate is used. With this method the idea is rejected that the foreign subsidiary is only an appendage of the parent company. On the contrary, the view is taken that the subsidiary is an entity in itself which produces a balance sheet whose information can only be transmitted if it is translated proportionally, that is, using only one exchange rate.

Accounting standards in the US, in the UK and in many other countries today generally require MNCs to use the closing rate method for the translation of their foreign subsidiaries' financial statements. Only the statements of those affiliates whose operations can be seen as a mere extension of their parent company's operations are to be translated using the temporal method.

The above are methods for the translation of balance sheets only. With the exception of the closing rate method which suggests that the profit and loss statement should be translated at the current rate "all other methods have fairly consistently assumed that revenue and expense accounts should be translated at historical rates." In practice, however, average exchange rates for the cover periods are used most often. Only items that are related to specific assets or liabilities (e.g. depreciation) are translated at the same rate as the corresponding balance sheet positions.

With all methods translation differences, that is translation gains or losses, will occur if currency rates fluctuate between balance

41 This version of the closing rate method is actually called the "modified" closing rate method. If all positions including owners' equity are translated at the current exchange rate, the "pure" closing rate method is used; see Kueting & Weber (1986), pp80-81.
42 In order to establish whether an affiliate's activities are merely an extension of the parent company's operations or whether it is rather self-contained in its local market, the concept of the affiliate's "functional currency" is used. It is defined as "the currency of the primary economic environment in which the affiliate operates and in which it generates cash flows"; Eiteman & Stonehill (1986), p172. If the affiliate's functional currency is the local currency, then it has to be seen as integrated into this country and hence the closing rate method would be used in translating its financial statements. If, however, the functional currency is the parent company's home currency, then the affiliate is regarded as totally dependent and the temporal method has to be used; see Eiteman & Stonehill (1986), p172; Buckley (1986), pp106-110.
44 See also Eiteman & Stonehill (1986), p170.
sheet dates. There are various possibilities as to how to treat these differences. Although the regulations are rather complex in practice - the treatment may differ with the type of translation differences - one can say that, in principle, under current accounting standards translation gains and losses do not influence the MNC's reported income if the closing rate method has been used for translation.

Only when the subsidiary's statement has been translated with the temporal method do the translation gains and losses flow directly through the income statement.\(^45\)

An MNC's accounting exposure has been defined above as all its foreign currency denominated assets and liabilities which are translated at the current exchange rate. It has now been shown that different translation methods differ in respect to which group of items is translated at historical exchange rates and which are translated at the current rate. From this it follows that the accounting exposure of an MNC is really a function of the translation method it uses. Applying different translating methods leads to different accounting exposures.\(^46\)

This observation is one of the most important criticisms of the use of the accounting exposure concept in corporate exchange risk management. The fact that by simply applying a different translation method the MNC's financial manager may come to a very different basis for his decisions is, however, only one shortcoming of the accounting exposure. Another equally decisive criticism is that the accounting exposure concept is a static concept which is based on the company's financial records. It is totally incapable of encompassing the various and complex ways in which exchange rate changes may really affect the company. This has been illustrated by Dufey in his influential article from 1972; he showed that the foreign exchange exposures of two companies, if measured with the accounting concept, may show exactly the same values, although these companies can be in very different economic situations and would be

---


\(^46\) See Buckley (1986), p95; Srinivasulu (1983), p37. This can be shown with numerical examples, see Buckley (1986), pp98-100; Eiteman & Stonehill (1986), pp174-181.
affected very differently by exchange rate changes (for example, because one company is entirely home market orientated whereas the other is totally dependent on export markets). Dufey concluded that

"[W]henever a method of measuring provides the same answer to situations which are, in effect, entirely different, it must be judged deficient as a basis for financial decision making." 48

Other criticisms of the accounting exposure concept include the following:

- it is a concept which is static and historically orientated rather than dynamic and geared towards the future, in other words, it measures assets and liabilities on given past dates instead of flows of currencies over future periods of time; 49
- it identifies exposures only from the moment onwards when the respective transactions enter the company’s books, not when the commitments really arise; 50
- it is not capable of dealing with off-balance sheet items (e.g. contingent exposures from tender offers);
- finally, and in connection with all of the above criticisms, the accounting exposure concept is concerned with book values only and does not reflect the true economic values of the amounts a company really has at risk; hence, foreign exchange gains and losses as measured by this concept bear no relationship to the real impact exchange rate changes have on the value of the firm itself, "they are purely of a paper nature". 51

The above arguments show decisively that the accounting concept of exchange exposure is not an appropriate concept to be used in foreign exchange risk management. It does not render useful

48 Dufey (1972), p54.
49 See Hagemann (1977), p83.
50 "... because of production and investment commitments, foreign exchange risks may actually arise as much as five years before they are reflected in the accounting system"; Hagemann (1977), p82.
information to the corporate financial manager and its application can lead to wrong and harmful decisions.\textsuperscript{52}

Two qualifications to this are necessary. The criticism of accounting exposure leads to the conclusion that as far as the management of foreign exchange risk is concerned "pure translation exposure can be ignored for all practical purposes".\textsuperscript{53} However this is a normative statement derived by academic reasoning. If in business practice investors (mis)interpret translation losses as real losses this may, in turn, inflict real losses on the company, for instance, because of an increase in the cost of capital.\textsuperscript{54} The question whether accounting exposure does or does not matter in reality can, therefore, only be answered empirically. A number of studies which investigated investors' reactions to the changes in US accounting standards changes seem however to suggest that investors do not, after all, misinterpret pure translation gains and losses.\textsuperscript{55}

The second qualification concerns the usefulness of accounting information in general. The rejection of the accounting exposure concept as a basis for decision making in corporate exchange risk management does not, of course, mean that all accounting information is worthless to the financial manager. The exposure information system - which is, as will be seen below, a crucial element for the management of foreign exchange risk - may well use accounting information, albeit selectively and perhaps in a modified form.\textsuperscript{56}

(c) The concept of cash flow exposure

In the preceding part of this thesis the concept of accounting exposure was criticised and finally dismissed for not concentrating on real economic values, that is, for showing "paper gains and losses". The concept of cash flow exposure, in contrast to this, is

\textsuperscript{52} See Shapiro (1986), p161. Srinivasulu cites the example of ITT which in 1974 entered into forward contracts of US$ 600m in order to manage its accounting exposure. The attempt to insure itself against potential paper losses resulted in real cash losses of US$ 48m; see Srinivasulu (1983), p37. See also Buckley (1986), p130.

\textsuperscript{53} Buckley (1986), p132.


\textsuperscript{56} See Prindl (1976), p28.
concerned with real values, i.e. basically with cash that has to be paid out or is received by the company.\textsuperscript{57}

Cash flow exposure can be broken down into transaction exposure and economic exposure. However, although transaction and economic exposure are both dealing with future cash inflows and outflows they are very different in their characteristics.

Transaction exposure concentrates upon cash flows which require the actual conversion of currencies;\textsuperscript{58} it arises whenever there is a time gap between a company committing itself to a foreign currency denominated cash flow and the time of its settlement.\textsuperscript{59} Thus, transaction exposure consists of all foreign currency denominated payables and receivables a company holds, including longer term investments and loans, as well as cash balances.\textsuperscript{60} The risk element lies in the possibility that due to a change in the exchange rate the home currency value of the cash flow may change during the period of time the contractual commitments exist.\textsuperscript{61} This kind of exposure is not confined to MNCs; it can be applied to any importing and exporting companies.\textsuperscript{62}

Transaction exposure "is a comparatively straightforward concept".\textsuperscript{63} The cash flows stem from specific, identifiable contracts, on which the necessary information can be easily supplied, mostly from the accounting system. The foreign currency values as well as the timing of the exposures are known in advance. In the sense that the decisions upon the contracts underlying the exposures have already been taken, transaction exposure is a static concept.\textsuperscript{64}

\textsuperscript{58} See Collier & Davis (1985), p327; Rodriguez (1979), p54; Shapiro (1986), p172.
\textsuperscript{62} One difference exists, however. A domestic company which exports or imports can theoretically avoid transaction exposure by using only its home currency as the currency of denomination. An MNC cannot avoid transaction risk if intra-group transactions take place; here the choice of the currency is only a medium for allocating the transaction risk; see de Haan (1983), p225; Pausenberger (1985a), p545.
\textsuperscript{63} Buckley (1986), p95.
Economic exposure, on the other hand, is a much broader and complex concept. Here one considers how exchange rate fluctuations will affect the competitive environment of the corporation, and what impact this will have on the company's revenues and costs, and, in the end, on its profits. The exposure therefore consists of the company's future operating cash flows - irrespective of their currency denomination - and, since these can be discounted, economic exposure is equal to the company's net present value. Foreign exchange risk in combination with the economic exposure concept, then, is the possibility that the net present value of a company may be affected by future changes in the currency rates.

The economic exposure concept goes one step further than transaction exposure in that its application is not even restricted to companies that engage in cross-border transactions.

"The concept of economic exposure is obviously just as applicable to a strictly domestic firm ... which may find itself exposed, in spite of itself, to the vagaries of the international economy", for instance, because it operates in industries with a high degree of import competition, or because its main customers are in turn heavily dependent on their export markets.

A major difference between transaction exposure and economic exposure is that the latter is not a static concept:

"perhaps the major characteristic of economic exposure is the dynamic nature of the concept; it is a feature of current, continuing and future business activity ...".

---

68 "... if any competitor has a foreign currency exposure, perhaps because it is an importer of finished goods, or of components which go to make up the goods, then indirectly the first company has an economic exposure, and it is no less real for being indirect." Douch (1987), p10; see also Flexl (1985), p17.
Economic exposure is concerned not only with known, but also with expected or potential future cash flows. What is important here is that with economic exposure not only the home currency values of known foreign currency denominated cash flows are uncertain; with economic exposure the foreign currency cash flows themselves are uncertain. This is because they are, as illustrated in Figure 2, themselves a function of the prevailing currency rates.

As a result of this it is necessary to recognise that in order to measure exchange risk by using the concept of economic exposure a two-step-approach has to be taken. Firstly, by analysing the economic environment of the company, i.e. the competitive structure of the markets in which it sells its outputs and sources its inputs, one can estimate the influences alternative exchange rate changes will have on the volumes and prices of the company's inputs and outputs. This estimation can be seen as a form of sensitivity analysis, measuring the responsiveness of the various items to exchange rate changes. The effects on costs, revenues and profits - still stated in the various local currencies the MNC operates with - can, as indicated in Figure 2, be called the "competition effect" of exchange rate changes.

In respect of a company's costs, for example, the prices of its inputs will be affected by exchange rate changes whenever the company uses (i) imported inputs, (ii) inputs which themselves compete with imports, or (iii) inputs which in turn are produced with the help of inputs. This means that basically every time a major exchange rate changes, this will, at least in the medium to long term, affect the prices and the price structure of a company's inputs. And, if the prices and the structure of relative prices change, a profit maximizing company will as a result also change the quantities of its inputs, and perhaps their composition altogether.

---

70 See Hagemann (1977), p84.
72 See Flood & Lessard (1986), p26. This was first pointed out by Dufey (1972), p52.
75 The terms "competition effect" and "conversion effect" (see below) have been introduced by Flood & Lessard (1986), p26.
Figure 2

The concept of cash flow exposure:
Competition effect and conversion effect as the effects of exchange rate changes on an MNC's profits

Competition effect

\[
\begin{align*}
\text{Quantities} &= f_1(er_1, er_2, \ldots, er_n) \\
\text{Prices} &= f_2(er_1, er_2, \ldots, er_n) \\
\text{Costs} &= f_2(er_1, er_2, \ldots, er_n) \\
\text{Revenues} &= f_4(er_1, er_2, \ldots, er_n)
\end{align*}
\]

Conversion effect

\[
\begin{align*}
\text{MNC's profits denominated in X} &= \left(\frac{er_1}{er_2} \cdots \frac{er_n}{X}\right) = \text{MNC's profit denominated in parent company's home currency}
\end{align*}
\]
The sum of both price and quantity effects is the competition effect of the exchange rate change on the company's costs. Analogous considerations have to be applied to the prices and quantities of the company's outputs, and it then becomes apparent that the overall effect is composed of a great number of small effects.  

Only as a second step are the foreign currency denominated figures then converted into the parent company's home currency (see Figure 2). In the process of conversion exchange rate changes will obviously result in varying home currency values of the MNC's profits. This can be called the "conversion effect" of an exchange rate change; it works in the same way as transaction exposures are affected by exchange rate fluctuations.

It is obvious that economic exposure is a concept that is very complex and difficult to put into practice. It is an all-encompassing concept, that is to say, it covers all effects exchange rate changes have on the business. Since basically all future cash flows are in some way influenced by exchange rates, and because the ways in which these influences work can be complicated, the task of gathering the necessary information will be laborious and intricate. A longer term perspective which sees the company as an ongoing operation is needed, and most of the required information cannot be obtained from the accounting system but has to come from an analysis of the company's competitive environment. Another criticism is that a measurement of economic exposure will always be subjective; it consists of estimations of future cash flow components and is based on an arbitrary time horizon.

And yet, the concept of economic exposure is today generally accepted amongst academics as being the most important foreign exchange exposure concept, and, as a matter of fact, as being "the" appropriate concept for use within corporate exchange risk

---

76 See Shapiro (1975), p492.
77 See Dufey (1972), p53.
The reason for this is that it is a concept which is consistent with what is normally seen as the primary objective of corporate management: maximization of the economic value of the firm on behalf of its shareholders. And since the value of an asset is equal to the sum of the discounted future cash flows it produces, the concept of economic exposure focuses directly on what really is exposed to exchange rate fluctuations, namely the economic value of the MNC as measured by its net present value.

(d) The Adler & Dumas concept: Exposure as a regression coefficient

More recently another concept of foreign exchange exposure was put forward by two exponents of the school of capital market theory, Adler and Dumas.

In an article published in 1984 Adler & Dumas define foreign exchange exposure as

"the coefficient(s) ... in a multiple linear regression of an asset's future domestic currency market price on (the set of) the contemporaneous foreign exchange rate(s)."

Adler & Dumas' arguments have since then received attention from other academics. However, since neither their concept nor their presentation of it in their 1984 article is easy to understand, it is sometimes misinterpreted in the literature. It may be useful therefore to explain the concept in some more detail before discussing and criticizing it.

Regression analysis is the technique of estimating the functional form of the dependence of one variable upon another or, in the case

---

82 "But, whilst there are no easy and uniform answers to the questions raised in the economic analysis, these are clearly the questions which should be asked." Walker (1978), p40; see also Buckley (1986), pp100-102; Eiteman & Stonehill (1986), p157.


85 See Adler & Dumas (1984), p43

of a multiple regression, upon several others. Mostly linearity of the function is assumed, and using certain mathematical tools, such as the least squares method, the linear function best fitting the given data points is then estimated.\(^\text{87}\)

To give an example, the home currency value (sterling value) of a foreign currency denominated (e.g. US-dollar) receivable will change in line with changes in the sterling/dollar exchange rate. If the exchange rate changes by one dollar, then the value of the receivable will change by the exact amount of dollars of the face value of the receivable. In other words, the function of the relationship between the sterling value and the dollar exchange rate is, as shown in Figure 3a, simply a linear function with a slope equal to the US-dollar face value of the receivable.\(^\text{88}\) Adler & Dumas define exposure as the beta coefficient of the regression, i.e. the slope of the linear function, and this in the above example equals the foreign currency value of the asset.

This is not a surprising result, and the significance of the concept can only be explained with a more complicated example. The value of a dollar denominated asset (e.g. shares of a US company) may for some reason vary with, say, the US-dollar/Deutschmark rate, and this relationship may not be perfectly linear. However, as shown in Figure 3b, data points for combinations of exchange rates and respective home currency values can be determined, and these form the basis for a regression analysis. As can be proved, the slope of the line derived will again be equal to the foreign currency (here Deutschmark) amount the value of the asset changes by when the exchange rate changes by one unit.\(^\text{89}\) The Deutschmark exposure of the US-dollar asset may now only be a fraction of the actual value of the asset. However, it is important to note that this proportion

\(^\text{87}\) For details see, for example, Bradley & South (1981), pp300-333; Wonnacott & Wonnacott (1984), pp319-382.

\(^\text{88}\) Only examples for simple linear regressions are given here. Adler & Dumas recognize the fact that assets can be exposed to changes in more than one exchange rate and therefore define exposures as the set of coefficients in a multiple regression. Whilst the technique of multiple regression is arithmetically much more complex, it is not in principle different to the here illustrated simple regressions; see Bradley & South (1981), p301.

\(^\text{89}\) See Adler & Dumas (1984), pp49-50.
The Adler & Dumas concept of foreign exchange exposure shows that part of the risk of the asset which is due to changes in the dollar/Deutschmark rate. This part of the asset's risk can be eliminated by hedging the exact amount of the exposure.

Adler & Dumas' concept thus distinguishes two kinds of risk, the "systematic risk" which can be eliminated through hedging and the "unsystematic risk" which is independent of exchange rate fluctuations.\(^90\) The exposures as measured with this concept are always expressed in terms of units of foreign currencies\(^91\) and they identify the exact amounts of foreign currencies needed to eliminate the systematic exchange risk of the underlying positions through hedging. In the literature on hedging this proportion of the actual position is called the "hedge ratio".\(^92\)

One further aspect of Adler & Dumas' exposure definition deserves special attention. Their exposure is entirely a matter of the

---

\(^{90}\) See Adler & Dumas (1984), p43.

\(^{91}\) See Adler & Dumas (1984), p43.

future; it is understood as a quantity which relates to a specific, well-defined future date. The conventional view that one should measure the impact of future exchange rate changes on the present value of the firm is rejected. To them the idea of a correlation between a known, and therefore certain, present value and random exchange rate variations over a future period of time is "vacuous". In their opinion exposure depends only on the covariance between future values with contemporaneous future exchange rates.93

This criticism of the conceptual shortcomings of the conventional approach which tries to analyse the effects of unknown future events on a known present value is clearly justified. By defining exposures as future quantities which depend on future prices and exchange rates, they themselves are recognized as being uncertain quantities derived from forecasts and estimations.94

A further positive aspect of Adler & Dumas' concept of foreign exchange exposure is the analytical rigidity and explicitness with which the authors apply statistical regression techniques to exchange risk. This again focuses attention on the statistical nature of exchange risk.95

Another merit of the concept is the identification of the optimal hedge ratio, i.e. the determination of the amounts needed as hedges, for instance in the form of forward exchange contracts, to eliminate all systematic exchange risk. This formula gives those firms that want to minimize exchange risk a conceptual framework on which they can base their decisions.

By differentiating between systematic and unsystematic risk the concept also shows clearly what hedging can do and what it cannot do. With hedging one can eliminate only that part of the riskiness of assets (or liabilities) that is correlated with exchange rate changes. For the remaining variability other methods such as diversification have to be used if it is to be reduced.96

93 See Adler & Dumas (1984), pp42-43.
94 See Wihlborg (1980), p27.
96 See Adler & Dumas (1984), p45.
What one has to criticise about Adler & Dumas' approach, then, is firstly that the concept of foreign exchange exposure as future quantities, and the identification of the optimal hedge ratio along the lines developed by Adler & Dumas, would be very difficult to implement in practice. However, this criticism of lack of operationality has been acknowledged by Adler & Dumas themselves.97

The second criticism concerns a rather fundamental taxonomic issue. The authors claim that

"the regression coefficient concept of exposure can provide a single comprehensive measure that summarises the sensitivity of the whole firm, as of a given future date, to all the various ways in which exchange rate changes can affect it."98

The idea of a sensitivity analysis of a firm's value to exchange rate changes is not new; as can be seen above, it is indeed inherent in the analysis of exchange risk as based upon the concept of economic exposure.99 However, the point to be made here is that such an analysis does not come up with a measurement for exposure, but rather for the riskiness of it.

For example, if a company has an asset worth £1000 that changes its value by £100 when a certain exchange rate changes by one unit, then it is inappropriate to state that the company's exposure is £100 only. If the term "exposure" is to mean "what the company has at risk" or, in other words, what in an adverse case it may lose, then the exposure is clearly £1000, because that is the amount it can (nearly) lose, if only the exchange rate change is big enough.

By the same token, the sensitivity of the firm's value to exchange rates, or, in other words, the extent to which it will be affected by exchange rate fluctuations, is clearly not the exposure itself but a - very useful - tool for measuring the amount of risk involved and, as shown above, the amounts needed to hedge this risk.100 What

97 See Adler & Dumas (1984), p48; see also Holland (1986), p66.
99 See above, II.2.(c).
100 A definition of exposure given by Madura and Shapiro is rejected here on the same grounds. They define exposure as "the degree to which" the value of a future cash transaction or the present value of a firm's future cash flows can be influenced by exchange rate fluctuations; Madura (1986) pp206 and 209; Shapiro (1988), p167.
the company has at risk at any one time is nothing other than its net present value comprising its discounted expected future cash flows. This is what the management aims (or, rather, should aim) to maximise and this is what will be affected by exchange rate changes.

This, then, is the main criticism of Adler & Dumas' concept: the failure to distinguish between foreign exchange risk and foreign exchange exposure.\(^\text{101}\) This criticism is supported by a quotation from another author of the school of capital market theory: Oxelheim points out that

"[i]n modern capital market theory, where the exchange risk is defined as the systematic risk connected with costs and revenues in foreign currencies, the risk [and not the exposure!] is measured in terms of the covariance between the exchange rate and the domestic yield."\(^\text{102}\)

To sum up, the sensitivity analysis advocated by Adler & Dumas does not measure foreign exchange exposure; rather, it measures the exposure's responsiveness to exchange rate fluctuations and is thus an appropriate measurement for the foreign exchange risk itself. As has been pointed out by Cornell & Shapiro:

"The proper way to measure exchange risk is to forecast the relation between changes in exchange rates and changes in the expected level and variability of real cash flow to the firm."\(^\text{103}\)

---

101 Ironically in doing so Adler & Dumas do not live up to their own demands, as they themselves point out: "Currency risk is not the exposure. Exposure ... should be defined in terms of what one has at risk." Adler & Dumas (1984), p42.

102 Oxelheim (1985), p62. A similar quotation can be found in Adler & Dumas' own article. They write: "Stock analysts have long been accustomed to measuring the riskiness [again: not the exposure!] of a security or a portfolio by its beta in a regression of the portfolio's return on the market index." Adler & Dumas (1984), p48.

3. Summary: Foreign exchange risk and exposure

The above sections of the thesis were composed of discussions of different definitions and concepts of foreign exchange risk and foreign exchange exposure. Since these discussions were rather extensive and in parts controversial, it is useful to summarise the conclusions of the previous sections and provide those definitions of risk and exposure that will be used throughout the remainder of this thesis.

- Foreign exchange risk shall be defined as the probability of future changes, for better or worse, in the home currency value of an asset, liability or cash flow stream caused by unexpected future exchange rate changes.

- Foreign exchange exposure shall be defined very strictly as "that which the company has at risk", that is, as

  * assets and liabilities in foreign subsidiaries' financial statements which have to be translated at the current exchange rate (accounting exposure);
  * future foreign currency denominated cash flows which have already been contracted (transaction exposure); and
  * all expected or potential future cash flows, irrespective of their currency of denomination (economic exposure).

In this thesis the view is taken that accounting exposure should be without relevance to the manager in MNCs. Management should only be concerned about cash flow exposure.

Of the two cash flow exposure concepts, economic exposure is the more important concept. It shows that the real exposure of a company at any time consists of all its future cash flows, hence its net present value at this time. Economic exposure is "the" exposure concept on which corporate exchange risk management should be based. It is a dynamic and all-emcompassing concept which - as will be seen later - requires a strategic management orientation.

The proposal by Adler & Dumas that foreign exchange exposure should be defined as the coefficients in a regression analysis was discussed. It has been rejected as an exposure concept, but such an
analysis represents a useful tool for the measurement and subsequent management of foreign exchange risk in MNCs.

The different foreign exchange exposure concepts are again represented in Figure 4, together with their definitions and the main criticisms thereof.
Figure 4
Foreign exchange exposure concepts

Foreign exchange exposure concepts

Conventional concepts

Cash flow exposure

Accounting exposure

Transaction exposure

Economic exposure

Adler & Dumas - concept

Definitions:
All foreign currency denominated assets and liabilities in any financial statement which have to be translated at the current exchange rate.

All foreign currency denominated payables and receivables a company holds, incl. cash balances, investments and loans.

The company’s future operating cash flows, irrespective of their currency denomination; if discounted, the company’s net present value.

The coefficients in a multiple linear regression of future domestic currency values on the set of contemporaneous foreign exchange rates.

Major Criticisms:
- Static and historically orientated
- Cannot cope with commitments which are not (yet) recorded in the MNC’s books
- Is a function of the translation method
does not reflect the real impact of exchange rate changes
- Is concerned with book values, not with real economic values
- Is concerned with real economic value, i.e. with cash inflows and outflows
- Is concerned with contractual cash flows upon which the relevant decisions have already been taken
- Is a static concept
- Is concerned with the economic value of the MNC, which is affected by exchange rate changes and which therefore is the real exposure of the company
- Encompasses all relevant effects of exchange rate changes on the firm
- Is applicable to all firms
- Is a dynamic, decision-making orientated concept
- This is not a measure of foreign exchange exposure but of the riskiness of values
- Is a valuable instrument in the process of risk evaluation
- Is not very operational
III. THE APPROACHES TO FOREIGN EXCHANGE RISK MANAGEMENT

1. The alternatives: An overview

In the following chapter it will be shown that along with the controversy about the correct concept for foreign exchange exposure - and partly in connection with it - goes another controversy about the theoretical foundations of foreign exchange risk management.

Up until the early 1970s\textsuperscript{104} it was generally accepted that exchange risk existed, without knowing and mostly without asking what exchange risk really was, why it was there and how it affected the company. This approach to foreign exchange risk management has here been called the traditional approach. It can be characterised as follows: it took foreign exchange risk for granted, regarded it as potentially harmful to the company, and deduced from this that it had to be managed by the company.

Following advances in the area of international monetary economics this unquestioning attitude was challenged. Economists now claimed that exchange rate changes do not matter to the company because certain equilibrium relationships persist in international markets; foreign exchange risk, in fact, does not exist at all. Or, if it exists, one can show by applying certain other theoretical models to international finance that there is no need for companies to manage it. This approach towards foreign exchange management represents an application of neoclassical assumptions to international financial markets; it depends very heavily on markets working efficiently.

The theories and equilibrium relationships developed by the neoclassical school of thought are not normally criticised as such. What has been criticised, however, is the view that they give a description of the real world. Numerous empirical tests and theoretical reasonings have shown that markets are not perfect and that deviations from equilibrium situations exist. Because of these shortcomings in real world markets MNCs are faced with foreign

\textsuperscript{104} The following sections describe the different approaches to foreign exchange risk management in their historical order. It has however to be pointed out that not all authors or publications can be clearly related to a specific approach (or "historical period"). The following should therefore be seen as an idealised description of the discussion about the appropriate approach to foreign exchange risk management.
exchange risk, and because of the potential losses and profits inherent in it a need exists to manage this risk. In line with Holland this view is called the "market imperfections approach".

2. The traditional approach

Much of the literature on foreign exchange risk management which was published during the 1970s was practically orientated. This literature was mainly descriptive, not analytical; without investigating the underlying factors it simply assumed that exchange risk existed, that it was potentially harmful, and that it therefore had to be managed.

However, in the traditionally orientated literature it was already recognised that in order to manage foreign exchange risk efficiently a systematic and consistent foreign exchange risk policy had to be formulated. Such a policy should contain the following four elements.

- A definition of foreign exchange exposure; "[t]he traditional concept of exchange risk management is based on reducing accounting or balance sheet exposure", a view which is reflected in much of the literature as well as in the attitudes of MNCs at the time. Rodriguez found in 1974 that "translation exposure for the current reporting period was used almost exclusively as the measure of exposure to exchange risk and as the basis for hedging this risk" in US MNCs. Although this gradually changed during the 1970s towards greater attention to the management of transaction exposure, a survey conducted by

---

105 This is not surprising since a number of the authors of these publications were not academics but practitioners in MNCs or financial institutions. Examples for this are Prindl, Heywood, Donaldson, Kettell, Kenyon and others.


107 Shapiro & Rutenberg (1976), p49.


Mathur at the beginning of the 1980s still showed that "firms place considerable emphasis on managing translation exposure".\textsuperscript{110}

- A definition of the company's objectives; secondly, the company's management has to decide and to formulate which goals it wants to pursue in its management of foreign exchange risk.\textsuperscript{111}

In exchange risk management the following positions can be taken:

- At one extreme the company can try to neutralise exchange risk completely. This can be achieved (theoretically) by entering into appropriate foreign exchange (hedging) transactions. The rationale behind this risk-averseness is that managers see their companies as specialists in production or marketing; their objective is to protect the profits of their company's primary business.\textsuperscript{112}

- At the other extreme the company can totally ignore exchange risk. This risk-neutrality is justified if the view is taken that foreign exchange losses are "the normal cost of doing business"\textsuperscript{113}, or if it is the management's opinion that either the costs of actively managing exchange risk are higher than the expected losses or that exchange gains and losses will offset each other over time.\textsuperscript{114}

It is now characteristic for the traditional approach to advocate a third position, an "intermediate policy" of "selective hedging".\textsuperscript{115} The alternative of ignoring exchange risk altogether is said to be acceptable for companies with small and unimportant foreign currency positions or in a system of fixed exchange rates; for MNCs under flexible rates it is rejected as suboptimal. The other alternative of hedging all risks is rejected as being too costly.\textsuperscript{116} The traditional approach recommends reducing exchange risk to an acceptable level while

\begin{footnotesize}
\begin{enumerate}
\item Mathur (1982), p26
\item Baker & Aggarwal (1984), p28.
\end{enumerate}
\end{footnotesize}
incurring only a tolerable cost. What effectively it recommends is to minimise risk and costs at the same time:

"In practice, financial officers of MNCs should attempt to reconcile the seemingly contradictory goals of optimising the risk profile of the firm while keeping down hedging costs over the longer run."  

Exchange rate forecasts; in a selective hedging policy the cost of hedging is weighed against the expected exchange loss of the unhedged position by comparing the known forward exchange rate with the expected future spot rate. Open positions are left uncovered only when the costs of hedging exceed the expected losses. Obviously, this policy depends upon the accuracy with which the future spot rate can be forecasted.

"In other words, the success of a selective hedging strategy depends on the forecasting ability of the decision maker." 

During the last 10-15 years a whole exchange rate forecasting industry has developed, offering various types of foreign exchange forecasting services. However, exchange rate forecasts are useful only if they are able to predict future (spot) exchange rates more accurately than the forecast of the exchange markets themselves, that is, the forward exchange rates. This ability of forecasts, which depends on the efficiency of the exchange markets, namely on the extent to which all available information is reflected in current prices, has been disputed fiercely in academic discussions. The traditional approach, however, assumes that profitable exchange rate forecasts can be

118 See Hagemann (1977), p85.
120 See Levich (1980), p99; Shapiro (1986), p127. Three types of forecasts are available from banks and other financial institutions: (i) judgemental forecasts, which rely on personal, subjective evaluations of the overall political and economic factors; (ii) fundamental forecasts, which are based on econometric models and their underlying economic variables (money supply, inflation rates, balance of payments, etc.); and (iii) technical forecasts which rely exclusively on the patterns of recent historical price movements. See Shapiro (1986), pp131-139; Jaycobs (1986), p13; Ross Jackson (1983), p108; Briggs (1987), pp10-17. Some forecasts also use combinations of the three types; see Ross Jackson (1983), p108; Madura (1986), p189.
made,\textsuperscript{122} and the frequency with which such services are used by companies shows that this view is widely shared in business practice.\textsuperscript{123}

Hedging instruments and techniques; the fourth element needed in a corporate's exchange risk management policy is the set of instruments and techniques which is appropriate in order to achieve its objectives. The choice of hedging instruments and techniques which by the traditional approach is seen to be available to the company's management is described below. The discussion is contained in part IV.2 under the heading of "Techniques and instruments for the tactical management of foreign exchange risk".

3. The market efficiency approach, part one: The neoclassical equilibrium framework

During the past 15-20 years advances in the field of international monetary economics\textsuperscript{124} have led to a better understanding of the determinants of foreign exchange rates and, thus, of the underlying factors of foreign exchange risk. Subsequently this was reflected in the discussions on foreign exchange risk management; academics began to take into account not only the fact that exchange rates fluctuate but also what makes them do so. In other words, there was a tendency to put the questions of corporate exchange risk management into a very broad macroeconomic framework.\textsuperscript{125} In the course of this process, the validity of the traditional approach towards exchange risk management was contested.


\textsuperscript{124} "In recent years, important contributions have been made to the monetary side of international economics." Soedersten (1980), p397.

Figure 5

The neoclassical equilibrium relationships in international financial markets

---

The framework which is used to explain foreign exchange rates and their fluctuations is basically a neoclassical theory of "market forces" in international foreign exchange and money markets. It consists of the following equilibrium relationships whose interdependence is illustrated in Figure 5:

- **Theory of Purchasing Power Parity (PPP)**, holds that spot exchange rate changes reflect changes in the inflation rate differentials between the respective countries.

- **Theory of Interest Rate Parity (IRP)**, holds that the forward exchange rate discount or premium reflects the interest rate differential between the countries.

- The **Fisher Effect for one country**, holds that the nominal interest rate in any country equals the real interest rate, ie, the real rate of return required by investors, plus the expected rate of inflation.

- **The International Fisher Effect ("Fisher Open")**, holds that interest rate differentials between countries reflect expected rates of change in the spot exchange rates.

- **The Unbiased Forward Rate Theory**, holds that the forward exchange rate discount or premium equals the expected rate of change of future spot exchange rates.

If these equilibrium relationships hold, that is to say, if prices in foreign exchange and money markets always reflect all currently known relevant information and if they adjust instantaneously to any new information becoming available, then corporations are not subject to exchange risk. Exchange rate changes then do not have a real impact on the firm, because they only reflect, and are being offset by, changes in inflation rates and/or interest rates, or

---

expectations thereof.¹³⁰ Foreign exchange risk simply does not exist in this neoclassical world of efficient markets.

Consequently, exchange risk management is not needed. Moreover, because the forward exchange rate anticipates future spot exchange rate changes the company cannot gain anything from engaging in hedging activities; hedging is thus shown to be illusory.¹³¹ The conclusions financial theorists drew from this application of neoclassical assumptions were that

"spending time on currency forecasting and selective hedging techniques is likely to be a misdirection of a firm's effort."¹³²

Or, as Logue & Oldfield comment pointedly:

"Their logical conclusion is that most foreign exchange hedging activity is ill-conceived and has little or no effect on the value of the firm. ... It appears then that corporate hedging in the foreign exchange market is at best irrelevant and at worst costly."¹³³

4. The market efficiency approach. part two:

The arguments of the school of capital market theory

Another line of argument which depends on other aspects of markets working efficiently has been put forward by authors from the school of capital market theory.¹³⁴ By applying the Capital Asset Pricing Model (CAPM) and the Modigliani-Miller Theorem (MM) to international capital markets these authors have tried to prove that even if exchange risk exists it need not be hedged by the firm.

¹³¹ Another view is that for the same reason there is no harm in using the forward markets either; see Giddy (1976), p100; Holland (1985), p36. If forward exchange rates are always correctly priced according to the market's expectations of future spot exchange rates, then the forward markets can be used to reduce the variability of the company's cash flows with only low costs. The argument of the market efficiency approach is, however, that "if these equilibrium relationships are working this is not of any value to shareholders." Holland (1986), p36.
¹³² Shapiro & Rutenberg (1976), p56.
The CAPM distinguishes between systematic risk and unsystematic risk. (This distinction has been introduced already in the discussion of the Adler & Dumas concept of foreign exchange exposure). Unsystematic risk exists if the variations of the returns of different assets (here currencies) are imperfectly correlated. This risk can be diversified away in the process of constructing efficient portfolios.135

Any remaining risk is systematic; it is, that is to say, correlated with exchange rate variations, and can be reduced through hedging, for instance with forward exchange contracts. However, such a reduction of systematic risk can only be achieved at an additional cost, the cost of hedging.136 Using this argument, the application of the CAPM to international finance shows that hedging does not increase the value of the firm.

What is emphasised in the CAPM is the clear trade-off between expected return and the risk of any market-traded investment. The basic idea is that the required return for an investment is a risk-free return plus a risk adjustment factor. The risk adjustment factor for any investment depends on the correlation of the variation of this investment's return with the variation in the return on the market portfolio; it is priced according to the market’s risk-return preferences. Using this trade-off between return and risk the model derives a Security Market Line, which shows all efficient risk-return combinations available to the firm.

Applying the above model to the problems of international finance leads to the following conclusions. If capital markets are efficient, that is, if the company’s shares and contracts in the foreign exchange markets are priced according to their risk-return profile, then any hedging activity does not increase the value of the firm, because it only removes risk at the expense of expected return. Hedging alters the company’s risk-return profile, or, in the words of the CAPM, it moves it along the Security Market Line.137

---

What can be concluded from the extension of the CAPM to international financial markets is that

"nothing is gained by hedging because the firm's market value is not altered. ... Thus, corporations need not avoid risk".138

The application of the MM Theorem adds a further aspect to this. In its original version it shows the corporate borrowing decision to be irrelevant, because the shareholder can obtain any leverage he wants by borrowing himself.139 If the argument is extended to international finance, corporate exchange risk management decisions can be shown to be irrelevant.

In efficient markets the reduction of unsystematic risk through diversification can be achieved by the individual investor in the same way as by the company. Some authors even argue that companies should not try to reduce their level of exchange risk because exchange risk may be an attribute of corporate stocks which is actually desired by investors. Their objective is to hedge their individual consumption bundles, which may (partly) consist of imported goods.140

Analogously, the individual investor can hedge any unwanted systematic exchange risk himself, by entering into forward contracts himself, or by adding risk-free assets (government bonds) to his shares. He can construct his portfolio according to his own personal risk-return preferences.141 It follows that

"corporate foreign exchange management is superfluous; what the firm does, an investor can do".142

141 See Dufey & Srinivasulu (1983), pp56-57; Giddy (1977a), p32. Feiger & Jacquillat extend this argument further; by applying the MM Theorem to MNCs they provide a formal proof that the value of the firm is independent of the currency denomination of its debt; see Feiger & Jacquillat (1982), p218. See also Holland (1986), p37.
5. The market imperfections approach

The neoclassical approach towards foreign exchange risk management and the arguments of the school of capital market theory are built on strict assumptions about the efficiency of markets. Although only very few people would subscribe totally to these views and their somewhat extreme conclusions, they have nonetheless been highly influential in the discussions on foreign exchange risk management in recent years. One can say that the position which is widely accepted today, and which following Holland is here called the "market imperfections approach", has been developed through discussions about and criticisms of the market efficiency approaches.

The main issues of this discussion and with them the main positions of the market imperfections approach can be summarised in the following:

- The market efficiency approach claims that in efficient markets "foreign exchange risk does not exist; even if it exists it need not be hedged; even if it is to be hedged, corporations need not hedge it".

The all-important question, therefore, is whether markets are efficient and whether the above cited equilibrium relationships hold in real world financial markets. Numerous empirical studies have been undertaken in order to answer this question. The consensus which seems to emerge is that the relationships do hold in the long run while substantial deviations occur in the medium and short run.

The implication for corporations is that exchange gains and losses which are being realised without protective actions will

---

144 See Holland (1986), pp9 and 40-44.
cancel each other out if a long enough view is being taken.\textsuperscript{147} However, short term deviations from the equilibrium relationships exist in reality; they can be considerable and they can persist for up to a number of years.\textsuperscript{148} In these cases companies are affected, since exchange rate changes are not (immediately) offset by inflation rate and/or interest rate differential changes.\textsuperscript{149} Other reasons why exchange rate changes may have real effects on the company are differences in national taxation systems, the taxation of nominal returns (exchange gains are taxable income while exchange losses are not deductible), and the existence of contractually fixed cash flows.\textsuperscript{150}

The first major conclusion of the market imperfections approach, therefore, is that

"exchange rates are largely irrelevant in the long run and that all firms, purely domestic firms as well as multinationals, are exposed to short-term fluctuations in exchange rates."\textsuperscript{151}

Moreover, exchange rate fluctuations which are not anticipated can seriously affect a company's cash flow and may even, for example, in the case of single but large transactions, threaten its liquidity position.\textsuperscript{152} And, as Buckley puts it:

"there is little consolation in the company being all right in the long run, if it is dead in the short run".\textsuperscript{153}

One can conclude that avoiding the costs of financial distress and default is a most justifiable goal for actively managing foreign exchange risk.\textsuperscript{154}

\textsuperscript{147} See Giddy (1977a), p30; Mathur & Hanagan (1981), p28. The crucial question in this context has been asked by Feiger & Jacquet (1982), p125: "How long is the long run?"  
\textsuperscript{151} Wihlberg (1980), p24.  
\textsuperscript{154} See Dufey & Srinivasulu (1983), p57.
If this argument is pursued further, it becomes apparent that hedging foreign exchange risks would be a rational strategy even if financial markets were completely efficient. In such a scenario, companies would not be able to profit directly from "outguessing" the exchange markets; rather such a strategy would be costly because of transaction costs and the time and effort involved.\textsuperscript{155} It would be true that "firms engaged in these hedging strategies can expect at best to break even in the long run".\textsuperscript{156}

Be that as it may, as Dufey & Srinivasulu correctly point out:

"This reasoning misses the whole point of corporate hedging. A treasurer wants to hedge not because of his desire for excess returns, but to achieve a level of risk/return with which his management feels comfortable".\textsuperscript{157}

The reasoning that hedging is useless because it is not a means of increasing corporate profits assumes a totally risk-neutral attitude on the part of the management of the firm as well as of its owners.\textsuperscript{158} Reducing the variability of a firm's cash flow can have a value in itself. This may be reflected in the management's enhanced ability to plan ahead because of the reduced uncertainty, or it may manifest itself in lower costs of funds for the company.\textsuperscript{159} Corporate exchange risk management directed at reducing the additional variability in its cash flow may thus be a rational strategy even in efficient markets.\textsuperscript{160}

Another argument, which leads to the conclusion that corporate exchange risk management is necessary, is the following:

"Purchasing Power Parity is necessarily aggregative",\textsuperscript{161} and even if the PPP relationship held in general - on which empirical tests cast serious doubts - a company would still be affected by exchange rate changes if the underlying inflation is non-neutral

\textsuperscript{155} See Shapiro & Rutenberg (1976), p50; Buckley (1986), p126.
\textsuperscript{156} Shapiro & Rutenberg (1976), p50.
\textsuperscript{157} Dufey & Srinivasulu (1983), p59.
\textsuperscript{159} See Dufey & Srinivasulu (1983), pp57 and 60.
\textsuperscript{161} Aliber (1978), p56.
and the prices of all the company’s inputs and outputs do not move exactly in line with general inflation.\footnote{162}{... there is, in real terms, no exchange risk as long as relative prices remain constant; ... relative price risk remains the fundamental source of risk to which firms are exposed and it is equally faced by domestic and multinational corporations." Jacque (1981), p90. See also Whilborg (1978), pp17-24; Flood & Lessard (1986), p27; Shapiro (1986), pp169-171.}

Exchange rate fluctuations which lead to changes in relative prices will affect the company in just the same way as any other relative price change (brought about, for example, by a change in consumer demand behaviour). By the same token, such exchange rate induced relative price changes require the company’s management to respond to the change in the competitive environment, be it with tactical or with strategic means as with any other such change.\footnote{163}{See Shapiro (1986), p244; Cornell & Shapiro (1983), p25; Flood & Lessard (1986), p28; Dufey & Srinivasulu (1983), p56.}

"Real long-run exchange risk, then, is largely the risk associated with relative price changes that are brought about by currency changes."\footnote{164}{ Cornell & Shapiro (1983), p19.}

The argument that corporations need not hedge exchange risk because stockholders can do this if they wish again depends on the efficient functioning of financial markets.\footnote{165}{See Jacque (1981), p82; Holland (1986), p36.} If it can be shown that due to market deficiencies individual investors are not able to hedge exchange risk exposure as efficiently as MNCs, then there is a case for exchange risk to be managed by the firm’s management on behalf of its owners.\footnote{166}{See Dufey & Srinivasulu (1983), p57; Giddy (1977a), p32.}

As a matter of fact, many reasons for this can be found: size barriers and economies of scale in international markets place smaller investors at a disadvantage relative to large companies; and they may even prohibit their access to certain market segments.\footnote{167}{See Dufey & Srinivasulu (1983), p57; Mathur & Hanagan (1981), p23; Giddy (1977a), p32; Holland (1986), p61.}

Secondly, the investor needs to obtain the relevant information for his hedging decisions. This information (level, timing and
currency denomination of exposures) will be available within the firm. To obtain a comparable amount of information the individual investor will incur considerable additional costs.\footnote{168}

Thirdly, certain hedging techniques (eg, transfer pricing, leading and lagging) are only available to MNCs, and they cannot be applied at the level of the individual shareholder. Other advantages which are unique to MNCs include their access to local financial markets, to government schemes and special subsidies, tax factors, their ability to bypass legal restrictions imposed by certain countries, etc.\footnote{169}

It may indeed be one of the major advantages MNCs have over individual investors as well as over their domestic counterparts that they can take advantage of imperfections in real world markets. These may consist of the segmentation of financial markets, of differences in national tax systems, and of deviations from market equilibria in international markets in general. Empirical research has shown substantial deviations from market equilibria exist and persist for longer periods. This on the one hand necessitates the management of the risks inherent; on the other hand it opens up possibilities of actively exploiting these deviations in international markets to the company's profit.\footnote{170} Giddy writes in this context that

"... much of what international financial management is about is taking advantage of the international firm's ability to exploit market imperfections",\footnote{171}

and Holland adds to this by correctly pointing out:

"The task of international financial management under these conditions is to identify such opportunities and exploit them subject to political constraints."\footnote{172}

\textbf{172} Holland (1986), p41.}
To sum up the above discussion - which is represented in Figure 6 - and the position of the market imperfections approach, corporations are again faced with the fact that foreign exchange risks exist. However, the discussion of the market efficiency approach has shown that, in most instances, the companies will be exposed to a much lower degree of risk than was traditionally assumed. The discussion also made visible the limitations of corporate exchange risk management. It has to be recognised that free profits can only be made if deviations from market equilibria exist. In other situations systematic exchange risk can only be reduced by the company incurring a cost.

The extent to which the company now tries to hedge exchange risk or to which it actively seeks to make a profit in foreign exchange markets, therefore, depends on three factors (see Figure 6): the level of exchange risk it sees itself exposed to; its view on how efficient international money and exchange markets are; and, as before, its attitude towards taking risks.


Figure 6

The case for corporate exchange risk management

**The neoclassical equilibrium framework**
- Theory of Purchasing Power Parity
- Theory of Interest Rate Parity
- The Fisher Effect for one country
- The International Fisher effect
- The Unbiased Forward Rate Theory

**Markets are efficient and equations hold continuously.**

Exchange rate changes reflect changes in inflation and/or interest rate differentials. In the long run the expected value of exchange gains and losses is zero. Exchange risk does not exist. Active exchange risk management is unnecessary, it is a waste of resources. Because of transaction costs and time and effort involved it is even harmful to the value of the firm.

This position assumes total risk-neutrality on side of the firm. Because of unanticipated exchange rate changes cash flows are unstable. This increases cost of funds and may even threaten the liquidity (survival) of the company.

There is a case for an active corporate exchange risk management

The foreign exchange risk policy a company's management adopts depends on:
- the level of foreign exchange risk it sees itself exposed to;
- its view on how efficient financial markets work in reality;
- its attitude towards risk taking.

The management decides to ignore foreign exchange risk, either because it believes in market efficiency or because its company is for other reasons not exposed to a significant level of exchange risk.

The management's objective is to neutralise foreign exchange risk. It tries to reduce the variability of its cash flows through hedging activities.

The management seeks to profit from its foreign exchange risk management activities. It perceives substantial deviations from market equilibrium which it wants to exploit through arbitrage.

Foreign exchange risk does exist and there is a case for actively managing it.

Companies need not manage foreign exchange risk. The individual shareholder can hedge systematic exchange risk according to his personal risk-return preferences. By constructing efficient portfolios he can reduce unsystematic exchange risk.

Several reasons (market imperfections) exist why MNCs can manage their foreign exchange risk more efficiently than the individual investor.

(The arbitrage activities of market participants is exactly the mechanism which causes deviations to disappear and thus re-establishes equilibrium situations in real-world markets.)
IV. TECHNIQUES AND INSTRUMENTS FOR THE MANAGEMENT OF FOREIGN EXCHANGE RISK

1. Techniques and instruments for the strategic management of exchange risk

Before the acceptance of the economic exposure concept by most theoreticians, foreign exchange risk management was generally seen as a responsibility of the company's financial management only. Even as late as 1984 Baker & Aggarwal saw it "as an aspect of tactical, or day-to-day, planning".175

This attitude has to be disputed most strongly. The discussion on economic exposure has enhanced our understanding of foreign exchange risk greatly. Exchange rates now have to be recognised as strategic elements, changes in which will influence the relative attractiveness of national and international markets. They will affect the MNC's competitive environment in much the same way as other strategic factors, such as changes in consumer behaviour, potential market entries, etc. This has been illustrated by Srinivasulu, who writes:

"Changes in currency values may erode the profitability of established markets and products, or open up opportunities for new products and markets. Certain foreign locations that had previously been considered unsuitable for new plants may show new promise. Traditional financial policies may have to give way to new ones. Sources of supply may have to be established in new countries. 'Make or buy' decisions may be subject to reconsideration."176

From this understanding that foreign exchange rate changes can alter the opportunity set available to a corporation, it follows that a strategic reorientation of the company's objectives and policies is required to cope with the risks inherent. For "[a] strategic problem cannot be overcome by tactical responses, no matter how sophisticated they are."177

Two important conclusions for corporate exchange risk management have to be drawn from the above. Firstly, it becomes apparent that a long term approach to exchange risk management is required; it has to be incorporated into the long-range strategic planning system of the corporation. Exchange risk management must not be a matter of day-to-day planning. On the contrary, rather than always reacting only on an ad hoc basis, the company needs to plan ahead for unexpected exchange rate changes, in the same way it does for other strategic change. This is true if it wants to defend its competitive position in its markets, but it obviously holds all the more for companies which hope to profit from actively exploiting market imperfections.

Secondly, and in connection with the above, it is important to realise that exchange risk management is not a matter for the financial sector of the company alone. Rather, as Dufey wrote in 1972, it should be "integrated with all facets of decision making by the company". Finance is but one area of corporate decision making, and as far as strategic planning is concerned perhaps not the most important one.

"The primary technique for coping with this economic risk is strategic management in the choice of products, markets, sources, etc. On the financial side, appropriate choices with respect to currency of denomination of debt, place of issue, and maturity structure can be additional avenues for coping with economic risk." Cornell & Shapiro take this view to the extreme by saying that 

"the major burden of exchange risk management must fall on the shoulders of marketing and production executives". The only role they concede to the financial management of exchange risk is to cope with "some residual operating exposure".

This, however, is carrying things too far. Firstly, it does not take account of the fact that in long-range strategic planning all corporate decision making areas are closely interrelated. This is especially true for financial planning, because virtually every decision problem has a financial aspect to it. 184

Secondly, the financial sector of the company will often be more flexible in respect of the management of exchange risk than other sectors. Exchange risk is only one risk the company is facing and exchange rates are only one strategic factor among many others. Consequently, it will in many cases not be possible for the company to achieve its exchange risk management objectives by means of altering its choice of markets and products, by changing its pricing and promotional strategies, or by shifting its sourcing and production locations. 185 The MNC’s flexibility in respect of these variables depends on its specific position in its markets, 186 and "[t]he one attribute that all the strategic marketing and production adjustments have in common is that they take time." 187 In many cases it will be a more sensible - and sometimes, indeed, the only - alternative to pursue the objectives by

"appropriately structuring the currency and maturity of the firm’s financial assets and liabilities rather than altering operating cash flows." 188

In summing up one can say that foreign exchange risk management should be seen as a strategic problem which affects all parts of the MNC. However, because of its characteristics the company’s financial sector can play a crucial role; financial policies are well suited for achieving exchange risk management objectives, be it for their own sake or be it as surrogates for other policies which are more difficult to implement. 189

188 Giddy (1976), p99.
2. Techniques and instruments for the tactical management of exchange risk

The emphasis on the necessity for a strategic approach towards exchange risk management should, of course, not mean that the tactical, day-to-day management of it becomes obsolete. In large corporations with worldwide operations, foreign currency positions will change daily and in an environment of volatile exchange rates the fine-tuning of the company’s exposures to exchange risk has therefore to be a continuous process.

What is of the utmost importance here is an adequate group-wide information system which "should be timely, succinct and orientated to decision and control". 190

"The importance of the information system cannot be overemphasised. ... it is the very 'backbone' of any exposure management system". 191

Obviously this holds especially true for companies whose treasuries actively participate in the wholesale foreign exchange and money markets. In these markets profits - or indeed losses - are being made by switching positions on a very short term basis. Dealers work on horizons of minutes or even seconds, 192 and companies can operate in such markets only if they have access to precise up-to-date information as to their exposures in foreign currencies. Today, modern computer-based reporting systems can provide such a high level of information.

Be that as it may, short term exchange risk management has to be seen in perspective; it cannot be isolated from the medium and longer term policies the company pursues. Therefore, in order to be consistent the short term objectives should always be drawn from the goals developed in the context of strategic planning. 193

190 Buckley (1986), p142.
191 Tran (1979), p104.
The hedging techniques and instruments\textsuperscript{194} which are available for use in tactical or operational exchange risk management can be divided into two broad groups: (i) those that reduce foreign exchange exposure or prevent it altogether from arising, and (ii) those which insure the company against losses from existing exposures.\textsuperscript{195} The former group embraces exposure netting and matching, leading and lagging, and pricing policies. The latter includes forward exchange contracts, currency futures and options, foreign currency borrowing and lending, currency swaps, discounting, factoring, and government exchange risk guarantee schemes. In the following discussion of these techniques and instruments the perspective of risk minimisation is taken; it should however be borne in mind that most of the techniques and instruments can also be used for more aggressive exchange risk policies.

(a) Exposure reducing or preventing exchange risk management techniques

Exposure netting

If a company expects cash inflows and outflows which are identical in terms of currency of denomination and timing, then for practical reasons only the difference between them, the "net exposure", is subject to exchange risk. The effects exchange rate changes have on receivables and payables cancel each other out, and hence only the net of them needs to be managed by the company.\textsuperscript{196}

"The assumption underlying exposure netting is that the net gain or loss on the entire currency exposure portfolio is what matters rather than the gain or loss on any individual monetary unit."

\textsuperscript{194} There is some confusion in the literature regarding the definition of the term "hedging". Some authors distinguish the term "covering" from "hedging" and define the former as actions taken in the process of managing accounting exposure, whereas the latter is related to transaction risk, see McRae & Walker (1980), p119; Jokisch (1982), p130; other distinctions are given by Prindl (1976), p58 and Briggs (1987), p123. Here, the term "hedging" is used very broadly to describe all techniques and instruments which can be used to reduce or eliminate foreign exchange risk.

\textsuperscript{195} See Kenyon (1981), p49. A classification frequently used in the literature is that of Prindl (1976), p58. He distinguishes internal techniques, which are "part of a firm's regulatory financial management", Buckley (1986), p153, and external techniques which use contractual means to prevent foreign exchange losses.

\textsuperscript{196} See Kenyon (1981), p60; Henning, Pigott & Scott (1978), p390; Pausenberger & Voelker (1985), p68. This holds true in its simple form only when taxation is neutral, that is, when exchange gains and losses are taxed at the same rate.

\textsuperscript{197} Shapiro (1986), p206.
Exposure netting is an extremely valuable tool especially in MNCs with substantial intra-group cash flows; instead of numerous exposures at subsidiary level, now only one consolidated, group-wide net exposure is established and the amounts which have to be hedged can thereby be reduced considerably. 198

However, because of the information required to compute a group-wide net exposure, a certain degree of centralisation of the MNC's exposure management function is needed. 199 Some companies go further and centralise totally their exposure management - together with other financial functions - in special subsidiaries, called "reinvoicing centres". The MNC's operating units will sell all their goods to this centre which then resells them to the company's customers. If all payments to and from the MNC's operating units are made in their respective local currencies, then all transaction exposure is allocated at the reinvoicing centre. 200

Apart from being a prerequisite for exposure netting, centralised foreign exchange risk management offers other important advantages, such as access to more competitive financial markets, better conditions due to larger transaction volumes, a concentration of specialised expertise, etc. 201 The extent to which the exposure

198 See Kenyon (1981), p60; Briggs (1987), p33. In the literature, the netting of foreign exchange exposures is sometimes equated with the netting ("clearing") of actual cash transactions; see, for instance, Holland (1988), pp79 and 86-93; Buckley (1986), pp153-156. However, exposure netting is purely conceptual, the actual transactions need not be affected at all. The netting of payments, on the other hand, means that actual payments, which in most cases are denominated in one currency only, are netted out and that only the net amounts are then transmitted between the MNC's units. The main advantage of a clearing system is the reduction of cash transfer costs; this may include savings on buy/sell spreads in exchange markets. See Pausenberger & Voelker (1985), pp60-65; Holland (1988), p86.


200 See Kettell (1979), pp176-178; Buckley (1986), pp147-148; Eiteman & Stonehill (1986), p584; Mathur (1982), p25. In most cases, however, the centralisation of the exchange risk management is not the predominant reason for establishing a new legal entity. The decisive factors are mostly tax factors, and reinvoicing centres are - like other finance vehicles - usually located in low-tax jurisdictions, so-called "tax havens". The tax saving mechanism works as follows: all goods are sold to the reinvoicing centre at cost only; the reinvoicing centre then sells the goods at a margin and thus (theoretically) all corporate profits are allocated at the reinvoicing centre. Since the tax rates are very low in the country of location (the tax rate for corporate profits in the Netherlands, for example, can be as low as 2.4%, and other tax havens, eg, the Cayman Islands, do not have income taxes at all) the MNC can substantially reduce its overall tax bill. However, for the very same reason the use of reinvoicing centres is in many countries prohibited by taxation authorities; for details see Glaum (1986), pp28-38.

management can be centralised is, on the other hand, often restricted by national government controls and regulations.

**Exposure matching**

If a company can match its cash outflows with cash inflows of the same currencies, it insulates itself against the effects of exchange rate fluctuations.\(^{202}\) With the above described technique of netting, the MNC identifies those operational cash flows which "naturally" balance each other out ("natural matching"\(^{203}\)). By the same token, the company can intentionally establish currency positions in order to match existing open exposures.\(^{204}\) It can, for instance, try to contract its sales in, say, US-dollars if it expects future net cash outflows in this currency, or it can try to switch its costs into dollars if it anticipates future net cash inflows in dollars. Although this is a policy most appropriately pursued in the context of strategic management, it may also be attained by tactical means, for instance, through borrowing or lending in the appropriate currencies.\(^{205}\)

Basically, matching as well as netting involves a two-way cash flow in one currency.\(^{206}\) However, sometimes the same result can be achieved with different currencies which are closely linked together (for example, the EMS currencies); this technique is called "parallel matching".\(^{207}\)

**Leading and lagging**

Leading and lagging is the technique of adjusting the terms of trade credit between companies. If a company holds payables (the reverse of the following holds true for receivables) in a currency which it expects to appreciate, it will want to speed up these payments

---

204 It is important to recognise that the exact timing of cash inflows and outflows which are supposed to balance each other out is crucial. The net exposure of the MNC is increased instead of reduced by the absolute amount of a complementary currency position if the original and the complementary payments are not made on the same date; see McRae & Walker (1980), p106; Buckley (1986), p156; Pausenberger (1985a), p545.
206 See Buckley (1986), p156.
207 See Kettell (1979), p176; Holland (1986), p82.
(leading) in order to avoid paying a higher local currency sum after the revaluation. Analogously, it will want to delay payments (lagging) in currencies it expects to depreciate, because after the devaluation it can buy the same amount of foreign currency with less of its own local currency than before the exchange rate change. Apart from the effects of the delay the company receiving the payment is not disadvantaged by this practice, since it receives the same amount of money. However, in order to assess the full impact of leading and lagging on both parties, tax effects and interest rate differentials have also to be considered.208

Although payments to third parties may also be deliberately delayed or accelerated to a certain degree,209 leading and lagging is more feasible between associated companies. Especially in MNCs with a centralised foreign exchange risk management, cross-border cash flows between the different units can be timed according to the overall goals of the group.210

The use of leading and lagging goes beyond a strategy of pure risk minimisation. By their very nature these techniques are rather aggressive risk management devices; they are "designed to take advantage of expected devaluations and revaluations of currencies".211 For this reason the application of leading and lagging is often restricted by government regulations. Government authorities impose time limits on leads and lags, or prohibit their use altogether.212

Pricing policies

There are two types of pricing policies which can be used in exchange risk management, the choice of the invoicing currencies and price adjustments.

212 See George (1976), p171; Holland (1986), p81; Buckley (1986), p158; see Eiteman & Stonehill (1986), p221 for a listing of the prohibitions and limitations on leads and lags in selected countries.
Exporting and importing companies that engage only in transactions denominated in their home currencies can completely avoid transaction (not economic!) exposures.\textsuperscript{213} However, there are a number of reasons why this will not always be feasible in practice. In cross-border deals the choice of currency is a means of allocating the exchange risk involved; consequently, the outcome of this choice will normally reflect the relative bargaining strengths of the two parties.\textsuperscript{214} A company that insists on factoring only in its own home currency can easily lose a substantial proportion of its business. Also, in some markets (eg, oil and other raw materials), all transactions irrespective of the country of origin of the parties are denominated in one currency only, the home currency of the leading market participants (usually the US-dollar).\textsuperscript{215}

For intra-group transactions the choice of currency is of limited importance anyway. As was pointed out earlier, in this case the technique is only a means of allocating (centralising) the MNC’s foreign exchange exposure.

"In an intracompany transaction it makes no sense to have a foreign exchange gain by one subsidiary at the expense of another, unless there are definite tax advantages. The currency denomination of the invoice merely determines who will realise the gain or the loss".\textsuperscript{216}

Price adjustments are another possibility of neutralising the immediate impact of exchange rate changes on the net cash flows of the MNC’s overseas subsidiaries. Practically this involves the raising of selling prices to offset the adverse effects of exchange rate changes. If the company is always able to raise its prices exactly in line with exchange rate changes, it effectively does not have any exposure in this currency.\textsuperscript{217} However, the company’s ability to do so depends on its pricing flexibility in its markets; and, in any case, if it is able to raise its prices following exchange rate

\textsuperscript{213} See de Haan (1983), p266; Pausenberger (1985a), p545; Buckley (1986), p159.
\textsuperscript{214} See Kettell (1979), p177; Buckley (1986), p159.
\textsuperscript{215} See Buckley (1986), p159.
\textsuperscript{216} George (1978), p161. See also Buckley (1986), p161; de Haan (1983), p266; Pausenberger (1985a), p545.
changes, the question suggests itself why it has not done so already in order to maximise its profits.218

Price variations can be brought about more easily on intra-company trade. Here, in theory, prices do not have to be set according to the laws of market demand and supply but can be set according to the overall goals of the MNC. The technique of modulating the prices of goods and services traded within different units of a group to its overall benefit is called "transfer pricing". It is commonly used as part of the corporate tax strategy or for repatriating "blocked" funds from countries with tight regulations.219

For exchange risk management price adjustments by themselves are - contrary to some statements in the literature220 - not helpful, since any gains made by one unit of the MNC are immediately cancelled out by an equal loss of another unit. However, in combination with the technique of leading and lagging, transfer pricing allows the company to convert greater amounts of weaker currencies into stronger ones, and vice versa.

"[T]ransfer price manipulations as such ... do not achieve a gain on the exchange front. But transfer price adjustments do enhance the exchange benefits to be derived from timely leading and lagging."221

Having said all this, it is important to note that MNCs are restricted by government controls in their use of transfer pricing techniques. Taxation and other authorities require companies to adhere to the so-called "arm's length principle", which holds that

"the price used on internal transaction should not deviate from the one prevailing between unaffiliated parties, for similar goods under otherwise similar circumstances".222

---

220 See, for instance, Prindl (1976), p64; George (1978), p167; Buckley (1986), p158.
(b) Exposure neutralising exchange risk management techniques and instruments

Forward exchange contracts

Forward exchange contracts are, together with foreign currency borrowings and lendings, the classical instruments for hedging foreign exchange exposures. Forward exchange markets enable companies to buy or sell a stated amount of a foreign currency on a stated future date at a predetermined rate of exchange.\(^{223}\) The forward exchange rate is likely to differ from the "spot" rate, that is to say, the rate for immediate delivery. It can either be at a premium or a discount from the spot rate, depending on interest rate differentials and expectations about future spot exchange rate changes.\(^{224}\) Forward exchange markets exist for most of the major currencies of the world. Contracts are normally available for durations of up to 12 months, and for the more important currencies for up to two years; on occasion, they can also be arranged for longer periods.\(^{225}\)

Forward exchange contracts are used to cover open transaction exposures. If, for example, a UK company expects an inflow of US$ 100,000 in three months' time, it can enter into an offsetting forward contract, whereby it sells the same amount of dollars for the same future date at a predetermined, certain rate of exchange. In the same way as with matching, the forward cover reduces the net exposure to zero and hence neutralises the exchange risk element in the foreign currency transaction.

Forward option contracts

The forward option contract (option date forward contract) - not to be confused with currency options which will be explained below - is a variation of a forward exchange contract. As with a "normal" forward contract, the exchange rate of a future exchange of currencies is fixed irrevocably in advance. What is left open,\(^{223}\)

\(^{223}\) See, for example, Kettell (1979), p184; Buckley (1986), p45.

\(^{224}\) See above, Section III.3.

\(^{225}\) See Buckley (1986), p181 for a listing of available spot and forward exchange markets. See also Eiteman & Stonehill (1986), p94; Kemp (1984), p26. According to Madura (1986), p264, longer term forward contracts have become rather popular and "maturities of up to ten years or more can possibly be set up for the major currencies."
however, is the precise date of the contract’s maturity; a range of possible maturity dates is agreed at the outset. A UK company, for example, may arrange with its bank to exchange a given sum of dollars at a specified rate of exchange within a period of, say, three months beginning in six months’ time.

Obviously, forward option contracts are ideally suited for hedging future cash flows whose exact settlement dates are not known in advance. Yet, one has to consider that the bank, which does not know at which date during the range the contract will be executed, will charge the company the worst rate of exchange which occurs in the forward exchange market within the chosen option period.

**Foreign currency borrowings and lendings**

Borrowings and lendings of foreign currencies are an alternative technique of hedging foreign exchange exposures; this is sometimes called a "money market hedge". If a UK MNC expects a payment of, for example, US$ 100,000 in three months' time, it can lock in its current rate of exchange through the following set of transactions: it borrows the amount of US$ 99,975, exchanges them instantly into pounds sterling and invests the proceeds. At the end of the three months it receives the 100,000 dollar payment and repays with it both the loan and the interest which has accrued on it during the three months.

With the same technique an expected dollar outflow can be hedged: the company now borrows the equivalent amount of pounds (if cash is readily available it naturally need not borrow the money), converts it into dollars and invests these for the duration of the exposure; at the maturity date the dollars are used to repay the original obligation.

---

228 See, for instance, Prindl (1976), pp78-78; Eiteman & Stonehill (1986), p207; Madura (1986), pp254-256.
The effects of a money market hedge are the same as using a forward exchange contract, and due to the interest rate parity the costs of both instruments will in efficient markets be exactly the same.229

The remaining instruments and techniques for the tactical management of foreign exchange risk are of lesser importance, both in terms of academic interest and practical relevance. Therefore, they will be outlined only briefly in the following.

Discounting foreign currency denominated receivables

Transaction exposures which consist of foreign currency denominated bills of exchange may be hedged by discounting. Exchange controls permitting, the discounting can be done with a bank in the company’s own country; alternatively, the bills can be discounted in the respective foreign country, in which case the proceedings will be converted at the spot exchange rate into the company’s home currency.230

Factoring

Factoring refers to the technique of companies selling all types of accounts receivable on a regular basis either to a bank or to a specialised factoring institution. Similar to discounting, the company sells its foreign currency receivables in return for the equivalent sum of its home currency.231

Forfaiting

With factoring the buyer of a receivable usually does not assume the credit risk involved, he will instead reserve for himself the right to take recourse to the seller of the obligation. Forfaiting, in contrast, is the technique of selling trade obligations - on an

231 See Buckley (1986), p173.
individual rather than on an ongoing basis - whereby the buyer has no right to hold the previous owner of the receivable responsible if the debtor defaults.\textsuperscript{232}

**Government exchange risk guarantee schemes**

In many countries government agencies provide schemes for companies to insure themselves against foreign exchange risk. These programmes are established to foster the countries' export activities; for this reason, not all types of exchange risk will qualify and companies will have to meet certain requirements (for example, long term trade commitments, exports of specified goods only, etc.) in order to be eligible for covering their exchange risks under the insurance scheme. Examples of such agencies are the Export Credit Guarantee Department (ECGD) in the UK, Eximbank in the US, and Hermes in West Germany.\textsuperscript{233}


\textsuperscript{233} See Prindl (1976), p79; Kettell (1979), pp186-198; Buckley (1986), p179.
V. THE MANAGEMENT OF FOREIGN EXCHANGE RISK IN UK MULTINATIONAL CORPORATIONS: AN EMPIRICAL STUDY

1. Introduction

The empirical study undertaken for this thesis sought to find out whether and how UK MNCs managed foreign exchange risk. The following chapter reports the findings of the study. Since the empirical study corresponds with the theoretical discussions of the first part of the thesis, the results will not normally be commented upon. Only in those instances where new aspects are concerned will references be made to the relevant theoretical literature.

The first three sections of the following chapter will address the companies' treatment of the three different types of foreign exchange exposure. The subsequent section will look at the way the foreign exchange risk management function is organised within the MNCs. The last section will then report on the objectives the corporate treasurers followed in the management of their companies' foreign exchange risk.

2. Accounting exposure management

The study produced some interesting and surprising results on the management of accounting (translation or balance sheet) exposure in UK MNCs. For some 15 years, the literature on international financial management has been demonstrating that accounting exposure is not an useful concept to be used as a basis for corporate foreign exchange risk management. Against this background it was surprising to find that UK MNCs were still very much concerned about their accounting exposures. Of 16 companies replying to these questions, a minority of only three considered it to be without relevance. They explained that they simply accepted it as a result of doing business and would not consider influencing or managing it. The most outspoken example of this attitude was the following:
Company A:
Translation risk I can’t honestly say we take at all seriously. We certainly do not manage it. We cover our dividends, but that is transactions - real money transferred from one country to another. But with translation exposures, nothing happens.

Thirteen companies out of the 16 respondents replied that they considered accounting exposure to be of importance. Of these, two influenced their exposures through the gearing of their overseas subsidiaries but would not attempt to hedge the remaining net asset exposure.

This leaves 11 companies which were prepared to manage actively their net accounting exposures. In all cases this meant the parent company borrowing in the currencies of the net asset exposures of their subsidiaries. Five of these had explicit policies as to the management of their accounting exposures. One company claimed to hedge completely its accounting exposures. Three companies sought to hedge their exposures, but they also considered the cost of borrowing in foreign currencies and expected exchange rate changes. The objective of hedging the balance sheet was here clearly mixed with speculative motives. The fifth company also hedged its net foreign assets; it was however concerned about the effects future exchange rate changes could have on its overall debt-equity ratio if it borrowed heavily in foreign currencies.

Company B:
Yes, we take our net asset values and hedge them with foreign borrowings. Our translation risk is managed and hedged 100%.

Company C:
As far as our overseas assets are concerned, we have what we call a "managed matched situation". In other words, we try and match our assets in the US with US-dollar liabilities to protect our balance sheet. And we manage it. On certain occasions, say, if the dollar is strong, we will reduce our liabilities in dollar, if it is weak we will increase it. By and large, we are looking for a matched situation. We are not 100% matched at the moment, but matching is pretty good.

Company D:
Yes, we do monitor our accounting exposure. We measure it and we manage it by means of borrowings in currencies of net exposures. However, we are very concerned about not losing control of our gearing, and we therefore aim for what we call a "constant currency gearing".

The other six of the 11 companies reported that they did not continuously manage their accounting exposures. They closely monitored them and would take action, i.e. borrow in the respective
foreign currencies, under certain circumstances. Most companies appeared to be in close contact with analysts, brokers and banks about this matter. Other important considerations for whether and when to hedge their accounting exposures were interest rate differentials, tax factors, the groups’ overall gearing, and expectations about future exchange rate movements. On the whole, the degree to which “views” on future exchange rates determined the company’s borrowing and hedging decisions was surprisingly high.

3. Transaction exposure management

For 14 of the 17 companies interviewed, the day-to-day management of transaction exposures was the centre-piece of their foreign exchange risk management. Two companies declared that for them transaction exposure management was of minor importance and that balance sheet exposures were relatively more important.

One company - and only this one company - was of the opinion that there was no point at all in attempting to manage transaction exposures. This company was concerned about the longer term influences of exchange rate changes on its business. It had in fact developed an approach to manage its economic exposures with financial instruments. However, it perceived foreign exchange markets to be efficient enough so as to render futile any attempt to gain by managing transaction exposures.

Company A:

In managing transaction exposure the only thing that matters is to be consistent. If you sell forward all the time or not at all is going to make very little difference. But if you sell forward until you see “Oh, we’re making losses”, the chances are that each time you change it will be just before the turn of the cycle. Then you lose more than you gain. So all we like to see in our companies is consistency. At the parent company most of the funds flow is dividends and if we bring the funds out of the country at all we take the rate of the day. We don’t try to be covered.

As to the 16 MNCs that did manage their transaction exposures (including those for which this was of minor importance), their approaches were found to be very diverse, spanning the whole spectrum from hedging all exposures on arising to large scale trading in foreign currencies. Six companies explained that it was
their policy to hedge all their transaction exposures completely. Two of this group of companies hedged every exposure immediately on arising. The others seemed to allow themselves some flexibility as to the timing of their taking cover.

Another group of six MNCs responded that they generally tended to hedge their transaction exposures but allowed themselves the discretion of leaving proportions uncovered at times. Within four of these companies the proportions appeared to be very small in relation to the size of the overall exposures managed. The other two companies had a rule of always covering a minimum of their transaction exposures of 60% and 75% respectively. Whether to go beyond the limit imposed by top management or whether to leave the remaining proportion open was up to the discretion of the treasury management.

The remaining four of the 17 MNCs surveyed were involved in foreign exchange dealing to a greater extent. However, two of these remaining four asserted that their positions were limited by the exposures incurred through their basic business. That is, they would not sell a currency they were already short of, or buy it if they already had a long position in it.

**Company B:**

Views are being taken on short term movements of currencies. Sometimes we hedge 100%, sometimes 0%, traditionally we hedge around 70%. However, we never have greater open positions than our basic, operational exposures.

Only two companies appeared to be engaged in trading in foreign exchange beyond that limit. In their opinion, foreign currencies were a commodity they dealt in for profit as with any other commodity. To the visitor, the treasury departments of these two companies looked exactly like the dealing rooms of smaller or medium sized banks, and this attitude was also reflected in the answers received during the interviews.

**Company C:**

We take a selective approach. We do not directly cover. Our operational transaction exposures are integrated into our daily trading. We are quite actively engaged in short and medium term trading in foreign exchange and money markets.
Company D:

The actual transactions coming from our operating units we simply take on our books as part of the actual trading. We trade in foreign exchange, but we do not quote into the market. We take the quotes given to us by the banks. We do not trade on spreads. Basically we work like a small bank. There are trading limits for all the banks, and we try to make money on small short to medium term movements of the markets.

A final point to be mentioned here is that with some MNCs the management of transaction exposures had been the subject of changes over recent years. These were often directly connected with personnel changes in the treasuries of the companies, but they also appeared to be the effects of learning processes - in some cases quite clearly processes of learning by trial and error.

Company E:

Up to the mid-70s we had a 100% discretion on our transaction exposure management. We then got advice and forecasts from a bank and either left 100% uncovered or covered 100%. However, we mostly got it wrong; often two or three times wrong because of stop-loss decisions. We consistently made losses on this policy, and therefore we changed our policy.

4. Economic exposure management

Because of the complex nature of the topic and the great diversity of the companies interviewed, it is not surprising that the questions about the management of economic exposure and the longer term, strategic aspects of foreign exchange risk management produced very heterogeneous results. Some of the questions met with only hesitant replies and at times the use of the term "economic exposure" seemed even to evoke a feeling of uncertainty and unease with the interview partners. The following quote gives a good instance of this:

Company A:

We do think about our economic exposures a lot, but it is difficult to say exactly what we do.

Again 16 companies replied to the questions. Of these, six companies did not make any attempt to forecast and analyse their future cash flows in order to manage their economic exposure. Only incurred and reported transaction exposures formed the basis of their exposure management.
Ten companies based their foreign exchange risk management on cash flow forecasts, but the degrees of sophistication and the time horizons used for such forecasts varied greatly. For four companies, forecasting was limited to the supply of information on expected foreign currency denominated orders. Three other companies followed a system whereby they always bought and sold forward the estimated foreign currency outflows and inflows of the next planning period. The planning horizon for this practice varied from one month to 12 months. One company, for example, would buy forward throughout the year 1988 the foreign currency revenues it expected to receive during the year 1989. This was done on the basis of a budget which had been concluded in August 1987 and had not been revised since.

Two companies used more highly developed cash flow forecasting systems. One produced a monthly groupwide net exposure forecast for the coming 12 months. The other attempted a comprehensive forecast of its costs and revenues over the overall lifetime of its operations; this forecasting system had a time horizon of five years, but in some aspects it went out even further than that.

All of the above nine companies had the management of their expected future cash flows closely interlinked with the management of actual transaction exposures. In contrast to this, the tenth company using forecasts did not engage in managing transaction exposure at all (see preceding section). However, it did use a sophisticated system of matching the currency denomination and maturities of its debt to the cash flows it expected to receive from its operations abroad.

The same company was also one of three companies within the sample found to employ a highly sophisticated technique - a form of regression analysis - which determined their real as opposed to their nominal exposures. To give an example, a UK based company may export a product to the US. On the surface it thus appears to have a US-dollar exposure. However, its major competitors may be German, and the international dollar price will for this reason follow the pattern of the Deutschmark/dollar rate. Effectively the company receiving dollars therefore faces a Deutschmark exposure. To generalize, the world prices of certain products are markedly influenced by the basket of currencies of the major market
participants. The following quotes come from two companies using the technique, one of which is again Company A.

**Company A:**

Basically the movement of the price of one of our products consists of two components. There is the price of the product itself and then there is the basket of currencies of the consuming countries. Our department dealing with this product holds that they are quite capable of managing the product element of the price, but they can't deal with the vagaries of the foreign exchange markets. But then we came along with a product which effectively did just that. We give them an option over the foreign currency side of the product price in return for a premium which they regard as entirely satisfactory.

**Company B:**

Just recently we have found the correlation between the price of one of our main products and exchange rates. It is a very complicated formula and we have been looking for it for four and a half years.

One of the most significant results of the questions on economic exposure was that none of the companies interviewed used any means of managing exchange risk other than financial means. In this respect the practice of UK MNCs does not comply with this demand of modern literature on exchange risk management theory. Only three companies responded that exchange rate considerations played a role at all in non-financial decision making areas (e.g. sourcing, product development or production location), but even with these companies this role was only a minor one.

**Company C:**

Exchange risk influences strategic decisions only in a minor way. Hedging may be a nice by-product of a decision but it is not an initial decision factor, not decisive.

In general, foreign exchange rates and foreign exchange risk were not seen as strategic factors. Although most respondents gave reasons for this, a number of companies appeared not to be aware of the important longer term effects of exchange rate changes and the risks involved. Others were aware of these longer term implications but simply did not know what to do about them. Two reasons were given most often for not attaching more importance to the problems of the strategic management of foreign exchange risk: the companies either did not feel very susceptible to the longer term economic effects of exchange rate changes, or they felt committed to their particular business which did not allow them any flexibility in

---

matters such as sourcing, location of production facilities and the like.

5. The use of currency forecasts

The use of currency forecasts is directly related to the policy adopted by the MNC's treasury. Reflecting the heterogeneity of the policies, the managers' answers regarding currency forecasts were also varied. Five companies did not use any sort of currency forecasts. They either did not need them because their exchange risk management was based on strictly defensive rules, or they felt that it was impossible to forecast future exchange rates.

Company A:
No. We don't need to because we hedge.

Company B:
We believe that it is impossible to make forecasts. If you make forecasts there probably is a 50% chance that you'll be wrong.

Four treasurers asserted that they only used forecasts supplied to them free of charge, e.g. through freely available publications or through informal contacts with banks. This left eight companies which bought in currency forecasts and/or employed their own economists to do such forecasts. All types of forecasts were used, with an emphasis on technical forecasts (chart analysis) for short term predictions and fundamental forecasts (based on econometric models) for longer term purposes.

The treasurers stated unanimously that the forecasts they used were not decisive for the opinion they formed. In fact, most treasurers openly admitted that their forecasts usually did not produce correct predictions of future market conditions.
6. The companies' exchange risk management objectives

During the interviews the treasurers were asked to state precisely the objectives of their foreign exchange risk management. Sixteen answers were received to the question. Nine treasurers described their companies as totally risk averse. Four treasurers said that although they aimed to make profits on their exchange risk management and did not hedge all of their exposures their approach could correctly be described as risk averse. Three of the interview partners characterized their companies' attitudes as "risk taking" or "risk seeking in relation to the additional return".

These answers are interesting for two reasons. Firstly, as intended they supply information as to the objectives pursued by the MNCs. The following selected quotes give an impression of the nature and diversity of the answers:

- We are totally risk averse. The objective is to minimize our financial risks.
- We are essentially risk averse but we have to be profit conscious as well. We regard finance as a resource to be maximized.
- The objective of the treasury is to enable the company to do what it does best. So my job is to make sure that they don't have to worry about what the exchange rate will do. The objective is to stabilise the company. Hedging is giving the company time to put its house in order to meet the changes in the exchange rates.
- We are definitely risk averse. Our aim is to minimize the impact of exchange rate changes on our share price and the economic performance of our company.
- Our primary aim is to avoid a major loss.
- We are not risk averse. Here in the treasury of the head office we are risk seeking in relation to the additional return. Our operating companies are advised to minimize their risks.

It also proved interesting to compare the answers with earlier statements made by the managers. If the companies' approaches towards the management of transaction exposures is taken as an indicator for their risk attitudes, one can group the sample into three categories. Interpreting the data presented in Section VI.3 gives the following result: six companies were "totally risk averse"; six companies were "fairly risk averse"; and four companies were "risk takers". It also proved interesting to compare the answers with earlier statements made by the managers. According to the companies' approaches towards the management of transaction exposures is taken as an indicator for their risk attitudes, one can group the sample into three categories. Interpreting the data presented in Section VI.3 gives the following result: six companies were "totally risk averse"; six companies were "fairly risk averse"; and four companies were "risk takers".235 Table 1 compares these figures with the above answers. The comparison shows a clear tendency on the part of the

235 excluding the company not attempting to manage its transaction exposures.
treasurers to claim a more risk averse approach to exchange risk management than justified by their actual management behaviour.

TABLE 1: THE COMPANIES’ EXCHANGE RISK MANAGEMENT OBJECTIVES

<table>
<thead>
<tr>
<th></th>
<th>Number of answers to direct question</th>
<th>Analysis of actual transaction exposure management</th>
</tr>
</thead>
<tbody>
<tr>
<td>totally risk averse</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>fairly risk averse</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>risk taking</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

In all the study produced mixed results as to the risk attitudes and the exchange risk management objectives of the interviewed MNCs. Nonetheless, the survey undertaken shows that it is wrong to state conclusively that UK MNCs are risk averse and do not engage in speculative foreign exchange activities. Some MNCs undoubtedly are risk averse and cautious. Others operate a discretionary hedging policy and accept the risks inherent in this. With these companies hedging decisions are often guided by personal "views" on future exchange rate movements and the objective is clearly to profit by "outguessing" the markets. Another group of MNCs has gone further than that. They have accepted foreign exchange trading (corporate treasurers prefer the term "trading" to the term "speculation" which has a negative, accusing connotation) as part of their business, and operate a highly sophisticated exchange risk management which in some respects is comparable to that of smaller or medium sized banks.

In summing up, one can say that of the UK MNCs surveyed only a minority were risk averse in the true meaning of the term. The majority to varying degrees accepted the risks inherent in uncovered foreign exchange exposures, or even sought to increase these risks in order to profit from their foreign exchange risk management.
PART C: THE PROCESS OF FINANCIAL INNOVATION IN INTERNATIONAL FINANCIAL MARKETS

I. INTRODUCTION

"Financial innovation is not a new phenomenon. In many ways the history of finance, and the evolution of financial systems, is the history of financial innovation. All financial instruments, techniques, facilities and markets that now exist and are taken for granted as natural features of finance, came into being at one time, and at that time would have been described as financial innovation."

As this quote demonstrates, the importance of financial innovation for the financial system cannot be overestimated. This importance has for a long time not been reflected in academic literature; instead the subject was largely neglected. It is therefore not surprising that

"the analysis of the innovation of financial instruments and practices is not nearly as well-developed as its counterpart in the real sector,"

the sector, that is, which produces tangible, material goods.

Although the occurrence of financial innovations is by no means confined to the recent past, a pronounced increase in the rate of innovation can be observed in financial markets over the last decade or so. This development has brought with it a growing interest in and a rather lively discussion about financial innovation. However this interest has largely been fuelled by the concern of monetary authorities about the stability of the financial system and their problems in conducting monetary policies. As a consequence, macroeconomic and political economy aspects predominate in the emerging literature, and references to the impact of financial

4 See Llewellyn (1988a), p35.
innovation on the financial behaviour of non-financial private sector enterprises are scarce.

The present thesis seeks to address one aspect of this issue, the impact of financial innovation on the exchange risk management of MNCs, and the following part is designed to provide the second element for such an analysis: an outline of the process of financial innovation in international financial markets. Chapter II is concerned with the taxonomy of financial innovation and the problems arising in this context. Chapter III will then make an attempt to provide a theoretical framework for the analysis of new financial instruments and practices. In Chapter IV the determinants of innovation in real world financial markets will be identified. Finally, Chapter IV will give an outline of the major developments in international financial markets in recent years.
II. THE NATURE OF FINANCIAL INNOVATION

1. Defining 'innovation'

The term "innovation" can be used to describe a process or, in an object sense, the outcome of this process. Both will be looked at in the following, since an analysis of new financial instruments and techniques is incomplete without an understanding of the process which led to their emergence.

In its process sense, innovation describes different forms of technological progress. Technological progress is however not confined to the real sector, i.e. to changes in the production of "material" goods. Technological progress can also occur in the areas of, say, marketing or organisational theory. The concern of the following chapter will be innovation in the financial sector of the economy.

Financial innovation has only recently become the focus of attention, and until about a decade ago the area was largely undocumented. Real sector innovation, on the other hand, has been analyzed and discussed for a long time. Consequently, a whole range of definitions of the word "innovation" has in this context emerged over the years. In particular one can highlight the following three groups of definitions.

---

7 "A technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome. A technology usually has two components: (1) a hardware aspect, consisting of the tool that embodies the technology as material or physical objects, and (2) a software aspect, consisting of the information base of the tool. Indeed, sometimes the hardware side of a technology is dominant. But in other cases, a technology may be almost entirely comprised of information; examples are a conservative political ideology, a religious idea like transcendental meditation, a news event, a rumour, assembly line production, and management by objectives (MBO)." Rodgers (1983), pp12-13. See also Sutton (1980), p160; Drucker (1955), p56; Drucker developed this thought further in a later work by saying: "Innovation, then, is an economic or social rather than a technical term." Drucker (1985), p30.
8 Already the classical economists like Malthus, Ricardo, Say and Marx were interested in the effects of technological progress. Other milestones were the work of Schumpeter and, since World War II, of Mansfield, Schmookler, Scherer, and Cyert and March; see Kamien & Schwartz (1982), pp3-27; Silver (1975), p62; Drucker (1985), pp23-24.
9 A study by Tinnesand has brought together 108 different definitions of "innovation"; see Tinnesand (1973).
The first goes back to the work of Schumpeter in the 1920s and 1930s. He defined innovation in an analytically rigorous but rather narrow way as "the setting up of a new production function". This relates to

(i) the application of new production techniques which allow existing goods or services to be produced with reduced costs (process innovation), or
(ii) the introduction of completely new products (product innovation).

Schumpeter made a sharp distinction between the origination of new ideas (invention), and actual innovation, which to him was confined to the process of commercialising the new knowledge.

A more recent school of thought rejects this distinction because of the close interdependence between the two activities. Here innovation has been defined in a much broader way as

"all those activities from basic research to invention to development and commercialisation, that give rise to a new product or means of production".

A third type of definition has been given by Rodgers. He focuses more on the social aspects than on the supposedly objective technological aspects of innovation. To Rodgers,

"[a]n innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behavior is concerned, whether an idea is 'objectively' new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation."

10 Schumpeter (1939), p87.
13 "Invention is in practice part of the process of innovation. To exclude a discussion of invention in deference to a strict definition would incur high costs. It would hamper understanding of the process whereby new knowledge is harnessed in production." Parker (1978), p26.
It is common to all definitions that novelty is, in one way or another, seen as the essential characteristic of an innovation. However novelty is a relative term, and the following three dimensions of innovation need to be made explicit in order to put it into concrete terms:\textsuperscript{16}

- Firstly, one needs to specify the subject dimension of an innovation. That is, one has to answer the question of to whom an innovation represents something new, to the seller, the buyer, or both. In the case of a process innovation, this will obviously be the adopting company, but with product innovations one can distinguish three different possibilities:

(i) The innovation may relate to a completely new product. It will then be new to both market sides.
(ii) A product can also be new to the customers without being new to the selling company, which perhaps has already been selling the same product in other markets. The innovation then consists of the organisation finding a new market for its product.
(iii) It can finally be new solely to the selling company, if the product has already been offered to the customers by another type of company. This can be called institutional innovation. (The introduction of current accounts by building societies in the UK represents an example of this kind of innovation.)

This distinction of (i) new instruments, (ii) new markets and (iii) new institutions is also applicable to financial innovation. Silber, for instance, writes:

"Changes in the financial structure occur when new financial institutions emerge, or when new financial instruments or new markets are innovated.\textsuperscript{17}"

- Secondly, the term innovation implicitly contains a time dimension. Here one has to decide up to which age a product can still be classified as new. This is obviously a subjective

\textsuperscript{16} See Bueschgen (1986), pp301-302.
\textsuperscript{17} Silber (1975), p53.
matter, and depending on the characteristics of the markets in question, especially on the lengths of their product life cycles, there will be substantial differences as to the time dimensions of innovations. 18

- The third dimension which needs to be defined is the intensity of an innovation. One can observe a continuum ranging from "normal" managerial activities, like varying the appearance of an existing product as part of a company's marketing strategy, to major technological breakthroughs.

"In oligopolistic markets with product differentiation, it is a standard selling strategy to describe a product as 'new, improved'. A handful of firms each providing a similar if not identical range of products may continuously announce new, improved, superversions of their products which may only be new in trivial aspects or product design." 19

A - necessarily arbitrary - borderline has to be drawn in order to specify from what level of intensity onwards an observed change qualifies as an innovation.

Innovation is a dynamic process, not a discrete act. Drucker has characterized it as one of the essential functions of any business enterprise:

"... any business enterprise has two - and only these two - basic functions: marketing and innovation. They are the entrepreneurial functions." 20

Innovative activities have to be seen as rational reactions of companies to profit opportunities, which, in turn, are caused by market inefficiencies or incompleteness. In perfect markets with consumer sovereignty, such profit opportunities by definition could not exist. 21 An incentive to innovate exists, because

18 See Bueschgen (1986), p301.
20 Drucker (1955), p53.
"[a] company which innovates successfully is likely to enjoy a much enhanced economic performance. Its growth rate is likely to increase and also its profitability."²²

Therefore innovation is an important competitive tool for private enterprises, and, going back to Schumpeter, the view is held that competition through innovation is more important than pure price competition,

"because it is the more decisive means of gaining an advantage over competitors".²³

Since technological advances are beneficial to the company, both in absolute terms and relative to its competitors, its "technology strategy", that is, its attitude towards innovation, becomes an important feature of its overall competitive strategy.²⁴

The success of the innovative company will induce other companies to follow suit. (In some cases they will not only be induced, but indeed be compelled, to follow, if they do not want to be forced out of business altogether.) After a certain time lag and a learning process, they will adopt the innovation and implement the new technologies or produce the same or similar new goods. This process is called diffusion.²⁵ It is a paradox of the process of innovation that the greater the success of an innovation, that is, the greater the profits reaped from it by the initial innovator, the faster the innovation will, ceteris paribus, be diffused and the extra-profits eroded.²⁶

---

²² Parker (1978), p51.
²⁴ For an elaboration of this see Porter (1985), pp164-200, here esp. p176.
²⁵ See Podolaski (1986), p109; Sutton (1980), p186. For the economy as a whole, this process "is often much more important than the occurrence of an innovation or the appearance of an invention." Podolaski (1986), pp108-109.
2. The differences between real sector and financial sector innovation

The conventional definitions of innovation have, as mentioned in the preceding section, been formulated in the context of real sector (i.e. industrial) products and processes. However a number of fundamental differences exist between real sector and financial sector innovation.27 These differences are interesting for two reasons. Firstly, by depicting them one can learn about the characteristics of financial innovations. Secondly, they represent problems for defining financial innovation, and they have therefore to be borne in mind when developing a taxonomic framework for the analysis of financial innovation.28

- Financial instruments are basically contracts written on paper. In principle no technological barrier exists for creating new financial contracts. This has been pointed out by Greenbaum and Haywood, who write:

"[T]he emergence of a new financial claim is qualitatively different from a technological advance. ... [A]ll possible financial claims can be defined, in principle, at any point in time ..."29

Desai and Low take this idea to the extreme and come to the conclusion that

"[i]n this sense, financial innovations are not new goods. They are always there, but in zero supply."30

- In its broadest sense a financial instrument is a legal contract between two parties, one of which sees it as an asset, the other as a liability. Since financial instruments are legal constructs, their creation is naturally strongly influenced by legislation, that is, by laws and other regulations.

---

27 See Niehans (1983), p532; Llewellyn (1988a), p3. It has however to be pointed out that these differences (and therefore the following chapter) relate mainly to product innovations. Such differences are much less pronounced in the application of new techniques in the production of financial services.


Unless explicitly forbidden, every type of legal contract may be created between two parties. In other words, legislation draws the borderline between those types of contracts which are allowed to be written and those which are not. Financial innovation, then, is about

(i) finding unprohibited legal areas which not are as yet utilized,
(ii) interpreting existing legislation in new ways,
(iii) searching for niches in existing legislation which allow for the lawful circumvention of restricting regulations, and
(iv) using areas which have been newly opened up to commercial use by changes in regulation (deregulation).

This dominance of legal aspects in financial innovation stands in contrast to industrial innovation, where such considerations do not normally play such a major role.

One can develop this argument further by saying that since financial instruments are legal contracts, all financial innovations are, in a sense, also legal innovations. This conclusion should emphasize the paramount importance of legal aspects in the process of financial innovation.

- Unlike industrial innovation, the innovation of new financial instruments cannot be defined in terms of changes in a production function. A production function describes the relationship between the amounts of inputs which, given an existing state of knowledge, are needed to produce given amounts of output, and vice versa. Financial instruments (and techniques) consist mainly of information, and the same amounts of inputs (information, time, physical inputs, etc.) are needed to produce, say, a

33 This relationship will be looked at in more detail later on in the thesis.
34 See Desai & Low (1987), p115.
35 "The core of financial technology is the storage, retrieval and transmission of information." Niehans (1983), p539.
forward exchange contract for US$ 1,000 as for producing one for US$ 1,000,000.

Financial instruments are made up of a limited number of attributes, such as maturity, expected rate of return, price risk, credit risk, country risk, liquidity, pricing conventions and so forth. Financial innovation therefore most often only involves a modification of one or more of these basic characteristics, or of their combination. In other words, financial innovation mostly consists of "unbundling" existing packages of characteristics, and either combining ("repackaging") them in different ways or pricing and selling them as separate products. Niehans writes:

"While the bundling and unbundling exhibits an infinite variety, the basic products themselves have remained largely unchanged since medieval times and perhaps since antiquity. Except for electronic technology, if an experienced banker from medieval Venice or Genova came to life again, he could understand the operations of a modern bank in a matter of days." 37

For related reasons financial innovations are extremely easy to imitate. The characteristics of a new financial instrument are immediately visible, and all an imitating firm needs to do is to analyse the exact composition of a given contract and replicate it. 38

New financial instruments are not only easy to imitate, it is also practically impossible to prove the originality and uniqueness of a financial product from existing variations of the same bundle of characteristics. This is the reason why patenting does not normally take place in the financial sector. 39 Many empirical studies limit the scope of their analysis in dealing with real sector innovation by "defining" innovation as those new products and processes which qualify for patent protection. This

criterion obviously cannot be used for identifying financial innovations.

- Real sector firms are rewarded for their efforts and risks in the development and marketing of new goods through the extra-profits they are able to make due to the temporary monopolistic advantage achieved. With financial innovation the imitation lag will often be very small, or indeed almost zero, because of the ease of replication and the lack of patent protection.\(^{40}\)

- Furthermore, financial products tend to be homogeneous, rendering product differentiation through innovation impossible. Yet differentiation can still be achieved, but on the level of the firm as a whole. A firm can acquire an image of innovativeness and dynamism through the development and marketing of new goods and services.\(^{41}\) If this image spills over into its other business areas, the firm as a whole will have differentiated itself successfully from its competitors. Differentiation leads to some degree of loyalty from customers and thereby to a lower price sensitivity.\(^{42}\) Hence an economic rationale exists for firms to engage in financial innovation. They are able to appropriate the returns from their innovations, albeit in an indirect way.\(^{43}\)

- In the real sector innovative firms will normally seek to retain their monopolistic advantage for as long as possible. In direct contrast to this, a quick and extensive diffusion may in some instances actually be in the interests of an innovator in the financial sector.\(^{44}\) In the eyes of potential investors, marketability represents an important characteristic for any security. Marketability means the ease with which an asset can be (re-)exchanged for money, expressed in terms of transaction costs


\(^{41}\) Some people may doubt to what extent this holds true for banks and other financial institutions which traditionally were known to be rather conservative. However, this attitude seems to have changed. "Bankers used to be given the advice: 'never be first'. For better or worse, this is not heard so often now. Instead, banks and other firms are vying with each other to enter new markets and to introduce new instruments." Leigh-Pemberton (1986), p225. Notwithstanding this apparent change, it still has to be pointed out that financial firms will only be able to benefit from an image of innovativeness if they already enjoy a sound overall reputation; see Dufey & Giddy (1981), p35.

\(^{42}\) For details on differentiation see Porter (1980), pp35-36.

\(^{43}\) See Dufey & Giddy (1981), p35.

and time. Most financial instruments for this reason require a broad and deep secondary market in order to gain acceptance, a market, that is, with many participants and a large turnover volume. The probability for a secondary market to develop and the costs for establishing it will therefore be among the factors a firm has to consider in marketing a new financial product.45

- As part of their promotional strategies, real sector firms frequently publicly announce their newest developments, often even before bringing them to the market. In view of the ease with which financial products can be imitated, such a policy would obviously be counterproductive in the case of most financial innovations.

- For reasons related to the above, it is difficult to identify financial sector innovations in practice. They are to do with the generation of information and its first application to commercial use. These processes are however not well documented, and

"[n]ew financial instruments or processes often remain unnoticed for some time, and information on them remains unrecorded or systematically gathered until wide diffusion has taken place".46

3. A taxonomy of financial innovation

The process of financial innovation can, as indicated above, take many different forms, spanning from the variation of minor characteristics of existing financial innovation to the invention and commercialisation of entirely new financial instruments and techniques. The financial products and processes themselves are also of a very varied nature. They cover

(i) the whole range of financial instruments and services used within and by the customers of the financial sector,
(ii) the mechanisms of transferring instruments and services between different market partners, as well as

(iii) the internal techniques of the financial sector used in the production of these instruments and services.

Because of its varied nature, financial innovation presents considerable taxonomic problems. Firstly, it is difficult to present a precise definition as to what constitutes a financial innovation. These difficulties are to do with the nature of innovation in general and the peculiarities of financial innovation as described in the preceding section. However, a working definition is needed, especially in the light of a following chapter, which is to consist of an outline of the major financial innovations in international financial markets over recent years.

In this thesis financial innovation shall hence be defined as changes in the instruments and services produced by the financial sector for the use of its customers. Changes which relate purely to techniques and mechanisms of transferring financial instruments and services between different market partners, or to the internal workings of banks and other financial institutions, are thus excluded from the following. This restriction of the definition to financial products is usually made in the literature - albeit not expressly.

Two further limitations will be made. This thesis is concerned with the influence of financial innovations on the exchange risk management of MNCs. The first limitation therefore is that the thesis will consider only those innovations which are relevant in the context of international financial management, excluding innovations which are confined to domestic financial markets.

The second limitation of the problem area addressed in this thesis will be made solely on practical grounds. As far as new financial instruments are concerned only debt instruments will be considered in the following. Innovations in "pure" equity instruments are therefore excluded from the discussion.

After defining financial innovation, the second problem area for a taxonomy lies in developing a consistent system of classification.

---

for financial innovations. It is the rationale for a classification system that one can group a given set of elements in such a way

"that most of your observations will fit into one or another category without too much doubt or arbitrariness in the process".48

In other words, an ideal classification system would divide the given elements into a set of mutually exclusive and exhaustive classes.

Even the broadest classification of financial innovation, the distinction between product and process innovations, does not fulfil this requirement. It depends, for instance, on the point of view as to whether a currency swap is classified as a product or a process. For a bank, selling its services in intermediating swaps will be a new product line; for its customers, a swap will rather be a new process of acquiring funds in a cheaper way.49

A number of more elaborate attempts at classification have been made in the literature. Since most of the authors writing on financial innovation deal with aspects of monetary policy, it is not surprising that some have used related criteria to classify financial instruments and techniques. Podolski, for instance, separates

"those innovations which have a direct effect on the monetary aggregates from those whose effect might be indirect or even negligible".50

Holland, to cite another example, distinguishes between "circumventive innovations," which emerge when market participants seek to by-pass restrictive monetary and regulatory controls, and "transcendental innovations", i.e. innovations unrelated to controls imposed by government agencies or central banks.51

Only a few tentative attempts have been made to develop a system of classification for financial innovations without reference to

48 Simon (1969), p209; see also p54.
50 Podolski (1986), p111.
51 Holland (1975), pp161-162.
regulatory issues. Franzen tries to identify seven categories of innovations according to the underlying economic process leading to the innovation.\textsuperscript{52} Vittas takes a completely different approach; he distinguishes four groups of new financial products: funding instruments; underwriting instruments; hedging instruments; and arbitraging instruments.\textsuperscript{53} Both systems are not very consistent. In the cases of numerous new instruments it is purely arbitrary in which category they are classed.

Another and more elaborate system of classification has been used in a recent study by the Bank for International Settlements (BIS). The BIS report freely admits that

"a unique taxonomy [for financial innovation] cannot be derived from any generally accepted economic principle"

and that it is

"the best guiding principle to try to find something that 'works'".\textsuperscript{54}

The classification scheme the BIS proposes is based on the basic functions performed by a system of financial intermediation. It distinguishes between

(i) price risk-transferring innovations,
(ii) credit risk-transferring innovations,
(iii) liquidity enhancing innovations,
(iv) credit generating innovations, and
(v) equity generating innovations.\textsuperscript{55}

The BIS classification system has clear merits. In particular, it is possible to relate different classes of innovations to different macroeconomic determinants of innovations, such as increases in

\textsuperscript{52} See Franzen (1988), p19.
\textsuperscript{53} See Vittas (1986), p16.
\textsuperscript{54} BIS (1986), p171.
\textsuperscript{55} See BIS (1986), p172; see also Llewellyn (1986a), p4, who identifies seven basic functions of the financial system; for the functions of international financial markets see Dufey & Giddy (1981), p33.
price volatility or changes in the demand for liquidity. Nevertheless, the system suffers from the same drawback as Vittas' scheme; as is acknowledged by the BIS itself, it does not lead to a clear-cut and unequivocal ordering of financial innovations.

The above discussed classification systems were all based on the functions performed by the financial system. The drawback of this approach is obviously that most financial products can be used for multiple purposes. In the above systems they can therefore belong to a number of classes simultaneously.

The system of classification which shall be proposed here is derived not from the functions of the financial system but from an important inherent feature of financial innovations.

As is frequently pointed out in the literature, financial innovation is one of the main forces which bring about a global integration of national and international financial markets. Firstly, financial innovations are easy to transfer from one market to another, and innovators will try and take advantage of their new developments in as many markets as possible. This tends to make financial markets similar as to the instruments being offered. Secondly, some innovations are designed to exploit differences between the conditions in existing markets or market segments. The use of these arbitraging instruments enforces a similarity of conditions in financial markets. Thirdly, by combining characteristics of instruments which formerly belonged to more or less strictly divided market segments, innovations close the gaps between different markets (or market segments). Such innovation has the effect of effacing the boundaries between different financial markets, thereby reducing the segmentation of national and international financial markets.

Using the above described feature one can now distinguish the following groups of financial innovations.

---


(i) Financial innovations which occur in already existing specific financial markets; such innovations can be interpreted as the unbundling and repackaging of the characteristics of a given financial product (or group of products), without changing the essential nature of this product. Such innovations are "spectrum filling" in the sense that they complete a given spectrum of possible permutations of a set of characteristics. An example of this kind of innovation is new developments in the Eurobond market. In the Eurobond market, new and modified products are launched continuously, but they can still be grouped together as belonging to one market.

(ii) Financial innovations leading to the emergence of new markets; this group of innovations increases the efficiency of the financial system by removing incompleteness, either through combining existing characteristics in a distinctly new way, or through the introduction of new characteristics. This second group of innovations can be further split into four subsets.

(1) Financial innovations adding new characteristics to the set of available characteristics, thereby creating entirely new original financial markets; this type of innovation can be described as "spectrum broadening", for it increases the number of possible financial instruments. It can be expected that these additional possibilities will be explored through further spectrum filling innovations as these newly-created markets mature.

Foreign currency options are a good example of this. Before the introduction of currency options there was a latent demand for the flexibility provided by options. The innovation of currency options meant the introduction of a characteristic into financial markets which was hitherto not available. Consequently the market for currency options forms a distinct market of its own. It cannot be described as a subset of another market nor does it combine characteristics of different existing markets like the innovations in the following category.
One can also observe that in the recent past numerous innovations have taken place within the markets for currency options. These are filling the spectrum of possibilities created by the introduction of the original characteristic.

(2) Financial innovations consisting of a combination of characteristics which were previously only available in different markets; this second subset comprises innovations that lead to the emergence of markets for new instruments which combine characteristics of instruments that formerly were available only in divided markets (or market segments).

The so-called "underwriting facilities" represent an example of this. Underwriting facilities are, in principle, a vehicle for emitting short term notes, backed up by a long term commitment of banks to buy these notes. They therefore close the gap between markets for different maturities and combine characteristics of loan and capital market instruments.

(3) Financial innovations consisting of a splitting up of existing bundles of characteristics; the third type of financial innovation involves basically the reverse process of the previous type. Here the characteristics of existing financial instruments are being taken apart ("unbundling"), and priced and marketed separately. The parts of what formerly made up one single product can now be bought in numerous new markets. Examples for such instruments are caps, floors and zero coupon bonds.

In a wider sense the process of "securitisation" can be interpreted as a combination of the above two types of financial innovation. Financial institutions take their assets and liabilities, "unbundle" them, and either sell the components separately to the markets or "reassemble" them in different ways to arrive at marketable securities.
(4) Financial innovations in new arbitraging instruments (i.e. swaps) that help to reduce the segmentation of existing financial markets; although the various forms of swaps which have emerged over recent years are usually seen as financial instruments, swaps are basically a pricing technique. They are a mechanism for arbitraging price conditions in segmented markets. This arbitrage leads to a uniformity of the conditions in the different market segments; it effectively removes the barriers between the segments and leads to a global market.

To conclude, swaps by themselves are not really financial instruments. Their innovation has not added to the number of characteristics available in financial markets. The markets for swaps are rather markets for the banks' services in arbitraging and pricing already existing financial instruments such as loans, bonds, commercial paper, etc.

The classification system developed here is illustrated diagrammatically in Figure 7.
Figure 7

A classification system for financial innovations in international markets

- Financial innovations in international financial markets
  - Financial innovations in existing markets
  - Financial innovations leading to the emergence of new markets
    - Financial innovations leading to entirely new markets
    - Financial innovations combining characteristics from different existing markets
    - Financial innovations consisting of an unbundling of existing sets of characteristics
    - Financial innovations in arbitraging and pricing techniques
III. THEORIES OF FINANCIAL INNOVATION

1. An overview

The requirements for a theory of financial innovation have been spelled out by the BIS in its 1986 report on recent innovation in international banking.

"An ideal theory of the process should explain how changes in general economic conditions created specific profit opportunities for new instruments to emerge. It should explain all innovations and the order in which they arose and should relate to a wide range of historical experience." 58

The BIS report continues by pointing out that no theory as yet exists that meets all of these criteria.

So far there are two theories of financial innovation that have been discussed in the literature.59 One is the theory of constraint by Silber, the other the theory of demand for characteristics which originated with Lancaster. Both these theories are microeconomic theories. That is to say, they endeavour to explain the causes of individual innovations brought about by individual financial institutions.

This approach leaves unanswered all questions concerned with the process of innovation in the financial sector or indeed in the economy as a whole. In other words, the existing microeconomic theories are not integrated into a framework in which sectoral changes or changes that affect the entire economy could be explained.

In the following chapter the existing two theories of financial innovation will be described. Firstly, Silber's theory of constraint will be critically assessed. This theory looks at financial innovation from the viewpoint of the supplying financial institutions. After that, the theory of demand for characteristics will be explained in some detail. It is left for the following chapter to present a more comprehensive model of the process of

59 See de Boissieu (1987), p213.
financial innovation. This will not only identify those factors that lead the individual institution to innovate new financial instruments and practices, it will also relate these microeconomic factors to the wider meso- and macroeconomic determinants of the behaviour of the financial firm.

2. The theory of constraint

The theory of constraint was first outlined by Silber in 1975. Since then he has reiterated and refined its main points in two further publications.

Silber's theory is quite straightforward. Its basic assumption is that financial firms seek to maximize utility, which for practical purposes can be equated with profit. In pursuit of this the firm underlies certain balance sheet constraints. Constraints are imposed on the behaviour of the firm both externally and internally. The most prominent external constraints are government and supervisory regulations; other external constraints are posed by the market place.

Internal constraints include self-imposed liquidity requirements, portfolio preferences, a target rate for the growth of total assets, and so on. The model is completed firstly by the policy tools, i.e. the set of financial instruments and techniques available, and secondly by the parameters the firm has to accept as part of its optimisation problem. 60

In Silber’s model, which is expressed using the framework of linear programming, in any given situation firms will maximize their "objective function" subject to the prevailing constraints. 61 The model’s basic hypothesis, then, is that

60 See Silber (1975), pp64-66; Silber (1983); 89-90.
61 Silber (1983), p89.
"innovation of financial instruments and practices occurs in an effort to remove or lessen the financial constraints imposed on firms."\textsuperscript{62}

Causes for such efforts are exogenous changes in the existing constraints which either directly reduce the firm's utility (profits) or increase the cost of adhering to a given constraint. In the language of linear programming, the firm is stimulated to search for new policy tools, that is, new financial instruments or techniques, by increases in the shadow prices of constraints. The intention behind the innovation is to return to the previous level of utility. A final factor to be considered in this optimisation model is the cost of developing and marketing the new tools in relation to the increased shadow prices.\textsuperscript{63}

In a study in 1977, Ben-Horim and Silber formulated a formal, mathematical LP model for the behaviour of the financial firm and simulated the behaviour of major US commercial banks for the period between 1952 to 1972. Their empirical tests

"tend[ed] to support the view that innovations that were introduced coincided with or immediately following periods of rising shadow prices."\textsuperscript{64}

Silber's theory of constraint is a valuable point of departure for the analysis of financial innovation. However, it is not sufficient to explain the whole process of financial innovation. Firstly, the model describes innovation solely as responses to utility changes in the firms' balance sheet constraints. Thus within the model only "adversity innovations" are allowed to occur.\textsuperscript{65} Secondly, it implicitly assumes that without exogenous changes in the firms' constraints no scope exists for innovation to take place. In other words, it assumes that in given situations firms succeed perfectly in optimising their utility. This (neoclassical) assumption does not of course represent a correct description of real world business organisations.

\textsuperscript{62} Silber (1975), p64.
\textsuperscript{63} See Podolski (1986), pp185-186.
\textsuperscript{64} Ben-Horim & Silber (1975), p292.
\textsuperscript{65} Podolski (1986), p186.
Thirdly, Silber’s model is too general in that it gives the profit motive as the single incentive for the occurrence of innovations. Whilst the drive to increase profits - together with that to reduce risks - in theory is indeed the ultimate motive behind all business activities, this statement holds little explanatory power. In reality, innovations are caused by a multitude of different motives which are related to numerous different changes in the environment of financial firms.

Finally, the microeconomic determinants for the emergence of financial innovations by themselves are not sufficient to explain the process of financial innovation in a wider macroeconomic framework. For that, the microlevel determinants have to be integrated into a model of the dynamic processes and forces taking place in the economy as a whole.

3. The theory of demand for characteristics

The theory of demand for characteristics is a theory that underlies numerous discussions on financial innovation. Various authors have adopted its concepts and phraseology, but in spite of the extensiveness of its application, the use of the theory is hardly ever acknowledged expressly. Moreover, only very rudimentary outlines of the theory are to be found in the literature. This is the more surprising as the theory of demand for characteristics provides a powerful tool for the analysis of a number of aspects of financial innovation.

67 See Podolski (1986), p86.
68 An example of this is the present thesis, where the concepts of the characteristics theory have already been used in the sections on the nature and the taxonomy of financial innovations. Examples in the literature are Dufey & Giddy (1981), pp34-35; BIS (1986), pp160-171; and Llewellyn (1988a).
69 An early attempt to apply the characteristics approach to financial innovation can be found in Greenbaum & Hayward (1971), pp571-573; recently, Desai & Low (1987), pp115-118, developed this application further. Also see de Boissieu (1987), pp213-215.
The theory of demand for characteristics was developed by Lancaster in the 1960s as a new, alternative theory of consumer demand. Lancaster, as well as other economists, criticized the traditional neoclassical demand theory for taking recourse to the subjective utility function of the household instead of explaining consumer behaviour more fully. A particular weakness of the old theory was its inability to integrate newly innovated goods (or services). The utility functions were defined over the number of goods currently available, and they had to be abandoned completely with the introduction of any new good to the marketplace. Even if the new good was only a variation of an already existing good, no a priori statement could be made about the properties of the new preferences of the household.

The central hypothesis of Lancaster’s alternative model can be summarized as follows. Consumers do not demand goods for their own sake. Instead it is the intrinsic characteristics (attributes) of goods that are the real objects of demand. For it is the characteristics contained in the goods that are the ultimate source of utility. Hence the demand for goods is only an indirect demand. In analogy to production theory, goods are seen as merely an input to the consumption process. In the course of this productive activity the consumer realises the characteristics of the goods and thereby derives utility.

Goods will normally possess several characteristics, and the goods differ from one another in the combination and the relative intensity of their characteristics. The model makes the assumption that characteristics are always objective and measurable. In other words, a given good will always be exactly the same to all consumers. The households' preference functions are now defined not in terms of the number of goods existing, but in terms of all the relevant characteristics, which may or may not be available in the current choice of goods.

70 Lancaster firstly advanced his theory in two articles, Lancaster (1966a) and Lancaster (1966b); he then elaborated his model into a comprehensive theory of consumer demand in the monograph, Lancaster (1971).

71 See Lancaster (1966a), p133.
With "normal" consumer goods (e.g. cars, stereos, clothes, etc.), the assumption of the objectivity and measurability of the goods' characteristics severely restricts the applicability of the theory. In such goods, subjective and immeasurable factors, such as aesthetics, trendiness or prestige and social status, play an important role in consumer behaviour. However, this limitation does not apply to the markets for financial assets and liabilities, and the model can therefore be successfully used to analyse financial innovations.

On several occasions throughout the thesis it has already been stressed that financial instruments consists of only a limited number of characteristics (return, risk, liquidity, maturity, currency denomination, etc.). This list can be thought also to include those characteristics which to date are not yet included in existing instruments. For instance, until recently this would have been the case for the flexibility now provided by currency options. The consumers in financial markets, i.e. the demanders of financial assets and liabilities, each behave according to their utility function whose elements are the above listed characteristics.

If for the sake of explanation reality is reduced to only two characteristics, say, return and liquidity, the model can be illustrated diagrammatically. In Figure 8, these characteristics are measured in some appropriate way along the x and the y axes. The points $x_1$, $x_2$, $x_3$ and $x_4$ represent financial assets which contain the two characteristics in different proportions. $x_4$, for instance, contains $r_4$ of return and $l_4$ of liquidity. The actual proportions of the asset $x_i$ are given through the tangens of the angles.

With the help of this graphical presentation of the theory it now becomes possible to illustrate some interesting aspects of innovation in financial markets. From Figure 8a it is apparent that there is a "gap" between the assets $x_3$ and $x_4$. This gap represents an opportunity for the successful innovation of a new financial product. It is shown in Figure 8b that the "ideal" innovation would be located on the ray $Ox_5$ which halves the angle between $Ox_3$ and $Ox_4$.

---

The Lancaster theory thus provides the possibility to identify potentially profitable innovation opportunities, and it can be used to assist in the design of the most suitable new bundle of characteristics. Furthermore, developing another interesting feature of the model one can specify in more detail the necessary attributes of the new financial product $x_5$. In order to do this, it is necessary to introduce the concept of the "efficiency frontier". If $x_1$, $x_2$, $x_3$ and $x_4$ are the securities available, and perfect divisibility is assumed, then an investor can choose for his portfolio any return-liquidity combination along the line $x_1x_2x_3x_4$ (the dotted line in Figure 9). This line is called the efficiency frontier as it represents all efficient $r$-$l$-combinations available.

For the new asset $x_5$ to be potentially successful in the marketplace, it has to contain the two characteristics in sufficient quantities so as to push forward the efficiency frontier. For example, if the new asset is located at point $x_5^1$ in Figure 9, it is more efficient for an investor to realise point $S$ through a
The efficiency frontier and the efficiency substitution effect

The above presentation was confined to the case of two characteristics, using advanced mathematical tools (linear algebra); it can however be generalized to the n-characteristics case. One can conclude that Lancaster's theory of the demand for characteristics represents a valuable instrument for the analysis of financial innovation. Theoretically, it provides interesting insights into their nature, and terms like "spectrum filling innovations", the "unbundling" and the "repackaging" of "bundles of characteristics" only become meaningful on the basis of a full exposition of the model. Practically, financial markets are the one example where the model can be applied to identify opportunities for new instruments.

74 "Thus there is an efficiency substitution effect which essentially is a switching effect." Lancaster (1966a), p142.
to assist their design and to evaluate the chances for the success of their subsequent marketing.

As a final point, the theory of the demand for characteristics and Silber's theory of constraint should not be seen as competing or mutually exclusive microeconomic theories of financial innovation. On the contrary, the two theories are rather complementary in that they highlight two different facets of the same phenomenon.75 Silber's theory seeks to explain the process of financial innovation by looking at the incentives which exist for the individual financial institution to supply new financial instruments, while Lancaster's theory describes the opportunities and requirements for successful financial innovations from the viewpoint of the customer of the financial sector.

75 See de Boissieu (1967), p213.
IV. THE DETERMINANTS OF FINANCIAL INNOVATION

1. An overview

Financial innovation is not a random process; it is driven by certain motives on the part of the economic agents involved, that is, the demanders and suppliers of innovations, and it is also influenced by external forces working on the behaviour of these agents. In fact, one finds the process of financial innovation to be interwoven with a multitude of economic and non-economic processes and developments, and this happens on various levels.

The following chapter seeks to analyse these interrelationships. It will be demonstrated that in the analysis of the determinants of financial innovation one can distinguish three levels which differ in their degree of abstraction:

(i) a microeconomic level, where the forces leading to financial innovation are seen from the point of view of the individual financial institution;
(ii) a meso-economic level, where financial innovation is shown to be one of several forces of structural change taking place within the financial sector of the economy; and
(iii) a third level of broad macroeconomic, political and technological developments that bring about structural changes in financial markets, of which financial innovation is a part.

Some of these forces have at times been singled out by different authors as "the" determinants of financial innovation. However, it will be shown in the following that financial innovation is too broad and varied a phenomenon to be explained adequately by only one factor. For a few innovations it may be possible to identify a single cause, but this is not the case for the majority of financial innovations, and not for the process as a whole. Usually a number of factors together, and in interaction with each other, have brought about new financial instruments and techniques.

77 For example, this has been the case for government regulations and technological change in the real sector.
Podolski formulates this as follows:

"The characteristic feature of our attempts to probe into the innovation-inducing factors is that a combination of circumstances seems necessary for financial innovation to occur. It is unlikely that a simple hypothesis will suffice to explain monetary and financial behaviour and how the financial system reacts to change or manages change. Financial innovation is essentially a manifestation of interdependent influences, and the process of financial innovation seems complex and as yet not fully understood." 

Nevertheless, it is the purpose of this chapter to try to identify the determinants of financial innovation and to analyse the linkages between them. It will also endeavour to explain why the rate of innovation in financial markets has increased markedly in recent years. In order to achieve these objectives, the following discussion will take the form of a "ceteris paribus" analysis, arguing as if direct causal relationships existed between the various determinants and individual financial innovations.

2. Microeconomic determinants of financial innovation

The microeconomic level represents the lowest level of abstraction when analysing financial innovation. Here one investigates the forces which induce individual financial institutions to create new products or processes. Two groups of such forces can be found; one of them can be characterised as "static" determinants of financial innovation, the other as "dynamic".

In economic theory it is generally assumed that economic agents (individuals, corporations, banks, etc.) aim to maximize their utility. As far as private enterprises are concerned, utility is mostly equated with profits. If the assumption is made that at any given point in time real world markets are to some degree imperfect and incomplete, then it is rational behaviour for profit-orientated financial institutions to search actively for new profit-generating
(or risk-reducing) products, or for new and more efficient ways of production.

Van Horne stresses this point too by saying:

"[T]he stimuli to financial innovation are many. The more basic foundation, of course, is the opportunity to make markets more efficient and/or more complete and, by doing so, realize a profit and/or reduce risk. The profit/risk reduction motive is the fundamental reason behind the financial innovations observed."80

This means effectively that financial innovation will take place even in an otherwise completely static environment as long as imperfections and incompleteness still exist. Since no additional changes in the environment are needed to produce the innovations, the determinants responsible for this, the imperfections and incompleteness of real world markets and the profit motivation of the economic agents, can be called "static" determinants. Innovations of the above kind can be said to be supply-induced, "active" innovations. They are unrelated to any external influences and stem purely from the pursuit of profits by private enterprises.81

The counterparts to active innovations are "reactive" innovations.82 These can be interpreted as the reactions by which financial institutions adapt themselves to changes in their competitive surroundings. Changes in the economic environment alter the set of parameters which determine the optimising behaviour of the firms. In order to come to a new profit maximising situation, they have to revise and, if necessary, change their behaviour. Financial innovation is one way by which businesses adapt themselves to the new set of conditions.83 As will be seen below, such changes may take very different forms; they represent the second, "dynamic", group of determinants of financial innovations.

---

81 Such innovations are called "aggressive" innovations by some authors; see Dufey & Giddy (1981), p35; Llewellyn (1988a), p13.
82 This type of innovation has been called "defensive" by Dufey & Giddy (1981), p35, and "adaptive" by Niehans (1983), p538.
83 See Forsyth (1987), p141. This approach has been developed into a formal linear programming model by Ben-Horim & Silber (1977).
Reactive innovations can be grouped further into four categories, the first three of which relate to changes within the financial sector, whereas the fourth category relates to changes external to the financial sector of the economy:

(i) "Responsive" innovations; these are a reaction to changes in the demand patterns of the customers of the financial sector. The portfolio requirements of customers (individuals, private and public enterprises, government agencies, etc.) may change for various reasons. Such changes provide profit opportunities, if the financial institutions can meet the new demands with the development of new instruments or services. This is not always the case, since the development of new financial products is subject to constraints, to external limitations imposed by supervisory regulations and to internal portfolio constraints of the institutions.84

(ii) "Protective" innovations;

"[f]inancial institutions are not passive but have their own portfolio objectives and constraints which change through time".85

Protective innovations are the effects of changes internal to banks. In order to fulfil the requirements of their (or rather their top managements’ or their shareholders’) changed preference systems, they will offer new services to their customers.

(iii) "Defensive" innovations; banks and other financial institutions are - directly or indirectly - affected by changes in monetary policy or supervisory regulations. They will respond to these changes, either to meet the new regulations or to try to circumvent them. Again, innovation is one of the forms by which firms react to such changes. However, the relationship between government regulations and financial innovations is rather complex and therefore will be discussed in more detail below.

84 See Llewellyn (1985), p18; see also BIS (1986), p181.
(iv) "Technical" innovations; this group of innovations is not related to changes in the financial sector, but comprises those innovations which can be seen as adaptations to technological advances in the real sector. The development of new or improved "real" goods can have a direct bearing on the individual financial institution, if these real innovations can be utilized profitably in the production of financial instruments. The use of computers and modern communications equipment in banking is the most obvious example of this. Technical innovations will mainly affect the banks' "back-offices" and will therefore be process innovations. Yet certain product innovations may also have a background of technological change in the real sector. As with regulations, the relationship between technological change in the real sector and financial innovation is complicated; it will be looked at again in a later section.

The different forms of microeconomic determinants of financial innovation, and the different forms of resulting financial innovations are shown in Figure 10.
Figure 10
Microeconomic determinants of financial innovation

- **Static determinants:** Profit opportunities due to imperfections and incompleteness of real world markets
- **Dynamic determinants:** Changes in the environment of financial institutions
  - Changes in the financial sector
  - Changes in the portfolio preferences of the customers
  - Changes in the portfolio preferences of the financial institutions
  - Changes in monetary policy and supervisory regulations
  - Changes in the financial sector

- **Responsive innovations**
- **Protective innovations**
- **Defensive innovations**
  - Technical innovations
  - Reactive innovations

FINANCIAL INNOVATIONS
3. Meso-economic determinants of financial innovation

In this section the process of financial innovation will be put into the wider context of the structural changes taking place in national and international financial markets. This is necessary, because

"[f]inancial innovation should be viewed as a reflection, and partly a cause, of structural changes evident in many financial systems since the early 1980s".86

As indicated before, there is not a simple one-way relationship between certain determinants and the resulting innovations. Instead the determinants are themselves interlinked in various ways, and, moreover, there are forces working in the opposite direction, too. Financial innovation, that is to say, can also exert influences on other elements of the financial system. It is therefore the major theme of this section that financial innovation has to be seen as one of several closely interrelated forces of structural change in the financial sector of the economy.

The aim of the following analysis, then, is threefold. Firstly, it has to be shown in which ways the different forces of structural change in the financial system influence the process of financial innovation. Secondly, the linkages between the forces have to be established, and, thirdly, it has to be ascertained how financial innovation in turn influences these determinants.

Eight broad forces of structural change in financial markets can be identified. They are:87

86 Llewellyn (1988a), p2; see also Llewellyn (1985) and BIS (1986), p127.
(a) regulatory changes,
(b) a general worldwide trend towards deregulation,
(c) the increasing competition between different geographical locations of financial markets,
(d) the increasing competition between institutions within financial markets,
(e) a growing internationalisation of financial institutions and their customers,
(f) the increasing global integration of national and international financial markets,
(g) the high levels of inflation during the 1970s and the increasing volatility of interest and foreign exchange rates, and
(h) the increasing sophistication of financial market participants.

These forces and the interrelationships between them are depicted in Figure 11; they will now be looked at in turn in more detail.
Figure 11

Meso-economic determinants of financial innovation: Forces of structural change in national and international financial markets

FINANCIAL INNOVATION

- Increased sophistication of market participants
- High levels of interest rates and increased market volatility
- Increasing global integration of financial markets
- Growing internationalisation of finance
- Increasing competition within financial markets
- Regulatory Change
- Worldwide trend towards deregulation
(a) Regulatory change

The importance of changes in regulations imposed by governments, central banks or other supervisory authorities for the process of financial innovation has been pointed out before. Some authors go so far as to assert that regulations are the sole, or at least the dominant, cause for the emergence of financial innovations.88

However this is much too restrictive an approach. As Silber correctly points out:

"Many have argued that financial innovation is largely a response to regulation. ..... While this hypothesis has merit, it is too narrow to explain properly the evolution of financial instruments. Regulation turns out to be just one element of a more general category of innovation-generating phenomena."89

Nevertheless, the circumvention of regulations which are perceived as being restrictive by the markets remains one of the major determinants of financial innovation. The most prominent example of this is the development of the so-called "Eurodollar" markets.90 The main reason for the emergence of these markets in the 1960s was the existence at that time of restrictive capital and monetary controls in the US. These restrictions, in particular the notorious interest rate equalization tax on foreign bonds and the interest rate ceiling under "Regulation Q", induced American and other banks to move their US-dollar denominated funds to "off-shore" financial centres. Other regulations which in the past have induced financial institutions to change their behaviour are certain types of taxation (e.g. withholding taxes) and reserve and capital ratio requirements.

However, the relationship between regulations and financial innovation is more complicated and subtle than suggested by the above. Not only does the imposition of regulations lead to the

89 Silber (1975), p64.
90 The Euromarkets are, in principle, wholesale markets for deposits, loans, bonds, etc. which are denominated in currencies other than the home currency of the banks conducting the transactions. Since these markets are thus situated outside the jurisdictions of the currencies involved, they are subject to little or no supervisory control and in particular free from costly regulations such as reserve requirements. For a discussion of the history of the Euromarkets and their origins see Shapiro (1986), pp505-519, Holland (1986), pp24-26, Eiteman & Stonehill (1986), pp397-422.
emergence of innovations; the development of new instruments and techniques designed by the markets to evade or circumvent the regulations will also, after a certain time lag, induce the authorities to react and impose further regulations. These new regulations will then, in turn, spark off another round of innovation.\textsuperscript{91}

In other words, a "dynamic sequence"\textsuperscript{92} exists between regulations and financial innovation, where regulations bring about financial innovations, which bring about regulations, and so forth. This relationship has aptly been called "regulatory dialectics".\textsuperscript{93}

"This concept embodies an interpretive vision of cyclical interaction between political and economic pressures in regulated markets. It treats political processes of regulation and economic processes of regulatee avoidance as opposing forces that, like riders on a seesaw, adapt continuously to each other. This alternating adaptation evolves as a series of lagged responses, with regulation and regulatees seeking to maximize their own objectives, conditional on how they perceive the opposing party to behave."\textsuperscript{94}

Two further aspects of the role of regulation need to be mentioned. Firstly, instead of causing financial innovations unintentionally, regulations can also be applied to force financial institutions to use new instruments or techniques.

"Regulation is often seen as a brake on financial innovation, but this view is too simplistic, for there are two mechanisms by which regulations can stimulate innovation. The first is the familiar process by which the financial system develops new techniques in order to circumvent regulatory obstacles. .... The second and less common process is where regulatory policy is deliberately used to impose change on an unwilling financial system."\textsuperscript{95}

As an example Forsyth, from whom this quote has been taken, gives the fundamental changes in the London Stock Exchange in 1986.

\textsuperscript{92} de Boissieu (1987), p216.
\textsuperscript{93} This term goes back to Kane (1977), p55. See also de Boissieu (1987), p216; Podolski (1986), p198; Llewellyn (1988a), pp3-4.
\textsuperscript{94} Kane (1981), p355.
\textsuperscript{95} Forsyth (1987), pp141-142.
The second argument to be put forth here also stresses that monetary authorities do not always curb only the innovative pressures coming from the private sector. They themselves sometimes

"contribute to the process by offering new and attractive financial products, which are indispensable for the financing of growing budget deficits".96

(b) A worldwide trend towards deregulation

The previous section examined the relationship between changes in regulations and financial innovation and stressed that a considerable proportion of financial innovations has been developed in the past in order to circumvent existing regulations. The last decade or so has seen a worldwide tendency towards a general deregulation and liberalisation of financial markets. Paradoxically, this trend has also functioned as a driving force behind the process of financial innovation.

The measures being taken by the governments of some of the major industrial countries

"include the abolition of exchange controls, the removal of interest rate ceilings, the opening of domestic markets to foreign financial institutions, tax reductions and the relaxation of certain traditional boundaries that limit the types of financial activities of interest to financial institutions".97

Earlier it was explained that regulations determine the boundaries for the lawful activities of financial institutions. A relaxation and abolishment of restrictive regulations and controls therefore means an expansion of these boundaries. Market participants can now enter into new lines of business; they can create previously prohibited financial instruments or can innovate new techniques, and


they will do so if these new areas provide possibilities for increasing their profits and/or reducing their risks. 98

A number of reasons lie behind the tendency towards deregulation, and they illustrate how closely different developments within financial markets and in their economic and political surroundings interact with each other. Firstly, the accelerating rate of innovation taking place on an international scale led to the factual obsolescence of many regulations which were binding only within national boundaries. 99 In principle, monetary authorities had three alternatives to respond to this. They could have cooperated on an equally international basis, for instance, by establishing a supranational central bank with internationally binding powers. This choice failed for practical and political reasons. The second possibility was to answer with ever tighter national regulations. However, regulations will in practice always be one step behind the innovations brought about by the profit-driven entrepreneurial spirit of the markets. In addition to that, the growing international integration of financial markets and the high mobility of international capital flows which follows from it has made such regulatory measures increasingly pointless and even counterproductive. Faced with tighter regulations, which like an additional tax effectively increase the cost of domestic banking 100, financial intermediation will tend to emigrate if possible. 101 This leaves the third alternative, which is to give way to the pressures of the market forces and to liberalise financial markets from restrictive and prohibitive regulations.

Such steps have in the recent past been taken by several national governments, often in order to "repatriate" 102 financial business which they had previously lost because of restrictive monetary and capital controls. Indeed, as will be shown below, deregulation is today a strategy employed by national authorities in order to compete with each other as attractive locations for an increasingly

international but at the same time highly mobile and sensitive financial services industry.

A final point - whose practical importance however should not be underestimated - is that a policy of deregulation was consistent with the economic and political (or philosophical) views held by the political groups and parties in power at the time in countries like the UK and the US. This applies in particular to their belief in the virtues of free enterprise markets. These views were also often shared by influential economists working as policy advisers, academics, or in government institutions such as central banks, who then strongly supported and strengthened the deregulatory tendencies.

(c) The increasing competition between financial markets

A third force of structural change in the financial system has been the increasing competition between different geographical market locations for the provision of financial services.

The introduction of modern telecommunications systems and the emergence of international financial centres in places like Tokyo, Singapore and Bahrein, which bridge the gap between the traditional financial centres in the U.S and Europe, have led to a truly global financial market. Trading in foreign exchange markets, and stock and security markets today takes place on an on-going around-the-globe 24-hours basis.

As a consequence, the customers of the financial sector increasingly have international options. The geographical location of the financial institutions is becoming less and less relevant in considering the requirements and principles of financial intermediation. In other words, in the course of the developments over recent years, national and regional financial centres have lost

their competitive advantages. A German MNC interested in currency options, for instance, will not only ask its German banks in Frankfurt for quotes, but it will also contact banks or brokers in Switzerland, London or New York, and it will then deal in the market offering the most competitive conditions.

One result of the growing integration of financial markets and the internationalisation of finance has been the increasing competition between national financial systems and geographical market locations.106 This has affected the process of financial innovation in two ways.

Firstly, national authorities have come under pressure from their domestic financial community to increase the attractiveness of their market location, and thereby companies' profit opportunities, through a policy of deregulation and liberalisation of financial markets and through other policies favourable to the conduct of financial business. Deregulation and a fostering of the entrepreneurial and innovative spirit of the financial markets - as long as it does not threaten the stability of the country's financial system - is also in the interests of the authorities, because the financial services industry is a very attractive source of local employment, tax revenues and other benefits for the economic development of the region and for the country as a whole. Niehans concludes that

"[t]he elimination of discriminatory regulation will ... increasingly be used as an instrument of international competition".107

Secondly, financial centres have to offer their customers a comprehensive range of services and instruments in order to retain or enhance their attractiveness. For this reason financial innovations will be included in their range as quickly as possible, and the competition between financial markets thus increases the speed with which innovations are diffused.108 The wide distribution

that organized foreign currency option exchanges have found within only a few years is an example of this influence.

(d) The increasing competition within financial markets

Competition in international financial markets has not only increased between different geographical market locations, it has also intensified markedly within the financial markets themselves.\(^{109}\) Ten or fifteen years ago, banks and other financial institutions in many countries operated in markets that were sheltered from competition. Regulations prohibited the entrance of new competitors, the financial markets themselves were partitioned, and competition between individual institutions within the respective segments was often restricted by regulation or cartels.\(^{110}\)

These regulatory impediments to competition have mostly been removed during the last decade or so, and, as could be expected, this deregulation has produced a much higher degree of competition.

"Deregulation normally generates, at least in the short and medium term, greater competition and further innovation as a form of competitive action."\(^{111}\)

Today, banks in particular face two additional sources of competition, from foreign banks and from indigenous companies which operate in related business areas.\(^{112}\)

However, deregulation is not the only reason behind increased competition. Modern telecommunications systems have made it possible for relevant information to reach all market participants virtually at the same time and without delay. This technology leads to a more competitive pricing structure and to a reduction in margins.\(^{113}\)


\(^{110}\) For the situation in the UK see Fjorde (1983) and Podolski (1986).

\(^{111}\) Podolski (1986), p136.


\(^{113}\) See BIS (1986), pp181-182. Dombret reports that the average margin for loans to high quality borrowers in the OECD was 0.6% p.a. in 1981. This was reduced to 0.47% in 1984, and in 1985 the average margin was down to only 0.125%; see Dombret (1987), p624.
A further factor which has contributed to the competitive pressure is the third world debt crisis. The debt crisis (which will be looked at in detail in Section C.IV.4.) led, amongst other things, to a strategic reorientation of all major international banks. Strategies which had previously been geared towards high earnings and above all growth were replaced by an emphasis on risk reduction and consolidation, and banks refused to lend further to third world countries or other high risk borrowers.\textsuperscript{114} A highly liquid market was thus deprived of a substantial proportion of its customers, which resulted in much fiercer competition for the remaining high quality customers, banks, government authorities and private corporations from industrialised countries. Indeed, the market for international bank lending has become a "borrowers' market", with borrowers pressurising the banks into loans with lower costs, lower risks and other more favourable conditions.\textsuperscript{115}

The competitive pressures have led to an increase in the rate of innovation. Banks simply have to respond more quickly and with innovative means in order to compete successfully. A vivid illustration of the situation in some markets is given by the following quotation from the journal "Euromoney":

"The competition to be heard is so intense that investment bankers often think innovation is their only way in."\textsuperscript{116}

Banks and other financial institutions have by and large recognized the increasing importance of innovation for their long term survival.

"Alas, it is no longer possible for a financial institution to remain in a nice, safe niche. .... Financial innovation becomes increasingly necessary for survival."\textsuperscript{117}

For this reason,

\textsuperscript{114} See Schmidt (1987a), p84.
\textsuperscript{115} See Dombret (1987), p326.
\textsuperscript{117} van Horne (1985), p623.
"in the past few years a number of major international financial institutions, both investment and commercial banks, have established within their organisational structures 'new product' or 'product development' groups. These can be viewed as the financial equivalent of the industrial research laboratory."\(^\text{118}\)

Moreover, competition has also fostered innovation by way of creating a greater entrepreneurial spirit in markets that were traditionally known for their reluctance to change and for their dislike of risky innovations.\(^\text{119}\) This spirit is obviously beneficial to the development and marketing of new instruments and services, and together with the institutionalisation of innovation within firms it has ensured that by now the process of innovation in financial markets has gained a momentum all of its own.\(^\text{120}\)

(e) The growing internationalisation of finance

A determinant of financial innovation which has closely interacted with other forces of structural change in financial markets has been the growing internationalisation of finance.\(^\text{121}\) This term describes three related phenomena:

(i) the increasing internationalisation of financial institutions,
(ii) the increasing internationalisation of the customers of the financial sector, and
(iii) the increasing relative importance of international business for individual financial institutions and for the financial system as a whole.

The last two decades have seen an unprecedented increase in the number of banks becoming active in international finance and also in the extent to which individual banks have internationalised their

\(^{118}\) BIS (1986), p185.

\(^{119}\) The Bank of England, for instance, wrote in 1983 of the "aggressive, competitive and innovative spirit prevailing ... in the financial system"; Fjorde (1983), p371; and Llewellyn remarks on the "marketing ethos" to be found in the management of financial institutions; Llewellyn (1988a), p35.

\(^{120}\) See BIS (1986), pp184-186.

\(^{121}\) See Dombret (1987), p640; Llewellyn (1988a) p35.
operations and organisations. Lewis and Davis conclude after having analysed not less than 4300 overseas offices of banks:

"What is readily apparent is that banks operating out of most countries have a global sphere of operations; that is, banking is truly multinational." 

In many cases, the initial reason for the overseas expansion of banks was the preceding internationalisation of industrial and trading companies. The banks followed their customers abroad in order to meet their demands for borrowings and other services in foreign markets. Various other reasons (the growth of the Euromarkets, restrictive regulations or saturation in the domestic markets, risk diversification, etc.) have also contributed to the growing internationalisation of financial institutions.

What is of interest here is the fact that the internationalisation of the banks' customers, the subsequent internationalisation of the banks themselves, and the resulting increase in the scale and the relative importance of the banks' international business operations have spurred the process of financial innovation.

Firstly, the growth of international finance, that is, the increase in the rendering of financial services involving different currencies, different legal environments, different taxation systems and so forth, has created a need for a wide range of highly specialized financial instruments and techniques. For obvious reasons this has given rise to profitable innovation opportunities.

Secondly, financial institutions find it easier to enter new markets if they can provide an advantage over established competitors. Newly-developed instruments or techniques represent such a lever for the successful penetration of international financial markets. The

122 It has been estimated that during the 1970s every year about 60 new banks became engaged in international financing. Citicorp, doubtlessly the example for a highly internationalized bank, today operates with some 2000 offices in more than 90 countries; see Lewis & Davis (1987), pp217 and 249.


intended internationalisation may thus have induced banks to invest in the development of new products.\textsuperscript{127}

Thirdly, the sheer number of international institutions operating in international financial centres such as London or New York, and the great variety of different organisations and cultures represented by them, have made such market centres ideal breeding grounds for innovations.\textsuperscript{128} They have fostered a "cross-fertilization" of concepts and ideas which then, especially in an atmosphere of intensive competition, has led to the development and marketing of new financial services.\textsuperscript{129}

To conclude, the growing internationalisation of finance has contributed to the process of financial innovation, because for a number of reasons,

"on balance, the rate of production and spread of financial innovation is greater in international than in domestic markets".\textsuperscript{130}

\begin{itemize}
\item[(f)] The increasing global integration of financial markets
\end{itemize}

The relationship between the process of financial innovation and the increasing integration of national and international financial markets has already been described above.\textsuperscript{131} The deregulation of markets, the ensuing competition between and within financial markets and the internationalisation of financial institutions have all helped to interlink and integrate national and international financial markets, but

"[t]he new instruments ... have also contributed, although in very different ways, to the process of financial integration ... "\textsuperscript{132}

\begin{itemize}
\item[127] See Llewellyn (1988b), p246.
\item[128] In 1981, a total of 453 different banks were present in London alone; see Lewis & Davis (1987), pp250-251. Another statistic shows that in 1985, 293 foreign banks were represented in the UK; see BIS (1986), p151.
\item[129] See Dufey & Giddy (1981), p36.
\item[130] Dufey & Giddy (1981), p36.
\item[131] See Chapter C.II.2. of the thesis.
\item[132] BIS (1986), p153.
\end{itemize}
However, as with the other determinants described above, there is a two-tier causal link between financial integration and innovation. Integration, that is to say, also stimulates the process of financial innovation.

In a truly globally integrated financial market, innovation is the only possible means of gaining competitive advantage, and thus integration provides organisations with a strong incentive to invest in innovation. Integration, as described above, will also facilitate the diffusion of new instruments and techniques, and for some innovations (e.g. new Eurobond varieties) only a world-wide integration can provide primary and secondary markets which are enough to justify the investment and risks involved in the development of new financial products.133

(g) High levels of interest rates and increased market volatility

For the financial environment, the 1970s and the 1980s have been a period of high interest rates and a markedly increased volatility of markets. For a number of macroeconomic and political reasons (to be explained below), inflation rates in most industrial countries rose sharply during the 1970s. At the same time, and partly as a result of the inflationary climate, nominal and real interest rates increased and, like foreign exchange rates, fluctuated wildly and unpredictably. These market developments meant a greater uncertainty for the users of financial services, in particular for companies involved in long term investment and borrowing.

By the same token the increased market volatility meant higher risks for the financial institutions supplying financial instruments. Thus, a desire existed both on the side of the users and of the suppliers of financial services to create new instruments and techniques that would help them to cope with the changed market environment.134

Firstly, higher interest rates induced corporations and other asset holders to economize on non-interest bearing balances and generally to optimise their cash management. Interest-bearing current accounts and innovative cash management techniques, especially the computer-based "cash management systems", have been offered by banks in response to these new customer demands.\textsuperscript{135}

Secondly, the development of loan and security instruments with shorter maturities and, above all, with variable rates of interest, or the creation of completely new markets for futures and options, are all examples of financial innovations determined by the system's greater need for devices to reduce or manage, i.e. price and redistribute, the increased risks.\textsuperscript{136}

Thirdly, the increased volatility and risks have also produced a growing interest in the flexibility of financing. In other words, a demand emerged for techniques which allow financing decisions to be reversed and investors and borrowers to switch quickly between different assets and liabilities and with low transaction costs.\textsuperscript{137}

The trend towards a securitisation of finance, that is, the tendency to use securities markets for funding rather than bank loans and to enhance the marketability of other financial assets, as well as the success of the swap markets, can, at least to some extent, be traced back to this influence.\textsuperscript{138} To sum up, one can only agree with Llewellyn in saying that

"[t]here are legion examples of financial innovation in response to the increased volatility of interest rates, exchange rates and the rate of inflation, and the high level of interest rates".\textsuperscript{139}

\footnotesize{135 See Glaum (1987).}
\footnotesize{136 See Studer (1988), p17.}
\footnotesize{137 See Dini (1986), p378.}
\footnotesize{138 For a detailed discussion of the securitisation phenomenon see BIS (1986), p129-140; Schmidt (1987a); Dombret (1987); Storck (1987b), p10.}
\footnotesize{139 Llewellyn (1988a), p18.}
The increasing sophistication of market participants

The last force for structural change in the financial sector to be discussed here as a determinant of financial innovation is the increasing sophistication of the participants in international financial markets.\(^{140}\) This holds true for financial institutions as well as for their customers, which for a large part are comprised of MNCs, government agencies and, with growing importance, professionally-managed institutional funds (investment trusts, pension funds, insurance companies, etc.).\(^{141}\) Reasons for this are the stronger competitive pressures, the higher demands posed by a more volatile market environment, and the generally reduced level of profitability during a period of worldwide economic recession. These factors - some academics include their own research and teaching in this list\(^{142}\) - have made companies more sensitive to financial risks and aware of the need for a performance-orientated attitude towards finance.\(^{143}\)

The impact of the increased sophistication in the process of financial innovation is twofold. Firstly, on the side of the banks it has enhanced their understanding of the principles of modern finance and financial markets.\(^{144}\) Bankers are also more responsive to their customers' needs, and this, combined with a more entrepreneurial spirit, has led them to perceive profitable possibilities for new financial products. On the side of the banks' customers the sophistication also has meant a better understanding of the workings of modern financial markets. At the same time they have become more aware of their own needs and requirements within these markets.

Secondly, both borrowers and investors have become more receptive to the new, and sometimes rather complicated, financial instruments and techniques offered to them by their banks; only this has made possible the successful development of markets for instruments like

\(^{141}\) See BIS (1986), pp155-156
\(^{142}\) See van Horne (1985), p624.
\(^{144}\) See van Horne (1985), p524.
options, index-linked futures or other highly specialized constructions.

4. Macroeconomic determinants of financial innovation

On the highest level of abstraction there are three broad strands of macroeconomic forces which affect structural changes in the financial system and in doing so determine the process of financial innovation:

(i) rising wealth in the major industrial economies,
(ii) changes in the general economic and political environment of the financial system, and
(iii) technological changes in the real sector.

These three strands of forces lead to changes in the level of demand for financial services, the relative efficiency of different financial instruments and techniques, the portfolio preferences of the users of the financial system, the portfolio preferences of the suppliers of financial services, and the regulatory framework within which the participants in financial markets operate,

which then, in turn, cause structural changes within the financial system, as described in the preceding section. The relationships between the external macroeconomic forces and the internal changes within the financial system are modelled in Figure 12. The three strands of external forces will now be discussed briefly in the following sections.

Figure 12

External macroeconomic forces leading to structural changes in the financial system

- Rising wealth
- Changes in the economic & political environment of the financial system
- Advances in the state of knowledge in the real sector of the economy

Changes in:
- the level of demand for financial services
- the relative efficiency of financial instruments and techniques
- the portfolio preferences of the users of the financial system
- the portfolio preferences of the suppliers of financial services
- the regulatory framework of the financial system

STRUCTURAL CHANGE IN NATIONAL AND INTERNATIONAL FINANCIAL MARKETS
(a) Increasing wealth

Silber wrote in 1975 that profitable opportunities for financial innovations are created when the size and/or the composition of surplus and deficit units in the system change.\textsuperscript{146} Whilst the composition of surplus and deficit units in any economy is influenced by factors such as those discussed in the following section, the absolute size of aggregate borrowing and lending is clearly a function of the number and the wealth of the members of the economy.\textsuperscript{147}

Increases in the wealth of the economy do not only lead to increases in the overall level of demand for financial assets and liabilities. They also lead to a demand for an increased variety of financial instruments and services.\textsuperscript{148} Economic agents want to diversify their portfolios, and with rising wealth more and more specialist combinations of financial characteristics can be profitably created and marketed. This driving force behind the process of financial innovation is most notable in the development of ever new varieties in the Eurobond and other securities markets, which are aimed at special "niches" of the growing international investor market.

(b) Changes in the economic and political environment of the financial system

During the last 10 to 15 years, a number of deep-going changes have taken place in the economic and political environment of national and international financial systems. These changes have had a profound impact on the structures and workings of financial institutions and markets, and again financial innovation was one way in which the financial system adapted itself to the newly emerging situations.

\textsuperscript{146} See Silber (1975), p56.
\textsuperscript{147} See Rybczynski (1988), pp259 and 264.
\textsuperscript{148} See Llewellyn (1988a), p16. This point was already recognized and presented in a formal model by Greenbaum & Haywood (1971), pp573-574.
- Changes in economic policies pursued by the governments of major industrial countries; during the 1960s and at the beginning of the 1970s the governments of most western industrial countries relied on Keynesian policies to "manage" their economies. However, in the course of the 1970s these policies proved to be unable to combat a combination of stagnation and inflation ("stagflation"); instead they appeared to be responsible for increasing inflation, budget deficits and government borrowing.

Following electoral successes of conservative groups and parties at the end of the 1970s and the beginning of the 1980s, economic policies switched in a number of OECD (Organisation for Economic Cooperation and Development) countries from a demand-orientated Keynesian approach to supply-side orientated monetarist strategies.

These changes were most marked in the UK and the US. In the UK the Conservative government under Thatcher implemented a rigorous anti-inflation policy after its election in 1979. This involved a tight budget policy and in particular a very strict monetary policy, committed to short term money supply targets.

Massive tax cuts by the Reagan administration coupled with increased defense spending produced record budget deficits in the USA. At the same time a stricter monetary policy was adopted to avoid inflation, and because the deficit was financed through international capital markets rather than domestic savings, these policies resulted in a world-wide rise in interest rates and in a strongly appreciating dollar.

Similar changes in economic strategies - albeit of a less drastic nature - took place in other industrial countries, too. They mostly resulted in periods of high interest rates, deflations of the economies, exchange rate fluctuations, and in general in an increased uncertainty about the unstable economic and political environment. These factors, in addition to the direct effects the policy changes had on financial market participants (for instance through tax changes or through the tightening of the money supply), strongly influenced the behaviour of financial institutions and their customers. Together with other
developments they were responsible for structural changes in the financial systems, as described above.\footnote{149}{See Llewellyn (1985), p2; Dudler (1987), p159.}

- Oil price changes and changes in the financial positions of the OPEC (Organisation of Petroleum Exporting Countries) countries; only a few factors have had as strong an influence on the world economy and on the world financial system as the turbulent changes during the last 15 years in the price of oil. From October 1973 onwards, successive rises in the oil price\footnote{150}{The price of crude oil quadrupled from October 1973 until the end of 1974, and, after depreciations of the US-dollar, it was doubled again by OPEC in 1979; see Eiteman & Stonehill (1986), pp50 and 56-57.} - brought about by the oil-exporting countries organising a cohesive and efficient cartel - led to a dramatic shift in the patterns of international flows of savings and investments, and consequently in the distribution of wealth between industrialised and oil-exporting countries.\footnote{151}{See Studer (1988), p17; Llewellyn (1985), p14.}

The effects of the oil price shocks of the 1970s on the economies of the industrialised countries were a slackening of economic growth, a rise in inflation and severe fluctuations in exchange rates.\footnote{152}{See Eiteman & Stonehill (1986), pp50-57.} Equally important for the development of financial markets was the accumulation of huge balance of payments surpluses by the OPEC countries. Countries such as Saudi Arabia or Kuwait, which lacked sufficient immediate industrial investment opportunities, reinvested their revenues largely in short term Eurodollar deposits and government securities. The overall increase in the demand for international financial intermediation caused by the "recycling of the petro-dollars" through the international banking system, together with the peculiar portfolio preferences of the OPEC countries (OPEC was highly risk averse and had a pronounced liquidity preference) provided strong impulses for structural changes in the financial system.\footnote{153}{See Llewellyn (1985), pp16-17; Eiteman & Stonehill (1986), p61.} They contributed to the rapid growth in the Eurodollar markets, and they were also partly responsible for the massive
increases in variable interest bank lendings to developing countries.154

During the 1980s the financial situation of the OPEC countries has again changed. Oil prices have fallen and instead of accumulating surpluses, some OPEC members today face liquidity problems. From a balance of payments surplus of US$ 152 bn in the period from 1980 to 1982 OPEC’s financial position has deteriorated to a deficit of US$ 24 bn in the period from 1983 to 1984.155 This reverse in OPEC’s situation has again had a strong impact on the financial system; for instance by contributing to the decline of the Euroloan markets and to the emergence of the third world debt crisis.156

- Other changes in balance of payments imbalances and in the patterns of international money and capital flows; since the beginning of the 1980s the structure of international payments has not only changed between industrial and oil-exporting countries, it has also changed within the industrial countries themselves.

"[O]ne of the most significant structural changes for international financial intermediation occurred between major industrial countries: the US moved from an $8 billion surplus to a $102 billion deficit, and the combined surplus of Germany and Japan rose from $7 billion to $70 billion."157

In the US, the balance of payments deficit necessitated a rise in the general level of interest rates, for high rates of return were needed to attract foreign investors to purchase US-dollar denominated debt. Given that the dominant institutional investors from Japan, Western Europe and the US preferred longer term marketable assets, and required them to be raised at low costs and with high returns158, the recent balance of payments imbalances were an additional impetus for the trend away from bank lending (formerly preferred by OPEC) towards a

156 See BIS (1986), p134.
securitisation of international finance. Innovations in numerous new securities instruments and also in various new issuing techniques have their origins in these developments.

- The general development of the world economy; whilst almost all industrial countries experienced a relatively steady economic growth during the 1950s and 1960s, growth rates slackened during the 1970s. Following the oil price shocks and the failure of Keynesian demand policies to retain economic growth, the world economy ran into a period of recession. High unemployment figures, high rates of inflation and an unprecedented number of business failures characterized the economic environment during the last decade in most OECD countries.

For the financial sector this meant that in respect of its corporate customers its tasks shifted from the financing of companies' investments and expansion to assisting them in optimising their cash management and restructuring their borrowings and financial investments. The emphasis in corporate finance today lies with risk reduction and the provision of liquidity on the one hand, and a more performance (rather than growth) orientated approach towards the management of liabilities and financial assets on the other.

Such innovations as modern "electronic banking" techniques for corporate cash management, and the instruments of swap, futures and options markets, reflect this shift in emphasis brought about by a harsher economic climate.

"In summary, variation in the level of economic activity affects not only the magnitude and type of funds needed, but also the risk attitudes of financial institutions and other market participants. In turn, these affect financial innovations in our society."
The third world debt crisis; the role of the third world debt crisis as a determinant in the process of financial innovation has been mentioned before. After a boom period of bank lending to developing countries in the late 1970s, countries like Brazil, Mexico, Nigeria and many others, ran into difficulties when they were hit hard by the world recession and a steep rise in US-dollar interest rates. The crisis finally broke out openly in August 1982 when Mexico stopped servicing its debt, an example subsequently followed by other countries.162

In the first instance, the rapid growth of bank lending to developing countries in the second half of the 1970s was a determining factor in the development of the Euroloan markets with their various product and process innovations. The outbreak of the crisis at the beginning of the 1980s then found the banks in very vulnerable positions. US banks especially had exposures to debt crisis countries of multiples of their equity capital.163 The banks reacted to this - and to certain supervisory regulations imposed in the aftermath of the crisis - by trying to reduce their exposures both in absolute terms and in relation to their overall assets and their equity capital.164

Today lending to third world countries has virtually stopped and banks have in general become more risk conscious rather than growth or return orientated.165 They have also sought to take the pressure off their balance sheets - and to comply with stricter regulations - by improving their "off-balance sheet" business, i.e. activities like dealing in securities and exchange markets, and providing services, such as guarantees, acceptances, commitments or fundings through the issue of stock or securities.166 In the course of these policies, banks have

---

162 For an account of the major causes of the third world debt crisis see Decooedt (1986).
163 See Feinberg (1986), p24. Even after years of "crisis management", major US banks are still in deep trouble. In September 1987, Manufacturers Hanover, the worst off of the big New York based banks, still had US$ 9.2bn LDC debt outstanding. US$ 1.9bn of its total reserves of US$ 2.7bn were designated for LDC debt. At the same time its common equity amounted to only US$ 2.1bn. This means that, even after subtracting all reserves from its outstanding LDC debt, the remaining US$ 6.5bn exposure was more than three times its common equity of US$ 2.1bn; see The Economist (1988), p70.
165 See BIS (1986), pp130-131; Schmidt (1987a), p84;
166 See BIS (1986), pp141-142.
contributed to the securitisation of financial markets in general. In addition, they have innovated more specific techniques to reduce their holdings of troubled LDC debt, for instance, by turning third world debt into marketable securities or through more complicated schemes such as debt-equity swaps.\footnote{167}

\textbf{(c) Technological progress in the real sector of the economy}

Technological change in the real sector of the economy is the third macroeconomic determinant of financial innovations. Although it is the last determinant to be discussed, it is by no means the least important one. On the contrary, real sector technological advances are one of the few factors that have been put forward at times as the dominant force leading to the emergence of financial innovations.\footnote{168}

The technological changes that have influenced the financial sector most significantly over the last two decades are without doubt the application of computer-based information processing and telecommunications systems. Within these two decades, the use of these new technologies has spread into practically all areas of banking. This widespread diffusion has altered profoundly the workings of the financial industry, and the new technologies have had a strong influence on the process of financial innovation.\footnote{169}

Figure 13 illustrates that technological progress in the real sector has induced financial innovations in three different ways.
Figure 13

Technological advances in the real sector of the economy and the process of financial innovation

Technological advances in the real sector of the economy

Direct application of new real sector technologies as new financial products banks offer to their customers (product innovation).

Application of new real sector technologies in the banks' production of financial instruments and services (process innovation).

Direct influence on financial innovation; with new real sector technologies the production of new financial instruments or services becomes possible, i.e. cost effective or technically feasible.

Higher degree of price competition increases pressure to compete by means of innovation; leads to a higher rate of financial innovation.

Indirect influence on financial innovation; new real sector technologies make financial markets more competitive.

FINANCIAL INNOVATION
In some cases new real sector technologies have been turned directly into new financial product innovations. As an example of this, for a number of years most banks have now been offering computer-based cash management systems to their corporate customers. The firms can even buy or hire the hardware, i.e. the terminals or microcomputers, from their banks. Basically, all instruments and services which the banks offer under the heading of "electronic banking" can be interpreted as product innovations based on the banks' adaptation of computer and communications technologies.\textsuperscript{170}

However, more important than the direct applications have been the influences exerted by the use of the new real sector technologies in the banks' production of financial instruments and services. By itself this use is best described as process innovations having taken place in the banks' "back offices"; as such it is of no interest in the context of the definition of financial innovation used in this thesis. Yet these process innovations have in turn sparked off numerous innovations of new financial instruments and services to be used by customers of the financial industry.

Two ways can be identified through which the widespread application of computer-based information processing and transfer systems has influenced the innovation of new financial products (see Figure 13).

Firstly, the employment of the technologies has had a "direct influence", where it has enabled the banks to provide financial products which otherwise they could not have provided. In other words, before the advent of computer technology a number of financial instruments or services could not be produced by the banking sector in any cost effective way, or their production was technically not feasible.

Process innovations change not only the production function of a company, but consequently also its cost function.\textsuperscript{171} Technological progress may thus change the cost structure of a financial institution in such a way that the provision of an instrument or a

\textsuperscript{170} See Glaum (1987).
\textsuperscript{171} See Silber (1975), p64.
service which used to be too costly now becomes cost effective and profitable.

One of the most notable effects of the utilisation of computer and related technologies has been the dramatic reduction in transaction costs, i.e. in the costs of initiating and conducting transfers of financial assets between economic agents. People and paper have been displaced from processing information, and this has greatly reduced costs. Only with these developments, that is, only with international funds transfer systems that enable the daily transmission of hundreds of thousands of transactions worldwide for minimal costs, could truly global financial markets have emerged over the last decade or so. By the same token, only with these technologies could markets for stocks, bonds, futures, etc. grow in volume as they have done; the huge numbers of transactions in today’s financial markets could not be coped with without the electronic processing and transmission of information.

A second direct influence existed where the appliance of new real sector technologies made technically feasible the development of new financial instruments and services. The use of small desk-top computers, or the installation of multi-terminal mainframe systems, have given bankers greatly enhanced capabilities to design and price new complex financial instruments on an on-going basis. Broad and deep markets in such products as swaps, forward rate agreements (FRAs), caps and, above all, currency options could only evolve with the banks being able to identify, measure and monitor continuously the risks involved. Despite the complexity of these complicated instruments the banks must also be able to compute and quote prices in a matter of seconds.

Next to the direct influences of real sector technological progress on specific financial innovations, there has been an "indirect influence" on the process of financial innovation as a whole. The

introduction and diffusion of the new technologies in the financial sector have contributed significantly to the increased competition in financial markets, and the increased competition has in turn spurred the pace of financial innovation. This is the third mechanism by which real sector technological progress has led to the innovation of financial products.\(^{176}\)

The widespread use of computers and computer-based telecommunication systems has increased competition in various ways. As described above, it has drastically brought down transaction costs in financial markets. This has meant that the critical yield differential between alternative investments has been reduced by the same rate.\(^{177}\) To give an example, if previously an interest rate differential of a quarter of a percent was necessary to induce an investor to switch his funds from, say, the US-Treasury bill to the Swiss franc bond market, this differential may now be reduced to a mere sixteenth of a percent. In the course of this process, the conditions in international financial markets have become more similar and more competitive.

Another effect of the new technologies has been that it has made more information available more quickly to more market participants. Together with all the other factors discussed above, this has contributed to a reduction in margins in financial markets. A third way in which international market conditions have become more similar and more competitive is the ability of modern computer systems to spot and even to utilize arbitrage possibilities (e.g. differentials between futures and spot prices)\(^{178}\) automatically.\(^{179}\)

It has also been suggested that because of the reduced costs and because of the trading possibilities modern technologies open up, financial markets have become more contestable.\(^{180}\) The contestability of a market is the degree to which it is influenced by potential competition, that is, by the threat of new market entries. In a

\(^{176}\) See BIS (1986), pp181-182.

\(^{177}\) See Niehans (1983), p539.

\(^{178}\) It was this "computer trading" that is said to have triggered the waves of sellings that eventually led to the stock market crash of "Black Monday" in October 1987; see Coopers & Lybrand (1988), p104.


\(^{180}\) See Podolski (1986), p170.
perfectly contestable market even a monopolist could only demand the prices of a perfectly competitive market. In other words, every increase in the contestability of a market tends to make this market more competitive.

It has been explained in an earlier section that increased price competition puts financial institutions under greater pressure to compete by means of innovation. A final effect of the new technologies is that, just as they make new information on market conditions more broadly and more quickly available, they also lead to a speedier diffusion of new financial instruments and techniques. 181 This again helps to explain the higher rate of innovation that can be observed in national and international financial markets over recent years.

As a final point, the dotted lines in Figure 13, leading back from the banks' applications of new technologies to the process of technological progress in the real sector, indicate that here again a two-tier relationship exists. Real sector innovations are being used by the financial sector and their use subsequently leads to financial innovation. However, financial institutions represent a major group of customers for the suppliers of computers, communication systems and related real sector products. The needs and requirements of the financial sector therefore also strongly influence the development of new products by industrial companies. In other words, not only does real sector technological progress determine the process of innovation in the financial sector, the thrive for the innovation of new financial instruments and services at the same time determines in reverse the technological progress in the real sector of the economy.

5. Summary

In the foregoing chapter the process of financial innovation was shown to be inextricably intertwined with numerous other forces and processes taking place on various levels of the economic system. As

illustrated in Figure 14, the financial system, that is, the financial institutions and their customers, can be interpreted as a subsystem of the economy as a whole. As such it is influenced by changes taking place at the macrolevel of the economy. Three strands of macroeconomic changes were identified above. Rising wealth, changes in the economic and political environment, and technological change in the real sector affect structural changes in the financial system, and they thereby determine the process of financial innovation.

The meso-level is represented by the financial sector of the economy. Here eight different but closely interrelated forces of structural change have been discussed. These eight forces all determine the innovative behaviour of the units of the financial system. Interrelations exist where the innovation of financial instruments and practices in turn influences other meso-economic processes in the financial sector.

At the microeconomic level of the analysis the question was posed of what induces individual institutions to innovate. It was explained that financial innovations are ultimately driven by the motives of private enterprises to increase their profits and to reduce their risks. As long as market imperfections or incompletenesses exist, innovations can occur in an otherwise completely static environment. However, real world markets are dynamic. Various types of changes in the environment alter the set of parameters which determine the optimising behaviour of the financial firm. The firm has to change its behaviour in order to regain its profit maximization equilibrium, and financial innovation is one way in which it can react to the changes in its economic environment.
Figure 14

The determinants of financial innovation

**MACROLEVEL:** THE ECONOMY AS A WHOLE

Rising wealth

- Changes in the economic & political environment of the financial system
- Advances in the state of knowledge in the real sector of the economy

**MESOLEVEL:** THE FINANCIAL SYSTEM

Financial innovation

- Sophistication of market participants
- High interest rates & market volatility
- Global integration
- Internationalisation
- Regulatory change
- Deregulation
- Competition between financial markets
- Competition within financial markets

**MICROLEVEL:** THE FINANCIAL INSTITUTION

Static determinants: Profit opportunities due to imperfections and in completeness of real world markets

Dynamic determinants: Changes in the environment of financial institutions
V. RECENT INNOVATIONS IN INTERNATIONAL FINANCIAL MARKETS: AN OVERVIEW

1. Introduction

The following chapter gives an overview over financial instruments and techniques that have newly emerged in international financial markets over recent years. Because of the great range and variety of innovations, such an overview of necessity has to be selective and brief. In addition, given the current dynamism in financial markets, it can only give a "snapshot" showing the state of the art at a particular point in time. The product life cycles of financial instruments are shortening, and what today is described as an interesting innovation may be already outdated by tomorrow. An account of the fast changing nature of modern financial markets is given by the following quote.

"Fashions come and go in the international loans market, just as they do along Bond Street and Fifth Avenue. One that has come and is now ... as 'passe' as bell-bottom trousers is the corporate multiple option facility, or MOF."\(^{182}\)

The following chapter is based on the taxonomy developed earlier on in this part of the thesis. Thus, it is limited to innovative debt instruments and techniques in international markets, and it is structured according to the classification system developed earlier. The first section of the chapter deals with innovations in established markets, that is, with innovations in the Euromarkets. The second section looks at entirely new markets, the markets for financial futures and options. In the third section, instruments will be explained that combine characteristics from different existing market segments. Following that, the fourth section addresses the opposite, i.e. instruments which are basically split parts of established bundles of characteristics. The fifth section, finally, is concerned with new arbitraging (swap) instruments and practices.

\(^{182}\) Fidler (1988), pVIII.
2. Innovations in specific financial markets: The Euromarkets

The development of the Euromarkets has been characterized as "perhaps the most important financial innovation of the post war period."\(^{183}\) From their beginnings at the end of the 1950s, they have grown to become one of the world's largest systems of financial markets. By today the markets have firmly established themselves, and they compete successfully on all levels with the national financial markets of the major industrial nations. Hence the emergence of the Euromarkets cannot be numbered among recent innovations; however, these markets have stimulated - and they continue to do so - the development of innumerable new instruments and techniques\(^{184}\), and they have acted also as "channels of financial 'technology transfer'".\(^{185}\) That is to say, the competition between the Euromarkets and the national financial systems has ensured that new financial products and processes have diffused quickly and thoroughly from the international to the national markets, and vice versa.

As was indicated in a previous section, the Euromarkets are wholesale markets in which deposits, loans, bonds, etc. are traded outside the jurisdiction of the countries of origin of the respective currencies. Thus they are "external", "parallel" markets free from costly regulations prevailing in national financial systems, such as (withholding) taxes and reserve requirements.\(^{186}\)

Traditionally the Euromarket system could be divided into the Euromoney, the Euroloan and the Eurobond market. However, the boundaries between these segments have lost their importance over recent years, and the Euromarkets today present themselves as a set of integrated and closely interrelated markets.\(^{187}\) Moreover, new developments, such as the emergence of the markets for Euronotes and Eurocertificates of deposit have further contributed to this integration. Having said that, for the sake of clarity, the

---

185 Podolski (1986), p117.
following presentation of the developments and innovations in the Euromarkets will follow the ordering of the different segments of the market system.

(a) The Euromoney market

The Euromoney market is a wholesale market for short term deposits. It is an interbank telephone market, in which large volumes are traded in a standardized form. For the financing MNCs it is of limited importance; it can however be used to offset imbalances in their short term cash management. 188

(b) The Euroloan market

The Euroloan market is a market for medium to longer term bank loans. The Euroloan market dominated international financial intermediation throughout the 1970s. It played an important role in the banks' recycling of the "petro-dollars" and in the massive increases in lendings to developing countries. During this time the Euroloan market was the source of many innovations. Most eminently, it was here that the concept of variable "roll over" interest rate lending was introduced to international markets. 189

Since the beginning of the 1980s, and partly as a consequence of the international debt crisis, the Euroloan market has declined in importance. At the end of the 1970s, more than half of the volume of medium and longer term lendings in the Euromarkets took the form of syndicated bank loans. This proportion shrank to only 16.4% in 1985, and it has been declining further since then. 190

190 See Damm (1986), p228.
(c) The Eurobond market

Whereas in loan markets banks transform the deposits of investors into loans to borrowers, bonds are a form of medium to longer term debt that are issued directly by the final investor.\textsuperscript{191}

It is the Eurobond which has taken over the dominant position from Euroloans. Over the last decade the Eurobond market has experienced "phenomenal growth"\textsuperscript{192}, and it is now the world's largest securities market. And like the Euroloan market ten years ago, the Eurobond market today is the origin of innumerable innovations.

"It is no coincidence that the biggest securities market in the world is also the most innovative. The Eurobond market has surpassed New York in terms of new issue volume for the first time now, and it is the market's unrivalled creativity that has been one of the principal motive forces behind its growth."\textsuperscript{193}

Although the Eurobond markets are characterized by a wide range of possible conditions and features, one can identify three basic ("plain vanilla") types:\textsuperscript{194}

- straight bonds; these are bearer bonds with an interest rate which is fixed for the entire maturity period;
- floating rate notes (FRNs); despite their name, FRNs are not "notes" (see below), but bonds with variable interest rates. The interest rate is linked to a market index (e.g. the London Interbank Offer Rate, LIBOR, or the US-Treasury bill interest rate), and it is adjusted to this market rate in certain intervals (usually 3 or 6 months);
- convertible bonds; the special feature of this type of bond is that they can be exchanged by the investor - during a given period and at predetermined conditions - into shares of the issuing company. Since the investor has the chance of gains from this exchange, the interest rate of the convertible bond can be lower than with "normal" fixed or variable interest bearing bonds.

\textsuperscript{191} See Shapiro (1986), p514.
\textsuperscript{192} Shapiro (1986), pp514-515.
\textsuperscript{193} Euromoney (1986b), p5.
\textsuperscript{194} See, for instance, Euromoney (1985a), pp161-209, here pp164-165.
The usual maturities of Eurobonds are 5 to 10 years; shorter and longer maturities of 3 years and less or 20 years and more are possible. The average volumes of issues are approximately US$ 75m for straight bonds and US$ 215m for FRNs.\(^{195}\) Again, a large spectrum exists, with US$ 10m issues at the lower end, and such massive issues as the 1985 US$ 2.5bn "floater" of the UK government at the other extreme.\(^{196}\) As regards the currency denomination, the US-dollar was traditionally predominant. Most recently this has changed and in the first half of 1988 the dollar accounted for less than 40% of new issues.\(^{197}\) Other important currencies are the Deutschmark, the pound sterling, the Swiss franc, the Australian dollar, the Canadian dollar, the yen and the ECU.

The issue of Eurobonds is usually arranged through an international consortium of banks, the so-called underwriting group. This consortium often involves hundreds of banks; one issue in 1985 by the Save the Children Fund had no less than 2500 syndicate members.\(^{198}\) The issue is allocated to the underwriters by the "lead manager", which is the bank primarily responsible to the issuing borrower.\(^{199}\)

In practice the issuing process is much more complicated than this. Because of the complexity, it also is one of the most prominent areas for innovation.\(^{200}\) New techniques include tender panels and direct placing by the borrower.

Other innovative variations and features of Eurobonds include the following:\(^{201}\)

- Dual currency bonds; these bonds are denominated in one currency, but the issuing price and the interest streams are in another  

---

197 See Jackson (1988), pVIII. For current volumes and decompositions of the lendings in the Euromarkets see the monthly publications of the Morgan Guaranty Trust Company of New York.
201 For the following see Euromoney (1986b), pp6-35; Vittas (1986), pp16-22; Dresdner Bank (1986a), pp1-8.
currency. This is an attractive means for MNCs to finance their overseas subsidiaries. They receive cash in local currency, and service the debt from their cash flows, while at maturity the parent company repays the principal in its home currency.

- Bonds with warrants; these are plain vanilla type bonds with "sweeteners" attached to them. The warrants can be traded separately from the bonds, and they may offer the exchange into equity of the issuing company, the supply of further bonds, other securities and the like. Some bonds have also been sweetened by currency options.

- Perpetual bonds; a major innovation of recent years, this type of bond has no redemption date. They were developed by banks as an alternative to raising equity and, provided they meet certain conditions, perpetual bonds can count as primary capital.

- Partly paid bonds; with these bonds, the investor pays the amounts owed in instalments. Part of the bonds' face value is due at the date of issue, the rest at predetermined future dates.

- Zero coupon bonds; nominally zero coupons do not pay any interest. Factually, the investors gain from the fact that the bonds are issued at a deep discount against their redemption value.

The following are all innovations in connection with variable interest bearing bonds:

- Mismatch FRN; this is an FRN with a mismatch between the interest rate readjustment period and the interest payment period. For example, the interest rate can be adjusted monthly to the 6-months LIBOR but it is paid only every six months.

- Minimax FRN; the interest rate on this variable interest bond is subject to both a minimum rate (floor) and a maximum rate (cap).

- Capped FRN; as with the above, the interest rate on this bond cannot rise above a certain maximum rate. However, the investor can sell the cap separately from the bond.

- Rising coupon FRN; the interest rate on this type of bond rises over the maturity period according to a schedule. The opposite are falling coupon FRNs.

---

202 This latter version has been called "bunny bonds" because "they multiply like rabbits"; Euromoney (1986b), p3.
- Flip flop FRN; this is a long maturity FRN with a relatively high interest rate, which at a certain time can be exchanged for another FRN with a shorter maturity and a lower interest coupon.
- Upside down FRN; with this bond the "normal" floating rate principle has been turned upside down. That is, its coupon rises when the market rate falls, and vice versa. This is achieved by subtracting the prevailing market rate from a certain benchmark rate (which at the same time acts as a cap). These bonds are also known as yield curve adjustable notes (ycans, see Table 2).
- Drop lock FRN; this floating rate note is converted automatically into a fixed rate bond when the index rate falls below a certain level.

The above presentation of innovations in the Eurobond markets can provide only a highly selective overview over the great number of innovative Eurobond variations. In concluding, one can point out that the different features described above can of course be combined in various ways. An issue by the World Bank in 1985, for example, was a "T-bill based flip flop perpetual floating rate note"\textsuperscript{203}.

\textsuperscript{203} Euromoney (1986b), p9.
**Table 2: "Market Menagerie"**

*MARTKET MENAGERIE*

Financial innovation has not been an unmixed blessing. In addition to the concern about hidden risks, another undesirable tendency has been in the use of ugly "buzzwords" (such as securitisation and marketisation) and a host of perplexing acronyms. Here are some of the latter.

**FACILITIES**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIFs</td>
<td>Note issuance facilities</td>
</tr>
<tr>
<td>RUFs</td>
<td>Revolving underwriting facilities</td>
</tr>
<tr>
<td>SNIFs</td>
<td>Short-term note issuance facilities</td>
</tr>
<tr>
<td>TRUFs</td>
<td>Transferable revolving underwriting facilities</td>
</tr>
<tr>
<td>RAFTs</td>
<td>Revolving acceptance facilities by tender</td>
</tr>
<tr>
<td>BONUS</td>
<td>Borrowers' options for notes and underwriting securities</td>
</tr>
<tr>
<td>MOFFs</td>
<td>Multi-option funding facilities</td>
</tr>
<tr>
<td>COLTS</td>
<td>Continuously-offered long-term securities</td>
</tr>
</tbody>
</table>

**INSTRUMENTS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATS</td>
<td>Certificates of accrual on-treasury securities (coupon stripping of US treasury bonds offered by Salomon Bros)</td>
</tr>
<tr>
<td>TIGRs</td>
<td>Treasury income growth receipts (coupon stripping of US treasury bonds offered by Merrill Lynch)</td>
</tr>
<tr>
<td>STRIPS</td>
<td>Separate trading of registered interest and principal securities (coupon stripping of US treasury bonds offered by US treasury)</td>
</tr>
<tr>
<td>LYONs</td>
<td>Liquid yield option notes (zero convertible bonds with liquid yield option, offered by Merrill Lynch)</td>
</tr>
<tr>
<td>STAGS</td>
<td>Sterling transferable accruing government securities (coupon stripping of gilts by Quadrex Securities)</td>
</tr>
<tr>
<td>ZEBRAS</td>
<td>Zero-coupon Eurosterling bearer or registered accruing securities (coupon stripping of gilts by SG Warburgs)</td>
</tr>
<tr>
<td>BECS</td>
<td>Bearer Eurodollar collateralised securities (repackaging of UK FRNs into fixed-rate paper offered by Barclays)</td>
</tr>
<tr>
<td>MECS</td>
<td>Marketable Eurodollar collateralised securities (repackaging of UK FRNs into fixed-rate paper offered by Merrill Lynch)</td>
</tr>
<tr>
<td>ICONs</td>
<td>Indexed currency option notes (bonds with currency option)</td>
</tr>
<tr>
<td>FIPS</td>
<td>Foreign interest payment securities (dual currency perpetual bonds)</td>
</tr>
<tr>
<td>YCANs</td>
<td>Yield curve adjustable notes (FRNs with reverse pricing)</td>
</tr>
<tr>
<td>CARs</td>
<td>Certificates for automobile receivables (repackaging of car loans by Salomon Brothers)</td>
</tr>
<tr>
<td>CARds</td>
<td>Certificates for amortising revolving debt (repackaging of credit card debt by Salomon Brothers)</td>
</tr>
</tbody>
</table>

204 Vittas (1986), p17.
(d) Euro-Certificates of deposit

Like many other instruments, Euro-Certificates of deposit (Euro-CDs) have been transferred from national financial markets, most often the US market, to the international markets. CDs are short term bearer promissory notes. With maturities of anything between seven days and one year they are issued by banks which use them to balance their deposits in the interbank time deposit markets. \(^\text{205}\)

(e) Euronotes

A more recent innovation in the Euromarkets has been the emergence of short term unsecured corporate debt, the Euronotes. They are the corporate equivalent to the banks' CDs, short term bearer promissory notes, issued with maturities from seven to 365 days. \(^\text{206}\) Euronotes were first issued at the end of the 1970s, and after a tentative start the market volume has expanded sharply to over US$ 60bn in 1985. \(^\text{207}\)

Euronotes are normally issued under so-called issuance facilities underwritten by banks. These facilities however represent an innovation on their own, quite distinct from the actual instruments of the Euronote. As they combine characteristics which formerly belonged to different financial market segments (e.g. short term notes and long term underwriting commitments), these facilities will be discussed in a separate section below.

(f) Euro-Commercial Paper

Euro-Commercial Paper (Euro-CP) is basically the same instrument as Euronotes - short term corporate debt in the form of unsecured bearer promissory notes. \(^\text{208}\) There are however two differences between the two instruments: Euronotes are usually issued with maturities between three and six months, while Euro-CP normally ranges between 30 and 60 days. \(^\text{209}\) The second difference concerns the issuing

\(^\text{206}\) See de Oliveira, Marston & Fleming (1986), p78.
\(^\text{207}\) See Abdullah (1986), p267.
\(^\text{209}\) See Hobson (1988), pVIII.
process. Euro-CP is not underwritten by an issuing facility, and it is distributed through nominated dealers rather than through a tender panel.  

3. Innovations of new financial markets: Futures and options

(a) Financial futures contracts

Financial futures are binding exchange traded contracts between two parties to buy or sell given amounts of certain financial instruments at a fixed price on a predetermined future date. Although numerous variations of futures contracts exist, there are four basic types:

(1) Interest rate futures contracts; these are contracts over the future delivery and acceptance of interest bearing securities, such as US-Treasury bills, sterling gilt edged, or Eurodollar time deposits. Interest rate futures effectively transfer the interest rate risk from the holder of the security to the buyer of the futures contract. Like all futures, the interest rate futures contract can therefore be used to hedge or to trade the price risk associated with the underlying asset.

(2) Currency futures contracts; currency futures are basically exchange traded forward exchange contracts. In contrast to forward contracts, whose conditions (choice of currencies, quantities, prices, maturities, etc.) can be tailored to the specific needs of the company, the futures contracts have to be standardized in order to facilitate trading at organized exchanges.

(3) Stock index futures contracts; these are instruments to hedge or trade the price risks associated with the portfolios of stock indices. One of the best known futures traded indices is the Standard & Poor Stock Price Index which is based on 500 shares.

210 See de Oliveira, Marston & Fleming (1986), p78.
213 See Buckley (1986), p183; Madura (1986), 80.
The value of the stock index future is arrived at by multiplying the index by a fixed factor (usually 500).

(4) Precious metal futures contracts; precious metal futures are contracts for the delivery and acceptance of precious metal (gold, silver, platinum and others) based securities. This type of futures transfers the risks of changes in gold and other precious metal prices.

Financial futures contracts were first introduced to a subsidiary of the Chicago Mercantile Exchange, the International Money Markets, in 1972. The contracts were modelled after commodity futures which exist for non-ferrous metals, grain, soya, timber, pork bellies and numerous other predominantly agricultural goods. These commodity futures have a long tradition which in Chicago goes back to the middle of the 19th century.214

Financial futures have been a very successful innovation. With the volatile financial markets of the past 15 years, great demand existed for new and additional risk management tools.215 Today trading in futures takes place at exchanges in Chicago, Philadelphia, Toronto, London, Paris, Amsterdam, Singapore, Sydney and elsewhere in North America, Asia and Europe.

(b) Financial option contracts

An option is a contract which conveys the right, but not the obligation, to buy or to sell a given amount of an underlying financial asset at a fixed price before or at a certain future date.216 Well known are stock options, but as with futures there are also commodity options, stock index options and - of interest here - interest rate options and currency options.217

(1) Interest rate option contracts; like interest rate futures, interest rate options are an instrument for the hedging or trading of interest rate risk. Against the payment of a premium

the buyer of the option obtains the right to buy or sell an interest bearing security at a predetermined price at or before a certain future date.

(2) Currency option contracts; currency options convey the right, but not the obligation, to buy or sell given amounts of a foreign currency. For the cost of the premium the hedger or trader buys an exchange risk management tool which provides him with more flexibility than either forward or futures contracts.

Currency options are relatively new instruments, having been introduced at the beginning of the 1980s. Like futures, they are traded at organized exchanges, but a so-called "over-the-counter" (OTC) market also exists. The exchange traded options again are standardized instruments. OTC options, on the other hand, are fully negotiable, and consequently this market has produced a great variety of different option derivatives.218

(c) Other instruments

The other instruments to be presented in this section are, in principle, variations of futures and options. Very successful, particularly at American exchanges, have been options on futures, trading in which started in 1982. Futures on futures, futures on options and options on options are other permutations which at times have all been traded in US financial markets. These instruments can be used to hedge or trade the price risks in the futures and options markets themselves. They are binding or optional contracts for the future delivery and acceptance of futures and options contracts.219

A further offshoot of the futures markets is the forward rate agreement (FRA). This is a binding obligation by banks or other financial institutions to grant a predetermined interest rate for a future deposit or loan. FRAs are basically OTC interest rate futures, and this market has developed very favourably over recent years.220

219 See Zahn (1986), pp116-117
220 For details see BIS (1986), pp121-126.
4. Innovations of combined products

(a) Euronote facilities

Euronote facilities have been a feature of international financial markets since the early 1980s. They can be seen as an advancement of the principle of the revolving Euroloans of the 1970s.\(^{221}\) The replacement of the syndicated loans of the 1970s through the facilities, and through Eurobonds, is one of the most important facets of the process of securitisation.

Euronote facilities exist in many variations, which mostly differ from each other only in minor details. No clearcut taxonomy exists and many names or acronyms (NIFs, RUFs, SNIFs, etc.; see Table 2) are used, which are often created by individual banks in attempts to differentiate "their own" innovations. The term "note issuance facilities" (NIFs) can be seen as a generic term for all Euronote facilities. Of these the "revolving underwriting facility" (RUF) is the main type.\(^{222}\)

The basic principle of Euronote facilities is the following. A medium to long term programme is established for a borrower to issue short term Euronotes on a revolving basis according to his needs. These notes are placed with investors either by a single bank ("sole placing agent") or by a group of banks, the so-called "tender panel". The issuance is backed up a group of "underwriting banks" which commit themselves to buy any securities that the borrower is unable to raise directly in the markets at predetermined rates.\(^{223}\)

Euronote facilities thus combine characteristics of credit and capital markets. The underwriting commitment is a contingent liability of the banks to lend money which the borrower otherwise raises through the issuance of securities. The combination of short term notes and long term commitments brings together two further

characteristics which previously were available only in different markets or market segments.\textsuperscript{224}

From its start in 1980, the market for Euronotes took a tremendous development, and in 1985 facilities for almost US$ 60bn were arranged.\textsuperscript{225} Since then, however, the market has lost its momentum. In 1985 and 1986 European supervisory authorities agreed to include the contingent liabilities inherent in underwriting facilities in the capital requirement ratios. This move has meant that the instruments have become less attractive and subsequently the Euronote facilities have quickly lost ground to the markets for another innovative instrument, the Euro-Commercial Paper programmes.\textsuperscript{226} As described above, these are practically identical to the Euronote facilities but for the fact that the issuances are not underwritten. This development is an obvious example of "regulatory dialectics".

(b) Multiple component facilities

Multiple component facilities (MCFs)\textsuperscript{227} are a more recent innovation in international corporate funding instruments. Basically they are packages comprising various Euromarket stand-by-instruments, and they offer the borrower a broad menu of instruments, maturities and currencies. According to the anticipated needs of the individual customer, MCFs can include Euronote facilities, Euroloan stand-by-lines, Euro-CP programmes, bankers' acceptance facilities, and so on. During the maturity period of the programme the borrower can then choose the type of funding which suits best his requirements

\textsuperscript{224} See Bueschgen (1986), p329; Storck (1987a), p177.
\textsuperscript{225} According to estimations, only about 20\% of the stand-by-facilities are actually utilized by the borrowers; see Dresdner Bank (1986a), p10; BIS (1986), pp26-27.
\textsuperscript{226} This market has experienced an explosive growth. In only three years it has grown from a yearly volume of US$ 0.3bn (1984) to US$ 100 bn in 1987; see Friese (1988), p133. Already in 1986 the Euro-CP market had a volume which was twice as big as that of the Euronote facilities; see Kuntze (1987), p337; see also BIS (1986), p22; Engelen (1986), p81.
\textsuperscript{227} These facilities are also known under the following terms: multiple option facilities (MOFs), multiple instrument financing programmes (MIFPs); see Breuer (1987), p64; or as multi-option funding facilities (MOFFs), see Vittas (1986), p24.
and which at the time offers the most attractive terms in the markets.\textsuperscript{228}

As an example, Storck lists the following components of an 1986 US$ 400m MCF for the French MNC Thomson S.A.: a US$ 300m revolving credit facility available either as a direct loan or as a back-up facility for Euronotes, cash advances and a US-CP programme. The facility had a maturity of seven years and its maximum interest rate was five basis points (0.05\%) over LIBOR. On top of this, the borrower had to pay a facility fee of seven basis points p.a. and a utilisation fee depending on the utilisation rate.\textsuperscript{229}

Similar to the pure Euronote facilities, MCFs combine characteristics of credit and capital markets; they also combine short term financing and long term commitments, and they obviously consist of numerous instruments and currencies. Their emergence is a sign of the responsiveness of financial markets to the demands of corporate customers for a higher degree of flexibility.

The MCF market has existed for only four years. It has developed very quickly and by now most UK and French MNCs, the most important participants in this market, have been supplied with such a package. Therefore, and because the preferences among international banks have lately moved away from stand by-facilities to draw down-lending, the market for MCFs is already past its peak.\textsuperscript{230}

\textbf{(c) Transferable Loan Facilities}

The emergence of "transferable loan certificates" (TLFs) is yet another part of the process of securitisation. TLFs have to be interpreted as an effort to increase the flexibility of the traditional Euroloan by enabling its trade in secondary markets. Following the third world debt crisis, a strong demand evolved to trade such debt. After years of negotiations and numerous


\textsuperscript{229} See Storck (1987a), p183.

\textsuperscript{230} See Fidler (1988), pVIII.
conferences, existing Euroloans are today being bought and sold in secondary markets for discounted LDC debt; the tradability of new syndicated loans has been facilitated in two ways, through "transferable loan instruments" (TLIs) and through "transferable loan certificates" (TLCs).

With the former the loan is divided into marketable securities which the syndicate banks can sell in a secondary market. By taking possession of the security the buyer of the TLIs takes full title to all rights against the borrower. TLIs therefore

"endow the syndicated medium-term Eurocredit market with the flexibility and liquidity of note issuance facilities."

Transferable loan certificates, on the other hand, are not securities. Instead they are a provision in the original loan contract which subsequently enables the standardized transfer of the debt through a legal process which is called "novation". Novation is a legal contract between the syndicate member and another bank which replaces the old obligation with an entirely new one. The difference between TLIs and TLCs is thus a legal difference. With TLIs the new lender derives his rights from the possession of the security; with TLCs the rights are derived from a contract which has been created under the terms of the TLCs.

5. The splitting up of existing instruments

Numerous innovations in international financial markets have occurred in the form of an "unbundling" of existing financial instruments. For instance, it is common for Eurobonds to be marketed together with warrants, special interest rate features, currency options and the like. Usually the investor can detach these sweeteners from the bond and sell them on their own. If these secondary markets are successful and the products meet with

sufficient demand, then banks will start to offer them on their own and not only in connection with securities issues.\textsuperscript{235}

The most prominent example of markets which have taken on a life on their own are the markets for caps, floors and collars. These instruments used to be features of floating rate note issues. Today it is possible for a company to buy them from any major bank.\textsuperscript{236}

Another highly instructive example of the process of unbundling are zero bonds. They have been introduced as innovative Euromarket instruments but they are also found in most national financial markets. Zero bonds have been created by various banks through the "stripping" of fixed interest bearing bonds. Stripping means the separation of the fixed rate interest coupon from the bond; the coupons and the bond are then sold separately. A ten-year bond with ten interest payments can thus be turned into eleven zero coupon bonds of varying maturities.\textsuperscript{237} Such bonds have been offered by different banks under acronyms such as "CATs" or "TIGRs" (see Table 2).

6. New arbitraging instruments: The swap markets

(a) Capital market swaps

The fifth and last group of financial innovations, the new arbitraging instruments, consists of the various forms of swaps. In its most basic definition, a swap is a financial transaction in which two (or more) parties agree to exchange streams of payments over time.\textsuperscript{238}

The traditional swap of the foreign exchange markets has existed for many decades. It consisted of a cash or a forward exchange deal with an agreement to reverse this transaction at a future date, which usually did not go beyond one year. Modern swaps differ from that in

\textsuperscript{236} See Dresdner Bank (1986b), pp26-27.
\textsuperscript{237} See Walz (1987).
many respects. They cover much longer maturities, are not confined
to the exchange of currencies and they can involve much more complex
payment structures. 239

Various forms of modern swaps are used in international capital
markets; the following are the most important: 240

- Interest rate swaps; these are contracts under which two or more
  parties agree to exchange interest payment streams of differing
  natures. The underlying principals need not be exchanged; the
  exchange of the interest payments takes place according to a
  predetermined schedule. Most often swaps are arranged for
  liabilities, but "asset swaps" are also possible. In both cases
  there are two types, the "coupon swap" and the "basis swap". A
  coupon swap exchanges the interest rate streams between a fixed
  and a variable interest rate debt; a basis swap means the
  exchange of two different floating rate debts (e.g. LIBOR and T-
  bill based). In terms of market volume the interest rate swap is
  by far the most important form of all swaps.

- Currency interest rate swaps; a currency swap is an agreement
  between two parties to exchange equivalent amounts of two
  currencies for one another and, after a specified period, to re-
  exchange the original amounts. During the swap period the
  partners will also exchange interest payments at agreed rates on
  the outstanding amounts.

- Cross currency interest rate swaps; these are a combination of
  currency and interest rate swaps.

In recent years the banks have tried to extend the range of these
"plain vanilla" swaps by offering more complex structures. Here are
some examples of these "swaps of the second generation": 241

- Extendable swaps; this type of swap has a maturity of, say, five
  years but it can be prolonged by one of the partners.

240 For the following see Dresdner Bank (1986b), pp2-11; BIS (1986), pp37-39; Levedag (1985),
p8; Watts (1986), pp24-25.
- Puttable or callable swaps; these swaps can be terminated by one of the partners.
- Amortizing or draw down swaps; with this type, the principals of the debts decline or increase over the swap period.

Other types are swaps with a delayed start or options on swaps (swaptions). Obviously it is again possible to combine some of the above described swap types to create even more complex variations.

Swaps by themselves are not funding instruments, but they are often used in connection with funding activities. For instance, it is estimated that up to 80% of all Eurobond issues are swap-driven.\(^{242}\)

The rationale behind this is that swaps allow the parties to trade comparative advantages which they enjoy respectively in different segments of international capital markets.\(^{243}\) However, swaps are also used to restructure existing debt; this is done to arbitrage differences in the perception of specific risks, most notably the risks of future exchange rate or interest rate changes, or to hedge against such risks.\(^{244}\)

**(b) LDC debt market swaps**

Differences in the perception of risks are also the driving force behind the markets for another type of swaps, the LDC debt swaps. After the outbreak of the third world debt crisis a growing demand emerged among banks to enable the trade of the existing troubled debt. Smaller banks wanted to get rid of their exposures which in addition to the risks meant an administrative burden.

"They wanted to sell their debt, at almost any price, so that they could turn a deaf ear to the interminable negotiations and a blind eye to requests for additional 'voluntary' lending."\(^{245}\)

---

245 Newman (1986), p70.
Larger banks wanted to make adjustments in their portfolios; for instance, American banks preferred to concentrate on South American debtors while European banks took over East European debt. A few speculators were found who were willing to buy debt at a discount. These demands were the motive for the establishment of a secondary market for LDC debt. Some banks have learned that LDC debt are not just bad credits but that they may also be a potential source of earnings from the various forms of swap techniques that have been developed.

- Debt-debt swaps; debt-debt swaps are pure asset swaps; one bank takes loans that another bank does not want, and vice versa. There are numerous possible reasons for such deals, for example, differences in risk perceptions, the arbitraging of taxation differences or the realisation of cash fees.
- Debt-export or debt-commodity swaps; these are barter transactions consisting of the exchange of debt against exports of the debtor country or against other commodities.
- Debt-equity swaps; this is a technique which involves the capitalisation of third world debt. The creditor bank, or a third party which buys the debt in the secondary markets, converts the debt into local equity investment. The incentive for this type of swap is given by the fact that the investor is able to capitalise (at least part of) the discount at which the debt is traded in the secondary market.

Various other techniques are being used by the banks and their customers. Some banks have even gone as far as to donate LDC debt to charities to gain tax advantages. Another exotic innovation has been "debt-for-nature" swaps, where LDC debt is used to finance environmental projects.

All these new instruments and techniques are illustrative examples how changes in the economic and political environment, in the case of LDC debt swaps the third world debt crisis, influence the

---

financial system. These examples also show that financial innovations are one way in which financial institutions have reacted, and continue to react, to these challenges in their competitive surroundings.
PART D: THE USE OF SPECIFIC FINANCIAL INNOVATIONS IN THE EXCHANGE RISK MANAGEMENT OF MULTINATIONAL CORPORATIONS

I. INTRODUCTION

In principle, all innovations in international financial markets are in some way relevant to the corporate exchange risk manager. If denominated in the appropriate currency, practically all new instruments can be used to hedge operational currency exposures, or to open up speculative positions. In addition, it has become increasingly common for loans or securities to be denominated in more than one currency or to incorporate multicurrency clauses and the like; currency options and warrants on futures or options are also used to "sweeten" the issue of securities. In other words, international financial markets today offer the corporate treasurer a wide range of new techniques and tools to manage his company’s foreign exchange exposures. The following part of this thesis seeks to analyse the usefulness of a limited number of these innovations in corporate foreign exchange risk management.

A restriction of the study to a limited number of innovations is necessary for practical reasons. It is also unnecessary on theoretical grounds to examine each and every new instrument and technique. The features of financial markets which are directly related to exchange exposure management can be reduced to a few basic types. The following analysis will confine itself to those innovations which have added to the number of basic features. These innovations are currency futures contracts, currency option contracts, currency swaps and debt-equity swaps. Currency futures and options are alternative instruments for use in the tactical management of exchange risk, whereas currency swaps and debt-equity swaps have their place in the long term orientated, strategic exchange risk management.

1 As was pointed out before, hedging instruments can always also be used for aggressive, i.e. speculative, purposes. This fact should not be ignored in the theoretical literature; nevertheless, the following analysis will assume hedging to be the first objective of the corporate manager.
The following part of the thesis is divided into two elements. The first addresses itself to the question of how the usefulness of new financial instruments and techniques should be evaluated. In other words, it tries to establish the decision factors for the most useful and efficient instrument for corporate exchange risk purposes.

The second will then consist of a detailed analysis of the four specific innovations. They will be compared with their established and traditional competition. It is the aim of this analysis to find out the relative merits and drawbacks of these new instruments in respect of the tasks involved in the management of a company's foreign exchange exposures.
II. THE DECISION FACTORS FOR THE CHOICE OF THE EXCHANGE RISK MANAGEMENT TOOL

1. Introduction

New financial tools compete for their use in corporate financial management with the traditional and established instruments and techniques. The innovations can only then be successful, if their use leaves neither suppliers nor demanders worse off. To achieve this, the new products can either broaden the range of strategies available to the economic agents, or provide already existing alternatives more efficiently. In other words, to evaluate the usefulness of innovative financial tools it is necessary to compare them against their conventional competitors.

A corporate exchange risk manager who wants to hedge a given exposure can use the traditional forward contract or a "money market hedge" to achieve his end. Alternatively, he can use the innovative currency futures contract, the currency option, or in the case of longer term exposures a currency swap. The manager faced with this situation has to decide which of the tools to use in order to meet best his objective.

However, when it comes to this management decision problem there is a noticeable dearth of academic or practically orientated literature. Although many publications present and describe the various hedging tools, the problem of which tool to apply in a given situation is hardly ever addressed. Indeed not even references can be found as to the factors a manager should apply to evaluate the relative usefulness of different instruments. In a recent study which tried to elicit the personal preferences of finance officers, Khoury & Chan concluded after surveying the relevant literature:

---

3 See Franke (1986a), p190.
4 In particular situations he can also use a debt-equity swap. This is however not an obvious alternative and needs further explanation; see below, Section D.IV.2.
"Of all the research summarized above, however, no study has provided the corporate decision maker with fundamental reasons why one specific instrument should be used more extensively than another."  

The following sections will discuss those factors, or groups of factors, which are thought to be relevant for a manager’s decision which hedging tool to use.  

2. The cost of hedging  

The most obvious decision factor for the choice of a hedging tool is the cost of hedging. In the literature this term can have two meanings. One position holds that the cost of hedging an exposure is given by the difference between the given forward rate and the expected future spot rate. This is an ex ante cost based on subjective forecasts of future rates.  

The second position maintains that the "hedging cost can only be determined at termination of the hedging period."  

This ex post cost is based on realized rates, and a great number of empirical studies have tried to compare the cost of hedging in the forward, money and futures markets. However, in reality, the second notion of an ex post cost can for obvious reasons not be a factor for the ex ante decision between alternatives. The manager has to make his decision under uncertainty, that is, without knowing the relevant future exchange rates.

---

6 As pointed out, practically no literature exists on the topic of the following sections. The author however wishes to acknowledge the help of the corporate treasurers and bank managers who took part in the research interviews. The question which hedging instrument to use in which situation was an important part of each of the interviews. In these discussions the managers contributed valuable insights without which the following chapter could not have been written.
7 See, for instance, Giddy (1976), p96.
In any case, if financial markets are assumed to be reasonably efficient, the expected cost of hedging is not a useful decision factor. This is because the costs of hedging of the different instruments are not independent of each other. On the contrary, they are closely interrelated.

It was explained in Part One of the thesis that a money market hedge is but a synthetical forward contract and that due to interest parity the costs of both instruments are exactly the same. The costs of futures and forward contracts have to be equal in open markets, allowing for the fact that futures require the buyer to hold a certain cash position ("margin") with the futures exchange. However, the ex ante costs will be the same for both instruments if interest rates are assumed to remain constant over the maturity period.

The costs of currency swaps are also directly related to the costs of forward contracts, since

"modern swaps are little more than a series of forward contracts."12

With currency options the relationship is more complicated. For the supplier, currency options are much riskier than any of the other instruments, and therefore the option cost has to include a certain risk premium. However, even the pricing in the option markets is not independent of that of the other foreign exchange and money markets. By combining a put and a call option, a forward contract can be created synthetically. Options, on the other hand, can be replicated through managing positions in the cash or forward markets. Thus, allowing for differences in transaction costs and a risk premium, the ex ante cost of using a currency option should also be equal to that of using forward contracts or any other hedging instrument. In competitive markets the option premium should

---

9 See Khoury & Chan (1988), p43.
10 For this reason the money market hedge will not be considered any more as an alternative in the following.
reflect the average gains the buyer can expect to realize in the long run. Like forward contracts, in the long run options should therefore provide a cost-free hedge.

To conclude, in efficient markets the ex ante costs of hedging are the same for all the above traditional or new instruments. Such conditions can be assumed for today's international financial markets with their minute transaction costs and their ready supply of information. Even the smallest deviation from an equilibrium position is spotted automatically by computer-based trading systems, which then trigger off the necessary transactions to arbitrage the disequilibrium.

In other words, for a corporate treasurer, the ex ante costs of the various hedging instruments are only then a useful decision factor when market inefficiencies exist, e.g. through discriminatory taxation, or when he is quicker than the rest of the financial community to spot a deviation from price equality.

Having said all this, there are cost related factors which can be relevant to the decision problem. The reason for this is that the hedging instruments differ as to the certainty of their hedging costs.

With a forward contract, the realized ex ante cost is given by the interest rate differential implied in the forward rate. What is uncertain, however, is the ex post opportunity cost of hedging, represented by the difference between the forward rate and the spot rate at maturity.\(^{15}\)

With futures (and exchange traded options) an additional element of uncertainty exists with the margin requirements. The contracts are marked to market on a daily basis, and the margins change accordingly; funds may be released or additional funds needed depending on the developments in the futures' value. The margins cost an opportunity interest rate, and future changes both in the

---

\(^{15}\) Precisely this uncertainty is behind Madura's above quoted postulate that the cost of hedging can only be determined at the end of the hedging period.
margin and in the interest rate represent further uncertainty factors.

The only hedging instrument with certain costs is OTC currency options. The buyer of an option pays a premium which is the sole cost of this hedging tool. No further payments are required, and because of the optionality of the contract no opportunity costs can arise.

To summarize, the absolute costs of the alternative hedging instruments will usually not be a useful factor in the decision as to which tool to use in corporate exchange risk management. However, the certainty of the cost of hedging is different for each of the instruments, and this is a factor the corporate decision maker should take into consideration.

3. Availability

The availability of the hedging instrument is not a factor which determines the final choice between a given set of alternatives. Instead it influences the choice available to the decision maker. In the language of linear programming, availability is a constraint, not a parameter in the maximisation function of the decision problem.

The availability of financial products is restricted by supervisory regulations and by market constraints. In some countries, exchange controls and other regulations restrict the supply of certain instruments, currencies or maturities. Regulations can also limit the access of particular groups of customers to the relevant markets, or put restrictions on the purpose of the use of these markets.

On the other hand, the markets themselves can impose the same limitations. The access of customers, for instance, is regulated by their perceived credit-worthiness. This means that only the best known names with the highest standings can use the currency swap markets. Similar restrictions apply to the interbank forward markets.
and only the access to the currency futures and options markets appears to be more open to medium sized and less well known companies.\textsuperscript{16}

Availability is also relevant with respect to the conditions of the required contracts. For example, for very large amounts or for long maturity periods even the most prolific of all financial hedging instruments, the forward exchange contract, is available only in the most important currencies.\textsuperscript{17} In other currencies the markets are so thin that banks either refuse to engage in such deals or offer discouraging rates. This is the more true for other, less common instruments.

An important distinction has to be made between exchange traded and OTC instruments. Exchange traded futures and options are always standardized products which means that the range of available currencies and maturities is limited. These conditions cannot be altered, and they may differ from the specific requirements of a company. OTC instruments, in contrast, can be tailor-made to the customer's needs. Subject to the limitations outlined above, the company can thus obtain the exact contract size and maturity date to hedge a given foreign exchange exposure.

4. Flexibility

Flexibility is again a decision factor that incorporates different aspects. One aspect is connected with the above discussed availability of the full range of conditions and variations of an instrument. Some financial products are standardized and their conditions cannot be altered. Other instruments are fully negotiable and their markets are flexible enough to supply the required variations or special versions without too great a cost disadvantage.

\textsuperscript{17} See Buckley (1986), p164.
A second aspect of the flexibility of financial instruments is their future tradability. The financial situation of a company is the more flexible the easier it can sell back an instrument to the markets or cancel it out by a matching deal. This flexibility is greatest when the company is not restricted to the original supplier, in other words, when a ready secondary market is in existence.

This second aspect of flexibility stands in conflict to the first aspect. The ease with which a financial product can be (re-)sold in secondary markets is the greater the more standardized a product is. Therefore, exchange traded instruments which are inflexible as to the availability of special conditions are most flexible in respect to their tradability. The least tradable hedging instruments are complicated currency swaps or special currency option variations.

Finally, the term flexibility can be used to describe the situation of the company after the purchase of the hedge. Here a clear distinction exists between the "optional nature" of currency options and the "binding nature" of all other instruments.\textsuperscript{18} To have an option, i.e. the right but not the obligation to buy or sell a given amount of foreign currency, is obviously a much more flexible position to being "locked in" with a contract that is binding. The option allows the company to take advantage of favourable exchange rate movements while being covered against unfavourable changes. Currency options therefore provide the hedging company with a degree of flexibility not available with any of the other exchange risk management tools.

5. Other decision factors

Counterparty risk is a decision factor that is relevant for practically all financial transactions. With respect to hedging instruments two considerations apply. Firstly, exchange traded instruments are less risky than OTC instruments. With exchange traded instruments the exchanges themselves are counterparty to all contracts and thereby guarantee their performance. On the other

\textsuperscript{18} See Khoury \& Chan (1986), p47.
hand, OTC contracts are usually done with international major banks only, and the risk of their default is also very small.

Secondly, one has to consider the risk structure of the instruments. Compared to the other hedging tools, currency options are by far the riskiest. The writer of an option faces a theoretically unlimited loss, and hence the careful evaluation of the counterparty risk is particularly important for the buyers of currency options.

A further determinant for the choice of a hedging tool are the liquidity requirements. Exchange traded currency futures and options require the buyer to place a margin with the Clearing House of the exchange. The margin represents a liquidity commitment for the company, and since this commitment can change daily, it also represents a liquidity risk. For other instruments such official liquidity requirements do not exist. In some countries or for some banks it may however be customary to require customers to hold balancing accounts against their forward exchange or money market positions.

Also a decision factor is the management time and effort involved in the purchase and in the administration of a hedging instrument. Some instruments are easier to trade and to administer than others. A forward contract, for instance, can be bought over the telephone in a matter of seconds. All the counterparties then have to do is to exchange letters of confirmation and to initiate the necessary entries in their respective bookkeeping systems. Other instruments are more difficult to trade because they are more complex or because the markets are less standardized. A currency swap, for example, can still take a day or two to be arranged, and it necessitates a relatively extensive contract to be set up between the parties. Even more burdensome is the administration of exchange traded contracts. Their margins are marked to market on a daily basis and such changes require daily entrances in a company’s books.

A factor which is related to the previous one are the accounting and taxation regulations regarding foreign exchange risk management tools. These regulations may differ between the various instruments; such differences can mean decisive advantages or disadvantages for one or the other of the hedging tools. Discrimination may also exist
in such a way that specific instruments are favoured only in specific situations. These factors are difficult to deal with in a meaningful theoretical way. They can be totally inconsistent, having come into existence almost at random through historical processes; they differ from country to country and are subject to frequent changes. However, the empirical study undertaken for this thesis has given evidence of the paramount importance of this factor for business practice. At least in the UK, financial innovations are placed at a grave disadvantage against traditional instruments by the uncertainty surrounding their accounting and taxation treatment.
III. FINANCIAL INNOVATIONS FOR THE TACTICAL MANAGEMENT OF FOREIGN EXCHANGE RISK: CURRENCY FUTURES AND CURRENCY OPTION CONTRACTS

1. Currency futures contracts

Currency futures are very similar to forward exchange contracts. For this reason, futures stand in direct competition with forward contracts for their application in corporate exchange risk management. The following evaluation of the usefulness of currency futures for corporate hedging purposes will therefore consist of a critical comparison between these two instruments.

Like forward contracts, futures are binding obligations to buy or sell a fixed amount of a foreign currency at a fixed price on a predetermined future date. However, despite this apparent similarity there are some important differences between futures and forward contracts. These differences are of consequence for the corporate manager’s decision as to which of the two tools to use. Although some of the differences have been touched upon earlier, they shall be presented systematically in the following.

- Firstly, whereas the forward market works as an international telephone (or telex) market, currency futures (like other financial or commodity futures) are traded face to face on the trading floors of organised exchanges.\(^\text{19}\)

- Secondly, the choice of currencies, quantities and maturity dates of forward contracts can be tailored to the specific needs of the company. Currency futures, on the other hand, have to be standardised in order to facilitate trading at organised exchanges. They are available only for a limited number of major currencies, contracts are for standard quantities, or multiples thereof, and the delivery has to take place at one of a few specified delivery dates throughout the year.\(^\text{20}\)

---

\(^\text{19}\) See Madura (1986), p80; Buckley (1986), p183.

\(^\text{20}\) See Buckley (1986), p183; Madura (1986), p80. At the London International Financial Futures Exchange (LIFFE), for example, one can currently trade sterling, Deutsche Mark, Swiss franc and Japanese yen against US dollars; the standard size for the sterling contract is £25,000 and the delivery dates for currency contracts are the third Wednesday of each of the months of March, June, September and December; see LIFFE (1987), p5. For details see also Heywood (1984), pp75-90.
- Thirdly, with currency futures, the obligations of buyers and sellers are not to each other but to the Clearing House of the exchange. By taking title to all transactions, the Clearing House assumes all credit risk and thus effectively guarantees the performance of all market participants. 21

- Fourthly, at futures exchanges, both parties to any transaction have to place a cash deposit ("margin") with the Clearing House. The margin, which is a certain percentage of the contract size, helps to minimise the risk of the Clearing House activities. 22

- With forward contracts, gains or losses due to differences between the forward rate and the spot rate on maturity ("basis risk") are realised on settlement. With currency futures, outstanding contracts are valued every day, and gains and losses are credited or debited to the clients' margin accounts. 23

- Finally, while forward contracts are usually settled by actual delivery, only few futures contracts are held to maturity; most of them are settled through offsetting deals. 24

Clearly, currency futures have some distinct disadvantages relative to forward exchange contracts as far as corporate hedging is concerned. While the over-the-counter forward contracts can in all respects be tailor-made to the individual needs of the company, the standardized specifications of exchange traded futures most often do not enable the risk manager to hedge its open positions perfectly. Futures are also more difficult to deal in. Forwards can be arranged over the telephone with every major bank in a matter of minutes; with futures a transaction can only be executed by using established members of the exchange as middlemen. Finally, the margin requirements make futures relatively more burdensome for the MNC’s administration. The margin accounts have to be monitored continuously and the daily changes mean daily entrances into the company’s accounts. 25

22 See Nowack (1984), p1134; Heywood (1984), p82. Margin requirements vary according to the riskiness of the contracts; they are typically set at between 0.1% and 5% of the underlying value; see Heywood (1984), p82; Buckley (1986), p184.
24 See Buckley (1986), p183; Madura (1985), p83.
The limited usefulness of currency futures for the exchange risk management of MNCs has been recognized in most of the literature. However, a number of authors hold that futures may in some instances be used by the corporate treasurer. Some of these - often connected to financial institutions selling financial futures or to the futures exchanges themselves - do not substantiate this claim with arguments. Other authors have cited several relative advantages of currency futures over other hedging instruments; these advantages will be critically discussed in the following.

- With currency futures practically no counterparty risk exists, because the exchange and not a private party is the counterparty to all transactions. However, it is extremely doubtful whether the counterparty risk argument carries any weight in respect of foreign exchange dealings with major international banks. The probability of a major international bank like Citibank or one of the "Big Four" UK clearing banks going bankrupt, or being allowed to go bankrupt by the authorities, can be seen to be as remote as the collapse of the futures exchanges themselves.

- Dealing in futures does not use up credit lines with the MNCs’ banks. On the other hand, it requires a company to deposit margins, which in the end has the same effect on its overall liquidity position. Also, according to Eiteman & Stonehill "most large firms regard foreign exchange trading as part of their total banking relationship, and foreign exchange trading compensates their banks for other services received."

- Some authors claim that at times, the futures exchanges provide a better and deeper market - and thus smaller spreads - than the interbank forward market. This is however disputed by most other authors. Mostly it is pointed out that the volume of trading at

the exchanges is too small for the requirements of larger MNCs.\textsuperscript{32}

Buckley also asserts that

"it is normally the case that the cost of dealing forward are significantly less than those incurred through using the financial futures markets."\textsuperscript{33}

- Since futures are standardized and fully fungible, they can be traded and positions can be reversed without recourse to the original counterparty.\textsuperscript{34} This is not a convincing argument in favour of using currency futures, either. There is no reason why a company should have to go to the original counterparty to close out an open forward position. In practice, it will simply take the most competitive rate offered by any bank in the market for a second forward exchange contract that exactly offsets the existing position.

- The interbank foreign exchange markets are wholesale markets. Between banks the usual amount traded in the exchange markets is US$ 5m or more. Even smaller banks will not normally ask for deals on less than US$ 3m in order not to damage their market standing.\textsuperscript{35} With corporate customers, banks will deal in smaller amounts, but the reduction in size may have an adverse effect on the rate the customer achieves.

Currency futures, in contrast, are traded in relatively small tranches and do not discriminate against small volumes. The system of open outcry in the exchanges guarantees that all customers get the same rate, irrespective of whether they buy one or 100 contracts of £25,000 each. Many authors therefore argue that currency futures can be used to hedge small volume exposures.\textsuperscript{36}

However, whilst it is true that the prices at the actual exchanges do not discriminate against small volumes, this is not necessarily the case for the rates the corporate customer may be

\textsuperscript{33} Buckley 1986, pp190-191.
\textsuperscript{34} See Midland Bank Review (1982), p26; Cavalla (1987), p94.
\textsuperscript{35} See Fischer-Erlach (1985), p32.
able to achieve. He has to deal through a member of the exchange who will charge him a commission for his services.

"Transactions in the futures market require payment of a commission to the broker. The size of the commission is negotiated between the customer and the broker. Brokers discourage small transactions by imposing high commissions."37

In any case, the above argument does not apply to larger corporations. Large (multinational) corporations have enough market power to achieve competitive rates even if they wish to hedge small exposures, because their banks will want to preserve or enhance their overall customer relationship. Fischer-Erlach reports that for this reason large MNCs often get rates even better than those the banks concede in dealing amongst themselves.38

To smaller companies the futures market is said to provide another advantage. Before a company can deal in the interbank exchange markets, it has to build up the necessary relationships with market-making banks. The company becomes an accepted customer once the bank establishes a "dealing line" for it; this is the maximum amount of outstanding contracts the bank is willing to allow a customer at any one time.

For a small company it may represent a problem to establish such relationships. In such cases, instead of getting highly uncompetitive rates from a local bank branch, the futures exchanges provide an alternative to achieve market rates for its foreign exchange business.39 Again this is obviously not an argument for large MNCs to use currency futures, and Briggs refutes it even for small or financially weak companies:

"However, I do not think that this situation would occur often in practice. Foreign exchange business is too profitable for banks to refuse dealing lines in all but the worst cases."40

---

One can conclude this discussion as follows. For larger companies, and in particular for companies the size of the MNCs interviewed for the empirical study, no reason exists to use currency futures instead of forward foreign exchange contracts for their exchange risk management purposes. This conclusion arrived at by theoretical reasoning received strong support from the findings of the empirical study: none of the 17 MNCs surveyed used currency futures as an exchange risk management tool, or, indeed, had ever used them before.

This result must not be interpreted as a sign of any lack of sophistication or a reluctance on the part of the treasurers to use innovative instruments. The treasurers' answers in the interviews showed that the managers were aware of the relative advantages and disadvantages of different financial products. This awareness was also documented by the fact that most of the treasurers used interest rate futures on a large scale in their interest risk management.

The companies interviewed were all large MNCs. Hence, the results of the empirical study cannot be used to refute the arguments for the use of currency futures by smaller companies. As shown above, these arguments can however be disputed on theoretical grounds.

Finally, the question suggests itself as to why currency futures markets exist at all if the use of futures is inferior to the use of forward contracts on the basis of all the above discussed arguments. The answer to this question was received in the interviews with the bank managers who were familiar with both kinds of foreign exchange markets. The financial futures markets originated in the USA where, especially in Chicago, commodity futures markets had a long tradition. To a large extent the liquidity in all futures markets is provided through the activities of individual and institutional speculators.41 Private speculators use the currency futures markets; since banks are not willing to deal with them, they simply do not have the alternative of dealing in the interbank forward market. Speculation of a scale of that found in Chicago, for instance, does

not exist in the UK or in Europe. This partly explains the lack of liquidity of European currency futures markets.

Another factor explains why in the US the futures exchanges are sometimes being used by large MNCs. The US simply does not have a forward exchange market so highly developed and so deep as the European and in particular as the London interbank market. In addition, the different time zones can lead to situations where companies in western states may want to hedge their exposures at times when the interbank forward market, which is located mainly in New York, is rather thin. In these cases it may indeed be more efficient to use the currency futures exchange markets.42

These peculiarities of the US financial markets may explain the references to the usefulness of currency futures in the literature, which, incidentally, is dominated by US authors. It would however be wrong to transfer recommendations based on peculiarities of the US situation to the European or the UK financial markets. Here one can generalize that for corporate hedging purposes forward exchange contracts are superior to currency futures contracts.

2. Currency option contracts

(a) The mechanics of currency options

As was explained above, a currency option is a contract which conveys the right, but not the obligation, to buy ("call option") or to sell ("put option") a given amount of a foreign currency at a fixed price ("strike price") before or at a certain future date. If the option can be exercised at any day before the expiration date it is called an "American option", whilst options which can only be exercised on the expiration date are called "European options".43

Currency options are available from organized exchanges where they are traded in the same way as currency futures. Option contracts are

also on offer from banks, and these over-the-counter options are negotiable as to their currency denomination, volume and maturity. In making the choice between exchange traded options and OTC options similar considerations apply as with forward and futures contracts. Unless the corporate treasurer is able to spot deviations from price equality, OTC options will generally be more suitable for his purposes.

The price of an option, which the buyer has to pay the option writer at the outset, is called the "premium"; it is usually expressed in terms of units of the basis currency per unit of the underlying currency. The currency option premium is a function of the following four factors:

1. The level of the strike price relative to the current spot exchange rate; the higher the strike price, relative to the current spot rate, the cheaper - ceteris paribus - will be the call option and the more expensive the put option, and vice versa. If the strike price is below the current spot exchange rate a call option has an "intrinsic value". It is equal to the amount the holder of the option could realize through the immediate exercise of the option. Another term for options with a positive intrinsic value is "in-the-money options". The intrinsic value is zero with spot rate and strike price equal ("at-the-money option") or (for a call option) with the strike price being above the spot rate ("out-of-the-money option").

2. Maturity of the option; during the time remaining to the expiration date, movements of the spot exchange rate can possibly make the option profitable, or make it more profitable. The value of this possibility is the "time value" of an option. Time value and intrinsic value make up the total value of the option. The time value is the greater the longer the maturity of the option; it is zero at expiry. During maturity the time value is always

44 See LIFFE (1987), p5; Dresdner Bank (1986c) p2.

45 Complicated mathematical models are being used to compute the prices of options. These models go back to a formula developed by Black & Scholes in 1973. The Black-Scholes formula was originally developed for the pricing of stock market options, but a number of adaptations and variations for currency option pricing have evolved since then. See Buckley (1986), pp196-198 and 201-205; BIS (1986), pp67-72 and 101-120; European Options Exchange (1987), pp10-16; Dresdner Bank (1986c), pp14-15; Garman & Kohlhagen (1983); critically, Record (1985). For details see Jarrow & Rudd (1983).
greater than zero, but it decreases progressively over time, as the chances diminish that future exchange rate changes will result in a profit on the option.

- Volatility; the variability of the price movements of the underlying currency, that is, of the spot exchange rate, is called "volatility". The higher the volatility, the higher is the probability that an option will become profitable over the option period, and hence the more expensive the option price will be.

"In principle, it is the expected volatility of the underlying [exchange rate] over the remaining life of the option that determines its current value, and for this reason an existing option can increase or decrease in market value simply because the market changes its expectations of future volatility." 46

- Interest rates; options can be seen as claims on future payments, and hence interest rate changes will influence their present value. Since simultaneous inflows and outflows in different currencies are involved, both the domestic and the foreign interest rate have to be considered. 47

The premium of an option is often compared to an insurance premium. 48 With the option, the company insures itself against adverse movements in the exchange rate while still retaining the opportunity to benefit from a favourable exchange movement. Its maximum loss is limited to the non-returnable premium, whereas it maintains the possibility, in theory, of unlimited profits. 49 The opposite holds true for the option writer: his income is limited to the premium while he faces a potentially unlimited loss. This unsymmetric risk pattern of currency options is presented in Figure 15.

47 See Briggs (1987), p43; for details see Jarrow & Rudd (1983), p17. Another reason why interest rates influence the option premium is that they influence the cost of hedging the risks from writing options. This will be explained further below.
Figure 15

The unsymmetric risk pattern of currency option contracts

Figure 15a shows the risk-return profile for the purchase of a Deutschemark/US-dollar call option.50 The option costs a premium of p for every dollar; \( r_s \), the strike price, may be equal to the current spot rate. The option will not be exercised, if at maturity\(^{51} \) the prevailing spot rate is lower than the strike price \( r_s \). This is because the dollars can then be had cheaper in the spot market. The option will be exercised with any prevailing rate above \( r_s \), but on the whole the purchase will only be profitable if the dollar has risen above \( r_s + p \). Any rise in the dollar rate above \( r_s + p \) results in profits for the buyer. These profits are equal to the losses of the option writer. The currency option therefore is a zero-sum game. Options are, of course, not able to remove foreign exchange risk; they can only redistribute it.\(^{52} \)

Banks which are involved in writing options try to hedge the risks incurred through this type of business. This can be achieved through carefully matching each option sale with a purchase of a corresponding option. Another possibility is to take systematic

50 The reverse of the following applies to a put option which is presented in Figure 15b.

51 A buyer who wants to use an option before maturity will always sell the option, never exercise it. If he exercises, he only realises the intrinsic value, whereas a sale will also realise the option's time value; see Bryant (1987), p11.

52 See The Treasurer (1984), p11.
positions in the spot and forward markets of the underlying currencies. This latter method is called "delta hedging". 53

The delta of an option is a measure for the sensitivity of the option value to changes in the spot price of the underlying currencies. For example, if the delta of an option is 0.4, then the risk of writing the option can be eliminated by holding a position of 40% of the face value of the option in the respective spot market. However, in reality delta hedging is much more complicated than this, above all because the delta of an option changes every time the exchange rate of the underlying currencies changes. 54 Every exchange rate movement over the entire length of the maturity period of the option therefore necessitates an (in theory) immediate transaction in the spot (or forward) markets in order to retain its delta cover. This means that a system of delta hedging requires a continuous monitoring of the exchange markets, and it brings with it a huge turnover in the spot and forward markets.

Delta hedging effectively replicates currency options, and this equivalence of delta hedging and option is the basis of the option pricing models. The model price of the currency option is equal to the cost of replicating it through delta hedging. 55 However, this model price has to be adjusted for the transaction cost of hedging the options, for a risk premium which has to cover the bank against future changes in volatility and for a profit margin. 56 Only if these factors are neglected is it true that in the long run using options will yield the same results as not covering exposures at all or always covering them with forward contracts. This is because the option premium

"is in fact no more complex than a statistical estimate of the likely upside gain, based on the price history of the currency concerned." 57

53 For details on delta hedging see BIS (1986), pp77-80; Cooper (1985), pp9-10.
54 The degree to which the delta changes is measured by the "gamma" of the option. Advanced hedging methods are based on this ratio; see BIS (1986), p79.
One can conclude that in real world markets, where transaction costs and profit spreads exist, options on the average will be more expensive than forward cover or not covering exposures. In any case, price equality in perfectly efficient markets is true only in the long run. The cost of hedging for any one exposure may be very different for the three alternatives. In reality, corporate managers think and are evaluated on the basis of such short term orientations. Theoretical long run price equality is therefore irrelevant for the practical choice between different hedging tools. What is necessary instead is a more detailed comparison between the use of currency options and forward exchange contracts.

(b) Currency option contracts versus forward exchange contracts.

part one: The case of uncertain exposures

For their use in corporate foreign exchange risk management, currency options stand in direct competition with forward exchange contracts. Further instruments, which already compare unfavourably against the forward contract (money market hedges and futures contracts) need not be considered. As far as options are concerned, similar arguments as with forwards and futures favour the use of OTC options against that of exchange traded options. Therefore, a corporate treasurer looking for a tool to hedge his company's foreign exchange exposures normally has the choice between using forward exchange and OTC currency option contracts.

To start with, there is one area where options are clearly preferable to forward contracts. This is the hedging of uncertain future cash flows. For the hedging of foreign currency denominated cash flows where only the timing is uncertain, it is still possible to use forward range contracts. However, forward contracts are not suited to cover exposures with uncertain quantities or exposures which may not materialize at all. Such exposures are called "contingent exposures", and they can arise from tender-to-offer bids, take-over bids, foreign currency price lists, foreign dividend remittances, pending foreign law suits, etc. \(^{58}\)

---

If a company uses a forward contract to hedge, say, the potential exposure from a tender which subsequently is not successful, the company is left with a "naked" forward position. It then has effectively created an exposure; the forward contract has to be unwound which may lead to "windfall gains" or exchange losses.

"To suffer a foreign exchange loss on business that does not materialize is particularly galling. It is common experience that such losses attract more high-level attention that similar gains receive."\textsuperscript{59}

The ideal hedge for uncertain exposures is not the obligation (i.e. the forward contract) but the optional right to buy or to sell the foreign currency. This is exactly what the currency option does, and future foreign exchange exposures which are uncertain as to their quantities are hence a "classic case" for using foreign currency options. This holds true for exposures which are completely uncertain, and it holds true for that maximum portion of a cash flow forecast (e.g. on future foreign sales) which is uncertain. These uncertain future cash flows should be covered with put or call options.\textsuperscript{60}

It is exactly for this purpose of hedging uncertain foreign exchange exposures that currency options were demanded and predicted for by academics long before they actually emerged in the market place. Already in 1976, four years before options became available in financial markets, Shapiro & Rutenberg wrote:

"What the assistant treasurer really wants is a foreign options market. ... Although no such options are regularly available at present, they are needed, and we predict they will be available soon."\textsuperscript{61}


\textsuperscript{61} Shapiro & Rutenberg (1976), p54.
The corporate treasurer faces a much more complicated choice with the hedging of known foreign exchange exposures. For this decision problem a more detailed comparison between the characteristics of forward contracts and currency options is necessary.

Both OTC options and forward contracts are negotiable as to their conditions. Both instruments are available in all major currencies, for practically all volumes and for maturities of up to 18 months or, exceptionally, longer. However, the forward market as the more established and broader market has some advantages in these respects. Contracts for less important currencies are more easily available; the markets for major currencies are extremely liquid and for these currencies, maturities of up to five or even ten years can be arranged.

This is not the case for options. Because of the way options are priced, even major option market makers are unwilling to write options for currencies which do not have an established secondary market. Customers will also find the markets for very short and very long term options to be thin and consequently the rates to be unattractive. In addition, the option markets are (still) not liquid enough to accommodate readily the demands for extremely large volumes.  

Apart from these dissimilarities in market conditions, the most important difference between a forward contract and a currency option is to be found in their risk-return structures. Figure 16 compares the structures of the forward purchase of a foreign currency (the US-dollar) with that of a currency call option. The forward contract

---

Figure 16
The risk-return structures of a forward contract and a currency option contract

The forward exchange contract completely eliminates all foreign exchange risk in that it irrevocably determines the company's future exchange rate. No uncertainty remains; the possibility of ex ante real cash losses is removed as well as the possibility of gains. However, this elimination of the risks of real cash losses and gains implies the incurring of opportunity losses and gains which have to be interpreted as the ex post cost of hedging.

As was described in the preceding section, the risk-return pattern of a currency (call) option is entirely different. The option eliminates the risk of an exchange loss while leaving open the
possibility of a gain. The cost, ex ante and ex post, for this combination of downside protection and upside potential is the premium p (see Figure 16).

This comparison must lead to the following conclusion. For truly risk averse companies, that is, for companies that want to determine their future exchange rates on given and certain exposures, forward exchange contracts are preferable to currency options. The forward contract fixes the future rate without any upfront cost for the company. The option does not fix the rate. Against payment of the premium the buyer receives a floor (ceiling) for his future rate and the right to gain from favourable future exchange rate changes. In this sense, options are not pure hedging instruments. Instead, the option combines elements of a hedging and an investment instrument.

"So options do not offer any incremental protection over forward contracts - and in the case of a non-contingent exposure, the purchase of an option becomes an investment independent of the hedge decision and the underlying exposure."64

The option premium is the price for the downward protection it provides; at the same time it also is a bet on the upward potential of the currency concerned. Therefore, risk averse companies with a policy to hedge fully their exposures should use forward exchange contracts to achieve their goal.

"In any situation where there is a known currency risk which can be perfectly matched by a forward transaction the only way of eliminating risk is to go ahead with that forward transaction. Payment of premium for an option contract is the deliberate establishment of risk (the premium) against the hope of making extra profit."65

A second reason for the superiority of forwards over options for pure hedging purposes has been touched upon in the preceding section. In a neoclassical model world, the strategies of always using forward contracts or always using currency options would in the long run be equally expensive, that is, free of any cost. However, positive transaction costs of hedging and profit spreads

63 See Manthey (1986), p361.
64 van der Wal (1985), p22; see also Abuaf (1988), p57.
exist in real world financial markets. These imperfections belong solely to the options markets; in the interbank forward markets which are governed by the law of interest rate parity they do not exist. For this reason a strategy of options can be expected to be more expensive than one of using forward contracts.

In addition, the costs of options may also be increased through mispricing. Mispricing, i.e. the incomplete or inefficient use of available information, is highly unlikely in the forward markets. In the options markets with the complexity of the pricing mechanism and the less highly developed market structure there is quite a likelihood of mispricing.

Having said that, as with any other good, the mispricing of currency options on the other hand also creates profit opportunities for well-informed and flexible market participants. However, the utilization of such deviations normally requires a more active involvement in foreign exchange markets than found with purely risk averse companies.

Turning to companies with a more active foreign exchange risk management strategy, i.e. a selective approach to hedging exposure, the choice between using forward exchange contracts or currency option contracts is determined by different considerations. Such companies accept the deliberate establishment of risk as part of their financial strategy. By trying to outguess the markets they seek to enhance their operational results. This is done by taking "views" on the future development of major market parameters and by exposing cash positions accordingly in the hope of gaining additional profits within the treasury.

If views are taken on the future development of exchange rates, the use of currency options to gain from these views is suboptimal. A company with a net dollar inflow that expects the dollar to depreciate should cover this exposure by means of a forward contract. If the expectation is for the dollar to appreciate, the exposure should be left uncovered. In comparison, given the company's views are correct, the use of an option would in both cases yield results

that are worse by the amount of the option premium. In other words, currency options are not suited to a strategy of speculating on the future direction of exchange rate movements.\textsuperscript{67}

A second scenario for a company with a profit-orientated selective exchange risk management is the following. The dollar-receiving company expects the dollar rate to change markedly over the maturity period of the exposure but the company does not know at all which direction the changes will take. That is to say, the company now takes a view on the volatility of the exchange rate, not on its direction.

Numerous authors writing on the subject postulate that such a situation is ideally suited to the use of options. The naive argument holds that the option's combination of protection and profit potential frees the treasurer from making exchange rate forecasts.\textsuperscript{68} This however is an incorrect, or at least incomplete, argument.

An option is a bet on both the future direction and the volatility of a market. By itself it is not the ideal instrument for a bet on volatility only.\textsuperscript{69} Instead the above company should cover the dollar exposure with a forward contract and use a specific combination of two option contracts to exploit its view on volatility.

Indeed, one of the genuine advantages options have brought to the foreign exchange markets is that combinations of different options or of options with forward contracts provide the customer with a wide range of new, complex risk-return profiles which were not available hitherto.\textsuperscript{70}

\textsuperscript{69} See Giddy (1988), p86.
The combination to be used by the company which expects a volatility different from the market expectation is called a "straddle". It consists of the simultaneous purchase of a put and a call option with identical volumes, strike prices and maturities. Figure 17 demonstrates that the combination, which geographically means a vertical addition, leads to a V-shaped risk-return structure. The buyer of the straddle makes a profit if the exchange rate $r$ moves either way from the current rate $r_s$ (assumed to be equal to the strike price) by more than the sum of the premiums ($p_c + p_p$) on the options.

A third possible situation for the company in question would be that it expects the US-dollar to appreciate, but it is rather unsure about this forecast. Some of the indicators may also predict a fall in the rate. Now the company has a view both on the direction and on the volatility of the market. Because its view is too weak to leave a large exposure uncovered or to use forward contracts on its basis, a currency option may in this case be the tool best suited for the

---

company's objectives. It would provide cover against a loss on the exposure but it also enables the company to participate in the expected upside of the dollar rate. Nevertheless, the treasurer still has to evaluate whether he thinks the currently available options to be fairly priced. In other words, given all his information and expectations, does he think the premium he has to pay is worth the likely upside potential?

If the company does consider options generally to be fairly priced, it can then express its belief in the probability of its currency forecast by the choice of the option strike price. This choice also influences the cost of the option. The higher the belief in the forecast, the lower the level of insurance against losses, the lower the cost of the option. Next to the strength of the belief in the forecast, the choice of the strike price is also determined by the particular risk-return preferences of the company.

The conclusions of the above comparison of currency options and forward contracts can be summarized as follows.

(1) Currency options are the ideal instrument for the hedging of uncertain exposures.

(2) Risk averse companies should use forward contracts for the hedging of certain foreign exchange exposures. Forward contracts eliminate all uncertainty about future exchange rates while options are the deliberate establishment of some risk against the hope of future extra profits.

(3) For companies with selective exchange risk management strategies three scenarios have to be distinguished:

(i) If a company has a firm view on the direction of future exchange rate changes, it should not use currency options. It should use costless forward contracts or leave its exposures uncovered in order to take full advantage of its

76 See Giddy (1988), p86.
views. In these situations the use of options means a waste of the premium;

(ii) if the company has no view on the direction but on the volatility of the market, it should cover its exposures forward and use a straddle to speculate on volatility;

(iii) finally, if the company does have a view on the direction of the market but its belief in it is not very firm, an option may prove to be the ideal solution.

Before turning to the results of the empirical study on the use of currency options a further theoretical aspect can be added to the discussion. This consists of an application of the "principal-agent problem" to the decision between the use of currency options or forward contracts.

The principal-agent problem relates to the possibility that the decision of a manager (agent) may be guided by his own personal interests which are different to those of the owner (principal) of the company. The manager receives a (partially) fixed income which is not (or at least not entirely) related to the success of the company. According to the theory, the main concern of a manager is his own job prospects; the company's success is important to him only in as far as persistent losses will imperil his employment. The manager therefore primarily seeks to avoid losses; he aims for positive results which can be achieved without a great degree of risk. The main point of the principal-agent theory, now, is that the manager's risk aversion may be much stronger than is in the interests of the company's shareholder(s).77

Presented graphically (see Figure 18), the manager's marginal utility of the company's success decreases very quickly. That of the shareholders who hold a well-diversified portfolio does not (or not markedly; see Figure 18) decrease, since the success of the company is directly related to their income and wealth.

77 For details of the principal-agent theory see Barnea, Haugen & Senbet (1985).
An application of the principal-agent theory to the corporate hedging decision

In an application of the principal-agent theory Franke has shown that managers will generally prefer forward contracts to currency options in their hedging activities. To put it simply, this is because currency options have a high risk-return profile and their use exerts a strong influence on a company's results. In comparison, private investors have a higher preference for high risk-high return investments, such as options. According to the utility function of managers, the use of currency options is therefore more expensive than that of forward exchange contracts.\textsuperscript{79}

Franke concedes that the results of this analysis however are not conclusive. In reality, opportunity losses can have the same effect on a manager's job security as real cash losses. In the words of Humphreys, this is true especially for corporate treasurers:

"In the tough world of risk management, lost opportunities are often booked as an outright loss."\textsuperscript{80}

It is also conceivable that the manager expects to better his job prospects if he can report exceedingly high exchange gains, without regard to the (perhaps hidden) costs and risks to the company.

\textsuperscript{78} See Franke (1988b), p42.
\textsuperscript{79} For details see Franke (1988b), pp40-42.
\textsuperscript{80} Humphreys (1987), p267.
Graphically this could be incorporated into Figure 18 with a U-shaped marginal utility curve. With such a utility function the manager would prefer currency options to forward contracts.\textsuperscript{81}

Summing up, the principal-agent theory is an interesting tool for the analysis of the decision between the use of currency option and forward contract. However, without further information about the properties of the manager’s utility function, it does not render any definite results which would impinge on the validity of the conclusions of the above comparison between the use of forward contracts and currency options in a risk averse and a selective corporate exchange risk management.

(d) The use of currency options by UK MNCs: An empirical study

The literature on currency options is abundant with references to the apparent reluctance of treasurers to make use of this new instrument. A bank manager quoted in a recent article went as far as claiming that

"no more than one third of the top 500 British companies have ever even made use of a swap, future or option to manage financial exposure".\textsuperscript{82}

At first sight the results of the study seem to indicate that this assertion is not true. Almost all of the MNCs included in the survey had experience in the use of currency options. Of the 17 MNCs only a small minority of two had not used currency options before, and 15 companies were using options or had used them.

These figures do not however reflect the true extent to which the companies actually employed currency options in their foreign exchange risk management. Only one of the companies was involved very heavily in the currency options markets. This company did not only use options for the hedging of its exposures but traded them for profit. Its financial manager reported that it had an average

\textsuperscript{81} See Franke (1988b), pp43-44.

daily turnover in the currency options markets of about £20m. This is an outstandingly high figure by all standards. It is comparable to the turnovers of some of the biggest UK banks, and it is more than the average yearly turnover of any of the other companies in the sample.\(^{83}\)

The above company was also one of only two companies which regularly wrote options to the market. Apart from the above two, only one other company had written options on one occasion in the past. The treasurer explained that his company was "not very happy" with the experience, but that he would like to "try it again" in the future.

Three further MNCs wrote options not to the market but internally to their subsidiaries. Two of these did this occasionally and they always matched the positions with options bought in the markets.

The third company was exceptional. Firstly, it wrote currency options to its subsidiaries on a large scale. As a matter of fact, its subsidiaries used only options for their hedging purposes. Secondly, it did not match the options sold to its subsidiaries with options bought in the market place. Instead it operated a system whereby it delta hedged the risks of writing options to its subsidiaries by taking systematic positions in the spot and forward markets of the underlying currencies. The treasurer using this system was very convinced of its success.

**Company A:**

This system has been running for two and a half years now and we are extremely pleased with it. It has proved over the period that we can manage the options which we write for somewhat less than the premium we charge our subsidiaries. And they are very low price. Often half what the bank would charge. It has been very successful.

The two companies whose intensive use of currency options was described above were exceptions. Only four other companies of the 15 which claimed to have used options before used them on a regular basis. The other nine MNCs either used them occasionally or currently did not use them at all. The latter was often due to bad experiences in the past and to top management's (rather than the treasurer's) being disinclined to their further use. The following

---

83 According to an estimate by one of the bankers, the London interbank currency market has an overall turnover of about £1bn-5bn per day.
is an example of several such accounts heard during the course of the interviews:

**Company B:**

We have used options. We do not use them at this precise moment, because the experience this company has had with options is that we always have lost out on options. They have cost us a lot of money. At the moment, if I go into my Finance Director's office and say 'I want to buy an option for £100m for 1989 which will guarantee that our dollar rate will not go above 1.75' he will say 'great'. I will then tell him 'it will cost you £4m' and he will say 'Oh dear, what a good idea we're not going to use.'

Even with the four companies using currency options on a regular basis the actual volume was still very small, although reported to be rising in two cases. The volume of currency options did not generally exceed a proportion of only 5% of the volume of forward exchange contracts used in the companies' exchange risk management.

After closer examination of the data one must conclude that UK MNCs are indeed rather reluctant to make extensive use of the possibilities presented by the existence of currency options markets. The results show that there is a reluctance to use currency options; however they also show that there is no reluctance to try out their use.

The following reasons were given most often as a case for using currency options instead of forward contracts or other hedging tools:

- Above all the managers named the hedging of contingent and uncertain future cash flows as cases for buying options. This included tender-to-offer situations, the hedging of foreign currency denominated price lists, but also of that (additional) proportion of a company's future cash flows which are uncertain because of the "normal" vagaries of the planning process. One company formulated that as follows:

  **Company C:**

  If you are unsure about your cash flows, options are great as top-ups.

- Another recommendation was the following. According to the corporate treasurers' advice, options should be used when the company has no clear "view" on the future exchange rate in
question, that is, in situations in which the treasurer expects future exchange rate changes, but is not able (or willing) to take a view on the direction of these changes.

Company D:
Options are the instrument in a situation where you haven’t got a strong view on the market. All you know is that the rates will change but you don’t know where to. When you get to a position where it is so difficult to cover forward, then the option can solve that problem.

It was shown above that in such situations a straddle should be used rather than a single option.

- A further interesting case for the use of options was made by the treasurers of three MNCs. They explained that in certain circumstances, and in particular with respect to expected future exposures, their hedging decision was not based on considerations such as, say, risk and return, the efficiency of exchange markets or the protection of the company’s cash flows. Instead they were more concerned about their relative market position. For obvious reasons this is more important in duopolistic or oligopolistic markets. In such markets it can be crucial whether one or the other(s) or all competitors are hit by unfavourable, or can take advantage of favourable, exchange rate changes. If the exchange rate moves in the companies’ favour but one company has locked in its rates with forward exchange contracts, then its competitor(s) can lower the prices, thereby gaining market share or inflicting losses on the locked-in company. Here an option provides the degree of flexibility needed.

Company E:
You have to look at the competition. If you are not sure what the competition does, then you use options. If you cover your cash flows over longer periods with forwards and your competitors don’t, and the exchange rate moves in their favour, you have in fact created an economic exposure.

Company F:
Options are sold by the banks on the basis of speculation. That is how they are marketed. But that is the wrong way of looking at it. My own view is that you should buy an option if you have analysed what your competitors are doing. If you believe they are selling forward their dollars and your margins will stand the premium, then you buy the option and leave your position open. So that if the exchange rate moves in your favour, you can wipe out your competitors.
Company C:

Foreign exchange risk management is subtler than just taking 100% forward cover. In some cases, in fact in all cases, it is necessary to be aware of what the competition is doing. To give an example, one of our companies exports to the USA and its main competitor is UK-based too. Now it seems to me that the subtle and intelligent way of coping with that is to consider using quite a lot of options. Because if the exchange rate moves in your favour, you can take advantage of it in the same way as your competitor does. If the exchange rate moves against you, your uncovered competitor gets hammered and you don't. But if the rate moves against you and you've got forward contracts, you're locked in.

Question: How do you know what your competitor does?

Answer: I'm really not prepared to answer that - I am not talking about anything devious. People pick up bits and pieces. And in any case you don't have to know what your competitor does, you just have to think what is your best position against a competitor that does cover or against one that does not cover.

This interesting point has so far been largely ignored by the literature on hedging and hedging instruments. It is however very much consistent with the concept of economic exposure which claims to focus on the competitive situation of the company. One has to bear in mind also that a high proportion of today's internationalized markets are characterized by an oligopolistic market structure.

Given these reasons for using currency options, and given the widespread experience in their first application, the question suggests itself as to why the companies did not use this instrument on a much larger scale.

To start with, the managers interviewed did not consider currency options to be generally overpriced. It is often asserted in the literature that

"treasurers are dismissing foreign currency options as too expensive" 

The interviews showed that the MNCs' treasurers thought options in general to be fairly priced by the markets.

Company A:

I think if you have used options for a bit longer you will realize that they are not overpriced. There is a certain premium it is true, but I think a lot of companies have realized that this premium is well worth paying.

---

Company G:

The option premium is relative to the risks generally speaking worthwhile. My belief is that paying about 4% for a one year option or two percent for a 3 month option is not bad business. I think options are reasonably priced.

Nevertheless, the fact that currency options incur the payment of an upfront premium was a deterrent. Firstly, some treasurers appeared to have difficulties convincing their top management of the advantages of paying a large premium for the use of a hedging instrument. Secondly, some treasurers argued that they could not afford to use options to hedge exposures arising in markets with low operating margins. Thirdly, and most important, the accounting and taxation treatment of currency options was felt to be problematic.

According to the treasurers it was currently unclear how the upfront premium had to be treated in a company’s accounts and how it would be treated by the tax authorities. Apparently no agreement exists among the various accounting firms, and the tax treatment was subject to the discretion of the local taxmen or tax authorities. In other words, the situation was characterized by a great deal of uncertainty, and one company explained that this uncertainty was and had been the reason why it had never used options before.

The interviews made clear that the accounting and taxation treatment of currency options was the corporate treasurers’ most troublesome problem. Financial institutions have recently responded to the problems of their corporate customers as regards the payment of an upfront premium by offering a whole range of new products. These include options with deferred premium payments ("Boston options"), currency options where the premium is contained in adjustments on the strike price, or combinations of call and put options which create so-called "low cost" or "zero-cost options".

Zero-cost options have emerged under various names (cylinders, collars, G-Hedges, etc.), but they all have in common that the company buys a call option and at the same time sells a put option for the same amount and with the same exercise date. The premium

85 See also Warren (1987), pp246-251.
86 For recent developments on the accounting and taxation of currency options see Jackson (1988), p22.
will be zero if the cost of the call option is equal to the premium it receives for the put option. In order for the bank to cover its costs, the strike price on the option written by the company will be more favourable than the strike price on the option it receives from the bank. Effectively, the company gives up some (or, indeed, all\textsuperscript{87}) of its upward potential in return for a lower or zero premium.\textsuperscript{88}

The treasurers' attitudes to these option-'hybrids' were varied. A few MNCs used them and saw them as valid additions to the range of available treasury management tools. Most of the treasurers were however critical of the products, and of the banks' motives in supplying them.\textsuperscript{89}

\textit{Company F:}

When you start getting into areas such as cylinders and analyse them carefully what you end up with is an expensive forward contract. You know, these things arise because corporations are perceived to have an aversion to pay an upfront premium, so the banks devise ways of getting around this. In actual fact I would suggest that all it does is increase the banks' fee take in one way or another.

A final reason given by the treasurers why their companies did not engage more actively in the currency options markets was that they perceived option dealing to be resource-intensive. This point was put across in several of the interviews. The argument was, firstly, that the dealing was more complex than forward dealing because of the complicated pricing of options and the greater number of alternatives. In addition, however, a number of treasurers argued that it was necessary to "manage" options, that is, to open and close out option positions on an ongoing basis as the conditions in the exchange markets change.

\textit{Company H:}

If you want to reduce the cost of using options, you must manage them. You must do them on a larger scale. You need volume if you want to become an expert, and for that you need resources.

\textit{Company I:}

With forwards you do them and you can forget them; an options book you have to manage.

\textsuperscript{87} If the call and put option have the same exercise prices and are identical as to their amounts and expiration dates, then the resulting risk-return structure is exactly equal to a forward option contract ("synthetic forward option contract"); see European Options Exchange (1987), p26.


\textsuperscript{89} Also see Humphreys (1987), p267.
When asked, the managers could not explain this point further or provide any substantiating arguments. Sometimes the same assertion is made in the literature. It relates however only to a profit-orientated and speculative trading of options. When options are used according to the recommendations made in the preceding section, on theoretical grounds, no prima facie reason exists why currency options should in this respect be treated any differently from forward contracts or any other foreign exchange hedging tool.

90 See, for instance, Manthey (1986), p361.
IV. FINANCIAL INNOVATIONS FOR THE STRATEGIC MANAGEMENT OF FOREIGN EXCHANGE RISK: CURRENCY SWAPS AND DEBT-EQUITY SWAPS

1. Currency swaps

Currency swaps are the third of the instruments which have been singled out as potential exchange risk management tools. Swaps are basically agreements over the exchange of payment streams. A currency swap as one form of swaps consists of three elements. 91 At the outset, the two (or more) counterparties exchange the principal amounts of two debts which are denominated in different currencies. The exchange rate used for this transaction can be the current spot rate, the forward rate or any rate mutually convenient to the partners. The second element in a swap agreement is the ongoing exchange of the interest payments on the two liabilities. Each partner pays an agreed rate of interest on the principal he has received from his counterpart. The third and final step is the re-exchange of the principals at the maturity of the swap agreement. Normally the exchange rate used for the re-exchange will be identical to that of the initial exchange.

The effect of the currency swap procedure is to transform a debt raised in one currency into a fully hedged debt of another currency. 92 Depending on the nature of the interest payments of the two liabilities, the swap can also be used to alter the structure of the interest payment streams each company has to pay. This can be achieved with a cross currency interest rate swap, which was described in Section C.V.6.(a).

There are various reasons why two companies can engage in a swap transaction:

- The swap as an arbitrage mechanism enables borrowers to raise funds more cheaply than otherwise possible. 93 The swap mechanism allows unbundling of two decisions a borrower normally has to take simultaneously: which type of funds he needs and, secondly,

which type of funds he can borrow at the most competitive terms. With a swap the company simply raises the volume of capital it needs on the basis of costs alone. Only in a second step it swaps the money into the currency (and the interest rate structure) it prefers. The swap thus allows the utilization of comparative advantages which companies enjoy in particular segments of the financial markets. These comparative advantages are then traded in the swap markets.

To give an example, a US company may enjoy a high credit rating in its domestic financial markets, but it wants to borrow Swiss francs for an investment in Europe. At the same time an European MNC with a good local credit standing may be in need of US dollars. If the requirements are similar with regards to the quantities and maturities, the companies can - possibly with the intermediation of a bank - enter into a successful currency swap deal. The US company raises US dollars in the US capital markets while the European enterprise borrows the equivalent amount of Swiss francs. They then exchange ("swap") their loans, pay each other's interest during the swap period, and re-exchange the principal amounts on maturity in order to repay their respective loans. Both companies thus acquire the funds needed, but with the better conditions which only the corresponding counterparties are able to obtain.

Comparative advantages in financial markets are based on market imperfections. Without imperfections it is impossible for both parties to gain from a transaction. In perfect markets swaps would therefore be a zero sum game. There are many examples for market imperfections.

94 See Bueschgen (1986), p322.
95 See Buckley (1986), p175.
96 Large international banks with their worldwide connections and information systems are particularly well-suited to find "matching" swap partners. However, since 1984 banks not only act as intermediaries, but also engage in deals themselves; they now arrange one-sided deals without having found a matching counterparty. This activity is called "keeping a book" or "warehousing"; see Gelber (1986), p60; Erdmann (1987), p12.
97 See Buckley (1986), p175; Dresdner Bank (1986b), p3. Swaps are based on the Ricardian theory of comparative advantage which normally explains why gains are to be had from international trade. By applying this theory, it can be shown that swaps will be profitable even in the case where one company can obtain both sorts of funds more cheaply than the other company. Not (only) absolute cost differences but also "relative" differences form the basis for the benefits to be gained from swap transactions; see Arnold & Burg (1987); see also Turnbull (1987).
Since their inception, swaps have been used to arbitrage different perceptions of credit risk; different perceptions of interest rate risk and exchange rate risk; imperfections arising from systems of taxation, regulation or accountancy; differential access to information; market illiquidity; and transaction costs.  

- A second major advantage of the swap technique is that it allows companies to tap segments of financial markets which otherwise would be closed to them. This can be because of information inefficiencies (i.e. the borrower lacks a name familiar to the market segment) or because of discriminatory regulations. With a swap the borrower effectively buys the access of another borrower to the segment closed to him. Corporations can use the swap market to restructure their interest rate payments according to their needs and preferences. Liabilities can be switched from fixed to floating rate debt, or from one floating basis to another (e.g. from LIBOR to the US-Treasury bill rate). With this mechanism companies can hedge or speculate against expected future interest rate changes, or they can "position themselves" on the given yield curve according to their preferences.

- Finally, and of particular interest here, currency swaps are a further tool for the management of a company's foreign exchange exposures. The company can use swaps to change the decomposition of its liabilities. Like all other risk management tools, swaps can in this respect be used to reduce or to increase risk. With swaps the company can close out existing exposures by matching the currency structure of its liabilities to that of its assets, or by matching the currency denomination of its interest rate payments to that of its cash inflows. Alternatively, swaps can be used to create exposures in order to speculate on the future development of currencies which the company perceives to move favourably.

The discussion so far has focused solely on the swapping of liabilities. Although much less important in terms of market volume, it is also possible to swap financial assets. Analogously to debt swaps, asset swaps can be used to arbitrage market imperfections, to achieve high yield returns, to diversify into closed market segments and to hedge or trade interest rate and foreign exchange risks.\(^{105}\)

Currency swaps are often compared to forward exchange contracts\(^{106}\), or, to be precise, to the traditional swaps of the foreign exchange markets which are the equivalent of the capital and credit market swaps. This comparison is valid as far as the underlying basic principles and theoretical concepts are concerned. For the practical application of the two instruments, however, some important differences exist. These differences mean that unlike futures or options currency swaps in reality do not normally compete with forward exchange contracts for their application in corporate exchange risk management. Instead the two instruments are largely complementary. Both have distinct advantages and disadvantages over each other which in most situations make one or the other the clearly preferable hedging tool.

Forward exchange contracts are the more suitable instrument for the hedging of short term exposures.\(^ {107}\) For maturities of up to 12 or 18 months - and for important currencies even longer - the markets for forward contracts are very flexible, broad and liquid. Deals in the interbank market are normally for large volumes. However, corporate customers can also deal in smaller amounts without price disadvantage. The deals can be arranged over the telephone in a matter of seconds, and the standardized confirmation simply consists of a letter or telex stating the key elements of the transaction. This easiness of trading, the flexibility as to maturities and volumes and the minimal administrative efforts incurred make the forward contract the ideal tool for the day-to-day adjustments of a company's short term foreign exchange exposures.


Currency swaps, on the other hand, can only be used to manage longer term exposures. Typically they are for maturities of between three and ten, or even up to 20, years. They are also for large volumes only; the minimum for a swap deal is US$ 5m or the equivalent. The maximum amount depends on the current market liquidity, but deals over US$ 500m are not unheard of.¹⁰⁸

Like forwards, swaps are also arranged over the telephone. However, for currency swaps it may still take 24 hours or in exceptional cases even longer before a bank can give a quote to one of its customers. If the parties then agree on the deal, they will confirm its main conditions over the telex. The preparation and the exchange of the full documentation is a complicated matter and may take even months.¹⁰⁹ This is because currency swaps involve much more complex payment structures than forward exchange contracts. Also, because the maturity of a currency swap is much longer, the various forms of risks are much greater than with a forward exchange contract. This has to be considered in the preparation of the documentation which is the legal basis of the deal.

To summarize, currency swaps are more complicated than forward exchange contracts, and they involve a much greater administrative effort. For these reasons they are worthwhile only for long maturities and large volumes. Here, however, they have comparative advantages over forward contracts and therefore swaps are to a large extent complementary to forward contracts. Only for those currencies for which forward contracts are available for maturities of up to five years or longer does an area of competition exist between the two instruments. For the choice between the use of swaps and forwards in such situations some further arguments apply.

Forward contracts for long maturities are available only for the most important currencies, all of which are traded against the US-dollar. For appropriate exposures it is quite likely that such forward deals are cheaper than comparative currency swaps.

This may already be different for cross currency deals, i.e. exchange deals which are not made against the US-dollar. Such deals are unusual in the interbank forward market and if demanded they are normally arranged by combining two US-dollar forward deals. For example, a forward sale of French francs against Dutch guilders will be synthesized through the sale of francs against dollars and the simultaneous sale of the dollars against the guilders. In the thin long term markets this can be a complicated procedure and the corporate treasurer may get an uncompetitive rate which incorporates two bid-offered spreads.

In contrast to this, markets for cross currency swaps have evolved very dynamically over recent years. One can say that the swap markets have developed a specialisation for deals in "exotic" currencies, such as the Italian lira, the Spanish peseta, the Danish krona or the Finmark, or for "exotic" combinations of currencies. For the hedging of exposures in such currencies, swaps will often be the better, i.e. cheaper, alternative.

A further advantage of currency swaps over forward contracts lies with the periodic interest rate payments of swaps. Firstly, the ongoing exchange of the interest means that the cost of the swap is settled continuously over the maturity period, not in a lump sum at its end.

Secondly, the periodic interest payments make swaps an ideal tool for the hedging of ongoing foreign currency income or expenditure streams. With a debt swap the company can hedge the incoming payments of foreign currency royalties, dividends, or of exports or overseas sales. In the same way asset swaps can be used to hedge payments for imports, foreign labour costs, rents, etc. Whenever such income or expenditure streams start, terminate or change their currency denomination, the flexibility of swaps allows the corporation to react swiftly and without great cost and to adopt to the new exposure situation. In particular the complex payment patterns provided by amortizing, drawdown or other "swaps of the
second generation" enable the treasurer to tailormake the structures of the hedges into perfect complements of the underlying exposures.

In effect, the emergence of swap markets has meant that today strategic finance decisions, such as the determination of the interest and currency structure of a company's debt, have become changeable and reversible. Therefore, currency swaps are an instrument which can be used as a surrogate for the hedging of strategic exposures with operational policies such as sourcing, production location and pricing.

The hedging of ongoing and (ideally) periodic foreign currency payments cannot be achieved with a single forward contract. In theory the payment structure of a swap can however be synthesized through a series of forward contracts. Apart from the above factors (lack of availability for longer maturities and for less important currencies), this alternative has two drawbacks.

Firstly, to synthesize a, say, five-year swap with monthly interest payments requires 60 forward contracts. This of course is a clumsy business and it involves a lot of trading, documentation and administration. It also requires the company to pay 60 bid-offered spreads.

The second relative disadvantage is the following. Assuming fixed rate debts, a swap will produce a relatively uniform interest payment structure (see Figure 19) as it annualizes the interest rate differential over the maturity period. As Figure 19 shows, with a series of forward contracts only the payments for one currency can remain constant. If, for instance, the dollar is at a discount against the pound, and the dollar payments are held constant, the sterling payments will decrease over time. A currency swap thus leads to a more stable payment structure which may be preferable for the hedging of periodic and uniform foreign currency cash flows.

115 For the following see Barclays Bank (1988), p12.
To conclude, compared to currency swaps, forward exchange contracts are the more flexible and less expensive instrument for the hedging of short term foreign exchange exposures. Swap agreements take over where there are no liquid long term forward exchange markets.\textsuperscript{117} For the more important currencies this will normally be for maturities of five or more years. With less important currencies or with cross currency exposures, swaps may start becoming the more attractive alternative at a shorter maturity range.

With their payment structures and the flexibility of modern swap forms, currency swaps are well suited for the hedging of overseas projects or other long term, strategic foreign currency payment streams. They can be used as surrogates for operational policies which can only be altered at great cost and over longer periods.

\textsuperscript{116} See Barclays Bank (1988), p12.
\textsuperscript{117} See Price (1983), p30.
In addition, swaps can combine the purpose of managing foreign exchange exposures with cost savings in the company's medium and long term funding. Even in cases where alternatives exist for the hedging of long term exposures, swaps in many cases will therefore be the lowest cost alternative. One can thus agree with Buckley who writes that currency swaps are a valuable tool which "enables corporate treasurers to manage currency exposure and reap cost benefits at the same time."\(^{118}\)

2. Debt-equity swaps

Debt-equity swaps are one of the many financial innovations which have emerged in the aftermath of the international third world debt crisis. This technique involves the capitalisation of discounted third world debt into equity investments. Since it also involves the conversion of dollar-denominated liabilities into local currency, it is a further potential exchange risk management tool. Because of the nature of equity investments, it is clearly a potential tool for strategic exchange risk management. However, by definition, debt-equity swaps are only relevant for consideration in subsidiaries which are resident in third world debt crisis countries.

Foreign direct investments in third world countries are generally considered to be high risk investments.\(^{119}\) The investing MNC often faces extreme cultural differences and grave political and financial risks. Very often such countries are characterized by high rates of inflation. South American countries, for instance, for many years have been showing annual inflation rates of several hundred percent. Such inflation rates necessitate the continuous devaluation of the local currency relative to the US-dollar and the European currencies. Further problems for the MNC's business are created by price and wage controls or restrictions on imports and capital movements, which are imposed by the local governments to combat the hyper-inflation.

\(^{118}\) Buckley (1986), p178.

\(^{119}\) For this and the following see Pausenberger (1981), p196.
Despite the existence of special conventions and regulations for accounting in such high inflation countries, it can still be the case that the equity of a company is eradicated in a relatively short period because the index-linked values of the company's debts rise faster than the accounting values of its assets are allowed to appreciate. This is even more problematic for young subsidiaries which often require high capitalisation ratios to be able to finance their growth in countries with deficient local capital markets. In addition, for MNCs the book values of such subsidiaries are high risk accounting exposures, as they are subject to the continuous devaluation of the local currencies relative to the parent company's home currency.

Against this background of severe financial (exchange) risks it has to be analysed whether and how debt-equity swaps can be employed by MNCs to manage their long term strategic foreign exchange exposure in third world countries.

The basic mechanism of a debt-equity swap works as follows:

An MNC plans to invest in a third world country which is involved in the debt crisis. The MNC may want to increase the capitalisation ratio of an existing subsidiary, buy an established local company or found a new operation.

The first step, now, is for the MNC to find out whether the country in question allows the conversion of debt into equity or has official programmes for such conversions. By now, programmes exist in almost all debtor countries; well known are those of Brazil, Mexico, Chile and the Philippines. The MNC then has to check whether the planned investment is eligible under the regulations of the country's debt conversion programme.

The next step for the MNC is to acquire US-dollar denominated debt. This debt can be bought in the secondary markets for third world debt. Since these debts are technically defaulted, they are being traded with a discount. The rate of discount varies according to the

---

probability of the debt being repaid, i.e. according to the economic and political situation of the country against which the claim is held. Bolivian and Peruvian debt can be bought at prices lower than 10% of their face value, while Brazilian and Venezuelean debt, for instance, costs around 50%.122

This debt is then presented to the debtor, which usually is the central bank of the developing country. The central bank redeems the debt in local currency, which the MNC can then use to pay for its investment. The redemption is based on the current exchange rate and on the original face value of the debt, but various methods exist for the debtor country to participate to some degree in the discount of the value (e.g. through transaction fees or through tenders for the right to convert).

The process of converting debt for equity is far more complicated than this in practice, and numerous variations have been developed by the different countries offering debt conversion schemes. The principle however remains the same for all such transactions. By buying defaulted debt in the secondary markets and by converting it into the local currency through a debt-equity swap, the MNC acquires funds for local investments at a cost which is - often considerably - lower than with normal methods of funding, that is, by simply exchanging US-dollars or other currencies for the local currencies at the market based or officially determined exchange rates.123

In what ways, now, can debt-equity swaps be used to manage foreign exchange risk? Expressed in an accounting way, the foreign exchange risk exposure of an MNC in a third world country normally consists of its local equity investments in its subsidiaries. By investing an amount of US-dollars (or the equivalent of its European home currency) into a local currency equity investment, the MNC hence increases its exchange risk exposure in this country. In this sense debt-equity swaps are totally unsuitable for reducing or eliminating foreign exchange risk, or a company’s exposure to it. However, in a more subtle way, it can be argued that debt-equity swaps are useful to exchange risk management. They are useful, if they reduce the

amount of US-dollars needed for an investment that is to take place anyway, whether the technique can be used or not. In this case the use of debt-equity swaps can be said to reduce or minimize a given foreign exchange exposure.

The question whether and to what extent debt-equity swaps lower the cost of capital required for a given local currency investment cannot be answered conclusively. The conditions for debt-equity swaps vary considerably between different countries and in each of the countries they are also subject to frequent changes. Generalisations are therefore impossible to make. Numerous authors report impressive savings being made by MNCs which have successfully conducted debt-equity swap deals, e.g. Nissan in Mexico. However, such reports should be treated with caution. Often they are written by bank managers responsible for the marketing of the financial product in question. It also remains doubtful whether the numbers quoted as "profits" or "gains" on such deals have been computed in a way consistent with established accounting principles. For instance, as with other financial innovations the tax treatment of debt-equity swaps is a matter of uncertainty.

Theoretically valid and conclusive studies of the use of debt-equity swaps are lacking so far. One reason for this is certainly the political sensitivity of the matter both for the countries and the international banks involved in the debt crisis. However, although some sceptical voices are heard, it appears to be the case that debt-equity swaps provide an interesting funding alternative for MNCs considering investments in third world countries.

As to the relevance of the technique for corporate exchange risk management, the empirical study undertaken produced some tentative results.

Only two of the 17 MNCs included in the survey had actually used debt-equity swaps. One of these had done several such swaps over recent years; the other had done only one, but was just in the

process of completing a second deal. Of the 15 MNCs which had not used the technique, four companies had considered using them in the past and one was considering doing a swap at the time of the interview. For the remaining five MNCs the question of investing in the relevant third world countries did not apply at all or had not arisen in recent years.

The following is an account given by one of the treasurers who had successfully used debt-equity swaps to fund a project in South America:

Company B:

We have also used discounted debt in Brazil. We have saved, oh, perhaps 25% of the cost of these funds. We paid $75 for every $100 of debt.

I would recommend the use of debt-equity swaps. It is very valid and profitable. It involves not too much administration and it saves you lots of money. If you want to invest $50m and you can save 25% of that, that is a lot of money. And there is not a lot of documentation. It is fairly standardized.

I think if we now looked at a totally new project, the use of debt-equity swaps could make a difference whether to do it or not. If you are looking at a discount of 25%, then you are looking at a return on $75 instead of $100. That is a big difference and may well change your decision.

As regards the use of the technique in the management of exchange risk exposures, all of the treasurers agreed unanimously that these considerations did not play a role in the decision making process on investments involving debt-equity swaps. In all cases the MNCs were planning an investment in a third world country and sought the lowest cost funds available. According to the treasurers, debt-equity swaps will often be the lowest cost alternative for investments in the relevant countries.

To conclude, debt-equity swaps can be a profitable funding technique for investing in third world countries. In this sense, they lower, or even minimize, the exposure of the investing MNC to the danger of devaluations in the local currencies. However, neither in a theoretical sense nor from the viewpoint of the business practice are debt-equity swaps genuine exchange risk management tools. Decisive for the use of debt-equity swaps are not exchange risk management considerations, but solely the costs of funds for given projects.
PART E: RECOMMENDATIONS FOR FURTHER RESEARCH

In all three major parts of the thesis areas have been found where further research appears to be both necessary and promising.

Within the general theory of corporate exchange risk management the role of the individual risk manager needs to be scrutinized. Behaviourly orientated studies are required to ascertain what personal objectives risk managers in MNCs follow, and what their personal risk-return preferences are. It would be important to know exactly how the managers' and their departments' performances are evaluated in practice, and, moreover, how the managers think they are evaluated. It may well be that such studies would lead to the conclusion that accounting data and, for instance, the accounting concept of foreign exchange exposure are not as irrelevant as pure economic theory states. Accounting data may be the basis on which the work of the individual exchange risk manager is evaluated.

In corporate risk management, there may be conflicts between the interests of the individual risk manager and those of both the company's top management and its shareholders. The situation is further characterized by an unsymmetrical information distribution between management and shareholders. An application of the modern principal-agent theory to the decision problems of corporate exchange risk management therefore appears to be appropriate.

The same question was shown to be of relevance for the discussion about the use of currency options. Further knowledge about the risk managers' objectives and preferences could yield new insights with regard to the use of currency options in corporate exchange risk management. Depending on the results of such a study, guidelines could be devised by top management to ensure a hedging strategy and a use of specific hedging instruments consistent with the interests of the company's owners.
As far as the theory of financial innovation is concerned, a general taxonomy of financial innovation is still lacking. In this thesis an attempt was made to develop a consistent taxonomy for innovations in international financial markets. This taxonomy needs to be discussed and, if necessary, modified to encompass innovations in all financial markets.

Financial markets are changing fast, and there is no reason to expect the rate of change to slow down markedly in the foreseeable future. New structural forces emerge continuously which bring about new reactions by the financial institutions; other factors, which here have been described as new, become either established or irrelevant. Hence it will be necessary in certain intervals to revise both the list of financial innovations as well as the analysis of their determinants.

Finally, as far as the use of the four specific innovations is concerned, it appears to be of particular interest to analyse in depth how currency swaps can be used as a means to manage strategic foreign exchange risk exposures. This is because there are grave deficits in business practice in this area. The empirical study undertaken for this thesis has shown that MNCs still do not recognize the importance of a strategic approach to foreign exchange risk management. MNCs will have to recognize the importance of such an approach, and financial theory should prepare the ground for this learning process.

The same can be said about the use of debt-equity swaps. This instrument is still relatively unexplored in academic management literature, certainly least for political reasons which render the collection of reliable data difficult. However, an analytically sound evaluation of the use of this instrument is necessary before conclusions can be arrived at about its effects on the exposures of MNCs to foreign exchange risk in third world countries.
PART F: CONCLUSIONS

The objective of this thesis was to ascertain whether and to what extent financial innovations can be employed efficiently in the foreign exchange risk management of MNCs.

The main body of the thesis was divided into three parts. In Part B an outline was given of the basic concepts and problems of corporate exchange risk management. Firstly, taxonomic issues were addressed. Foreign exchange risk was defined as the probability of changes in the home currency values of a company's assets, liabilities or cash flows caused by unexpected future exchange rate changes. It was then shown that theoretically the concept of economic exposure is the most appropriate concept to be used as a basis for corporate management.

Secondly, it was discussed whether there really is a case for corporate exchange risk management. On the grounds of neoclassical equilibrium relationships it can be argued that in the long run exchange rate changes do not matter to the company. However, even in perfectly efficient markets - an assumption that does not hold for the real world markets in which MNCs operate - a case for corporate hedging can be made. Hedging reduces or eliminates the uncertainty of the home currency values of future foreign currency denominated cash flows. This reduced uncertainty enhances the company's ability to plan ahead for its future activities. This in turn may lower its cost of capital and is thus beneficial to the company.

The third section of Part B explained the techniques and instruments for the management of foreign exchange risk. The strategic nature of foreign exchange risk was emphasized and policies for long term exposure management were discussed. Part B closed with a presentation of the traditional tools for the tactical day-to-day management of foreign exchange risk.
Part C, the second main part of the thesis, was concerned with the process of financial innovation in international financial markets. Financial innovation is a phenomenon that has attracted much attention in the recent past. However, as yet, no comprehensive and accepted taxonomic framework has emerged. The thesis therefore attempted to develop a taxonomy for financial innovation in international financial markets. Financial innovations have been defined as changes in the instruments and services produced by the financial sector for the use of its customers. However, the thesis confined itself to new debt instruments and techniques in international markets.

The innovations have been classified on the basis of the different ways in which the new developments contribute to a global integration of national and international financial markets. The following groups of innovations have been distinguished:

- financial innovations occurring in already existing markets;
- financial innovations adding to the set of already available characteristics, thereby creating new markets;
- financial innovations combining characteristics which previously were only available in separated markets;
- financial innovations consisting of a splitting up of existing bundles of characteristics;
- financial innovations in new arbitraging instruments and techniques which help to reduce the segmentation of existing financial markets.

Following the taxonomic part, two microeconomic theories of financial innovations were presented. Both were too narrow to explain fully and satisfactorily the process of financial innovation; a more comprehensive model was outlined which interprets financial innovation as a complex process determined by micro-, meso- and macroeconomic factors.

The last chapter of Part C gave an overview of new financial instruments and techniques which have emerged over recent years in international financial markets.
In the third part of the thesis, Part D, four financial innovations were looked at in detail. It was discussed whether currency futures and currency option contracts can be usefully employed in the tactical, and currency swaps and debt-equity swaps in the strategic, foreign exchange risk management of MNCs. The aim was to find out in what situations the use of the new hedging instruments and techniques is advantageous relative to that of the traditional exchange risk management tools.

In order to undertake such an analysis in a meaningful way, it was necessary first to establish a benchmark for the comparison of different financial hedging policies. This proved to be an area completely neglected by the literature. The cost of hedging, the availability and flexibility, the risks and the accounting and taxation treatment were amongst the factors put forward by this thesis as decision factors for the choice between different hedging alternatives.

An in-depth analysis of the four innovative exchange risk management tools brought the following results:

- No reason were found why MNCs should use currency futures. One can refute conclusively all arguments found in the literature advocating their use. Forward exchange contracts appeared to be superior to currency futures contracts in all relevant respects.

- The results concerning the use of currency options were not as straightforward. Currency options were found to be the ideal hedging tool for contingent foreign currency cash flow exposures. With respect to certain exposures a distinction was made between completely risk averse companies and companies following a selective approach in their exchange risk management. The former should use forward exchange contracts to hedge their currency exposures. Forward contracts eliminate all risk, while the use of options implies the establishment of some risk against the hope of future gains. Selective MNCs, on the other hand, should use currency options only in one of three possible scenarios.
Whenever they have a firm view on the direction of an exchange rate, they should either use forward contracts or leave their exposures uncovered. For speculation on volatility, a so-called straddle, i.e. a combination of a put and a call option, was found to be the correct policy. Only in situations where the company does have a view on the direction of a currency, but has no firm belief in its own forecast, can an option be the optimal choice.

- Currency swaps were characterized as an ideal tool for the management of a company's long term exposures. Swaps are thus largely complementary to forward contracts which are typically available for maturities of up to only 12 or 18 months. An area of competition exists between the two instruments solely for those major currencies for which longer term forward contracts are actively traded. Various arguments were discussed for the choice between forwards and swaps in such situations.

- Finally, debt-equity swaps were presented as a potential instrument for the management of an MNC's foreign exchange risk exposures in third world countries. However, the discussion on this point had to conclude that debt-equity swaps can only indirectly be seen as exchange risk management tools. Basically, they are a technique to minimize the cost of funding a given equity investment.

The theoretical analysis of the topics discussed in this thesis was supplemented by an empirical study. Treasurers of 17 major UK MNCs and senior managers of six international banks, including the Bank of England, were interviewed about corporate exchange risk management and the use of financial innovations therein.

Some interesting findings were obtained concerning the MNCs' exchange risk management. Contrary to the position held by the academic literature, MNCs were found to attach a lot of importance to the management of their accounting exposures. At the same time, none of the companies used non-financial means to manage their exposures to foreign exchange risk, and only tentative attempts were
made to manage economic exchange risk exposures in general. It was also interesting to find that the corporate treasurers characterized their approaches to exchange risk management as much more risk averse than was justified by the facts observed. In all, the degree to which the decisions taken in the MNCs' treasuries were guided by speculative "views" on the future developments of foreign exchange and interest rates was surprisingly high.

The findings on the corporates' use of financial innovation mostly supported the positions arrived at in the theoretical analysis. For instance, none of the MNCs used or had ever used currency futures contracts. The picture was somewhat mixed with regard to currency options. With only a few exceptions, this product was used very tentatively, and the arguments put forward by the treasurers either for using or for not using them sometimes did not comply with the positions held by this thesis on theoretical grounds. Quite clearly, most treasurers were still in a learning phase as far as the use of this new, and rather different, exchange risk management tool was concerned.

Currency swaps were also used only sparingly. This can be explained by the fact that most of the MNCs in general did not pursue any longer term policies in their exchange risk management. The findings on the use of debt-equity swaps, finally, coincided with the theoretical results: those treasurers who had used or considered the use of this innovative financial product regarded debt-equity swaps solely as a technique to optimize the funding for an investment project in a third world country. As with all other longer term, strategic decisions, exchange risk management considerations played, if they played any role at all, only a very minor role in the respective decision processes.
**TABLE 3: COMPANIES AND INTERVIEW PARTNERS**

<table>
<thead>
<tr>
<th>Name of company</th>
<th>Name and position of interview partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT Industries plc</td>
<td>Mr. R.L. Desmond</td>
</tr>
<tr>
<td></td>
<td>Group Treasurer</td>
</tr>
<tr>
<td>Bowater Industries plc</td>
<td>Mr. C.K.J. Bowmer</td>
</tr>
<tr>
<td></td>
<td>Treasurer</td>
</tr>
<tr>
<td>The British Petroleum</td>
<td>Mr. S. Hotchin</td>
</tr>
<tr>
<td>Company plc</td>
<td>Manager, Customer Services, Treasury Division</td>
</tr>
<tr>
<td>Cadbury Schweppes plc</td>
<td>Mr. S. Tosswill</td>
</tr>
<tr>
<td></td>
<td>Treasurer</td>
</tr>
<tr>
<td>Courtaulds plc</td>
<td>Mr. D. Brooks</td>
</tr>
<tr>
<td></td>
<td>Assistant Treasurer</td>
</tr>
<tr>
<td>Hertz (Europe) Ltd.</td>
<td>Mr. M. Bryant</td>
</tr>
<tr>
<td></td>
<td>Treasurer Europe</td>
</tr>
<tr>
<td>Imperial Chemical</td>
<td>Mr. A.R. Auer</td>
</tr>
<tr>
<td>Industries plc</td>
<td>Corporate Treasurer</td>
</tr>
<tr>
<td>Jaguar plc</td>
<td>Mr. M. Lane</td>
</tr>
<tr>
<td></td>
<td>Treasurer</td>
</tr>
<tr>
<td>Johnson Matthey plc</td>
<td>Mr. I. Houston</td>
</tr>
<tr>
<td></td>
<td>Group Treasurer</td>
</tr>
<tr>
<td>Redland plc</td>
<td>Mr. S.J. East</td>
</tr>
<tr>
<td></td>
<td>Group Treasurer</td>
</tr>
<tr>
<td>Reed International plc</td>
<td>Mr. T. Fallon</td>
</tr>
<tr>
<td></td>
<td>UK Treasurer</td>
</tr>
<tr>
<td>Rolls Royce plc</td>
<td>Mr. K. Harding</td>
</tr>
<tr>
<td></td>
<td>Investment Controller</td>
</tr>
<tr>
<td>The RTZ Corporation plc</td>
<td>Mr. T.J. Lighterness</td>
</tr>
<tr>
<td></td>
<td>Treasurer</td>
</tr>
<tr>
<td>Tarmac plc</td>
<td>Mr. H.V. Clark</td>
</tr>
<tr>
<td></td>
<td>Group Treasurer</td>
</tr>
<tr>
<td>Company</td>
<td>Name</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>T &amp; N plc</td>
<td>Mr. L.M. Pearl</td>
</tr>
<tr>
<td>Unigate plc</td>
<td>Mr. M.J. Church</td>
</tr>
<tr>
<td>Unilever plc</td>
<td>Mr. R.H.P. Markham</td>
</tr>
</tbody>
</table>
# TABLE 4: BANKS AND INTERVIEW PARTNERS

<table>
<thead>
<tr>
<th>Name of bank</th>
<th>Name and position of interview partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Bank of England</td>
<td>Ms. F. Mann&lt;br&gt;Debt &amp; Development Group&lt;br&gt;International Division</td>
</tr>
<tr>
<td>The Co-operative Bank plc</td>
<td>Mr. J. Barge&lt;br&gt;Director, City &amp; International</td>
</tr>
<tr>
<td>Dresdner Bank AG&lt;br&gt;London Branch</td>
<td>Mr. G. Wegener&lt;br&gt;Manager, Securities Trading and Sales&lt;br&gt;&amp;&lt;br&gt;Mr. R. Lembster&lt;br&gt;LIFFE Floor Manager</td>
</tr>
<tr>
<td>National Westminster Bank plc</td>
<td>Mr. G. Parkinson&lt;br&gt;Senior Manager&lt;br&gt;Group Treasury</td>
</tr>
<tr>
<td>The Royal Bank of Scotland plc</td>
<td>Mr. S.J. Glenn&lt;br&gt;Manager, Information, Treasury Division</td>
</tr>
<tr>
<td>TSB England &amp; Wales plc</td>
<td>Lord Cobbold&lt;br&gt;General Manager&lt;br&gt;Financial Markets</td>
</tr>
</tbody>
</table>
### APPENDIX 2

#### TABLE 5: THE MULTINATIONAL CORPORATIONS:
#### TURNOVER, ASSETS AND EMPLOYEES

<table>
<thead>
<tr>
<th>Dominant Sector Product Area</th>
<th>Yearly Turnover (£ million)</th>
<th>Total Assets (£ million)</th>
<th>Number of employees [av.p.a.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT Industries Tobacco, Paper, Retailing, Financial Services</td>
<td>17,208</td>
<td>8,517</td>
<td>305,279</td>
</tr>
<tr>
<td>Bowater Industries Packaging, Chemicals, Building Materials, Tissue &amp; Timber, Freight Services</td>
<td>1,148</td>
<td>938</td>
<td>18,700</td>
</tr>
<tr>
<td>British Petroleum Oil, Minerals, Coal, Chemicals, Nutrition</td>
<td>27,578</td>
<td>26,704</td>
<td>126,000*</td>
</tr>
<tr>
<td>Cadbury Schweppes Confectionery, Soft Drinks</td>
<td>2,031</td>
<td>1,399</td>
<td>27,497</td>
</tr>
<tr>
<td>Courtaulds* Textiles, Chemicals, Wood Pulp, Packaging</td>
<td>2,262</td>
<td>1,545</td>
<td>65,400</td>
</tr>
<tr>
<td>Hertz (Europe) Rental Vehicles</td>
<td>no information available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICI Chemicals</td>
<td>11,123</td>
<td>8,787</td>
<td>127,800</td>
</tr>
<tr>
<td>Jaguar Automobiles</td>
<td>1,002</td>
<td>754</td>
<td>12,483</td>
</tr>
<tr>
<td>Johnson Matthey* Precious Metals, Chemicals</td>
<td>1,222</td>
<td>532</td>
<td>7,454</td>
</tr>
<tr>
<td>Redland* Construction Materials, Fuel Distribution</td>
<td>1,300</td>
<td>1,147</td>
<td>12,366</td>
</tr>
<tr>
<td>Reed International* Publishing, Information Services, Packaging, Paper</td>
<td>1,950</td>
<td>1,485</td>
<td>34,600</td>
</tr>
<tr>
<td>Rolls Royce Gas Turbine Engines</td>
<td>2,059</td>
<td>1,544</td>
<td>42,000</td>
</tr>
<tr>
<td>RTZ Mining, Metal Fabrication, Building Products, Chemicals</td>
<td>4,209</td>
<td>4,026</td>
<td>78,705</td>
</tr>
<tr>
<td>Tarmac Building Materials, Construction</td>
<td>2,201</td>
<td>1,720</td>
<td>28,031</td>
</tr>
<tr>
<td>T &amp; N Automotive Components, Industrial Materials</td>
<td>961</td>
<td>766</td>
<td>39,404</td>
</tr>
<tr>
<td>Unigate* Food, Dairy Products, Vehicles, Engineering</td>
<td>1,970</td>
<td>793</td>
<td>33,688</td>
</tr>
<tr>
<td>Unilever Chemicals, Food</td>
<td>16,550</td>
<td>5,914</td>
<td>294,000</td>
</tr>
</tbody>
</table>

* Figures for year to end of March 1987
+ Year end-figure

Source: Annual Reports
**TABLE 6: THE MULTINATIONAL CORPORATIONS: INTERNATIONALISATION PROFILES**

<table>
<thead>
<tr>
<th>Number of countries with manuf. operat.</th>
<th>Overseas as % of Total Turnover</th>
<th>Assets</th>
<th>Employees</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT Industries approx. 90</td>
<td>76</td>
<td>69</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Bowater Industries 14</td>
<td>51</td>
<td>63</td>
<td>52</td>
<td>43</td>
</tr>
<tr>
<td>British Petroleum approx. 70</td>
<td>58</td>
<td>85</td>
<td>78</td>
<td>75</td>
</tr>
<tr>
<td>Cadbury Schweppes more than 20</td>
<td>53</td>
<td>60</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>Courtaulds approx. 25</td>
<td>39</td>
<td>40</td>
<td>29</td>
<td>44</td>
</tr>
<tr>
<td>Hertz (Europe)</td>
<td>no information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICI</td>
<td>more than 40</td>
<td>49</td>
<td>53</td>
<td>56</td>
</tr>
<tr>
<td>Jaguar</td>
<td>no manufacturing subsidiaries abroad</td>
<td>78+</td>
<td>not applicable</td>
<td></td>
</tr>
<tr>
<td>Johnson Matthey 24</td>
<td>42</td>
<td>52</td>
<td>i.n.a.</td>
<td>48</td>
</tr>
<tr>
<td>Redland more than 30</td>
<td>54</td>
<td>75</td>
<td>46</td>
<td>52</td>
</tr>
<tr>
<td>Reed International more than 10</td>
<td>42</td>
<td>i.n.a.</td>
<td>31</td>
<td>43</td>
</tr>
<tr>
<td>Rolls Royce 3</td>
<td>74+</td>
<td>i.n.a.</td>
<td>7</td>
<td>i.n.a.</td>
</tr>
<tr>
<td>RTZ</td>
<td>40</td>
<td>65</td>
<td>71</td>
<td>76</td>
</tr>
<tr>
<td>Tarmac</td>
<td>9</td>
<td>19</td>
<td>information not available</td>
<td></td>
</tr>
<tr>
<td>T &amp; N 13</td>
<td>37</td>
<td>43</td>
<td>56</td>
<td>58</td>
</tr>
<tr>
<td>Unigate more than 40</td>
<td>38</td>
<td>43</td>
<td>65</td>
<td>43</td>
</tr>
</tbody>
</table>

Source: Annual Reports

* Figures for year to end of March 1987
+ Capital employed instead of assets
* includes exports from UK
- Unilever report figures for Europe instead of for UK; Turnover, for example, here therefore:
  Total Turnover minus Turnover Europe as % of Total Turnover
XXI

BIBLIOGRAPHY


Annual Reports of multinational corporations as listed in Appendix 2.


Euromoney (1983): "The way into any market" In: Euromoney, November, pp60-75.


Giddy, I.H. (1976): "Why it doesn’t pay to make a habit of forward hedging" In: Euromoney, December, pp96-100.


Lancaster, K.J. (1966b): "Change and innovation in the technology of consumption" In: AER, No. 2, pp14-23.


Tran, V.Q. (1979): Foreign Exchange Management in Multinational Firms, UMI Research Press, Ann Arbor (Mich.).


