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ENCYCLOPEDIC DICTIONARY OF FINANCE

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布莱克韦尔金融百科辞典

EDITED BY

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The Blackwell Encyclopedic Dictionary of Finance

Edited by Dean Paxson and Douglas Wood

Manchester Business School

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Foreword

It is a privilege to introduce this book and its contributors to a great new readership – the people of China.

In a transforming economy the challenge is to find new ways of managing and organising that harmonise with national culture. In meeting this challenge the most important tools are ideas and knowledge. This book is a toolbox containing a wealth of powerful and influential ideas. This is knowledge that has been influential in shaping how we think about what goes on in organisations, and which has stood the test of time. You will also find here ideas that are emerging as signposts for the future development of organisations and management. One major barrier to adopting this knowledge has been its restriction to the readers of specialist journals and books. This has led, over the years, to a great proliferation of specialist concepts and terminology – impenetrable jargon to the nonspecialist, making it unnecessarily difficult for lay readers to understand and get full value from the insights of scholars. The present volume solves this problem by providing a systematic inventory of key concepts, with clear explanations of them by a collection of the world's experts.

In a transforming economy like China, it is my hope that a book like this will be immensely valuable to

a) scholars and students who want a source book for key concepts, references to further reading, and linkages with other topics [cross references are indicated by words in SMALL CAPITALS]
b) business leaders and professionals who want clear explanations of management and organisational terms, and ideas about how to apply them in business settings

c) broad-minded and intelligent general readers who want quick digests of the essential academic knowledge on a given topic.

There are many ways of using a book like this. The cross-indexing system allows you to explore at will. If you pick a theme, you can follow a path of interconnected ideas through the main areas of business and management. For readers in China, as a region in the

midst of radical economic and social change, so of these might be as follows:

1. **Management style**. What kinds of leadership seem to work best and why? What are the preconditions for effective authority?
[see, for example, entries on: CEOS; DELEGATION; ENTREPRENEURSHIP; LEADERSHIP, MANAGERIAL BEHAVIOR; MANAGEMENT STYLE; POWER; RISK-TAKING; STRATEGIC MANAGEMENT; SUCCESSION PLANNING; SUPERVISION; TEAMBUILDING; TOP MANAGEMENT TEAMS; TURNAROUND MANAGEMENT; WOMAN MANAGERS]

2. **Organisational design**. How do you get the best out of people through how you organise tasks, communication networks and decision-making systems?
[see, for example, entries on: BUREAUCRACY; COMMUNICATION; DECENTRALIZATION; FAMIL Y FIRMS; INFORMATION TECHNOLOGY; JOB DESIGN; MATRIX ORGANIZATION; MUL TINA TIONAL CORPORATIONS; ORGANIZATION DEVELOPMENT; ORGANIZATIONAL DESIGN; ORGANIZATIONAL EFFECTIVENESS; RESTRUCTURING; SOCIOTECHNICAL THEORY; TECHNOLOGY]

3. **Human Resource systems**. What is current accepted wisdom about the effectiveness of key practices and processes? How do you make them work best?
[see, for example, entries on: ASSESSMENT CENTRES; DISABILITY; HOURS OF WORK; HUMAN RESOURCE STRATEGY; JOB ANALYSIS; MANAGEMENT DEVELOPMENT; NEGOTIATION; PARTICIPATION; PAYMENT SYSTEMS; PERFORMANCE APPRAISAL; PSYCHOLOGICAL CONTRACT; RACE; RECRUITMENT; SAFETY; SELECTION METHODS; TRAINING]

4. **Individual performance and adaptation**. Under conditions of change, which methods work best and how do people's motives translate into productive action?
[see, for example, entries on: ABSENTEEISM; CHANGE METHODS; COMPETENCIES; CREATIVITY; ERRORS; GOAL SETTING; INTERPERSONAL SKILLS; MENTAL HEALTH; MOTIVATION; PERFORMANCE, INDIVIDUAL; PERSONALITY; PRODUCTIVITY; QUALITY CIRCLES; STRESS]

5. **The cultural context for management**. How can we best understand and analyse how values and practices adapt to different national and industrial contexts?
[see, for example, entries on: CRISES; CULTURE; DOWNSIZING; EXPATRIATES; GOVERNMENT AND BUSINESS; INTERNATIONAL MANAGEMENT; MANAGEMENT OF DIVERSI-

TY; ORGANIZATIONAL CULTURE; POPULATION ECOLOGY; PRIVATIZATION; TECHNOLOGY TRANSFER]

6. **Strategic decision making**. What are the hazards and opportunities for how business plans are formulated? How can groups and teams be used to best effect? what biases distort judgement?

[see, for example , entries on: BEHA vIORAL DECISION THEORY; CONSULTANCY INTER VENTION METHODS; DECISION MAKING; DIVERSIFICATION; GROUP DECISION MAKING; INNOVATION; MERGERS & ACQUISITIONS; NETWORKING TOTAL QUALITY MANAGEMENT]

7. **Ethics**. What do we know about how principled business can be achieved in demanding market environments? How can employees be encouraged to act as good corporate "citizens" and businesses as socially responsible forces?

[see, for example, entries on: BUSINESS ETHICS; CONFLICT, CORPORATE SOCIAL PERFORMANCE; DISCRIMINATION; JUSTICE; LEARNING ORGANISATION; MORAL DEVELOPMENT; ORGANIZATIONAL CITIZENSHIP; POLITICS; VALUES]

This list is not exhaustive. There are almost as many ways of using this book as there are entries. For this reason it is my hope and belief that Chinese readers will find their own special interests served by its rich contents.

Nigel Nicholson
London Business School
September 1999

Preface

Although the basic purposes of finance, and the nature of the core instruments used in attaining them, are relatively constant, recent years have seen an explosion in complexity of both products and techniques.

A number of forces are driving this explosion. The first is internationalization encompassing a dramatic growth in the number of countries with stock markets, convertible currencies and a positive regime for foreign investors. For a number of years the more adventurous institutional and private investors have been increasing the proportion of their investments in foreign markets in general and emerging markets in particular in search of growth, higher returns and better diversification. Reflecting this, finance has begun the long process of overhauling the traditionally domestic measurement of risk and return. In the new world order in which the next generation is likely to see an unprecedented transfer of economic power and influence from slow growing developed economies to the high growth tigers in Asia and the Pacific Rim, the ability of financial markets to recognize and accommodate the changes will be a priority.

The second change has come from dramatic falls in the costs of both information and transaction processing. More information is available and it is available more quickly in more places. Improved databases allow sophisticated analysis that would have been impossible a few years ago and data intensive artificial intelligence techniques allow a much richer array of market structures to be considered. The switch to electronic systems of transactions and trading has dramatically lowered costs, allowing increased arbitrage and stimulating the widespread use of complex new derivative products and products offering potentially an infinity of combinations of underlying products. It is no exaggeration to claim that these new techniques and instruments can be used to provide a proxy for any underlying traded instrument.

This power is increasingly used in the marketplace to provide the financial community with new choices, including performance guarantees and indexed products. The development of traded instruments provides an ability to pinpoint exposures precisely and this has lead to a new science of risk management, where the net exposures of a portfolio of risky assets such as securities or bank loans can be estimated and, where required, selectively or completely hedged by buying opposite exposures in the marketplace. Not surprisingly, this encyclopedic dictionary reflects these new techniques which are inexorably creating a world in which financial assets are priced in a seamless global marketplace.

New technology has helped in selecting entries for the dictionary. A word count of titles in finance and business journals was used to identify the frequency with which particular terms appeared and this was used as a primary guide to the priority and length of entries. To accommodate new topics such as real options that are only just emerging into the literature, we also included some entries where interest was growing rapidly towards the end of the search period.

In compiling the dictionary we have been privileged in the support we have received from a wide range of distinguished contributors who have taken the time from a busy programme of research and publication to summarize the often voluminous literature in their specialist areas into an accessible form. Inevitably the technical content of some of the entries reflects the rocket science development

in the areas covered, but all entries provide an initial definition and bibliographic references for the less expert.

Finally, we would like to thank Joanne Simpson and Catherine Dowie for their support for this project. The demands of monitoring and recording the progress of contributions as they passed from commissioning through each stage of the editing process to final completion provided an essential foundation to the project.

Dean Paxson
Douglas Wood

Contents

Preface	vi–vii
List of Contributors	viii
Dictionary Entries A–Z	1–206
Index	207

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— A —

agency theory When human interaction is viewed through the lens of the economist, it is presupposed that all individuals act in accordance with their self-interest. Moreover, individuals are assumed to be cognizant of the self-interest motivations of others and can form unbiased expectations about how these motivations will guide their behavior. Conflicts of interest naturally arise. These conflicts are apparent when two individuals form an agency relationship, i.e. one individual (principal) engages another individual (agent) to perform some service on his/her behalf. A fundamental feature of this contract is the delegation of some decision-making authority to the agent. Agency theory is an economic framework employed to analyze these contracting relationships. Jensen and Meckling (1976) present the first unified treatment of agency theory.

Unless incentives are provided to do otherwise or unless they are constrained in some other manner, agents will take actions that are in their self-interest. These actions are not necessarily consistent with the principal's interests. Accordingly, a principal will expend resources in two ways to limit the agent's diverging behavior: (1) structure the contract so as to give the agent appropriate incentives to take actions that are consistent with the principal's interests and (2) monitor the agent's behavior over the contract's life. Conversely, agents may also find it optimal to expend resources to guarantee they will not take actions detrimental to the principal's interests (i.e. bonding costs). These expenditures by principal and/or agent may be pecuniary/non-pecuniary and are the costs of the agency relationship.

Given costly contracting, it is infeasible to structure a contract so that the interests of both the principal and agent are perfectly aligned. Both parties incur monitoring costs and bonding costs up to the point where the marginal benefits equal the marginal costs. Even so, there will be some divergence between the agent's actions and the principal's interests. The reduction in the principal's welfare arising from this divergence is an additional cost of an agency relationship (i.e. "residual loss"). Therefore, Jensen and Meckling (1976) define agency costs as the sum of: (1) the principal's monitoring expenditures; (2) the agent's bonding expenditures; and (3) the residual loss.

Barnea et al. (1985) divide agency theory into two parts according to the type of contractual relationship examined – the economic theory of agency and the financial theory of agency. The economic theory of agency examines the relationship between a single principal who provides capital and an agent (manager) whose efforts are required to produce some good or service. The principal receives a claim on the firm's end-of-period value. Agents are compensated for their efforts by a dollar wage, a claim on the end-of-period firm value, or some combination of the two.

Two significant agency problems arise from this relationship. First, agents will not put forward their best efforts unless provided the proper incentives to do so (i.e. the incentive problem). Second, both the principal and agent share in the end-of-period firm value and since this value is unknown at the time the contract is negotiated, there is a risk sharing between the two parties (i.e. the risk-sharing problem). For example, a contract that provides a constant dollar compensation for the agent (principal) implies that all the risk is borne by the principal (agent).

Contracts that simultaneously solve the incentive problem and the risk-sharing problem

are referred to as "first-best." First-best contracts provide agents with incentives to expend an optimal amount of effort while producing an optimal distribution of risk between principal and agent. A vast literature examines these issues (see e.g. Ross, 1973; Shavell, 1979; Holmstrom, 1979).

The financial theory of agency examines contractual relationships that arise in financial markets. Three classic agency problems are examined in the finance literature: (1) partial ownership of the firm by an owner-manager; (2) debt financing with limited liability; and (3) information asymmetry. A corporation is considered to be a nexus for a set of contracting relationships (Jensen and Meckling, 1976). Not surprisingly, conflicts arise among the various contracting parties (manager, shareholder, bondholders, etc.).

When the firm manager does not own 100 percent of the equity, conflicts may develop between managers and shareholders. Managers make decisions that maximize their own utility. Consequently, a partial owner-manager's decisions may differ from those of a manager who owns 100 percent of the equity. For example, Jensen (1986) argues that there are agency costs associated with free cash flow. Free cash flow is discretionary cash available to managers in excess of funds required to invest in all positive net present value projects. If there are funds remaining after investing in all positive net present value projects, managers have incentives to misuse free cash flow by investing in projects that will increase their own utility at the expense of shareholders (see Mann and Sicherman, 1991).

Conflicts also arise between stockholders and bondholders when debt financing is combined with limited liability. For example, using an analogy between a call option and equity in a levered firm (Black and Scholes, 1973; Galai and Masulis, 1976), one can argue that increasing the variance of the return on the firm's assets will increase equity value (due to the call option feature) and reduce debt value (by increasing the default probability). Simply put, high variance capital investment projects increase shareholder wealth through expropriation from the bondholders. Obviously, bondholders are cognizant of these incentives and place restrictions on shareholder behavior (e.g. debt covenants).

The asymmetric information problem manifests itself when a firm's management seeks to finance an investment project by selling securities (Myers and Majluf, 1984). Managers may possess some private information about the firm's investment project that cannot be credibly conveyed (without cost) to the market due to a moral hazard problem. A firm's securities will command a lower price than if all participants possessed the same information. The information asymmetry can be resolved in principle with various signaling mechanisms. Ross (1977) demonstrates how a manager compensated by a known incentive schedule can use the firm's financial structure to convey private information to the market.

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STEVEN V. MANN

artificial neural networks Artificial neural networks (ANNs) are learning algorithms in the form of computer programs or hardware. ANNs are characterized by an architecture and a method of training. Network architecture refers to the way processing elements are connected and the direction of the signals exchanged. A processing element or unit is a node where input signals converge and are transformed to outputs via transfer or activation functions. The values of outputs are usually multiplied by weights before they reach another node. The purpose of training is to find optimal values of these weights according to a criterion. In supervised training, inputs are presented to the network and outputs are compared to the desired or target outputs. Weights are then adjusted to minimize an objective function such as the root mean square error for instance. In unsupervised training, the network itself finds its own optimal parameters.

Although there are several types of neural networks, a simple example of ANN is the multilayer perceptron. The middle sets of units are called hidden layers and the other two input and output layers. The transfer functions in the input and output layers can be identities, and those of the hidden layer are usually sigmoid or hyperbolic tangent functions. These functions map the sum of weighted inputs to the range between zero and one or between minus one and plus one. The flow of signals in the example is unidirectional giving the name feedforward to the whole network. One can have also the output from the network and connect it to the inputs thus leading to recurrent networks which are useful for time series modeling. Typically, the hidden layers contain several processing elements. Obviously the outputs are modeled as highly non-linear functions of the original inputs. Thus, it is the architecture of units that allow an ANN to be a universal approximator. In other words an ANN can recover an unknown mapping from the input to the output space as long as it contains enough processing elements (White et al., 1992). The network can be trained with backpropagation (Rumelhart and McClelland, 1986), which seeks a minimum in the error function via the gradient descent method. Weights are adjusted in the direction that reduces the value of the error function after each presentation of the input records.

ANNs sometimes share the problem of local minima and the problem of overtraining. Because of the non-linearity involved, the algorithm may not always reach a global minimum. Overtraining refers to the situation where the network literally memorizes the inputs and cannot generalize (predict well) when it is applied to a new set of data. However, there are ways to overcome these problems and ANNs are very useful. In fact on many occasions they are superior to linear models in terms of prediction accuracy. A correctly trained network should be able to generalize, that is, to recognize patterns in data it has not yet seen. Although statistical measures such as t-ratios are not available, one can perform sensitivity analysis. This consists of varying one input within a reasonable range and observing how the estimated output function behaves.

Neural networks have been successfully applied in finance and economics, although research in this area is still new. Examples include forecasting security prices, rating bonds, predicting failure of banks or corporate mergers, and conducting portfolio management (Refenes, 1995). Although statistical models and ANNs overlap considerably, the two sets of models are not identical. White (1989) and Kuan and White (1992) discuss the parallels between statistical or econometric models and feedforward networks. Cheng and Titterington (1994) study ANNs from a statistical perspective, and Ripley (1994) compares standard classification techniques with ANNs. Classification is an area in which neural networks have been useful because they are often capable of sharply discriminating between classes of inputs with different characteristics. The general literature on ANNs is extensive. Hecht-Nielsen (1990) and Wasserman (1993) are two introductory books. The Internet news group comp.ai.neural_nets is an informative forum for exploring this growing field.

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ATHANASIOS EPISCOPOS

asset allocation In the analysis of portfolio management, the initial work of Markowitz (1959) was directed towards finding the optimal weights in a portfolio. It was quickly realized that the decisions involved in building up a portfolio were less frequent than the decisions to modify existing portfolios. This is especially important when analyzing how profitable portfolio managers have been over time. If, for example, a portfolio consists of equities and bonds, some investment managers might be particularly skilled in choosing specific companies in which the portfolio should invest, while others might be able to forecast at which times the portfolio should be more heavily invested in shares. The first type of skill would be classified as being more concerned with portfolio selection while the latter would be described as connected with timing or asset allocation.

Asset allocation decisions can be further divided. Investors can decide on an *ad hoc* basis to alter their portfolio by changing the weights of the constituent assets as a result of some specific model. For example, forecasting models are used to predict the performance of equities relative to bonds or real estate relative to equities. Dependent on the outcome of these forecasts, the investor will switch into or out of the asset being forecasted. Models are used to derive frequent forecasts of one asset against another and to move the portfolio day by day depending on the outcome of the forecasting model. This type of model is sometimes referred to as tactical asset allocation (TAA) and in practice is used in conjunction with some sophisticated trading in derivatives such as options or futures. Instead of buying more shares, this system buys options or futures in an index representing equities. If equities rise in value, so will the options and futures position and the portfolio thereby will increase in value to a greater extent than underlying equities. TAA is used to adjust portfolio exposure to various factors such as interest rates and currency movements as well as overseas investments (see Arnott et al., 1989).

An alternative category of asset allocation is the technique of dynamic asset allocation, where there is less emphasis on forecasting which component assets will perform well in the next period and more on setting up a policy by which the portfolio reacts automatically to market movements. This can be organized with the help of options and futures but can also be carried out by adjusting the weights of the component assets in the light of predetermined rules. For example, the policy of buying an asset when that asset has performed well in the current period and selling when it has done badly can be carried out in such a way as to provide portfolio insurance, i.e. it protects the portfolio by reducing the exposure to successive falls in the value of one of its constituent assets. An alternative dynamic asset allocation policy is that carried out by rebalancing so as to maintain a reasonably constant proportion in each asset. This involves selling those assets which have just risen in value and selling those assets which have just fallen in value. The two strategies are profitable in different phases of the market. When the market is moving strongly, the insurance policy is most successful. If, however, the market is tending to oscillate without a strong trend, the rebalancing policy works best. These principles are well illustrated in Perold and Sharpe (1988).

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C. W. R. WARD

asset pricing The modern theory of asset prices has its foundations in the portfolio selection theory initiated by Markowitz (1952). In a one-period framework Markowitz assumed that agents' utilities, and hence the price they will pay, depend only on the means and variances of returns. This mean-variance model can be justified either on the grounds of quadratic utility (for arbitrary distributions of the asset returns) or on the grounds of multivariate normal (or, more generally, elliptic) distribution of asset returns (for arbitrary preferences). Although quadratic utility has the unappealing properties of satiation and increasing absolute risk aversion in the sense of Arrow–Pratt and multivariate normality violates the limited liability properties of assets, the mean-variance model has had a pervasive influence on financial economics.

The portfolio frontier obtained within the mean-variance framework can be generated by any two frontier portfolios, a property called two-fund separation. Lintner (1965), Sharpe (1964), and Mossin (1966) combined the two-fund separation with the assumptions that agents have homogeneous beliefs, that markets clear in equilibrium, and that there is unlimited lending and borrowing at the riskless rate. The resulting model, the capital asset pricing model (CAPM), has been the major framework of thinking about the trade-off between risk and return. The (unconditional) CAPM states that the excess return on each asset (return less the risk-free rate) is proportional to the asset's market beta:

$$E(R_i - R_f) = \beta_{im} E(R_m - R_f)$$

where R_m is the return on the market portfolio and $\beta_{im} = \mathrm{cov}(R_i, R_m)/\mathrm{var}(R_m)$, the asset's market beta, measures the covariance of the asset's return with the market return. Black (1972) derived the CAPM for an economy without a riskless asset (the zero-beta CAPM).

The CAPM has been extensively tested. Black et al. (1972) and Fama and MacBeth (1973) originated the two frameworks in which most of the tests were done. However, the unsatisfactory empirical performance of the CAPM, as well as the problems identified by Roll (1977) related to the unobserved nature of the market portfolio, are the reasons why the single-period, single-beta relation had to be relaxed. Historically, the first direction was to place the individual decision making in an intertemporal set-up in which agents maximized utility, thus leading to the intertemporal CAPM (ICAPM) of Merton (1973). The other is the arbitrage pricing theory (APT) of Ross (1976).

Merton, working in continuous time under the assumptions of many identical agents with homogeneous expectations and market clearing, derived the ICAPM. The asset prices in Merton's model follow a diffusion process. If the investment opportunity set, namely the drift and diffusion parameters, and the instantaneous correlations between the returns of the different assets, do not change over time, then a continuous time version of the static CAPM holds: one obtains a single-beta security-market-line relationship. If the investment opportunity set is stochastic, however, a multi-beta relationship emerges:

$$E(R_i - R_f) = \beta_{im} E(R_m - R_f) + \sum \beta_{is} E(R_s - R_f)$$

where β_{is} measures the covariance of the return of the ith asset with the sth state variable. Thus, with a stochastically changing investment opportunities set agents need to hedge the future changes in their consumption for a given level of wealth. Given the interpretation of the S state variables as portfolios, the S portfolios are often referred to as hedge portfolios.

To derive the arbitrage pricing theory (APT) Ross (1976) assumes that asset returns are generated by a linear factor model:

$$R_i = E(R_i) + \sum \beta_{ik} f_k + \varepsilon_i$$