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FORMULATING A PRICING POLICY FOR FINANCIAL SERVICE CONGLOMERATES

PAR / BY

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FORMULATION D'UNE POLITIQUE DE FIXATION DES PRIX POUR LES SOCIETES DE SERVICES FINANCIERS

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RESUME

La dernière décennie a vu l'émergence de nombreuses de services financiers qui vendent en même temps des produits bancaires et d'assurance. Cette évolution se traduit par une difficult6 fondamentale en matière de politique de fixation des prix, dans domaines, tels que le développement du client, les performances organisationnelles globales et la compensation. Le présent article vise à résoudre cette difficulté :

- mettant en evidence les caractéristiques pertinentes des risques respectifs afférents aux produits bancaires et d'assurance, et les meilleurs moyens de comparaison / ajustement de ces risques ;

- montrant les implications sur l'élaboration d'une méthode cohérente de fixation des prix de différents types de produits ;

- donnant quelques exemples réels d'applications pratiques de la méthode suggérée.

La théorie financière procure des outils conceptuellement pertinents, qui permettraient en principe d'opérer cet comparaison / ajustement. La théorie moderne du portefeuille et son développement ultérieur, le Modèle de fixation des prix des actifs immobilisés, a fourni une base théorique et un outil utile de &termination du compromis entre le risque et la rentabilité attendue. La théorie de fixation des prix avec arbitrage repose sur une activité transactionnelle visant à éliminer les gains supérieurs ou inférieurs à ceux requis pour rémunérer le risque du marché.

Toutefois, ces outils sont inadéquats en pratique, impossibles à appliquer au niveau produit, et entraînent des difficultés d'estimation, qui les rendent peu utiles pour choisir la base d'une politique cohérente de fixation des prix.

Le Modèle de fixation empirique des prix, tel que défini dans le présent article, fournit un moyen préférable de comparaison des produits, sur les plans théorique et pratique. Sa justification théorique est possible sans les restrictions déformantes du Modèle de fixation des prix des actifs immobilisés, et il est facile à mettre en oeuvre sur la plupart des marchés, du fait de leur maturité générale. En outre, il incorpore tous les risques, de tout type de produit financier - y compris les risques internationaux.

Dans de nombreux pays, des actuaires ont utilisé des tests de profit pour mesurer la rentabilité et le taux de rendement des capitaux investis de produits assurances. Traditionnellement, la plupart des compagnies d'assurance " vie ont utilisé, dans leurs tests de profit, le même taux d'escompte risque pour l'ensemble de leurs activités et ont essay6 de le lier à la rentabilité du capital. Cette approche pourrait être acceptable pour beaucoup de compagnies d'assurance, mais elle ne l'est pas pour des tests de profit concernant des produits à la fois bancaires et d'assurance, ou sur toute une gamme de produits qui comportent des risques fondamentalement différents. Ne pas reconnaître les différents risques couverts par des produits d'assurance différents, peut entraîner des décisions incorrectes, en matière d'acceptabilité de la rentabilité d'un produit.

L'article traite des différents risques applicables à différents produits et présente les résultats de tests de profit concernant deux produits d'assurance - vie et deux produits bancaires, compte tenu ou non des différents risques implicites à chacun de ces produits. Ainsi est mise en évidence la nécessité d'incorporer le risque aux tests de profit lors de la comparaison de produits comportant des risques différents.

En conclusion, on résume certaines des applications du Modèle de fixation empirique des prix à des sociétés de services financier.

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FORMULATING A PRICING POLICY FOR
FINANCIAL SERVICE CONGLOMERATES

BY M. BLACK AND A. GUPTA

SYNOPSIS

The last decade has witnessed the emergence of many financial conglomerates, which are combining sales of both banking and insurance products. This development presents a fundamental challenge to pricing policy in several areas such as customer development, total organisational performance and compensation. The intention of this paper is to address this challenge by

- outlining the relevant risk characteristics of banking and insurance products and the best means of comparing / reconciling these risks
- demonstrating the implications for developing a consistent pricing approach for different product types
- providing some actual examples of the suggested approach in practice.

Conceptually relevant tools are available from finance theory and in principle these should allow for comparison and reconciliation. Modem portfolio theory and its subsequent development, the Capital Asset Pricing Model have provided a theoretical base and useful tool for evaluing the trade - off between risk and expected return. Arbitrage Pricing Theory relies on active trading to eliminate returns over and above those required to reward market risk.

These tools are, however, inadequate in practice. It is impossible to apply them at a product level and they suffer from estimation problems which make them unhelpful in providing a basis for a consistent pricing policy.

The Empirical Pricing Model, as defined in the paper, provides a preferable way to compare products, both theoretically and practically. It is theoretically justified without the distorting restrictions of the Capital Asset Pricing Model and is easy to implement in most markets because of general market maturity. Moreover, it incorporates all risks of any financial product regardless of the type - including international risks.

Actuaries in many countries, have used profit testing for measuring the profitability of insurance products and their return on investment. Traditionally, in their profit tests, most life insurance companies have used the same risk discount rate across the whole company and have attempted to relate this to the shareholders return on equity. Whilst this approach may be acceptable for many insurance companies, it is not acceptable when applying profit testing to both banking and insurance products - or across any range of products which contain fundamentally different risks. Failure to recognise the different risks entailed in underwriting different products can result in incorrect decisions regarding the acceptability of the profitability of a product.

The paper discusses the different risks applicable to different products and shows the results of profit testing two life assurance products and two banking products, both allowing f a and ignoring the different risks implicit in each of the products. By doing so, it emphasises the need to incorporate risk into profit tests, when comparing products which contain different risks.

The paper concludes by summarising some of the applications of the Empirical Pricing Model to financial service conglomerates.

Section 1

INTRODUCTION

The last decade has witnessed the breaking down of barriers between insurance and banking institutions. Throughout Europe, we have seen each *type* of institution breaking into the others former domain either directly, through acquisition or via joint ventures.

Methods for pricing insurance products are highly developed and have been successfully applied throughout the last 20 years. However, the risks associated with banking products are fundamentally different to those incorporated into insurance products and it would be inappropriate to apply insurance pricing techniques to banking products without allowing for the different types of risks involved in the different types of product

The emergence of financial services conglomerates presents a fundamental challenge to pricing policy in several areas :

- customer development
- total organisational performance
- compensation.

Each of these are considered below.

Customer Development

The current approach to development of customers within a financial conglomerate is by and large random and can be characterised by the phase "throwing mud at the wall". Despite the seemingly random approach to customer development, sales of some products are related and it is necessary to know whether the risks associated with each product are correlated, positively or inversely, and to allow for this in the pricing of the products. Failure to do so can lead to incorrect judgements as to which products should be sold and the prices at which they should be sold.

Within many financial service conglomerates there is a perceived need to develop customers more systematically. Systematic customer development increases the need to understand the underlying relationshops between risk and return of each product sold to a customer.

Total **Organisational** Performance

The current approach to pricing of insurance products is to measure the value contributed by the sale of each product and, ideally, to price each product so that it contributes the same value to the organisation as a proportion of a pre - defined value measure. Banks recognise that certain of their products are loss leaders, but do not know whether, or appreciate the extent to which, sales of these products lead to sales of other profitable products. If distribution channels and/or products are to be integrated in a way such that the institution maximises the value of its products sales, a consistent pricing policy is required.

Compensation

The principal of compensating sales people in proportion to the value created by the sale is widespread in the insurance **industry** and remains **the** only defensible compensation principle for proprietary companies. Proportionate compensation is required if employees **are** to be motivated financially to carry out actions consistent with increasing shareholder value. Joint ventures between **banks** and **insurance companies** require a firm basis for identifying the value added by each organisation in **undertaking the** various types of risks and analysing how value added by **the** joint venture is being distributed between the parties.

The intention of this paper is to address this challenge by

- outlining the relevant risk characteristics of **banking** and insurance products and **the** best means of comparing / reconciling these risks.
- demonstrating the implications for developing a consistent pricing approach for different product types
- providing some actual examples of the suggested approach in practice.

Section2
THE EMPIRICAL PRICING MODEL

Conceptually relevant tools are available from finance theory and in principle these should allow for comparison and reconciliation. Modem portfolio theory and its subsequent development, the Capital Asset Pricing Model have provided a theoretical base and useful tool for evaluating **the** trade **off** between risk and expected return.

In analysing risk, it is necessary to distinguish between the two generic **types** of risk - specific risk and systematic or market risk. In the stock market, specific risk is the variability of outcome specific to an individual **stock,** whereas systematic risk is the effect of general economic activity **common** to all stocks in the marketplace. Specific risks can be almost **costlessly** eliminated by **holding** a **diversified** Portfolio of stocks. Since systematic or market risk affects all stocks, it cannot be eliminated through diversification and the Capital Asset Pricing Model derives a relationship between market risk and the reward investors **should** expect for taking on certain levels of market risk The Capital Asset Pricing Model does however, suffer from various drawbacks which are discussed below. The Capital asset pricing model **has** been well documented elsewhere (see references 1 and 2) and a full discussion of it here is therefore not considered appropriate.

Arbitrage Pricing Theory relies on active trading to eliminate **returns** over and above those required to reward market risk The **theory(see** reference 3) states that expected market return is **determined** by a linear combination of a **finite number** of unspecified systematic **factors.** The theory makes no attempt to **define** these factors, but focuses on whether market **disequilibrum** exists allowing arbitrage profits to be **made.** Arbitrage profits exist when an investor can **risklessly** achieve returns above the risk free rate through hedging **strategies a** other market transactions. In **efficient** markets arbitrage profits are eliminated by trading **normalisation** and **therefore** risk free investment only obtains a risk free **rate** of return.

The tools provided from finance theory are however, inadequate. The Capital Asset Pricing Model suffers from the inability of application at a product level. Moreover, it assumes that the correletion co - efficient between a stock and the market is stable and where an industry is currently undergoing major structual change, the stability of an historically estimated correlation co - efficient is questionable. Furthermore, both the Capital Asset Pricing Model and Arbitrage Pricing Theory are difficult to test and apply and suffer from estimation problems which make them unhelpful in providing a basis for a consistent pricing policy.

Banking and insurance products are subject to different risks ; the key ones involved in each are shown below :

Banking Products	Insurance Products
Interest rate risk	Mortality and lapse risks
Credit risk	Sales risk
Expense risks	Expense risk
	Investment risk

A consistent pricing theory must take into account each of the different types of risks and both the Capital Asset Pricing Model and Arbitrage Pricing Theory are incapable of doing so in practice.

A new approach based on Arbitrage Pricing Theory addresses a risk and expected return trade off at the product level and thereby provides a managerial tool for making investment decisions, designing products and allocating capital under conditions of rationing. This new approach has been termed the Empirical Pricing Model (EPM). It does not try to predict or explain market behaviour, it simply observes it and translates it into the implied cost of capital.

The EPM starts from the premise that markets are reasonably efficient and consequently that risk free investment only obtains a risk free rate of return. At the company level, arbitrage profits do not exists or, at least, are too small to exploit.

The first step of the empirical pricing approach is to discount cash flows from a product (or profit test a product) at a risk free rate. If the cash flows from a product are certain, then the appropriate discount rate to use in profit testing it would be the risk free rate. In practice, product cash flows are not certain but can he made so by developing or acquiring a hedging strategy. The costs incurred in developing or acquiring the hedging strategy, in an efficient market, represents a market assessment of the systematic risk. Therefore the risk free present value of expected returns minus the costs of the hedging strategy defines a risk adjusted net present value of expected returns. From this an implicit, product specific cost of capital or value can be &rived as shown below.

$$\sum_{t=0}^{n} \frac{\text{Cashflows}_t}{(1+r)^t} \quad -\text{Hedging Costs} = \sum_{t=0}^{n} \frac{\text{Cashflows}_t}{(1+c)^t}$$

where r = risk free rate
c = cost of capital for the product

The fact that the price of the hedging strategy is obtained from a competitive market, as defined by the absence of arbitrage profits, means that portfolio effects between products have been completely inputed by the market. In conceptual terms, the cost of the hedging strategy can be derived by selling the cash flows in an efficient market, which would pay the company exactly the risk adjusted net present value.

The EPM is both theoretically and practically preferable in providing the means for product comparison. It is theoretically justifiable without the distorting restrictions of the Capital Asset Pricing Model or the questionable econometric techniques required for execution of Arbitrage Pricing Theory. It is applicable at a product level rather than at a company level providing line managers across different businesses with individual, yet market determined, investment criteria. It incorporates all risks of any financial product regardless of type, including international or currency risks. Furthermore, it is easy to implement and maintain in most markets because of general market maturity - its application relies only on the existence of secondary markets which can provide tradable hedging strategies. These markets, whilst currently the domain of a limited number of financial products, are growing in size and number of products traded.

Section 3
MEASURING PRODUCT PROFITABILITY

Profit testing is a well established method for measuring the profitability of insurance products and their return on investment. It has been used extensively by actuaries in the UK and many other countries over the last 20 years. A profit test projects the underlying cash flows of an "average" product over the life term of the product, against the statutory valuation basis, allowing for the anticipated actual experience of the product Readers unfamiliar with the principals of profit testing are referred to references 4 or 5, or to reference 6 for a more basic description of the methodology.

Traditionally, in their profit tests, most life insurance comparnies have used the same risk discount rate across the whole company and have attempted to relate this to the shareholders return on equity. In doing so they have made two implicit assumptions. They have assumed that :

1. The risks across all products are the same.
2. The difference between the risk free rate and the risk discount rates is equivalent to the return expected for accepting the risks inherent in the products.

This approach is acceptable, if the risks inherent in the various products are s   ciently similar for the differences between them to be ignored. Many companies have historically only sold products in a limited sector of the market, say the unit - linked market or the with - profits market, in which case the first assumption will probably have been true.

Shareholders choice of the appropriate risk discount rate has been influenced by their perception of the risk contained in their companies products. It does not necessarily follow, however, that the risks entailed in all sectors of the insurance market are

sufficiently similar for the same risk discount rate to be **adopted** In practice, in the UK, these has been recognised by insurance companies insofar as shareholders and management of proprietary with - profit companies have been prepared to accept lower discount rates in calculating appraisal values of their companies than the shareholders of unit - linked companies. This reflects the difference between the risks entailed in writing traditional participating business and unit - linked business.

The approach of using the same risk discount rate across an entire company is, however, crude and is not an acceptable way of measuring the profitability of a product in a financial institution where the risks implicit in the different products sold are **fundamentally** different, This is undoubtedly **true** in a financial **services conglomerate.** The following diagram shows the impact of incorporating risk into the profit testing of individual products and compares the approach of using a risk adjusted rate of return for individual products to using a company - **wide** cost of capital across all products.

Impact of incorporating risk into
product profit testing
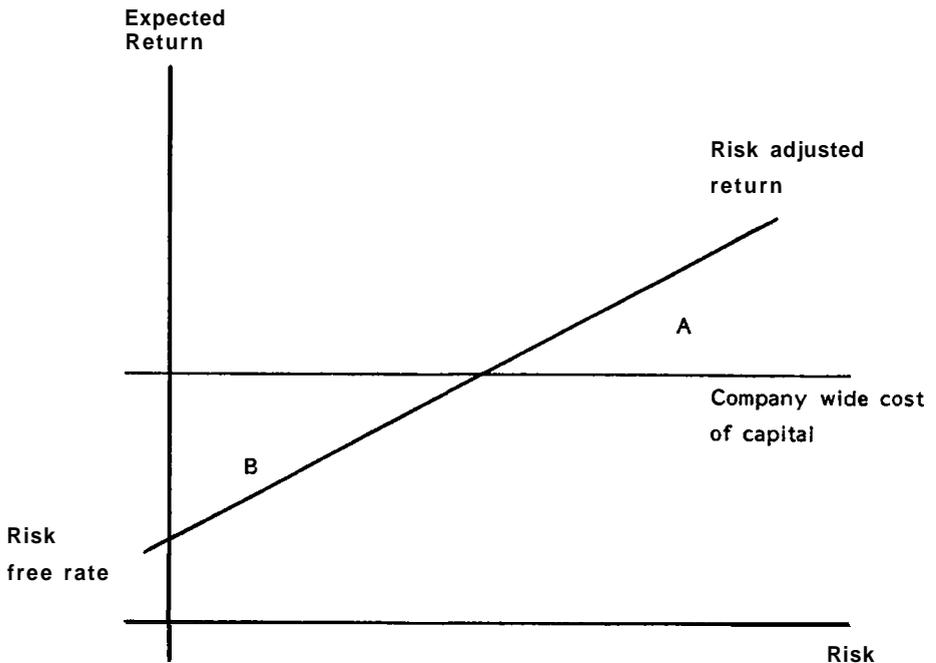
The diagram shows that companies using the same risk discount rate across their whole portfolio would incorrectly reject product B as not meeting their required return on equity, whereas the risk contained in product B is such that on a risk adjusted return basis, it should be accepted. Similarly, the same shareholders would incorrectly accept product A.

Consider the example of a financial institution writing two insurance products and two banking products.

• Banking products
- Personal Unsecured Loans (PUL)
- Mortgages

• Insurance products
- Credit Insurance
- Term Assurances

In our examples we have assumed that the personal unsecured loans are far an amount of £ 2,000 repaid over three years. The mortgages are assumed to be a £ 30,000 mortgage repaid over 25 years. The credit assurance is taken as a typical product covering death, disability and unemployment an a personal and secured loan off 2,000, at a cost of 6% of the regular repayments. Although the premiums for the credit insurance are expressed in this way, the plan is in effect a single premium product with a premium of 6% of the attached loan and the loan is increased by 6% to pay the premium. The term assurance has been taken as a policy sold to a 30 year old with a sum assured of £ 30,000 and a monthly premium of £ 17 payable over a 25 year period.

The following table briefly compares the underlying risks of the various products.

Product

Risk	PUL	Mortgage	Credit Insurance	Term Assurance
Interest rate / Margin	Medium	High	Low	Low
Investment	Low	Low	Low	Medium
Credit / Lapse	High	Medium	Low	Medium
Expense	Low	Medium	Low	Medium
Mortality / Morbidity	Low	Low	Low	High
Sales	Low	Low	Low	Low

In the above table, interest rate / margin risk is the risk that competitive pressures could erode the future margins expected to emerge from the product · this is most likely to occur on the mortgage plan where competitive pressures could farce the institution to adopt a lower than preferred interest rate in the future. This compares to the investment risk, ie the risk that the investment of the funds produce lower returns than that built into the pricing of the product ; this is particularly relevant for the term assurance because of the substantial guarantees contained in this product and the need to set up reserves to provide for these guarantees.

The credit / lapse risk arises from the possibility of a greater than expected proportion of customers defaulting on the contracts because of their inability to maintain their repayments · this is especially relevant for the personal unsecured loan. The expense risks are particularly high for the longer term contracts, where inflation could cause costs of administering the contract to increase beyond that allowed for in the pricing of the products. Mortality and morbidity risks are usually, perhaps surprisingly, low for the credit insurance, because of the low claim rates experienced and the high margins built into these products.

In considering the above products, we have assumed that they are all sold through the same distribution channel and that the sales risk, ie the risk that the contract has been inefficiently or incorrectly sold, is low for each of the contracts. Where multiple distribution channels are used, it is necessary to consider the different sales risks involved in each of the distribution channels. In practice, it is not always easy to separate lapse risks from sales risks.

Applying the Empirical Pricing Model, profit test of these products produced the following net present values.

	Product			
	PUL	Mortgage	Credit Insurance	Term Assurance
NPV				
Risk free value	33	61	34	124
Hedging costs	34	281	2	22
Risk adjusted value	(1)	(220)	32	102

In the above calculations, we have assumed a risk free rate of 8% per annum.

The results indicate that the returns on each product, after allowing for the risks entailed in each product, are substantially different Ignoring the risks of each product could lead a company to conclude that all products were profitable. After allowing f a the risks of each product, substantially different results emerge which could encourage the company to focus its attentions in different directions, eg focus more in the unsecured lending market rather than the mortgage market, or place a greater emphasis on selling credit

insurances together with personal unsecured loans. A company which was heavily in the mortgage market might need to consider how it could sell more assurances, or other products with inversely correlated risks, to its customers so as to reduce the long term risks of its mortgage business.

Some of the applications of the Empirical Pricing Model are discussed in the following section.

Section 4
APPLICATION OF THE EMPIRICAL PRICING MODEL

The previous section demonstrated how the Empirical Pricing Model could be used to measure the profitability of the various products sold by financial services conglomerates. Although a relatively limited range of products was considered, the same approach could be applied to a far wider range of products.

Although it could be argued that existing markets are not completely efficient, they are sufficiently so to enable the Empirical Pricing Model to be applied so as to produce meaningful results. We have found the results of using the Empirical Pricing Model to be managerially useful as a firm foundation for establishment of a rational pricing policy by

- quantifying the real relative value of risks and future profits
- identifying the real sources of value creation and destruction within a conglomerate organisation
- providing the foundation for integrating actuarial and marketing demands and pricing.

The first of these was demonstrated in the previous section. Using this approach it is possible to identify which product areas are creating value within a conglomerate organisation and which product areas are destroying value. Increased competition within the banking industry over the next decade will force more and more banks to be selective in their product offerings. Failure to appreciate the real sources of value creation can lead to inappropriate product focus. Application of the Empirical Pricing Model can, as demonstrated, identify the risk of particular product strategies.

In particular, the Empirical Pricing Model provides a means for integrating the various actuarial and marketing pricing demands. Historically, actuaries have profit tested products without providing for the various risk entailed in the products. Actuaries have often appreciated the risks inherent in the product, but have found this difficult to communicate to the marketing departments, which has led to inachievable marketing demands. The Empirical Pricing Model enables the risks inherent in a marketing approach to be quantified and communicated. In doing so, it provides a basis for more systematic and efficient customer development, improvement of organisational performance and effective compensation strategy.

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