THEORETICAL STUDY ON STOCK OPTIONS IN SMALL AND MEDIUM ENTERPRISES

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Andrew Pendleton, Joseph Blasi, Douglas Kruse, Erik Poutsma, and James Sesil

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Address for correspondence: Professor Andrew Pendleton, Manchester Metropolitan University Business School, Aytoun Street, Manchester M1 3GH, United Kingdom
Tel 44 161 247 3974. Fax 44 161 247 6350 E-mail a.d.Pendleton@mmu.ac.uk

Biographical information

Andrew Pendleton is Professor of Human Resource Management, Manchester Metropolitan University Business School. He has published widely on employee financial participation, and wrote *Employee Ownership, Participation, and Governance* (2001). He was a member of the Advisory Group that assisted the UK Government in developing the Share Incentive Plan and Enterprise Management Incentives arrangements for stock options in 1999-2000.

Joseph Blasi is Professor in the School of Management and Labor Relations, Rutgers University, New Jersey, USA. He has a distinguished publishing record in the area of employee share ownership and stock options. He wrote *Employee Ownership: Revolution or Rip-Off?* (1988) and *The New Owners: the Emergence of Employee Ownership in Public Companies* (with D.Kruse, 1991).

Douglas Kruse is Professor in the School of Management and Labor Relations, Rutgers University, New Jersey, USA. He has a distinguished publishing record in the area of employee share ownership, profit sharing and stock options. He wrote *Employee Ownership and Employee attitudes: Two Case Studies* (1984) *Profit Sharing: Does It Make a Difference? (1993)*, *The New Owners: the Emergence of Employee Ownership in Public Companies* (with J. Blasi, 1991). He is a research Fellow at the National Bureau of Economic Research in Cambridge, Massachusetts.

Erik Poutsma is Assistant Professor in the School of Management, Nijmegen University, Netherlands. He is an expert on employee financial participation in Europe, and was a co-author of the European Commission's Report on Employee Financial Participation ('Pepper 2') in 1996. He has conducted several major studies for the European Foundation for the Improvement in Living and Working Conditions

James Sesil is Associate Professor in the School of Management and Labor Relations, Rutgers University, New Jersey, USA. He has written on the use of stock options in 'new economy' firms. Prior to completing his PhD at the London School of Economics, he worked as a compensation manager.

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Chapter One Introduction

Introductory comments

This report provides a comprehensive survey of the academic literature on stock options. It summarises and evaluates each of the major strands of the literature, which are located in the disciplines of Finance, Financial Economics, Labour Economics, Human Resource Management, and Industrial Relations. Our focus is primarily upon the use of stock options for executive remuneration, though we refer also at various places to broadly-based or all-employee share option schemes. Given the particular interest in small and medium-sized enterprises, it also draws on the small business literature where appropriate. The report addresses two major sets of questions. The first concerns the use, effects and impact of stock options, with the key issues being whether stock options are a desirable and effective instrument. The second main question concerns the use of stock options in small and medium-sized enterprises (SMEs). There are several important issues here. For instance, how widely used are stock options in SMEs? Are stock options more prevalent in some sub-sectors than others? Are there any particular issues arising from the use of stock options in SMEs, and indeed how relevant are stock options to the particular context of SMEs? What are the barriers to the use of stock options in this sector, and are there any measures that can be taken to encourage their use? Should their use be encouraged in SMEs?

The context to the report is the major growth in the use of stock options since the late 1980s. This growth has been most dramatic in the United States of America, where by the early 1990s around two-thirds of Chief Executive Officers (CEOs) of large firms received grants of stock options (Murphy 1999). By 1999, 94 per cent of Standard and Poor 500 companies granted options to their top executives. The value of these option grants at the date of grant accounted for nearly 50 per cent of total remuneration of CEOs in these companies (Hall and Murphy 2002). In most European Member States stock options have arrived on the scene somewhat later, but rapid growth can now be observed in some economies (Germany and France, for example). There have been initiatives in several Member States to facilitate the use of stock option grants, whilst, at European level, the European Commission has sought

to promote stock options (alongside other types of financial participation) (see Commission of the European Communities2002).

An employee stock option is a right to acquire company stock at some future point at a price set at the date of grant. The possibility of gains arising from upward movements in stock prices is the primary reward emanating from options[1]. This feature is viewed by advocates of stock options as providing the basis for a powerful incentives tool. Stock options apparently provide the means to align managerial and employee interests with those of shareholders, thereby providing the latter with incentives to take actions that will maximise shareholder value. The critical question is whether stock options have this impact in practice.

Focusing on executive stock options, we identify two main perspectives on this issue. One, drawing on principal-agent perspectives, suggests that stock options on the whole do align managerial/employee and shareholder interests, though there is some debate as to their effectiveness in this respect. Stock options are therefore seen as a (partial) solution to the fundamental corporate governance problem of the separation of ownership (shareholders) and control (managers). This can be described as the 'optimal contracts' model (Bebchuk *et al* 2001). The second perspective argues that stock options are instruments that are utilised by insiders for their own benefit, though references to 'shareholder value' may be made to hide self-aggrandisement. This has been described as the 'rent extraction' model of stock options (Bebchuk *et al*, ibid). Whereas the 'optimal contracts' perspective suggests that stock options help to resolve the governance problem arising from the separation of company ownership and control, the 'rent extraction' view suggests that stock options will reflect this governance problem. However, we point out that research evidence on broad-based stock options and employee ownership suggests that the 'rent extraction' model does not apply to broad employee ownership (as opposed to top executive compensation.)

The perspective adopted in this report regarding executive compensation inclines towards the second perspective, on the grounds that a succession of important studies

[1] The Finance and Economics literature views the financial pay-off as the main, possibly the sole, reward emanating from stock options but they may also have a function in facilitating employee ownership, in which case psychological pay-offs may also be important.

find that top managers benefit from 'insider' advantages in the institutions and processes of pay-setting and that patterns in the award and exercise of stock options is consistent with informational advantages. There are also important question marks over the potential incentive effects of stock options for executives, highlighted increasingly in the literature on the valuation and incentives sensitivity (Murphy 1999 summarizes these studies). Furthermore, studies of corporate behaviour suggest that stock options may influence encourage top managers to take actions (eg. stock repurchases) that are of primary benefit to themselves. These criticisms were perhaps a minority view amongst academics writing on stock options but, following the Enron and Worldcom affairs, they are likely to gain a wider appeal. It is notable that key US decision-makers (eg. Harvey Pitt, Chair of the Securities and Exchange Commission) are now explicitly critical of executive stock options (see Pitt 2002). The influential corporate governance body – The Conference Board – has recently called for stock options to be replaced by stock awards in executive remuneration packages (The Conference Board 2002). New requirements for shareholder votes on all stock options plans in the US and moves by the New York Stock Exchange (NYSE) to increase the number of independent directors may make US stock option plans more answerable to shareholders (New York Stock Exchange 2002a; 2002b).

It should be borne in mind throughout the report that, as the executive stock options literature is primarily American in origin, its concerns and findings will reflect the specific features of the US context. The separation of ownership and control may be viewed as especially marked in the US and this may provide for greater managerial discretion in pay-setting arrangements than in many European countries. In European countries, stock options may be capable of tighter control by shareholders but equally the greater capacity for investor control of managers emanating from more concentrated ownership may render stock options less necessary as an incentives tool. To some extent, the debate in European countries about stock options is focuses not just on their incentive powers but also on whether their use leads to or reinforces a shift in the balance of influence of various stakeholder groups and encourages an ideology of 'shareholder value' at the expense of 'stakeholder capitalism' (see Hopner 2001; Rappaport 1999). These concerns tend to be more muted in the US literature as it is widely assumed that the firm should be beholden to its shareholders rather than to a wider group of stakeholders.

In the report we address a series of questions that have arisen in the stock options literature over the last ten years or so. Bearing in mind that the literature is primarily American and that much of the evidence and findings will reflect American experience,

1) what are the main features of stock options, and how do these differ from other stock plans
2) how are stock plans regulated, and how does the regulatory regime affect the character of stock options?
3) How widespread are stock option plans, especially amongst small and medium-sized enterprises, and how much do they contribute to remuneration packages?
4) What factors influence employee participation in stock option programmes?
5) What factors influence firms' use of stock options?
6) How powerful are the incentives provided by stock options?
7) Is the presence of stock option programmes associated with superior levels of corporate performance?
8) How much value do stock markets attach to stock option programmes?
9) What are the effects of stock options on employee behaviour?
10) When do stock option grants and exercises occur, and what factors influence the timing of these?
11) Do stock options encourage stock repurchases in place of dividend distributions?
12) How widespread is the phenomenon of re-setting and what factors are associated with its occurrence?
13) What are the known characteristics of stock option plans amongst small and medium-sized enterprises (SMEs), and what lessons can we derive from the literature that are relevant to small firm settings?
14) What are the barriers to the use of stock options in SMEs, and what types of SME environment provide the most fertile territory for the use of stock options?

There are several important considerations that need to be borne in mind when interpreting the findings from the literature, and these are outlined in the following section.

General comments on the literature

The stock options literature is of fairly recent progeny. Until the early 1990s there was very little literature specifically on stock options though there was a burgeoning literature on managerial compensation more generally. The growing focus on stock options has reflected the rapid growth in the use of stock options, from the late 1980s in the case of the United States and from the late 1990s for much of Europe[2]. Given the pattern of use of stock options, it is not surprising that nearly all of the academic literature on stock options is American. The literature therefore tends to embody assumptions resting on common American practice. There are very small literatures on stock options in the UK and France. A body of literature is just starting to develop in Germany, reflecting the rapid growth in the use of options by listed firms since the legal changes of 1998. So far, though, the literature emanating from mainland Europe has been primarily descriptive in character, and is only just beginning to address the key conceptual, theoretical, and empirical questions raised above.

Most of the literature is to be found in the disciplines of Finance and Financial Economics, and thus the key journals for papers on stock options tend to be *The Journal of Finance, The Journal of Financial Economics, The Journal of Accounting and Economics* etc. It is not surprising therefore that much of the literature reflects concerns, assumptions, and approaches that are common to these disciplines. Principal-agent theory and the 'efficient markets hypothesis[3]' are at the core of the literature. Perspectives from Industrial Relations and Human Resource Management are less in evidence in the literature, and indeed literature emanating from these disciplines tends to have a different focus from the Finance/Financial Economics literature. There is a greater interest in employee participation, attitudes and

[2] Stock options have been used in France and the UK for somewhat longer. See the chapters on The Character of Stock Options and The Incidence of Stock Options.
[3] This maintains that stock markets efficiently process all available information

behaviour in these approaches. Even so, principal-agent theory also tends to be the primary theoretical approach.

The different disciplines tend also to use different sources of data. The US Finance literature focuses almost entirely on executive stock options and mainly utilises proxy statement information (available in the ExecuComp database), accounting information (Compustat database), and share price information (from the Centre for Research in Security Prices CRSP), whereas the HRM/Industrial Relations literature tends to draw on surveys of company characteristics.

The data sources used by the Finance/Financial Economics literature colour the coverage and character of much of the extant literature in several ways. One, because the data used is primarily 'hard' financial information, it cannot readily evaluate individual orientations towards stock options, and hence cannot ultimately determine whether stock options provide incentives to employees. In other words, it cannot fully incorporate the psychological factors that may influence whether, and to what extent, stock options are worthwhile to employees. The formal valuation models used in the literature do not explicitly incorporate psychological factors, and researchers interested in the impact of risk aversion on the worth of options to employees have to insert imputed values for this phenomenon. There have been few empirical investigations of executive (or rank and file) employees' *perceptions* of option worth (but see Lambert and Larcker 2001) as opposed to formal calculations of option value based on option grant size. A critical issue, which is not fully addressed in the literature, is whether employees see options as a substitute for part of core compensation or as a complement to it[4]. The nature of these perceptions seems likely to have a major bearing on employee valuations of stock options, and hence their potential incentive effects (see Lambert *et al* 1991; Hall and Liebman 1998; Hall and Murphy 2002)[5]. If options substitute for 'core' pay, and if option recipients are risk averse, a lower value may be attached to a given level of options for a given level of stock volatility than where options are perceived to be a complement to the remuneration package. In the former instance, an employee may believe that they

[4] Since 2000 US law (The Worker Economic Opportunity Act 2000) treats options held by blue collar and some salaried workers as a 'perk' not as core compensation
[5] This literature focuses almost entirely on executives

will *lose* wealth if the option goes 'out-of-the- money' whereas in the latter case they may perceive that they won't *gain* wealth in these circumstances. Thus, the asymmetric pay-off properties of options may function in entirely different ways according to the recipient's view of options in relation to their total remuneration package. This is an important issue when we consider the use of options in SMEs and 'new economy' firms, where options are seen to substitute for cash wages due to liquidity constraints. The logic of the suggestion made above is that very large grants of options will need to be made in these circumstances to provide an appropriate 'risk premium'.

Evidence that employees may value stock options in different ways to those presumed by formal valuation models is provided by studies on the exercise of options. As we will see later, most employees exercise their options at times other than those predicted by valuation models to provide the greatest value to them (see Chapter on The Exercise of Stock Options).

A second consequence of the data used in most studies is that the focus is on the Chief Executive Officer and other top officers. ExecuComp incorporates data on option grants and exercises for the top five officers, as mandated by the US Securities and Exchange Commission from 1993. This is entirely appropriate when the focus is executive compensation, and it also reflects the predominant use of stock options as a tool for executive rather than all-employee compensation. However, proxy statement information is not adequate for evaluation of all-employee option schemes as the only relevant information provided (in the US) is information on the total number of grants and exercises. Data on participation rates and distribution patterns are not available. Thus, it is arguable that the literature has not been able to respond to the growing incidence of option plans open to all or a significant proportion of employees. There are relatively few papers in the Finance/Financial Economics literature that focus on broad-based stock option plans.

By contrast, the Human Resource Management, Labour Economics and Industrial Relations literature tends to focus on all-employee or broad-based schemes. It is also important to note here that much of this literature is perhaps less concerned with stock options as a specific reward instrument than as a mechanism for transferring equity

into employees' ownership. Indeed, most of this literature focuses on employee share ownership in general rather than stock options in particular. The concerns of academics in these fields therefore tend to differ somewhat from Finance scholars. They are interested in whether stock plans lead to greater identity with and commitment to the firm rather than on the financial valuation of stock-based rewards. The point of intersection of the two sets of literatures is the pay-performance relationship, and the determinants of the use of stock-based rewards. An emerging literature focusing on broad-based stock options attempts to compare the effect of broad-based stock options on a corporation's financial performance before and after their adoption. This HRM/Labour Economics/Industrial Relations literature has found that broadly-based stock option schemes are associated with superior levels of corporate performance.

A third consequence of the type of data that is usually utilised is that the focus is almost always relatively large, listed firms. ExecuComp, for instance, comprises compensation information on the Standard and Poor 500, the Mid-Cap 500 and the Small-Cap 500. This is a 'happy marriage' in so far as stock option plans are most widely used in larger, listed firms. However, it does mean that there is a paucity of analysis of the use and effects of stock options in small/private firms. Information on the use of stock options in 'new economy' firms has been collected mainly by consultancy firms rather than academics. The primary focus has been the extent of their use. The depth and sophistication of analysis that has characterised the study of large firms has not so far been possible in the small firm/new economy sector. The best data on new economy firms and private firms can be found in Weeden, Carberry, and Rodrick (2000) .

A fourth feature of the data used in most studies is that it is country-specific. Whilst the dominance of US-derived data can be attributed to the correspondingly greater use of options in the US than elsewhere, there are idiosyncratic features of the US finance and corporate system that must be borne in mind. The corporate governance system in the US differs markedly from that in mainland Europe. Whilst its stock markets are larger and more developed, it is also the case that ownership is relatively highly diffuse in the US. Although some US scholars have argued that the extent of the separation of ownership and control in the US is efficient (eg. Fama 1980; Fama and

Jensen 1983), this leads to a fundamental corporate governance problem. How do diverse investors get managements to act in their interests? The optimal contracts literature argues that stock options are a useful instrument for this purpose but a counter view is that the US governance systems allows management to exploit options for their own benefit. The New York Stock Exchanges new 2002 recommendations on option plans attempt to address this deficiency (NYSE 2002a; NYSE2002b).

Further oddities of the US system of stock options are that the accounting system discourages the linking of options to company performance. This is a particular problem with executives who, because of weak corporate governance, essentially set their own pay in the US. Non-executive employees in the US typically get their options based on a performance evaluation that at least introduces some evaluation into the process. 'Relative performance evaluation' for executive awards is weak to non-existent, so that option recipients can benefit from a rising market even though the performance of their own firm may be below average or declining relative to other firms. As the Chairman of the US Federal Reserve Bank put it recently,

> "There have been more than a few dismaying examples of CEOs who nearly drove their companies to the wall and presided over a significant fall in the price of the companie's stock relative to that of the competitors and the stock market overall. They, nonetheless, reaped large rewards because the strong performance of the stock market as a whole dragged the prices of the forlorn companies' stocks along with it" (Greenspan 2002)

A further quirk of the US system is that although stock options are not expensed onto the profit and loss account, companies can nevertheless claim a tax deduction (based on a compensation expense) for the difference between strike price and market price at exercise. This asymmetry of treatment between accounting and tax systems provides very strong reasons for executive insiders to use stock options in their management of 'investor relations' as well as for any incentives purposes. Overall, the point of these observations here is that the US is an unusual case, and it cannot be assumed that the findings from the US literature can readily be generalised to other national contexts.

Approach of the report

To reiterate, the report has two main objectives. The first is to provide a comprehensive overview of the extent academic literature on stock options. The second is to extrapolate relevant information from this literature and identify issues for the use of stock options in SMEs. Given the paucity of data and research on stock options in SMEs, most of the report is inevitably concerned with addressing the first objective. Nevertheless, it is hoped that careful scrutiny of this literature will clearly identify the most important issues arising for the SME sector, and facilitate policy discussions on the use of stock options in this sector.

In the report we identify two main perspectives on stock options, that have been applied to consideration of executive stock options. The first (the 'conventional wisdom' amongst practitioners and observers until the Enron and Worldcom collapse[6]) is the principal-agent perspective. This suggests that, where there is separation of ownership and control, there is a divergence of interests between shareholders and managers/employees. Given asymmetric distribution of relevant information, it is costly for shareholders to monitor whether 'insiders' are expending appropriate effort or making decisions that benefit shareholder interests. Since the pioneering paper of Jensen and Meckling (1976) stock ownership by managers has been seen as a useful instrument for aligning interests. Stock options are perceived as an especially powerful tool because the capacity to increase wealth is at the core of this instrument. Hence the incentive and alignment effects are potentially highly potent. It can be argued that stock options are a potentially more effective incentive mechanism than other forms of performance-pay because they focus on desired outcomes rather than process (such as effort) (see Murphy 1999).

The second perspective, which is gaining ground post-Enron, is that stock options are a form of rent extraction by insiders at shareholders' expense (see Bebchuk *et al* 2001). Managers and employees assert their insider advantages to introduce reward programmes that provide the potential for significant wealth increases at little risk. The assumption here is that compensation programmes are usually developed by

insiders rather than shareholders, and thus will reflect insider preferences (eg. risk aversion). Institutions of shareholder representation such as Boards of Directors and Annual Meetings tend to be weak vis-a-vis managers or else are captured by them. This view is expressed graphically by Chancellor (2002: 32),

> "Of all the claims made by the advocates of shareholder value, none is more ludicrous than the assertion that by rewarding managers with stock options it has resolved the principal-agent problem. In practice, the generous compensation of top executives has created an overwhelming incentive to manipulate earnings in order to inflate share prices. In many instances, this has allowed senior executives to cash in their options leaving the shareholders to suffer heavy losses"

Evidence cited to support the rent-extraction view in the literature includes the widespread use of share-buybacks in the US in preference to dividend payments, the absence of relative performance evaluation, and the often dominant role of the CEO in executive pay determination. Again, this view has been mainly applied to executives, not broad-based employee ownership.

Our review of the literature in this report inclines towards the second perspective. As regards executive stock options, it is suggested that the case for the incentives or 'optimal contracts' model is not proven, partly because of the type of data and approach that is used. There is also a significant volume of findings that are inconsistent with the 'optimal contracts' view. Meanwhile, many of the findings from the literature (written mainly from the optimal contracts perspective) are consistent with the 'rent extraction' view. Thus, *pace* Bebchuk *et al* (2001) it is suggested that in practice stock options tend not to provide a solution to the corporate governance problem arising from the separation of ownership and control. Instead, stock options practices tend to reflect this governance problem. As Bebchuk *et al* put it (2001: 31),

> "The rent extraction view also starts with recognition of the shareholder/management agency problem, but in this model executive compensation is seen as part of the problem rather than a remedy to it".

Like Bebchuk *et al*, we do not argue that one perspective is right and the other wrong. Both perspectives have some explanatory power. However, many of the practices

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[6] John Plender of the Financial Times newspaper has referred to the 'theology of stock options' (see Plender 2002)

associated with the use of stock options in the US are more consistent with the rent extraction rather than the optimal contracts view.

Summary of findings

The core of the US literature concerns the sensitivity of executive remuneration to stock price performance on the grounds that this provides a measure of incentives. The optimal contract approach suggests that this sensitivity should be quite high if stock options are to function effectively as a reward mechanism. The landmark paper (written before the stock options boom in the US) by Jensen and Murphy (1990) found low levels of sensitivity: CEO wealth changed only $3.25 for every $1000 change in shareholder wealth. More recent studies (eg. Hall and Liebman 1998) have found a higher sensitivity (partly because of technical reasons). The rising proportion of CEO's remuneration package that is composed of stock and stock options may be increasing this sensitivity. Jensen and Murphy suggested that their results were inconsistent with agency theory but more recent findings have questioned this judgement. The rising levels of sensitivity are at the core of the optimal contracts view of stock options.

However, we draw attention to several problems with this assessment in the report. One, in the absence of information on perceptions and valuations gleaned directly from recipients themselves, we can never measure the incentive effects of a given level of sensitivity. Sensitivity is often equated with incentives but this is a conceptual sleight of hand. The incentive power of a given sensitivity will depend on the motivation and characteristics of the recipient. Some executive employees may be highly motivated by a given level of sensitivity whereas others may be less so. There has been very little research indeed on individual perceptions of, orientations to, and evaluations of stock options. A further problem is that compensation research over a long period of time has indicated that most employees prefer to 'satisfice' rather then optimise their compensation. On the whole they prefer predictable but sub-maximum earnings to unpredictable maximum earnings. There are exceptions to this generalisation: for instance, Lee Iacocca joined Chrysler in the early 1980s for $1 salary plus performance-linked variable pay (quoted in Lazear 2002). But they are

exceptions. Individuals make trade-offs according to their effort and risk preferences where they have the capacity to influence their level of earnings. These considerations are at the heart of principal-agent theory (Gibbons 1998) and the optimal contract is seen as one that provides the appropriate balance between incentives, effort, and risk.

There are several key features of options in relation to risk. They do not permit the hedging of risk that is normally associated with call options. Indeed this prohibition is theoretically necessary to secure the incentive effects identified by agency theory (Abowd and Kaplan 1999). Furthermore, as executive employees (and rank and file employees especially) are typically undiversified investors (they typically have few other stocks plus their stock investments coincide with their employment investment) they bear a high level of risk. However, the formal valuation models used as the starting point for research on stock options do not incorporate employee's risk preferences. When imputed values for various levels of risk are inserted into these models, the results are less encouraging for proponents of stock options as high risk aversion substantially lowers the value of options. A further issue, which is barely recognised in the literature (though see Lambert *et al* 1991), is that evaluations of the riskiness of options by employees will vary according to whether options are seen to be a substitute for core compensation or a complement to salary. There is some evidence that employees place a lower value on options seen as a substitute rather than a supplement to core salary. This has disturbing (and costly) implications for those who view options as a useful tool for providing high-powered incentives in core remuneration.

The implications of these observations is that a substantial premium will need to be incorporated in executive option grants to overcome the preference for cash-rewards. This implies that stock options are a costly form of reward for shareholders, both in terms of dilution (or 'overhang') and in opportunity costs (given that options are not expensed onto profit and loss accounts). Put starkly, the value of options to executives are less than the cost to shareholders (Hall and Murphy 2002). It has been shown, by Hall and Murphy, that the value attributed to options (exercised at fair market value) by highly risk-averse, highly undiversified employees is about a quarter of the Black-Scholes-calculated cost to the company. They suggest that grants of

restricted stock are more economical for the company when stock-based compensation is to substitute for base pay: this is because recipients value stock more highly than options, and hence the company can provide smaller grants (or else secure larger cuts in base pay).

The problem of 'excess' options is intensified by falling markets because firms appear to respond to employee desires to minimise risk. Thus, the US literature shows the tendency towards re-pricing of options when options are 'underwater'. This practice has been frowned upon because it transfers risk from option holders to stock-holders but equally it is justified on the grounds of maintaining incentives. In other national contexts, re-pricing is generally prevented by the greater power of major stockholders. Recently, there has been a tendency in the US towards issuing new options when existing options are underwater, probably because of the growing assertiveness of institutional investors. This, however, gives rise to a new set of problems. The problem of 'overhang' or dilution is intensified because the new options add to the existing range of options (which might still be exercised should market conditions change). Recent surveys show an average overhang levels of nearly 15per cent in the US (24per cent in the technology sector) (Watson Wyatt 2002). This represents a substantial potential dilution of company stock. The capacity of insiders to 'unwind' incentives in this way suggests is consistent with the 'rent extraction' perspective on options and highlights the extent of the principal-agent problem in US corporate governance.

We highlight other problems with stock options that arise from the governance system. As insiders, managers possess important informational advantages, and this has an impact on stock options practices. Although shareholder approval may be required for the award of stock options, this is generally retrospective. One strand of the literature is concerned with the timing of stock option grants, and the possibility that option awards may be 'manipulated' by managers to fit with events that will maximise their own wealth (ie when managers have inside information that suggests that there will shortly be a rise in stock price). The literature is generally supportive of this proposition. Post-Enron, there is also a concern that the timing of option

exercises may be influenced by inside, privileged information[7]. There is little strong evidence to support this across the board with non-executive employees, but there is some evidence of this in small firms. However, the literature on option exercises shows that employees nearly always exercise their options well before expiry. They also exercise them when stock prices are volatile or after substantial price rises. These findings are significant because they are not consistent with the predictions of valuation models. They reinforce the argument that employees may perceive options differently to the way assumed in optimal contract perspectives.

We find further evidence that practices surrounding executive stock options are more consistent with rent extraction than optimal contract models. The evidence linking the growing use of options to the replacement of dividend payments by share buy-backs is strong and compelling. It can also be argued that the extent of uniformity between companies in the characteristics of stock options is indicative of rent-extraction on the grounds that optimal contracts should be adapted to the specific circumstances of each company and individual.

Remainder of the report

In the remainder of the report, we summarise and review the academic literature on executive options, supplemented by practitioner literature where appropriate. We also examine broad-based and all-employee options on those topics where there is a body of literature (incidence, determinants, and effects on corporate performance). We examine the incidence and distribution of options plans, and then go on to consider the literature on determinants of the use of these. We refer primarily to US experience, supplemented by information on European countries where stock options have been used for some time (UK and France) and on those countries where these appears to be a rapid growth in the use of options (eg. Germany and the Netherlands). We then consider the mainly US literature on valuation of options and incentives. We then examine the literature on specific aspects of behaviour associated with options, such as the timing of grants and exercises, the payment of dividends etc. The

[7] It is interesting to note that recent French legislation imposes 'blackout' periods for option

approach is to provide some general comments on the nature of the literature and its findings, and then to summarise the content of key papers. In Chapters Thirteen and Fourteen of the report we attempt to extrapolate information from the literature that applies specifically to SMEs and 'new economy' firms, and then attempt to identify the key issues that arise from the application of stock options in SME settings.

It is important to mention briefly what will not be considered in the report. We do not engage with the current debate on the accounting treatment of stock options surrounding the International Accounting Standards Board deliberations whether to require the expensing of stock option grants on profit and loss accounts. Nor do we consider in any great depth the regulatory influences on stock options practice. There is a wealth of technical information relevant to this, and this is better covered by surveys devoted entirely to this issue. However, we do provide some outline details of the US system as this assists in understanding the US academic literature. Also we do not consider the use of stock options in multinational settings. This is an important issue, of considerable relevance to practitioners. A recent communiqué published by the European Commission highlights this issue (Commission of the European Communities 2002), and the OECD is currently working on the difficult issue of divergent tax regimes (see OECD 2002). There is, however, virtually no academic literature on this topic[8]. For this reason we do not discuss the issue here. Finally, most of the literature we review is concerned with executive schemes, and thus most of the findings relate to executive compensation. Many of these findings are not readily extendable to all-employee or broadly-based schemes (junior employers are unlikely to be able to influence the timing of option grants, for instance). Where the literature deals with all-employee options, we make this clear in the report.

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awards/exercises around key announcements, such as quarterly performance figures

[8] An exception is a research project conducted for the European Commission by Francine van den Bulcke

Chapter Two The Character of Stock Options

Introduction

In this chapter we provide an overview of the distinguishing characteristics of stock options and similar instruments. Attention is drawn to those features of stock options that are thought to generate their incentive potential. We then go on to provide brief details of several variants of options and of alternatives to options which operate in similar ways. The main features of stock options in the US, UK, France, and Germany are described, with most of the attention focused on the US (because the literature mainly draws on US experience). The main influences emanating from taxation, the legal framework, and accounting conventions are outlined. However, we do not intend to provide detailed technical descriptions of regulatory regimes as these have been provided by others[9].

The main features of stock options

An option is a security giving its holder the right to buy or sell an asset, subject to certain conditions, within a specified period of time (Black and Scholes 1973). An employee stock option is a variant of this, whereby employees are provided with the right to acquire an option to purchase company stock at a future point at a price set at the grant date. The option has an expiry term and a vesting period commencing with the grant date. In general, a distinction can be made between 'American' options, which can be exercised at any point up to expiry, and 'European' options, which can be exercised only on a specified date[10]. The primary benefit to the beneficiary is the potential for capital gain between grant and exercise, coupled in some national settings (but not generally in the USA) with discounted exercise prices ('intrinsic value'). The optimal contracts perspective on stock options argues that this feature aligns the interests of option recipients with those of shareholders.

[9] For example, the studies of each EU country commissioned alongside this report
[10] This is not to imply that European options are the only form of stock options found in Europe

Compared with options in general, employee stock options have certain unique features. One, unlike 'conventional' options they cannot be traded, and employee option holders cannot usually hedge against the risk of declines in option value. These prohibitions may be found in general securities legislation or in legislation specifically governing the use of stock options. The inability to trade stock options provides a degree of risk that is not present with conventional call options. Since most employees can be seen as risk averse (unlike the professional investor) the riskiness of options may provide a powerful incentive tool. Equally, the asymmetric feature of option pay-offs – the recipient need not actually lose 'hard cash' if the option is out-of-the-money at exercise - provides some protection against risk. The optimal contract is said to be one that finds a balance between incentives effects and risk aversion.

A second, related feature of options is that they are normally subject to forfeiture prior to vesting should the employee voluntarily leave the firm. This can provide an incentive to remain in employment with the firm, thereby helping to secure returns on human capital investments made by the firm.

It is possible to identify several different kinds of employee stock options. Johnson and Tian (2000) identify six types of 'non-traditional' option: premium options, performance-vested options, re-priceable options, purchased options, reload options, and indexed options. These are described briefly here:

- *Premium options*. The grant price is higher than market prices at time of grant. In other words the option is out-of-the-money when granted. This is said to magnify the incentive effect of options
- *Performance-vested options*. These options only vest, and hence become exercisable, at a specified price above that of the grant price. This is also said to magnify incentive effects.
- R*e-priceable options.* These options permit resetting of the exercise price if stock price falls (see the chapter on Re-pricing of Stock Options) and are designed to counter the dis-incentive effects of significant falls in stock price.
- *Purchased options.* With these options the recipient pays a proportion of the exercise price at the point of grant, with forfeiture of this 'deposit' if the

options are not exercised. This locks the recipient into the option, and hence may enhance incentive effects.

- *Reload options*. With this type of option, the option holder exercises the option with shares already owned, and then receives new options to replace the shares used in the exercise. This is seen as an implicit way of re-pricing options and is sometimes used when stock prices have fallen.
- *Indexed options*. These options have a moving strike price, linked to a industry or market-wide stock index.

There are also other instruments which may be used in lieu of stock options but which may have a similar function. Phantom stock is where the firm undertakes to pay a cash bonus to employees based on the value of company shares or the increase in that value over time. In the latter instance, the bonus mimics the operation of a stock option over the period to exercise. It is a way of providing compensation linked to share price performance without the administrative or dilution implications of stock options, and hence may be attractive to small firms or in circumstances where the use of options is inhibited (as in Germany prior to 1998). Stock Appreciation Rights are similar to phantom stock but are more narrowly focused on growth in share value, and are more akin to stock options. SARs can usually be exercised at any point after vesting, whereas phantom stock bonuses are usually paid at pre-determined times. SARs may be used alongside stock options to help finance the options ('tandem SARs'). (See NCEO 2002). They are seldom used in the US because their accounting treatment is less favourable than that of options and because the relative advantage of SARs (there is no need to buy and resell stock to 'cash out') has been eroded by 'cashless exercise' of options using brokers (see Hall and Liebman 1998b). SARs can be useful, however, for international share schemes where firms want to provide share-based incentives without requiring foreign employees to trade on the domestic exchange.

A similar instrument to stock options, used by some large Germany firms in the 1990s (eg. Daimler Benz and Deutsche Bank), is the convertible bond (see Bernhardt 1999). This provides employees with the opportunity to purchase bonds with the option of converting them into shares with the same par value. In this case the difference between market value and par value of the shares provides the capital gain.

The objectives of stock option plans

The stated objectives of options are usually to attract, retain, and motivate its executives and employees (Hall and Murphy 2002), and the unique features of employee stock options outlined above can help to achieve these objectives. As Hall and Murphy put it, options enable firms to attract better quality and less risk-averse employees by raising compensation levels and by providing for performance-based upside earnings potential. They help to retain employees because of vesting provisions and long expiry terms. They can motivate employees by providing a direct link between company performance and employee wealth, thereby providing incentives for employees to take decisions that increase share prices. The payment of compensation in options also helps to conserve cash and reduce accounting expense (given current accounting standards).

Leaving aside the relative efficacy and balance of importance of these functions of options, the unique features of options can be shown to be highly relevant to the benefits claimed for them. Tradable options would remove self-selection incentives (though they may still help to attract employees). Tradable options without forfeiture would have no retention power. Tradable options would reduce incentives because the link between wealth and performance would be severed (option holders could increase their wealth by trading). Finally, tradable options would have a 'readily ascertainable market value' (US) or be a 'readily convertible asset' (UK) and would be recorded as an expense for accounting purposes, whilst recipients would probably be liable to more or less immediate income tax charges.

Whilst these features of stock options are said to provide them with power to influence employee behaviour, there is the possibility that such effects can be harmful. A fundamental issue is that most employees are risk averse (unlike risk neutral professional investors) and this is associated with the concentration of their human capital in their employing firm. Furthermore, in many instances their equity interests will be highly concentrated so risk cannot be diversified away. An ever-present danger with stock options is that those executive employees with the capacity to do so, may take steps to limit their risk exposure. For instance, they may attempt to

influence the timing of grants of options so as to secure a low exercise price (see the chapter on The Timing of Stock Option Grants). Or they may exploit insider informational advantages or their control over the disclosure of information to time stock option exercises at the most advantageous time. In general, risk aversion seems likely to impact upon the value of options, with the most risk averse attaching least value to them (see the chapter on The Valuation of Stock Options). In such circumstances options can be costly to the company because a larger number of options than is optimal to the firm may need to be granted as a 'risk premium'.

Although, there is a degree of risk associated with the distinctive features of options, there is the countervailing feature common to all options that downside risk is truncated. If the option goes out-of-the-money employees do not have to stump up the cash to exercise the option. However, a critical influence on the extent of downside risk, which is not widely discussed in the literature, is the perceived function of the stock option (but see Lambert *et* al 1991; Hall and Liebman 1998). If the option is seen to be part of core compensation because it substitutes for the level of cash wages the employee might typically expect to receive, there is considerable downside risk. On the other hand, if stock options are seen as a 'perk' that is supplementary to core compensation, the perceived risk is likely to be much lower. Options are often justified for top executives on the grounds that they are core compensation (this is the usual assumption in the Finance/Finance Economics literature) and hence there is likely to be a powerful incentive effect. In the absence of studies on executive perceptions and attitudes towards stock options, we cannot be sure recipients of stock grants perceive them in this way (see Chapter on Pay Sensitivity and Incentives).

The obvious question that arises from these consideration is whether stock options are the most effective and economical form of incentives-based variable remuneration? In certain situations (ie where they substitute for core remuneration) a high risk-premium may need to be paid. Yet, given that the Black-Scholes cost to the firm is usually higher than the value attributed to options by their recipients, and given that the full cost of options is not usually expensed, options may nevertheless appear to be a cheap form of remuneration for the firm. If the full cost of options is expensed onto

the profit and loss account, as is starting to occur in the USA, they may come to be viewed as an expensive form of reward. Stock grants may be a cheaper alternative.

It is important to differentiate between executive and all-employee schemes when considering incentive effects. Lazear (2002) and Oyer and Schaefer (2002) have suggested, it is highly unlikely that all-employee plans have meaningful incentive effects because of the free-rider problem[11]. Their view is that it is unlikely that all-employee stock options are granted to generate incentives in most cases, though the incentive effects are likely to be strongest in the smallest firms. Later in this report, we present empirical evidence by several co-authors of this report to the contrary. Alternative explanations for the use of stock options in these circumstances are that they provide a cost-effective retention tool, that they help to recruit high calibre employees, and that they signal confidence in the firm's prospects. The retention argument is that employees are most in demand from similar firms, and hence most likely to exit, when industry stock prices are high (ie when the industry is performing well). However, high stock prices provide options with higher values in these circumstances and hence help to lock-in employees to the firm (Oyer and Schaefer 2002)[12]. The matching argument suggests that the increases in compensation provided by options (or variable pay schemes) help the firm to attract higher quality job applicants (see Lazear 2002). Finally, the signalling argument (which also applies to executive only schemes) suggests that option grants signal confidence in the firm's prospects to investors. It has been suggested that this function may be especially important when investors are unsure how to value firms, as in the case of 'new economy' firms.

Similarities and differences with other forms of incentives and equity ownership

Stock options have features that differentiate them from employee share ownership plans. Most obviously, they do not generate dividends and voting rights to recipients prior to the exercise of the option, though a very small number of US firms provide

[11] The free-rider or 1/n problem is that, for a given level of effort, individuals receive a diminishing share of the rewards from incentives as the numbers of beneficiaries increase. Thus, there is an incentive to free-ride on the efforts of others

dividend protection (around 1 per cent in 1993: see Murphy 1999). This provides an incentive for executive option recipients to reduce dividend payments and channel free cash-flow into stock repurchases instead (see the chapter on Dividends and Share Buybacks). Also, share ownership plans expose employees to risk more or less immediately on entering the plan, whereas this is not necessarily the case with stock options (depending on whether options are seen as part of core compensation or an add-on). It is possible to benefit from share option plans without really entering into share ownership: cashless exercise means that stock is owned merely for a 'nanosecond'[13].

However, the fundamental difference stock options and stock ownership plans identified in the Finance literature relates to the value function. The relationship between the value of share ownership and stock prices is a linear one, whereas the value of stock options is viewed to be a convex function of stock price movements. Thus, it is suggested that as options become increasingly in-the-money the incentive effects may 'accelerate'. On this basis it has been argued that stock options may be most appropriate in high-risk business contexts. The convexity in the relationship of option values to stock price volatility provides incentives to option holders to take riskier decisions. There is a certain amount of evidence to support this supposition: Tufano (1996) found that gold mining firms where options were held by top managers used less price-hedging mechanisms than in those firms where stock ('restricted stock' in US parlance) was held directly.

Stock option plans and share ownership plans are often contrasted in the literature because of these differences in valuation effects. Whilst there has been a presumption that stock options have more powerful incentives effects than stock ownership, this has been challenged recently. Hall and Murphy (2002) have shown that once risk aversion and wealth concentration are factored into formal valuation models, the value of stock options are a small fraction of the estimates provided by Black-Scholes (see Chapter on Pay Sensitivity and Incentives). When the size of option grants are adjusted upwards to compensate for this, restricted stock becomes a less costly

[12] The same argument can be applied to executive only schemes. See Cuny and Jorion (1995).

alternative for the firm. In the wake of the Enron scandals, and the growing pressure for stock options to be expensed onto profit and loss accounts, calls to replace stock options with restricted stock are gaining momentum (see The Conference Board 2002).

Although stock options and stock ownership are often contrasted in the literature, option programmes may provide a low-risk portal for employee share ownership. This possibility is generally not discussed in relation to executive options because the presumption is that option grants are a component of compensation rather than a means to develop ownership (footnote on what happens to stock ownership when get options). The holdings of stock that arise from option exercises (prior to disposal) tend to be viewed simply as cash-equivalent wealth. However, the employee share ownership literature suggests that employees may derive psychological 'feelings of ownership' from stock ownership, and that these feelings engender greater commitment to the firm (see Pendleton *et al* 1998). A benefit of broadly-based stock option schemes is that they may provide a means of access for rank and file employees to share ownership. They may do this in a number of ways. They can give inexperienced employees time to monitor share price movements so that the eventual acquisition decision is more informed than at the outset of participation (ie when options are granted). In essence, they provide employees with an opportunity to 'dip their toes in the water' to see whether participation in equity ownership is suitable for them. They may provide time for employees to accrue sufficient savings to exercise the option without immediately being required to sell some of the shares to meet the exercise price[14].

However, there is some debate as to how far stock options lead to share ownership. There is evidence that executives sell their shares more or less simultaneously with exercise of options (see Carpenter 1998), suggesting that securing rewards is more important than equity ownership[15]. Core and Guay (2001) found that 'unexpected' levels of option grants (ie total grants that were larger than the norm) were matched

[13] The recently enacted (July 2002) Sarbanes-Oxley Act in the USA prohibits the provision of loans by companies to facilitate option exercises by their executives. The practice of cashless exercise has all but ceased because such arrangements might be construed as the provision of financial assistance
[14] As in the UK SAYE options plan

by unexpected levels of option exercises. However, their evidence is based on total flows rather than individual decisions so it is not possible to tell whether exercises follow grants at the level of the individual employee. There is clearly a need for further research in this area. One possibility raised by advocates of stock options is that participation in the options plan will generate 'quasi-ownership' sentiments amongst recipients even though exercised shares may be disposed of more or less immediately on exercise[16] Another view, in light of the loss of their life savings by many rank-and-file employees who bought employee ownership in Enron and Worldcom, is that stock options may provide an alternative to very risky stock ownership for lower level employees.

In recent years stock option plans have supplemented cash bonus incentives schemes widely offered to top executives. The primary benefit of stock options, compared with cash bonuses, is that their incentive effects derive from rewards that are based on all aspects of firm performance. By contrast, cash bonus schemes may be based on specific aspects of company performance, such as growth in profits. It may be argued that there are two problems with this approach to incentives. The first is that executives may manipulate accounting earnings (or other performance measures in use) (Murphy 1999) whilst the second is that reliance on specific performance measures distorts behaviour (Baker *et al* 1988)[17]. Stock options may sidestep this problem because they measure executive performance 'in the round'. Fundamental to this argument is the 'efficient markets hypothesis' ie that share prices incorporate all available information. There are two main criticisms of this argument. One is that executives may be able to manipulate events so as to influence share prices. The other is that share prices measures the value of an asset not the performance of individuals (Paul 1992).

[15] Exercising options at this time does not maximise value according to valuation models but reflects risk aversion amongst employees

[16] Raised in discussions about options in the UK in response to criticisms that options may rarely lead to long term stock ownership

Regulation and character of stock options

The use and character of options is governed by securities regulation, stock exchange rules, investor-generated codes of practice, tax regimes, and accounting standards. Employment law may also impinge on option usage. It has been widely argued in the employee share ownership literature that legislative identity and fiscal concessions are a key influence on the level of use of share ownership schemes, and a critical factor in explaining variations between countries (see Uvalic 1991; Vaughan-Whitehead 1995, Poutsma 2001). Although these observations are applied to financial participation in general, there is no reason to think that they do not apply also to stock options specifically. However, an additional highly important factor governing the use and character of stock options appears to be the character of corporate governance regimes (see Hall and Liebman 1998b).

In the United States, where stock options are most widespread and where the academic literature is largest, stock options mainly fall into two main types: incentive stock options and non-qualified stock options. Incentive stock options are governed by the Internal Revenue Code (Section 422) and are limited to $100,000 per vesting year. They must be granted at 'fair market value' or higher. They require shareholder approval. They must be held for at least 2 years from date of grant, and for a further year from the date of exercise. ISO recipients are exempt from income tax on exercise and liable instead to capital gains tax on sale of shares. Only about a quarter of US stock option plans take this form. Around three-quarters of US stock option plans are 'non-qualified' , and recipients do not attract the favourable tax treatment on exercise.

The typical US option has a ten-year term, with a three or four year vesting period. Drawing on a survey conducted in 1992-3, Murphy (1999) found that 83 per cent of a sample of 1000 largest firms had ten-year options. In the same survey 95 per cent of firms granted options at 'fair market value', with just 3 per cent offering a discount on FMV. Only 1 of the firms had indexed options, and 1.5 per cent had premium options. 4 per cent took a reload form. There is a considerable degree of uniformity,

[17] Individuals devote their attention to meeting the performance measures and place less emphasis on

therefore, in the character of US option plans. It has been argued (by Bebchuk *et al* 2001) that this suggests that optimal contracts are not typically the primary objective of stock plans. Given the diversity of firms, their circumstances, and their employees, greater diversity in stock options plans would be anticipated if optimal contracts were the desired outcomes of all or most stock option plans.

Most stock option grants in the US are not performance-based, and most commentators suggest that this state of affairs is the result of accounting considerations. To understand this, it is necessary to provide a brief outline of US accounting regulation. US firms can choose one of two main ways of reporting options: Accounting Principles Board Opinion 25 (APB 25)[18] or Financial Accounting Standard 123 (FAS 123). APB 25 is the more long-standing and requires that companies record the difference between strike price and market price at the date of grant as an expense ('intrinsic value'). Since most firms issue options 'at-the-money' the accounting cost under APB25 is usually zero. In the early 1990s, the Financial Accounting Standards Board proposed that the true value of options be recorded in the accounts using an instrument such as the Black-Scholes valuation model (see the chapter on Valuation of Stock Options). After extensive opposition from business, a compromise was reached whereby companies were given the choice whether to follow APB 25 or FAS 123. Most companies use APB 25. However, FAS 123 requires that companies that follow APB 25 must disclose in notes to the accounts the effect on earnings per share and compensation expense of stock-based compensation as if the options were valued under FAS 123.

Earlier, in 1992, the Securities and Exchange Commission (SEC) mandated disclosure in the proxy statement of the financial statements of stock-based compensation, with regard to the grant, exercise, potential value and conditions attached to stock options for the five highest paid executives[19]. Two methods could be used for valuation: either a measure of potential compensation realization based on a stipulate growth in stock price, or an ex ante Black-Scholes valuation or similar. It has been found that around a third of firms use a full valuation model, and that firms use the reporting

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unmeasured activities, even though the latter may be equally important or worthwhile

[18] Supplemented by FAS Interpretation Number 44 of March 2000. This automatically changes option plans from fixed to variable plan accounting where changes are made to the options, such as re-pricing.

approach which puts their stock options in the most favourable light externally (Lewellen *et al* 1995).

Under APB 25 option plans can be seen as compensatory or non-compensatory. The latter must be broad-based with uniform eligibility and grants (and must also meet certain expiry limits). If the plan is compensatory, there are two accounting approaches that can be used: fixed plan and variable plan accounting. Fixed plan accounting levies a charge based on the difference between the share price and exercise price at the point of grant (typically zero), and can be used where the number of shares and price to be paid is known and where there is *no performance condition.* If these conditions cannot be met, variable plan accounting has to be used. In this case, the measurement date for the compensation expense may not be until vesting or exercise. As well as being more complicated, high share growth during the vesting period will lead to high compensation charges on the profit and loss account. There are powerful inducements, therefore, for companies to operate option plans without performance conditions. This situation contrasts with the position in countries such as the UK, where investor pressure means that most listed firms incorporate performance conditions in their option awards. Implicit performance conditions can be built into US option awards using premium-priced options or accelerated vesting.

US stock option plans are regulated by relatively lax corporate governance provisions. NYSE and NASDAQ rules have generally required shareholder approval for all plans in which officers and directors participate but there has been an exception for broadly-based plans (defined as ones in which a majority of participants are not officers or directors). This has enabled firms to operate restricted plans open to officers, directors and an equivalent-sized group plus one of other employees as broad-based plans, and therefore not requiring shareholder approval. There has been some debate about this for some time, and finally in May 2002 NASDAQ agreed a rule change whereby shareholder approval is necessary for all option plans in which officers and directors participate. However, an exemption for the use of stock options as a 'golden hello' to new officers was maintained[20]. The NYSE recently took action to make

[19] How complete a picture this gives is open to question. See chapter on valuation
[20] See NASDAQ press release of 24 May 2002. See www.nasdaqnews.com/news/pr2002/ne_section02_113.html

corporate governance regulations more stringent for stock option plans NYSE 2002a; 2002b). The genesis of these initiatives pre-dated the Enron affair but the corporate governance failings revealed by Enron have given added impetus to corporate governance reforms of this type.

Within Europe, the UK has the highest use of stock options but the features of stock option plans tend to be different to those in the US. Virtually all all-employee schemes are operated in accordance with statutory guidelines (Save As You Earn and Company Share Option Plan) and participants are liable to capital gains tax on sale of shares rather than income tax on exercise. SAYE is a European-style option with a pre-set exercise date, whereas CSOP is an American style option typically with a 10-year time expiry date and minimum 3-year vesting period. The accounting approach is similar to the US GAAP under ABP 25 fixed plan accounting in that only intrinsic value is chargeable to the profit and loss account. Unlike the US, shareholder approval is needed for all option plans except where previously issued shares are used for all-employee plans[21] and where options are used as a golden hello (the LSE Listing Rules permit this).

The main institutional investors and their trade associations (the Association of British Insurers and the National Association of Pension Funds) have codes of practice to govern share schemes and operate a rigorous monitoring procedure. Whilst all-employee schemes operated under statutory procedures are loosely governed (it is assumed that the law provides sufficient regulation of corporate discretion), new codes of practice require fairly rigorous performance conditions for executive plans (see Pendleton *et al* 2002 for further details; Association of British Insurers 2002). At the same time, their limits on the size of executive options have been lifted. Performance conditions have been imposed in the wake of a series of reports on corporate governance in the 1990s (the Greenbury Report (1995) in particular). In 1997 the percentage of current executive option schemes with a performance criterion was 61.5 per cent but at that time the median percentage of the stock of executive options with no performance conditions was still over 70 per cent (Conyon *et al* 2000). This latter figure is likely to have diminished substantially since

then. The most common performance criteria in the UK for executive option schemes is Earnings Per Share (EPS) (see Pendleton *et al* 2002). Conyon *et al* (2000) found that 72 per cent of stock options with performance criteria used EPS, and just under 12 per cent used Total Shareholder Return (TSR). The reporting requirements in the UK for directors share options are now comprehensive, and more so than in the US.

In France stock options have been regulated by law since 1970 and stock options have been used for top managers for many years. There were a number of legal changes made in 2001 aimed both at encouraging greater use of stock options and enhancing 'best practice' in their operation. Until 2001 companies were not legally required to make public details of executive remuneration but from 1979 there was a requirement to include details of the ten largest compensation packages in the annual social audit to the Comite d'Entreprise. This requirement was seen as lax and perhaps more honoured in the breach than the observance (Alcouffe and Alcouffe 2000). The 2001 legislation required that companies publish a Special Report on the use of stock options, providing details of all grants and exercises to top officers of the company and also the ten largest grants and exercises by employees other than top officers. Shareholders authorise the principles of stock option plans (including time limits and strike prices) but the implementation (including the distribution amongst directors) is reserved to the board.

The 2001 legislation changed legal requirements concerning holding periods and also provided differential tax rates to support these. The 'blocking' period (from grant to sale of options) was reduced from five to four years. Options of less than Euro 152,500 are now subject to a lower rate of taxation: 40 per cent compared with 50 per cent for those above this limit. If shares are held for a minimum of two years after exercise and six years after grant, the tax rate drops to 26 per cent. There are no social security charges to the company or employee if more than four years elapses from grant to sale of shares. If shares are transferred into the Plan d'Epargne d'Entreprise (PEE) on exercise of options, the capital gains become exempt from tax after five years. The DARES survey conducted in 1999 (DARES 1999) indicates that

[21] However, new issues are generally used for all employee plans for cash-flow reasons and because a corporation tax deduction is available in some circumstances

in two-thirds of plans for senior management the strike price discount on current market value is 5 per cent but usually no more than 5 per cent in all-employee plans.

Share options were prohibited in Germany by the provisions of the 1965 Stock Corporation Law. German firms wanting to use share-based incentive compensation used either convertible bonds or Stock Appreciation Rights/phantom stock until the passage of the so-called KonTraG law in 1998. This allows companies to purchase their own shares or to make conditional increases in their equity to resource stock option schemes (prohibited prior to 1998). Further, this legislation allows options to be granted without any requirement that recipients deposit funds in the form of a convertible loan or proceeds from profit sharing. Stock option schemes are required to have a minimum vesting period of two years and to incorporate performance hurdles. The taxation system in Germany, however, has provided less active encouragement of share options than that in the countries mentioned above. Any intrinsic value is liable to income tax at exercise whilst gains on sale of shares are also liable to income tax if the shares are sold within a year of option exercise (a concessionary rate was introduced in 2002). There is also a small benefit arising from the Income Tax Law. The disclosure requirements are less strong than in France or the UK: there is no requirement that allocations of options to executives be stated in the annual report. Since the passage of the 1998 legislation there has been a marked growth in the use of share options and it is likely that the lifting of the legal prohibition on options has been a more important factor in promoting option schemes (especially executive schemes) than tax benefits. It is thought that about 50 per cent of incentive pay plans for top executives in AG firms for top executives now take the form of stock options. A report by Incomes Data Services estimates that 70 per cent of the top listed German firms now have stock option plans in operation for their top managers (Incomes Data Services 2001).

General observations

Previous work on financial participation (eg. Uvalic 1990; Vaughan-Whitehead 1995; CEC 1996) has suggested that a critical influence on cross-national use of profit sharing and employee share ownership is the presence of supportive legislation

coupled with tax concessions. The development of stock options seems to be consistent with this to a certain extent, as the recent German experience illustrates. A further influence on the characteristics as well as growth of stock options is the accounting treatment. That the market value of options is not charged to the profit and loss account is a significant advantage to companies. Some argue (eg. Greenspan 2002) that it has induced a significant distortion in company reported earnings. Others suggest that a change to the accounting treatment of options will have a major adverse impact on the incidence of stock options.

Whilst accounting regulation has a strong influence on the character of stock option plans, it is arguable that corporate governance also has a key role in determining the character and use of executive stock options. It is arguable that the explosive growth in executive stock options reflects two features of the US governance system. The first is that the growth and concentration of institutional investment, coupled with perceived failings of American business in the 1960s and 1970s (eg excessive, value-reducing diversification and an emphasis on corporate growth at the expense of shareholders' interests) (Jensen 1983), has led to the theology of 'shareholder value' becoming steadily more pervasive. Share options have been justified as a way of encouraging managers to enhance shareholder value. The second feature of the US governance system is that the power-balance between investors and managers tends to favour the latter (see Useem 1993). Until the recent new NYSE rules, the requirements for shareholder approval of option plans were fairly weak (though this appears to be changing). US business has been successful so far in resisting attempts to make the costs of options to shareholders more transparent. For instance, the business lobby was able to defeat the proposals emanating from the FASB in the early 1990s to fully charge the value of stock options to the P & L account. It has been argued (eg. by Useem and Gager 1996) that the success of American corporate managers in maintaining relatively lax corporate governance in the US has been achieved partly by appearing to adopt the principles of 'shareholder value'. Certainly, there are features of the US system of stock options that suggest that managers have acquired options on terms that are more beneficial to them than investors: for instance, the absence of performance conditions in most schemes.

Although we cannot fully consider the issue here, it is arguable that share options are a less necessary instrument in most European companies because of the differences in corporate governance. Ownership is far more concentrated in countries such as Germany and France so that the net benefits of active monitoring by owners are much greater. Furthermore, there are fewer numbers of listed firms in European countries (the UK is an exception). The separation of ownership and control, therefore, is much less marked in Europe than the US[22], and hence it is arguable that instruments to address principal-agent problems such as stock options are less necessary. Economic ecologists would argue that the lesser development of stock options in Europe is evidence that European systems do not need them. Equally, the implication of tighter corporate governance in Europe is that where stock options are adopted, they may be more tightly controlled by shareholders than in the US.

However, another perspective on the US situation, held by the US co-authors of this report, is that broad-based stock options are necessary to the development of a entrepreneurial technology sector, and that without them the economic benefits of such sectors cannot be achieved by societies. This view suggests that knowledge workers require equity for innovation and stock options have been the equity that such firms have used for this purpose in the US (se Sesil *et. al* 2002).

[22] It is arguable that the nature of the corporate governance 'problem' in Europe is different. Reformers' attention focuses more on the lack of transparency and the protection of minority investors than on the extent of managerial discretion per se.

Chapter Three The Incidence of Stock Option Plans

Introduction

The aim of this chapter is to provide an overview of the incidence of stock option plans in companies in the United States and in major European economies. Where possible we identify the balance between broad-based plans open to more or less all employees and those narrow-based plans restricted to top executives. We also provide details of coverage by employee where information is available. It is difficult to provide a fully comparable picture as the sources and quality of information differ between countries. By and large, information and statistics on stock options plans are best developed in those countries with a relatively long tradition of operating such plans. We then go on to compile the available evidence on the use of stock option plans by SMEs and 'new economy' firms. Whilst the incidence of option plans is very low in SMEs in general, it is very high (even by large firm standards) in 'new economy' small firms. We then summarise the findings from the literature on the contribution of stock option plans to overall pay packages (this issue is covered also in the chapter on Incentives). Finally, we examine the small literature on participation rates in stock option plans.

National incidence of stock option plans

i) United States

In the United States, stock option plans are now very common but the majority appear to be narrow-based, plans restricted to top executives and managers. The sources of information for estimations of the incidence of stock option plans mainly come from company level surveys of varying degrees of representativeness, though it is possible to determine the number of firms with plans for top executives from the proxy statement information contained in ExecuComp. Using this type of information, Murphy (1999) found that around two-thirds of Chief Executives of the largest firms in 1992-3 received stock option grants. By 1999 nearly every firm (94 per cent) in the Standard and Poor 500 granted stock options to their top executives (Hall and Murphy 2002).

A study of 415 firms by the Federal Reserve Banks in 1998[23] indicated that just over one third operated a stock options plan open to a wider group of employees than top executives, with such schemes more common in larger firms (ie 1000 plus employees). Nearly all of these plans offered stock to managers and professionals whilst only 6.7 per cent of firms in the survey (ie less than one fifth of firms with stock option plans) offered options to lower-graded employees[24].

The National Center for Employee Ownership periodically estimates the number of various kinds of share ownership scheme based on surveys of company practice, official statistics etc. In 1998 the NCEO estimated that there were 3,000 broad-based stock option plans (defined as 50 per cent participation or higher) with around 7 million participants. This compares with around 4,000 stock purchase plans and around 11,500 ESOPs and stock bonus plans. Weeden, Carberry and Rodrick (1998) found that 33 per cent of the 1250 largest global corporations in the US offered stock options to all employees. In study of around 280 Fortune 1000 firms, Lawler *et al* (1998) found that around 10 per cent of firms offered stock options to all employees in the first half of the 1990s but the percentage offering them to at least 20 per cent of the workforce increased from 30 to just over 50 per cent. It should be noted that these large estimates refer to companies that have ever used broad-based stock options in any year. The estimates fall significantly if one restricts analysis to those companies who grant stock options to most employees almost every year (along the same lines as executive grants)[25].

The US Bureau of Labor Statistics surveyed the incidence of stock option plans in 1999 and found that overall 1.7 per cent of all private sector employees received stock options in that year. As would be expected, participation rates are linked to occupational level. 12.9 per cent of employees earning more than $75,000pa had options in 1999 compared with 0.7 per cent of those earning $35,000 or under.

[23] The sampling basis of the study is not clear but the structure of the responses by size of firms appears to be broadly representative of that in the economy more widely (excluding very small firms)
[24] Until the Worker Economic Opportunity Act of 2000 there was a disincentive to award stock options to any employee who might receive overtime pay because the value of the stock option had to be computed into the base pay rate for calculation of overtime payments
[25] For an interesting discussion of this see David Leonhardt, Corporate conduct: compensation – stock options said not to be as widespread as backers say, *New York Times*, 18 July 2002

ii) United Kingdom

In the UK options are also widely used, and have been so since the early 1980s. Reliable information on the incidence of stock option plans is readily available in official statistics as the vast majority of broad-based plans are operated in accordance with statutory guidelines. Increasingly, executive plans are operated outside the framework of statutory schemes[26] but the comprehensiveness of reporting requirements means that estimates of the incidence and extent of schemes for directors can readily be made if desired.[27]

There are currently 1400 'Sharesave' approved share option schemes linked to SAYE savings accounts. With certain eligibility constraints, these schemes are required to be open to all employees. Approximately one million employees – between 3 and 4 per cent of the employed labour force – received grants of options in 1999-2000 (Inland Revenue 2001) with the combined total of grants worth over £2,500 million at initial market value. The average subscription in that year was £2,800. In 1998 93 per cent of the largest listed firms (FTSE 100) had a SAYE scheme. 70 per cent of the remaining members of the FTSE 350 had a scheme, whilst 34 per cent of other listed firms had a SAYE scheme (Treasury 1998). Most firms offer more favourable eligibility criteria than the five years employment stipulated in legislation, with a majority requiring one year's employment or less (see Incomes Data Services 1995: 7; IRS Management Review 1998: 27). Most also grant options at the maximum (80 per cent) discount (IRS Management Review 1998: 27).

In the UK, there is a further tax-approved scheme – the Company Share Options Plan (CSOPs). This scheme provides companies with discretion on eligibility, and traditionally this type of scheme has been operated as an executive-only scheme. However, when the limits on option grants was reduced to a cap of £30,000 in 1996 this reduced the attractiveness of the scheme for rewarding top executives, and for a while this decreased the use of share options for executive rewards and led to a corresponding growth in Long Term Incentive Plans (LTIPs) (see Main 1999). Increasingly, CSOPs have been operated as broader, though not necessarily all-

[26] The limits for approved selected schemes were reduced from £100,000 or four times salary to £30,000 in 1996.

employee schemes. Currently, there are around 3,500 of these schemes. In 1999-2000, 240,000 employees received options with a combined initial market worth of £1,310 million. The average grant of options was £5,000. In 1998 94 per cent of FTSE 100 firms, 86 per cent of FTSE 350, and 59 per cent of other listed firms had a CSOP (Treasury 1998).

Information from official statistics can be supplemented by firm and workplace level surveys. A study of business organisations with 200 plus employees in 1999 found that 30 per cent operated a broad-based share options schemes (open to 50per cent or more employees) and a further 15 per cent operated a selective scheme (Pendleton *et al* 2001). The Workplace Employee Relations Survey in 1998 found that 24 per cent of trading sector workplaces with 25 or more employees are covered by a share ownership scheme (the vast majority of which are likely to be share option plans) (Cully *et al* 1999). Share option plans are most common in financial services and relatively uncommon in manufacturing.

The development and pattern of executive share option schemes in the UK appear to be influenced by two factors: supportive legislation and the regulatory requirements of major investors (see Main, Bruce, and Buck 1996). Main *et al* (1996), in a study of 62 FTSE 100 firms, find a steep rise in the incidence of executive options after the passage of the 1984 Finance Act (establishing the predecessor of the CSOP). Within a couple of years of the passage of this legislation over 90 per cent of FTSE 100 firms awarded options for its top executives. Since the reduction in the limits on executive grants in the approved schemes (see above), firms have increasingly offered non-Inland Revenue approved option plans to senior executives and directors. The removal of the limit in the Association of British Insurers' *Guidelines for Share Incentives Schemes* in 2001 gave a major filip to executive share option plans. A survey of 112 firms in the lower reaches of the FTSE 500 by PriceWaterhouse Coopers (2001), with 191 share option plans, found that 42 per cent were approved option schemes, 41 per cent were unapproved, and 2 per cent were phantom options (no information was available on 15 per cent). 37 per cent of the schemes were open only to executive directors and 47 per cent to a wider group of senior staff. The ABI

[27] Information could be collated from that collected by the voting information services operated by

guidelines also moved from a limit on the amount of outstanding options (four times salary) to advocating US-style annual grants of options. Company practice has swiftly followed suit, and over 90 per cent of new option plans in FTSE 100 companies in 2001 took an annual grant form (New Bridge Street Consultants 2002.

iii) France

The extant evidence suggests very little use of stock options in other European countries though the incidence is starting to rise. A study conducted by Abowd and Kaplan of comparative CEO and HR Director compensation found that in 1996 only France, Italy, Switzerland, and the UK used 'long term compensation' (the present value of stock options and 'restricted stock'). Of the mainland European nations, France has the longest tradition of stock options owing to legislation in this area in 1970. So far, stock options have been mainly restricted to top executives.

A survey by DARES in France in 1999 of publicly quoted firms (n = 385) found that over one in two firms had a share option plan (Plan d'Options en Actions, or POA), and that over 90 per cent had introduced these since 1987 (the year that tax treatment on option gains changed). Most of these schemes are selective with only 15 per cent being all-employee (see Alcouffe and Alcouffe 2000). Another recent study of 34 listed firms found that about 1 per cent of employees in these firms participated in the option plans (Tchobanian and Nohara 2001)

iv) Germany

The use of stock options in Germany is very recent because until 1998 company law effectively prohibited stock options. Instead, Germany firms wishing to use incentive reward systems used either profit sharing or profit-related bonuses (for managers), Stock Appreciation Rights, or convertible bonds. Until the Control and Transparency in Enterprises Act (KonTraG) became effective in April 1998, employee stock option plans were for the most part applied by international concerns and usually aimed at the higher echelons (Hantsch and Hantsch, 1999).

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institutional investor trade associations.

Since the passage of the KonTraG legislation (the Law on Corporate Transparency and Control) in 1998 there has been rapid growth in the use of option plans (Deutsches Aktieninstitut/Hewitt 2001; Schneider and Zander, 2001; Weiler, forthcoming). The Deutsches Aktieninstitut/Hewitt study of listed companies (listed AGs), all other public limited companies (other AGs) and private limited companies (GmbHs) with more than 500 employees in 2000 found that 37 per cent had a broad-based financial participation scheme, while another 14 per cent intended to introduce a broad-based scheme in the next year. Of the AGs, 48 per cent had at least one scheme, while only 23 per cent of the other companies had at least one scheme. The financial participation schemes consisted for the greater part of employee stock ownership plans (43 per cent) and employee stock option plans (42 per cent).

Government statistics indicate that in 2000 about 250 Germany enterprises operated stock option plans, most of which were 'new economy' companies listed on the Neuer Markt. The 50 of these 250 enterprises are listed on the DAX, and al of these restricted stock options to senior management (see Weiler 2002: 11). In the majority of Neuer Markt firms, option plans were open to a wider group of employees than top management.

Overall, stock option schemes appear to be of limited significance in Germany, though their numbers are rising fast. As well as the legal prohibition on stock option schemes, the relatively small number of listed firms in Germany appears to be a relevant factor.

v) Netherlands

The extant evidence on the use of stock options in the Netherlands indicates that it is a fast-growing phenomenon though from a low base. In the mid-1990s around 1500 Dutch firms (about 3 per cent of the total) had an option plan, with a similar number of firms apparently planning to introduce stock options. Most of these plans are restricted to top management and senior white collar staff, and only about one-third are open to all employees (Poutsma and Bruin 2001).

There appears to have been a widespread use of stock option plans in firms listed on the Amsterdam Stock Exchange (the forerunner of Euronext). At the end of 1996, 44

out of the 50 most frequently traded AEX-funds and Midkap-funds on the Amsterdam Stock Exchange had an employee stock option scheme. The number of employee stock options these funds granted in 1996 alone was 60 per cent higher than the number of employee stock options they averagely granted in the four years before 1996 (Voûte and Van Loon, 1998). Duffhues, Kabir and Mertens (1999) conclude from the annual reports over 1997 of 168 companies listed at the AEX-index that 72 per cent had an employee stock option plan, 31per cent of which had a broad-based plan, while 69 per cent only had a narrow-based plan. Using data from the research by Mol, Meihuizen and Poutsma (1997), and new data, Poutsma and Braam (forthcoming), we see an increase in employee stock option plans from 65 per cent of listed companies in 1995 to 82 per cent in 2000.

From an analysis of annual reports over 1996 and newspaper clippings of 1997, it appeared that 19per cent of the companies listed at the Amsterdam Stock Exchange in 1997 had a broad-based financial participation scheme. This is probably an underestimation, for probably not all companies had made schemes public. Of the 19per cent of the listed companies with a broad-based financial participation scheme, 48per cent had an employee stock option scheme, 26 per cent had a convertible employee debenture scheme, and 23 per cent had a scheme with shares or certificates of shares. Companies in the ICT-sector (56 per cent) and in the financial services sector (67 per cent) were particularly likely to have had a broad-based schemes. It is striking that the degree of participation (number of participants/number of eligible employees) is the highest for employee stock option schemes (73 per cent, compared with 24 per cent for certificates of shares, and 36 per cent for convertible employee debentures). This was probably a consequence of the attractive fiscal regime that was at that time still in force (Mol and Van Beusekom, 1998).

Stock options in Small and Medium-Sized Enterprises

There is very little literature on share option schemes in small and medium-sized enterprises. This arises for two main reasons. The first is that there is very low usage of options in these companies. The second is that the reliance of many US scholars on readily-available databases (rather than collection of new firm-level data) tends to

restrict attention to the larger firms that are usually included in these data-sets[28]. However, the picture changed quite dramatically in the late 1990s with the emergence of 'new economy' firms. As yet, there is very little literature on the use of options in these firms other than reports on the incidence of share options by consultancy firms. Furthermore the use of stock options is not always differentiated from other share ownership plans.

It is clear that share option schemes are primarily a large firm phenomenon, and that the incidence of any form of share scheme amongst SMEs is very low. The 1998 Workplace Employee Relations Survey in the UK indicates that 1per cent of SMEs with 100 employees or less have a share ownership scheme (see Pendleton 2003). In Australia, an Australian Bureau of Statistics survey of small and medium-sized firms indicates that share schemes were present in 3 per cent of firms (author's calculation). In the US, the extant data also indicates that stock options are mainly a larger firm phenomenon. The Bureau of Statistics survey in 1999 indicates that just 2.1 per cent of establishments with less than 100 employees operated a stock option plan compared with 10 per cent of firms with more than 100 employees (Bureau of Statistics 1999). In mainland European countries there is little or no information on the incidence of stock options in small firms (though see below) since the overall incidence of stock options has been very low, and typically restricted to large, listed firms for top executive compensation. Dutch data indicates that around 2 per cent of firms with less than 50 employees operated a share ownership plan in 1996 (Poutsma and Bruin 2001).

Two developments are likely to have changed this picture in the last few years. First, in two countries (those with the longest tradition of supporting financial participation) policy makers have attempted to encourage stock option plans amongst smaller firms. In the UK new tax-approved arrangements – Enterprise Management Incentives – has been introduced for smaller firms (initially limited to firms with gross assets of £15million or less). The general tax breaks on offer has led to a high rate of introduction since the year 2000. Approximately 2000 firms have awarded EMI options, to an average of 10 employees. In France, the 2001 legislation enables

[28] One exception is Weeden et al. 2001 that reports on a number of private firms with broad options.

option holders in recent start-ups (where 25 per cent of equity is held by individuals) to benefit from lower rates of taxation and shorter holding periods. As yet there has been no research into the impact of these measures but clearly it will be desirable to assess the impact of them in the near future.

The other development is the emergence of the 'new economy', where stock option plans have been an attractive human resource management instrument because of their apparently favourable impact on liquidity and labour retention. The available literature (a small number of academic papers and consultants' reports) indicates a dramatically higher incidence than the SME norm. In fact, the majority of 'new economy' firms in most countries appear to have option plans. Furthermore, these option plans are open to a wider group of employees than is typical in SMEs.

In the US, a study conducted by the National Center for Employee Ownership of 275 venture-backed close companies found that 77per cent offered options to all employees (23per cent offered them to selected employees). Over a decade ago, Smith found that 82 per cent of firms in the United States INC 100 Fastest Growing Publicly Held Firms (mainly high technology SMEs) had a share options scheme (Smith 1988). A study of 217 new economy firms (not necessarily SMEs) found that over 90 per cent used broad-based stock options (Ittner *et al* 2001). Liebeskind's study (2000) of new, small bio-technology firms found a median percentage of shares held in reserve for stock options of 16 per cent. Nearly three-quarters of optioned shares were held by non-officer employees.

In the UK a recent study by the Involvement and Participation Association (2001) found that 63 per cent of 'dot.coms' operated a share ownership scheme for non-managerial employees. Similarly, a survey of internet companies by Industrial Relations Services (2001) found that 66 per cent had a share ownership scheme open to non-management staff.

In Germany, most stock option plans are to be found in Neuer Markt[29] firms: around 200 of these firms have option plans. Furthermore, about 70 per cent of option plans

[29] Discontinued in September 2002

are open to all employees (Weiler 2002). A more recent survey among companies listed at the NEMAX by the consultancy IPO-Management also found that approximately 65per cent had an employee stock option scheme, 14per cent had convertible debentures and 4per cent had employee stock ownership plans. 90 per cent in September 2001 were out-of-the-money (IPO-Management, 2002; Weiler 2002).

In the Netherlands, very little data is available on SMEs' use of stock options. A study by the Economisch Instituut voor de Bouwnijverheid (EIB) among companies in the building and construction industry in 1999 concentrated on profit sharing and employee stock ownership, and only makes mention of the *possibility* of employee stock options. Given the importance of small and medium-sized firms in the Dutch economy, this omission is unfortunate.

Contribution of options to pay packages.

The extant evidence indicates that options form a more important component of executive pay in the US than in any other country, and that the growth in options has been the single most important factor in driving executive pay upwards from the early 1990s (see Murphy 1999). Using Execucomp data on the S & P 500 for 1992 – 1996 Murphy finds that in most industries the median core salary of CEOs remained more or less unchanged in real value but total pay (including a modified Black-Scholes valuation of option grants at grant date) increased by 58 per cent in manufacturing and 55 per cent in financial services primarily because of growth in options. In 1996 option grants comprised 36 per cent of salary in manufacturing, 33 per cent in financial services, and 36 per cent in other industries. The utilities sector was the exception with 17 per cent of salary in options (this appears to be due to the regulated nature of utilities – see Chapter on Determinants of Stock Options).

It is interesting to examine the contribution of executive options to salary by size of firm. There is a small tendency for the relative contribution of options to vary with size. In 1996 options formed 34-39 per cent of total salary in the S&P 500, 32 per cent in the S&P Mid-Cap, and 31 percent in the S &P Small-Cap. However, during

the 1990s the contribution of options to salary grew most in the smaller firms: 55 per cent growth compared with 34 per cent in the better performing half of the S & P 500.

The use of options as a proportion of total CEO salary has been greater in the US than any other country. The Abowd and Kaplan study (1999) shows that in 1996 stock-based compensation contributed 15 per cent of total CEO compensation in the UK and France, 4 per cent in Italy, and 2 per cent in Switzerland. According to this study, Belgium, Germany, Netherlands, Spain and Sweden made no use of this form of compensation. Stock-based compensation contributed 9 per cent of salary to HR directors in France and the UK and less than 2 per cent in Switzerland.

Table 1 The importance of long-term compensation

The proportion of CEO compensation accounted for by long-term compensation (stock options, restricted stock, and performance-based stock plans

Country	*Proportion of total compensation in 1984*	*Proportion of total compensation in 1996*
Belgium	0	0
France	12	15
Germany	0	0
Italy	0	4
Netherlands	0	0
Spain	0	0
Sweden	0	0
Switzerland	2	3
United Kingdom	14	15
United States	17	29

Notes. Derived from Abowd and Kaplan 1999. Calculations based on purchasing power parity.

In the UK, Conyon *et al* (2000) examine the structure of CEO compensation in the 200 largest companies in 1997. They find that the Black-Scholes mean value of stock

option grants was £117,000, approximately 20 per cent of current compensation. However, the value of the stock of CEO options was approximately seven times as large the current grant. However, a note of caution is needed as the distribution is highly skewed. The median current grant of stock options was just £2,000. Only in the top quarter of firms by compensation levels did options account for substantial portion of total remuneration.

In France, Trepo and Roussel's survey of data on 107 President Directeur Generals (PDGs) find that on average stock options contribute 28 per cent of the total compensation package (median = 20 per cent)

Recent work in the Netherlands indicates that the contribution of options to executive reward packages is growing rapidly. Cools and Van Praag (2000) find that whereas 10 per cent of total management remuneration in 1997 took the form of stock options, by the end of the decade the contribution of stock options typically ranged from 15 to 25 per cent.

A steep rise in the importance of stock options can be observed also in Germany. A study of the remuneration of top managers in 10 leading German multinationals by Arthur Anderson in 2000 found that stock option grants contributed between 13 and 62 per cent of remuneration (quoted in Schulten 2002).

The use of options appears to be contributing to growing pay inequality in countries that make extensive use of them for senior management remuneration. Whilst the ratio of average CEO total compensation to average annual earnings for production workers in the US was about 25:1 in 1970, it had risen to around 200:1 in 1996 with realised gains from stock option exercises included in CEO total compensation (the earnings gap based on salary alone is about 75:1) (Murphy 1999). A similar, though much less pronounced story can be told in the UK. The use of options for CEOs increased from the late 1980s and contributed to a growing gap between CEO and manufacturing employee pay in the 1990s. Meanwhile in Germany, where options were barely used prior to 1998, the CEO: manufacturing worker pay gap stayed more or less constant (Conyon and Schwalbach 2000). However, recent evidence suggests this picture may be changing: in the final years of the 1990s top managers

experienced steep increases in remuneration, and much of this increase took the form of stock option grants and other 'shareholder-value'-linked remuneration (see Hopner 2001).

At the top end in the US the size of option grants is now very striking indeed. In 2001, the largest 200 US corporations (excluding mutuals, regulated utilities and firms with dominant insider ownership) awarded 100 'mega-options (ie grant value in excess of $10 million). The highest award was $915 million, awarded to the CEO of CitiGroup, with the average being $52.3 million. The average gain on exercise amongst these companies was $706 million (Oracle Corporation), with the average being $7.4 million (see Pearl Meyer and Partners 2002).

Participation rates

There is very little literature on participation rates in stock option plans. The reason for this appears to be that most option plans are open only to executive officers and top managers, and it is assumed that all those offered the opportunity to participate will do so[30]. However, it cannot be assumed that all employees in broad-based schemes will actually participate. Liquidity constraints, risk aversion, and ideological opposition may well limit participation to just a small proportion of the workforce.

Most of our information on participation rates is generated by consultancy and lobbying organisations. There is even less written on the determinants of participation, and we are unable to say with certainty what factors influence the participation decision[31]. This is unfortunate since this is clearly an important issue with policy relevance. If governments wish to promote participation in stock option plans, it is necessary to know more about the influences on participation. We also need to know what relationship stock option participation has with other forms of

[30] A complication with interpreting information on participation rates in the US is that stock exchange regulations have weaker approval requirements for schemes that are open to a wider group of employees than top executives. However, schemes that are open to such a wider group do not have to be all-employee. This is thought to have stimulated the development of 'cosmetic' broad-based schemes but there is no conclusive evidence on this.

[31] This contrasts with 401k plans in the US where there is a small but rigorous literature on the determinants of participation

long-term saving, given the emerging crisis in pension provision in many European countries.

We have comprehensive information on participation rates only from the UK. The UK WERS survey conducted in 1998 (Cully *et al* 1999) indicates that, where share schemes were present, all employees participated in 15 per cent of establishments, 'most' in 26 per cent, 'some' in 40 per cent, and 'none' in 20 per cent. Clearly these figures are imprecise and must be interpreted with this in mind. The respondent is the workplace manager with responsibility for personnel issues and hence may not have precise information on share scheme participation (which is typically organised by company level administrative departments). Analysis of the 1990 Workplace Industrial Relations Survey (WIRS3) found that on average 20 per cent of employees participated in SAYE option schemes (Millward *et al* 1992: 266). Participation rates in selective, executive option schemes are also available from this research. It was found that on average 9 per cent of employees were eligible to participate in the Discretionary Share Options scheme, and just over 90 per cent of these chose to do so (Millward *et al* 1992: 266).

During the course of the 1990s, employee participation rates appear to have increased. This may have been mainly the result of rising stock markets but in the absence of research on this topic we cannot be sure of this. A study by the share ownership lobbying group Proshare in 1998 estimated that 35 per cent was a typical participation rate (Proshare 1998). Some firms, especially those in financial services, have achieved much higher participation rates: Barclays Bank and HSBC Asset Management, for instance, have participation rates have been over 70 per cent (Incomes Data Services 1995: 6: IRS Management Review 1998: 30). A later survey by Proshare indicated an average participation rate of 47 per cent of eligible employees (1999).

To our knowledge there is just one study of the factors that influence participation rates. Dewe *et al* 1988 examined the propensity for employees to join an all-employee share option scheme (the UK SAYE) (as measured by stated intention to participate) and the attitudinal factors that influenced their intention to join. Their research site was a manufacturing site of a conglomerate with around 380 employees,

and the study was conducted in the late 1980s. Data was collected from 296 employees prior to the formal decision whether to enter the scheme.

14 per cent of the sample thought that they would definitely join the scheme, whilst 22 per cent said they probably would. 19 per cent said they would probably not participate, and 34 per cent stated that they would definitely not. The questionnaire asked for demographic and job characteristics, and asked respondents to indicate their attitudes to work, the possible merits of SAYE schemes, and the perceived bad points.

The study was guided by two alternative hypotheses. The first is that such a scheme will attract a variety of workers, including some who have negative views of the firm and SAYE schemes. Over time, some of those who have negative views will change their views as a result of participation in the scheme. The second is that such a scheme will attract mainly 'good' workers, and hence the attitudinal consequences of participation may be expected to be less.

In stepwise regression analyses, incorporating factors derived from the attitude scales by principal-components analysis, the strongest predictor by a considerable margin was the expectation of staying with the firm. General attitudes to work were not at all significant, and neither were most of the demographic or biographical variables. Four sets of attitudes relating to the share option scheme itself were significant: *hazards of participation* (referring to the difficulty of savings, the risk of losing savings etc) was negative, *commitment enhancing* (the efficacy of SAYE schemes in building up team spirit etc) was positive, *worker dependency* (the difficulty of affecting the share price, being tied to one employer etc) was negative, and *expected financial benefits* (share schemes are a good way to build up a 'nest egg', to make workers richer) was positive.

The researchers conclude that

> "workers favour joining when they feel favourably inclined towards share option schemes in general, irrespective of whether they are favourably disposed to the firm, the workplace or the job" (1988: 19).

The results indicate that workers' orientation to joining a scheme are primarily related to instrumental issues: are they going to be with the firm, will they get something out

of it etc rather than any sense of identity with the employer. However, A limitation of this research is that it does not seek detailed information on workers' financial commitments. Hence, it is difficult to assess to what extent joining decisions are influenced by the prevailing patterns of income and expenditure of respondents.

Baddon *et al* (1989) have information on participation rates in a SAYE share option scheme in two of their case study organisations. Out of 108 responses in one of the companies, they found an overall participation rate of 59 per cent. The highest participation rates were amongst clerical (89 per cent) and supervisory (88 per cent) staff, and the lowest amongst manual staff (46 per cent). Looking at it by pay levels, amongst weekly wage staff, participation rates tended to rise with income levels[32]. In the second company, participation rates of non-manual staff in various SAYE schemes varied between 83 and 91 per cent; participation rates of hourly paid staff ranged from 9 to 16 per cent. In a survey of 180 employees (about 10 per cent of the total; 30 per cent of the questionnaires distributed), financial reasons seemed to be most important set of reasons (absence of risk, easy way of saving, easy way of buying shares etc) for participating in the scheme. For those not joining, financial reasons appeared to be the most important: 'can't afford to participate' was the most widespread reason.

There is clearly a shortage of well-designed and scientific studies in this area. We need to know more about the influences on employee participation in stock option schemes. To do this, we need individual level (rather than company level) data, and to have comprehensive information on demographic characteristics, attitudes, and financial resources[33].

Summary

Unsurprisingly it is apparent that the incidence of stock option plans is highest in the US and the UK. Although it is extremely difficult to generate comparable incidence

[32] There is a dip in the middle of the wage distribution but it should be borne in mind that the numbers in each category is very small

[33] The author has access to a comprehensive dataset of this type (with several thousand cases) and it is planned to analyse this data in the near future.

rates, there appear to be something like 3,000 broad based schemes in the US and around 1,500 in the UK. Note however that the number of US firms and employees offering broad-based options goes down considerably if the criterion is annual distribution of options to most employees. Furthermore, a high proportion of listed firms have schemes oriented towards senior executives (over 66 per cent of the 1000 top US firms granted options to their CEOs in 1992; the proportion of UK listed firms with an approved discretionary scheme ranges from nearly 60 per cent in the lower reaches of the LSE to 94 per cent in the FTSE 100). It would appear that there are more narrow-based option plans than there are broad-based ones in these two countries. This also seems to be the case in mainland Europe. There is a much lower incidence of stock option plans overall, and these seem to be mainly aimed at senior managers (as in France). The incidence of stock option plans in European countries is increasing but from a very low base. In the mid-1990s, CEOs received no option-based compensation in several European countries. That situation is now changing fast, though it is difficult to find accurate data on the incidence or growth rates. There is a further clear difference between the US and the other countries reviewed: the contribution of options to total executive remuneration in the US dwarfs that in any European country, including the UK.

Chapter Four Determinants of the use of stock options

Introduction

An important strand of the literature on stock options is concerned with identifying the predictors of the introduction and use of stock options. What types of firms appear to be more likely to utilise stock option plans? What factors and characteristics appear to be associated with stock option plans? What influences the level of stock options that are granted to employees? Although the literature on these topics is not large, it is quite diverse. We would caution the reader that many articles refer to executive plans, whilst just a few refer to broad-based plans. Scholars in Finance and Financial Economics rely predominantly on the publicly-available data-bases such as Compustat and ExecuComp, and the variables that are utilised are more or less exclusively finance variables (for example, Mehran and Tracey 2001; Core and Guay 2001). By contrast, Human Resource Management/Industrial Relations scholars (eg. Sesil *et* al 2002) make more use of firm-level survey data, and are able to draw on a wider range of variables (such as on trade union strength).

These two literatures differ in other ways. The HRM/Industrial Relations literature focuses primarily on broad-based stock options plans whereas the Finance literature tends to focus on top management option plans. The Finance literature on this topic is almost exclusively American whereas the HRM literature is mainly English. So far, there is no literature from elsewhere in Europe on the determinants of stock option plans specifically, though a literature on share-based financial participation in general is gradually emerging (see, for instance, Festing *et al* 1999)[34]. There are also important methodological differences between the two groups of literature. The HRM literature tends to focus on the presence/adoption of an option plan, and thus tends to involve cross-sectional comparisons of firms/workplaces with options against those without options. By contrast, the Finance literature tends to focus on factors influencing variations in the level of options awarded. An additional complication within the literature as a whole is that certain measures may be used to proxy for quite different processes. For instance, expenditure on research and development might be used as a proxy for incentives issues (high expenditure may indicate high growth

opportunities, which in turn are thought to present greater monitoring problems) or as a measure of the human capital 'richness' of the firms. One measure refers to incentives, the other to recruitment and retention.

Despite these differences within the literature, it must be emphasised that the literature is small. There is, however, a more substantial body of literature associated with the adoption of other forms of equity compensation (Sesil *et al* 2001a). This literature indicates there to be no clear single picture associated with the adoption of employee share ownership. There is some evidence that firms that are more likely to incur high degrees of monitoring costs may be more likely to adopt equity ownership (see Pendleton 1997 for a discussion of this issue). It appears that large firms are more likely to adopt stock plans, suggesting that there may be high fixed costs associated with the administration of share ownership plans (*ibid.)* There is also some evidence that changes in a firm's performance are associated with the adoption of share-based compensation (Sesil *et al* 2001a). This may indicate the desire to obtain some compensation flexibility because this form of pay can increase or decrease compensation without changing base wage levels.

It is arguable that stock options have more intense effects than other types of share ownership scheme in some respects and weaker ones in others. The potential for future increases in stock price may have more powerful incentive effects than share ownership schemes. Equally, the potential for greater emphasis on financial returns and the fact that shares are not owned until exercised may give rise to weaker sentiments concerning identity with the firm. Ex ante perceptions of likely effects amongst those introducing stock options may have an influence on the type of firm and circumstances in which options are offered.

Theoretical background

Despite the differences within the literature identified above, the theoretical rationale for the use of stock option plans is fairly similar between studies of broad-based and

[34] There is also a long-standing literature on profit sharing in countries such as France and Germany

narrow-based stock option plans, and between the Finance and HRM literatures. The starting point is the core observation of principal-agent theory that employees may choose to shirk, steal, mis-represent their abilities, etc. in order to maximize their personal utilities. Faced with this "agency problem", firm owners have to put in place control mechanisms that will guide employee behaviour in the right direction. Agency theory (Eisenhardt 1989; Jensen and Meckling 1976) deals with the problem of creating alignment between the interests of owners and their agents by using appropriate control mechanisms. The theory rests on the assumption that people are self-interested utility maximizers who are both effort-averse and risk-averse (Jensen and Meckling 1976; Bloom and Milkovich 1998). The two control mechanisms available are behavioural control (monitoring) and output control (incentives) (Eisenhardt 1989). It is suggested that as monitoring becomes more difficult it may be efficient for firms to incur costs associated with aligning the interests of shareholders, managers and employees. Pay systems such as stock-based compensation can, in theory, align the interests of these two parties and may provide a cost effective substitute or complement to formal monitoring (Kruse 1993). This line of reasoning suggests that the probability of adopting a stock option plan will be higher in settings where monitoring or supervision is costly.

Within this common theoretical framework, there are variations in the literature in the identity of the agency problem. The managerial compensation literature in Finance focuses on the agency costs of the shareholder-executive relationship, as located in a context of the separation of ownership and control. The literature on broad-based share ownership plans tends to focus on the agency relationship between 'the firm' (as represented by its managers) and its employees.

What firm characteristics are associated with high monitoring costs? High growth makes control, coordination, and monitoring more difficult. High levels of intangibles such as intellectual capital may also increase monitoring costs (Bell and Kruse 1995). Specifically, firms that invest large amounts of money in research and development pose a monitoring problem for their owners, as it is very difficult for them to assess the quality and quantity of the work being done. Thus, it may be appropriate to leave it to the stock market to make that assessment, and reward

employees, at least partially, with market-based incentives. The same argument applies for firms with a high market value per employee and a high market-to-book ratio. These variables both indicate the presence of intangible assets (new knowledge generation, superior marketing, customer loyalty, etc.) created by highly creative, qualified and experienced employees.

Monitoring costs also increase with the use of sophisticated and expensive machinery (Bell and Kruse 1995). Cooperation among employees and between employees and management becomes more important because the production process is increasingly a function of team-based complementary work practices. Large firms may have more severe monitoring problems compared to small firms, as it is difficult to observe the level of effort of each individual employee. Therefore, large firms may be more likely to adopt incentive pay in general and broad-based stock option plans in particular. However, group incentives such as broad-based stock options may not work well in large firms, because of the higher potential for free-riding behavior. Due to that, large firms may be less inclined to adopt such incentives.

In addition to their desire to reduce monitoring costs, firms may be driven to adopt broad-based stock option plans because of financial constraints. Smaller and/or faster growing firms may face higher costs of capital (Core *et al* 2000, Ittner *et al* 2001), e.g. due to already high debt burdens, low liquidity, or because investors perceive the business prospects of such firms as risky. Under these circumstances, employee stock options can be used to secure the cash needed to sustain growth. This might be termed the liquidity argument for stock options.

From a human resource management perspective, employee stock options may be used to support a culture of accountability and entrepreneurship, and to promote teamwork and trust across individuals, departments, and business units (Applebaum and Berg 2000). Such group incentive plans may also be adopted to create an egalitarian work environment, assisting to promote the cooperative behaviors necessary for team production (FitzRoy and Kraft 1987; Weitzman and Kruse 1990; Kruse and Blasi 1997). Companies may also use broad-based stock options as a deterrent to unionization. There are two main factors here. First, the incentive effects of options may discourage employees from participating in institutions (ie unions)

that may be perceived to impede wealth creation. Two, the potential for option plans to generate employee stock ownership may lead to attitudinal changes whereby employees come to see themselves as owners.

The above arguments indicate that stock option plans are more likely to be of use to firms that have: 1) experienced high growth, 2) have high levels of intellectual capital, 3) have high levels of capital intensity, 4) face high costs of capital, 5) experience cash and profit shortages, 6) want to shift some of the business' risk to employees, and 7) want to stay non-union.

The literature

Smith and Watts (1992) is an important piece in the development of the stock options literature as it established the importance of investment opportunities in the award of stock options. Using data on industry compensation patterns from Conference Board surveys for several years between 1966 and 1986 coupled with firm level data taken from Compustat (averaged to provide industry means), they investigate the relationships between use of options (also financing, dividend and bonus plan policies) and the investment opportunity set, regulation and firm size. The relevant options measure is the proportion of firms in an industry that have option plans.

Their main contribution resides not so much in the empirical results but the extension of agency theory. They argue that managers' actions are less readily observable if the firm has more investment opportunities because there are a range of actions that may be taken and it is not readily clear which will be best for shareholders. Using options-based compensation is beneficial because it ties compensation to a performance measure that reflects the effects of managers' actions on firm value. They use the book to market ratio as a measure since the lower the book ratio in relation to market valuations, the lower the proportion of assets already in place given the market's evaluation of current firm value. They also predict that larger firms will be more likely to use option plans because of high fixed costs and economies of scale in plan administration. Their results are straightforward. As predicted, firms with better growth opportunities are significantly more likely to have a stock option plan. Option

plan firms are also larger, as predicted. Their prediction that firms in regulated industries will make less use of options (because of lower opportunities for managerial discretion) is also supported by the data.

In an important paper, Yermack (1995) attempts to test agency and liquidity-based reasons for the use of stock options for Chief Executives using a sample of 792 large US firms from 1984 to 1991. His research is concerned with the influences on grants of options: in other words a flow rather than a 'stock' model[35]. He uses two dependent variables. One measures the change in CEO wealth in relation to firm value as a result of each award (ie option sensitivity), and is a function of the Black-Scholes-derived estimate of the value of options in relation to stock price multiplied by the proportion of a firm's equity represented by each option award. This provides a useful measure of the 'worth' of the option award to the CEO, and hence is well-suited to tests of agency-based reasons for the use of options. The other dependent variable expresses the Black-Scholes value of option awards in relation to cash salary and bonus compensation.

His important finding is that few theories based in the agency or financial contracting literature have explanatory power (1995: 242). He suggests two interpretations of this set of findings: most corporations do not follow optimal compensation practices, or that financial economists theories of optimal compensation contracts are incomplete or incorrect (ibid.).

In detail his results in relation to agency/financial contracting theory are as follows:

a) there is no significant association between option awards and CEO equity holdings. A negative relationship was predicted on the grounds that relatively high holdings of equity would help to resolve agency problems, hence rendering options less useful.
b) There is no evidence that options are used more as CEO's approach retirement to deal with a potential horizon problem ie that CEOs time horizons are shorter than those of the firm

[35] He does not have data on exercises, and thus cannot test to what extent grants occur in response to exercises.

c) There is a negative relationship between growth opportunities (as proxied by Tobin's Q) and the use of options, contrary to theory and predictions. Theory predicts that monitoring will be more difficult when there are high growth opportunities (as shown by a high market valuation of the firm) because future events and decisions have higher uncertainty
d) There is positive, but weak, support for the notion that options will be used more when there is 'noise' in accounting data (measured by the ratio of variance in return on equity to the variance in stock returns). It is predicted that noise will have positive effects because the differences in performance measures make monitoring more difficult.
e) Contrary to the prediction of John and John (1993), there is no relationship between leverage (book value of debt/book value of assets). A negative relationship was anticipated because options apparently provide incentives to managers to undertake risky investments. Debt-holders will demand higher risk premia as a result. To preempt this, equity holders will reduce the incentives for managers by reducing pay-performance sensitivities. Thus, firms with high debt will use options to a lesser extent. However, in the pay-performance estimation a positive rather than negative coefficient is recorded (albeit insignificant).

The results for liquidity based reasons for using stock option awards are as follows

a) There is a negative relationship between non-payment of dividends and option awards in one of the estimations, as predicted. If it is assumed that non-payment of dividends proxies for cash constraints, the theory is supported. However, other studies suggest that option-holding managers may reduce or eliminate dividends because this transfers value to stock (see Chapter on Dividends). However, Yermack argues that the rise in value does not account for the extent of option-based compensation in zero-dividend firms
b) Yermack finds no evidence that option awards are driven by tax considerations (as measured by a net operating loss). It is suggested that firms with operating losses will have lower marginal tax rates, and that this will increase the attractiveness of stock options (which, unlike cash compensation, do not reduce taxable corporate income. Thus, a positive relationship between the proxy and stock options was anticipated, but none found.

c) There is no evidence that earnings management plays a role in awards of stock options. Interest cover is used as the measurement variable, proxying for the costs of reporting low accounting earnings. Since the award of stock options is not shown on the Profit and Loss account, they reduce compensation costs relative to cash salary, and therefore boost firms' net earnings. It is predicted that firms with lower earnings will be more inclined to adopt options.

Other results of interest are as follows:

a) Size of firm (log of assets) is not an important predictor. However, it should be borne in mind that the analysis is restricted to the largest US firms.
b) Firm performance is not related to pay-sensitivity (ie incentives) but is positively related to the mix of options and cash compensation (though the magnitude of this effect is small).
c) New CEOs receive especially large awards. Although Yermack does not discuss this, this could indicate a recruitment premium, and suggests that options are an important inducement in executive recruitment. Meanwhile, exiting CEO's receive very low option awards.

Much of the subsequent work on the determinants of stock options has attempted to replicate Yermack's approach. Bryan, Hwang, and Lilien (2000) replicate the work of Yermack, focusing on the use of restricted stock as well as stock options. We restrict the reporting of findings here to options. Like Yermack they use two measures for options: what they call *Incentive-Intensity* (the change in the value of CEO stock based compensation per change in market value of equity) and *Mix* (the ratio of the value of stock-based compensation to cash compensation. The range of potential determinants selected for analysis are:

a) investment opportunities. In addition to the monitoring benefits of options, options protect CEOs from downside risk arising from risky investments. Cash bonuses are less suitable because accounting earnings in high-growth firms are usually volatile. The measure used is R & D expenditure/market value of the firm (sum of market value of equity and book value of total liabilities)
b) Noise. See comments on Yermack above. The measure is variance of assets scaled by variance of annual stock returns

c) CEO ownership. Where CEOs own a large fraction of equity, the interests of shareholders and CEOs are already relatively aligned. Also risk-averse CEOs will want to diversify so awards of options will be smaller where company stock is already owned.
d) Agency costs of debt. The measure used is the book value of liabilities scaled by market value
e) CEO time horizons. The measure used is the CEO's age
f) Liquidity constraints. The measure is cash-inflows plus cash outflows to investment
g) Tax costs. Simulated marginal tax rate
h) Financial reporting costs. The measure is a dummy where the value is 1 where 'as if' earnings (ie earnings minus stock option compensation) are below a target level (derived from average change in earnings over 5 years)

Unlike Yermack, their results provide strong support for the hypotheses. The signs are as expected and significant for the whole sample and two sub-samples (S & P and non- S& P 500 index - a combination of Mid-Cap and Small Cap) for investment opportunities, noise, ownership, leverage (most estimations), free cash-flow (most estimations), tax, (most estimations), and reporting costs (most estimations). The only important exception is CEO age where the sign is the opposite of what is expected, and is significantly so in all estimations. This indicates that options are not used to deal with a supposed horizons problem with older CEOs. Instead, Bryan *et al* suggest that the positive association between options and CEO age is due to older CEOs preferring to minimize the uncontrollable effects of market-wide factors on their wealth. Another possible explanation is that younger CEOs are found in high growth firms. This result notwithstanding, this study is notable for the support it gives to optimal contracting-based views of options and to financial constraint theories.

Ryan and Wiggins III (2001) also follow the lead provide by Yermack. They focus on CEO stock options and set up three sets of hypotheses based on the existing literature.

- investment opportunity hypothesis – equity is used in firms with high growth opportunities because it is difficult to monitor actions yet to be taken (cf.

Smith and Watts 1992). Where the firm is especially dependent on human capital development, there is even more uncertainty

- managerial horizon hypothesis – This may be shorter than the firm's investment horizon, especially when CEOs are approaching retirement. Options may be used to align CEO horizons with those of the firm.
- efficient risk sharing hypothesis – managers have incentive to avoid investing in risky projects because of their human capital. More severe where riskier investment opportunities. Optimal contract should limit managers risk. Therefore firms with risky investments or volatile cash flow should use non-linear incentives to limit downside risk ie options

They construct three variables relating to incentive compensation by expressing cash bonus, restricted stock, and stock options as a percentage of total compensation. Here, we will present findings on stock options only except where findings on the other two are relevant.

In contrast to Yermack, their findings indicate that firms use options to ameliorate monitoring costs and to offset managerial risk aversion. They find positive relationships between the level of stock options and investment opportunity measures: R and D is significant at 1 per cent, and capital expenditure and market to book assets are significant at 5 per cent. However, the managerial horizons hypothesis is not supported as there is a negative relation between stock options and age. There is also a negative relationship with tenure (they suggest long-standing CEOs build up stock holdings and therefore require less-equity-based pay). There is a negative relationship between CEO stock holdings and options, consistent with the notion that CEOs with high stock holdings need less options for alignment purposes.

Volatility of cash flow is positive related to the use of stock options. High cash flow volatility makes it difficult to monitor the manager plus exposes him/her to risk that he/she will be blamed. In this instance he/she has the incentive to ameliorate the risk to his/her human capital by avoiding risky investments. There is a positive relationship with firm size. There is a positive relationship with debt-equity relationships suggested options used to ameliorate equity-debt agency conflicts. The negative relationship with convertible debt is consistent with this.

They find that firms with high R and D expenditure have less restricted stock and more options, suggesting that firms with more uncertain investment opportunities encourage risk averse managers to invest in risky projects by providing upside potential and minimizing downside risk.

Mehran and Tracy (2001) adopt a similar approach to Yermack (1995) in both the theoretical standpoint they aim to test and the selection of variables they use to test this. Their core hypothesis is that options will be used to ameliorate agency problems and to overcome the limitations of other forms of monitoring. Unlike Yermack, their focus is grants of options to all employees below the executive level. However, as they use ExecuComp data their observations on non-executive employees are necessarily limited. ExecuComp provides information on the percentage of option grants that go to employees other than the top five earners (total options grants minus those granted to the top five) but is unable to indicate the distribution patterns. Thus they cannot say what proportion of employees receives options. Work currently underway by one of the authors of this report indicates that typically only about 5 per cent of employees receive options in non-technology companies.

They suggest the following:

a) options will be used when a firm has a high growth opportunities because information asymmetries mean that it is difficult to evaluate managers' investment choices. The market-to-book proxies for growth opportunities, and a positive relationship with the award of options is expected.
b) It is difficult to monitor managers when there is 'noise' associated with the firm's performance. They measure this using the variability of stock returns over the previous year, and expect that higher variability will be associated with greater use of options. However, this increases the risk exposure of managers so a risk premium can be anticipated. They suggest that this might promote substitution away from options. Alternatively, it might be argued that firm's will grant a higher number of options than in an instance where managers are risk-neutral. However, neither possibility can be tested with the data as both take a counter-factual form and there is no data on managers' risk preferences.

c) Like Yermack (1995), and following John and John (1993), they suggest that high leverage firms will use less options because of debtors anxiety about the effects of option on managerial incentives to pursue risky strategies (at their expense)
d) Younger firms are likely to be more cash-constrained so options will be relatively attractive to them. Length of public listing is the variable used here.
e) Measures of size, performance, and industry are also included but these are not located explicitly in theory.

The dependent variable is the Black-Scholes value of new options grants in 1998, and the independent variables are those shown above, divided into quartiles with results shown in relation to the lowest quartile for each measure.

The results are as follows:

a) firms with a high return on assets grant fewer new stock options ie there is a negative relationship with performance. This is perhaps puzzling but possible explanations are that poorer performing firms make more use of options to provide incentives to improve performance or that firms time option grants when they are performing unusually badly so that grantees benefit from rising stock prices (see Chapter on timing of grants)
b) Option grants increase with the size of the firm, measured by employment and total assets
c) Highly leveraged firms pay out fewer options, as predicted. However, it could be that grants are made in high debt firms with the knowledge that attempts will be made to reduce debt, and hence stimulate upward movements in stock prices. In other words, this result picks-up a timing issue.
d) Firms with higher market-to-book values award more options, as predicted.
e) Noise, as measured by stock returns variance, is associated with lower option awards, contrary to predictions (though consistent with Core and Guay (see above). This suggests that avoidance of risk amongst managers is more important than monitoring (see Chapter on timing of grants).
f) Firms with cash-flow constraints award more options. Firms with a net operating loss have grants that are significantly higher than those in profit. This is the same as Yermack's 'raw' finding for this measure. He used the

same measure to suggest a negative relationship but based on it proxying for tax considerations, and found a positive relationship instead. It is more plausible as a measure of liquidity constraints as it does not depend on unobserved preferences in relation to tax. However, it could be argued that this again reflects a timing issue – firms issue options when they are performing less well but expect better performance in the future (see Chapter on timing of grants)

Core and Guay (2001) examine determinants of firm's use of stock options and also the level of use of stock options. They explore the level of options held by employees and the flow of options into and out of the plan via grants of new options and exercises (see Chapters on exercise and grants). Their main findings are that options are granted to non-executives more intensively when firms have greater financing needs and face financing constraints. However, as they rely on ExecuComp data, it cannot be assumed that they are dealing with broadly-based, all-employee schemes. The point made above about the potentially narrow-base of option grants to employees other than the top five executives also applies.

Their main hypothesis concerning the level of outstanding options is that firms use options to employees to provide incentives, to attract and retain key employees, and as a substitute for cash compensation. For the first reason, they therefore predict that firms provide incentives when direct monitoring of employees is costly ie when the firm is large, and more decentralized, when there is greater 'noise' in the firm's environment, and when the firm has greater growth opportunities. They propose that attraction/retention of employees is more important where human capital is a relatively more important factor of production (which they measure by subtracting book from market value, divided by number of employees). Arguably, in circumstances where growth opportunities are highly dependent on human capital, options will be especially used (Core and Qian 2000). Core and Guay also predict that because options tie employee wealth to aggregate performance, equity incentives will be negatively associated with diversification, and with sales between operating units. They also predict that firms that use options intensively to monitor top managers will also provide them to other employees.

They argue that new options are granted as a substitute for cash compensation and to make adjustments to aggregate incentives levels. The predict that equity compensation is substituted for cash pay by companies with cash constraints, high capital needs, high costs of accessing capital markets, and a relatively greater interest in attracting less risk averse workers. Their work is therefore highly relevant in its implications for the analysis of SMEs and 'new economy' firms. As regards incentives, they predict that firms attempt to manage option incentives around a target level so that exercises are compensated for by new grants.

They define option incentives as the change in the dollar value of the holders' options for a 1 per cent change in stock price , using the Black-Scholes model (the option 'delta'). They find the delta is approximately 0.75

They find that firms with greater monitoring costs and greater growth potential (proxied by firm size, book to market ratio and R and D expense) and suggest that this supports the incentive theory. This is debatable because the free-rider effect grows with size, and suggests that incentives become progressively weaker. The R and D variable may proxy for level of human capital and training and may be about lock-in rather than growth opportunities.

They find that the proportion of total options held by non-executives is associated with firm size and the number of employees. The book to market ratio and R and D expense are also significantly associated with this variable suggesting that options are used when growth opportunities are important.

They find that option grants are more heavily used by firms with cash constraints (measured by cash-flow shortfall), high capital needs, and high costs of accessing capital markets. High capital needs proxied by book to market and Rand D expense. Their results, however, provide mixed support for the notion that firms manage incentive levels for employees towards a target level. However, they find that grants are larger following larger exercises, and they suggest therefore that there is evidence that firms make additional grants to reinstate incentives lost through options.

Sesil *et al* (2002) provide a bridge between studies conducted in Finance and those conducted in Human Resource Management in so far as they use firm level survey data as well as accounting information. They attempt to identify the characteristics of firms with broad-based option plans, and the pre-adoption predictors of those who adopt broad-based stock option plans. Their results are broadly consistent with most of the literature surveyed earlier in that they provide some support for agency theory perspectives of stock option use and adoption. However, little support is provided for liquidity-based arguments for stock options. Their detailed results are as follows:

Growth (yearly growth in sales), intellectual capital (the ratio of R and D expenditure to assets), and capital intensity (the log of book assets per employee) show a strong and significant positive association with the presence of a broad-based stock option plan. There is no evidence that firms maintaining employee stock option plans are debt-ridden. As far as liquidity is concerned, they find that higher levels (rather than lower) of cash as a percent of assets are a significant predictor of the presence of an employee stock option plans.

Cross-sectionally, higher profit margins are not a characteristic of stock option firms. In fact, the respective coefficient for profit margin is negative (but it does not reach statistical significance). As far as risk is concerned, there is evidence that companies that have broad-based stock option plans show a wider dispersion of total annual shareholder returns.

As expected, union firms are found to be less likely to have stock option plans. This cross-sectional finding may reflect both a "supply" and "demand" problem. On the "supply" side, employers may be unwilling to offer union employees stock options. On the "demand" side, unions may not be too keen on having employees become owners.

Results for firm size indicate that the larger the firm is, the more likely it is that it will put in place a broad-based stock option plan. There are a number of possible reasons for this. Establishing and maintaining a stock option plan takes time and consumes resources. Small companies may use other compensation tools to duplicate the incentive effects of such plans at a lower cost (e.g. firm-wide bonuses tied to stock

price, phantom stock, etc.). Large companies face larger monitoring costs, hence the greater need to align employee compensation with firm performance. Also, large firms increasingly find it necessary to encourage and reward entrepreneurship behaviors, and broad-based stock options are a suitable vehicle to achieve that goal. On a more pessimistic note, observe the authors, large firms may use broad-based stock options to inflate their reported earnings or to benefit from tax breaks. Under current accounting rules, the cost of these grants is not deducted from reported income, and there is a potential tax benefit involved[i].

The results for adoption are very similar to those reported above for presence. Growth, R&D expenses, liquidity, and company size positively and significantly associated with the likelihood of adopting a broad-based stock option plan. Union presence has a negative effect on employee stock-option plan adoption. However, the results need to be interpreted with caution, as this sample contains only 57 plan adopters. Also the measures of stock option presence are derived from national and local media, and some firms with stock options may not have been recognized as having them.

Overall, Sesil *et al* (2002) suggest that their results provide moderate support for the contention that higher monitoring costs prompt firms to adopt and maintain employee stock option plans. However, they recognize that the positive effects observed in relation to some of their variables (eg intellectual capital) are consistent with human capital retention arguments as much as incentive reasons, and it is difficult to judge which is a better explanation. A clearer finding from their research is that, similar to Yermack 1995), liquidity problems do not lead to stock option usage. On the contrary, stock option firms appear to be relatively cash-rich.

Human resource management/industrial relations literature

There is also a small literature in the HRM/Industrial Relations field that deals with the characteristics of firms/workplaces with stock option plans. This forms part of a larger literature on the determinants of financial participation. So far, this literature is entirely from the United Kingdom because the main all-employee share ownership

scheme in that country has taken an option-based form. For reasons of brevity we will not provide such a detailed account of approach and findings of this literature. Also there are grounds for believing that the key results from these UK studies are somewhat unusual in a European context.

The UK studies utilize the series of Workplace Industrial Relations Surveys (now Workplace Employee Relations Survey) that commenced in 1980. The main findings that have emerged from this series of surveys is that in the UK broad-based option schemes are more likely to be found in large workplaces, unionized workplaces, and in workplaces with relatively advanced information and consultation procedures. Gregg and Machin (1988) found that share schemes were more likely to be found in workplaces where unions were present. However, amongst the group of unionized establishments, share options schemes were less likely in those with the highest levels of union membership. Pendleton (1997) found that, within manufacturing, share schemes were more likely to be found in those workplaces where there were collective agreements (with white collar staff). Pendleton (1997) and Conyon and Freeman (2000) also find a strong association between presence of share option schemes and joint consultation, information sharing and communication structures. These two sets of findings have recently been replicated in the UK component of a pan-European study of financial participation but the results in that indicate that the UK results are to some extent exceptional (see Pendleton *et al* 2001). A further finding of interest from two UK studies (Pendleton 1997 and Beaumont and Harris 1995) are that share option schemes tend to be found in workplaces with less sophisticated technology. This is at odds with the implications of much of the US Finance literature since it suggests that share option schemes are found in firms likely to have lesser difficulties in monitoring workers.

Summary

Overall, the determinants literature contains some interesting and suggestive results but also suffers from some weaknesses. The following results appear fairly clear in this literature. Size tends to be a strong predictor of option usage. Yermack aside, there is on balance reasonable support for the investment opportunity perspective on

the use of stock options. There is also some strong evidence for the liquidity arguments for options, though equally some counter-evidence (Yermack 1995; Sesil *et* al 2002, for instance).

Nevertheless, the literature can be seen to be unsatisfactory in a number of important respects. The reliance on readily available data tends to restrict the potential for analysis and means that some proxies are somewhat tenuous. For instance, whilst the managerial horizons issue is a potentially important influence on the use of stock options, especially if managers have considerable control over the grant of options (see Chancellor 2002), a measure recording the length of time to retirement can be seen as rather unsatisfactory. It would be better to have a measure of the tenure of the previous CEO or the average CEO tenure in the industry to gauge the horizons problem. However, this would require collection of additional firm-level data. It is difficult, also, to be entirely happy with the measures for investment opportunities. Whilst market to book valuation will reflect investor sentiment about growth prospects, it does not straightforwardly represent monitoring costs (other than as a theoretical possibility). Indeed a high valuation may represent confidence in the existing management to deliver shareholder value. It is interesting to note that studies using measures of agency costs based on technological characteristics have not found significant associations between contexts where there would appear to be high monitoring costs and the use of option schemes.

One of the surprising omissions from the literature is a consideration of risk. Agency theory predicts that optimal contracts will be a trade-off between incentives and risk. There is substantial evidence, consistent with agency theory, from elsewhere in the pay literature that firms facing high risk are less likely to use incentives-based pay schemes, and this can be explained by employee risk aversion (see, for instance, Bloom and Milkovitch 1998). Most of the studies cited do not measure the role of risk in the firm's operating environment, with Sesil *et al* (2002) being an exception. We need further research on this issue given that one justification for the use of options in Europe is to provide incentives to managers in markets that are becoming more uncertain and risky.

Chapter Five Pay sensitivity and incentives

Introduction

It is common for stock options to be justified by reference to their supposed incentive effects. This is true of practitioners and scholars, with the latter appealing to principal-agent and optimal contracting theories as the basis of the claim. In principle, there are two ways of putting this claim to the test. One is to see how far option values respond to changes in share price, on the assumption that the greater the response, the greater the incentive. The second is to observe company performance at some point after options have been awarded, on the basis that if options have incentive effects there will either be performance improvements or differential performance levels in a cross-section of firms. Virtually all of this work is on executive stock options.

Finance scholars virtually always take the former approach, whilst the latter is more common amongst labour economists and human resource management specialists. Whilst the former use share price performance as their yardstick (or 'input' measure), the latter typically use economic measures of productivity as outcomes or attitudinal changes as intervening variables. Given this data source, finance scholars are reluctant to assess incentive effects by effects on share price because the efficient markets hypothesis assumes that the share price incorporates all known information and it is therefore methodologically very difficult, perhaps impossible, to identify the discrete effects of option-based incentives. In this chapter we outline the findings of Finance scholars' work on the responsiveness of compensation to share price, whilst in another chapter we consider the effects of options on performance. We also consider other effects of options on behaviour in the chapter on behaviour.

Before presenting the findings of this work, some general observations will be helpful. In the corpus of work on pay-performance sensitivity, the focus is almost always the chief executive or other top managers (ExecuComp has stock options data on the top five managers since 1992). There is no work on the sensitivity of other employee's compensation to performance as detailed information on option grants

and holdings are not readily available (though in principle it could be obtained). The second point to note is that, as in all other areas of work on stock options, the literature is nearly entirely American. Third, all studies adopt a similar methodology: that is, they calculate the values of options held and awarded using a Black-Scholes (or Black-Scholes-derived) option pricing methodology to achieve a measure of total compensation capable of being regressed against changes in share price. As will be shown, there are some reservations about this approach. Fourth, recent work suggests that the level of options is a very important, possible the most important, determinant of pay-performance sensitivity. However, whether options do provide an optimal contract is open to question, as we shall see.

Within this general framework there are two methods of calculating pay-performance sensitivity. One is to determine the dollar increase in total compensation arising from a dollar change in stock price. The other is to calculate the rate of change in compensation emanating from a percentage change in share price (elasticity). The latter is arguably a preferable approach as it relates compensation change more clearly to compensation levels and enables more precise comparisons of sensitivity between high and low earners. Even with this advantage, however, it should be noted that the value of an option to an executive will be in part a function of risk preferences, his/her total wealth, the fraction of that wealth in company stock, and the likelihood that the executive will remain with the company (Murphy 1999). Furthermore, it is unlikely that all firms face similar enough circumstances for a given sensitivity value to resolve principal-agent problems in all firms (Garen 1994). Research in finance, which almost always utilises on data available from readily available from public sources (Compustat, CRSP, ExecuComp etc), does not collect either the firm-level or individual data necessary to address these issues. Typically, risk preferences have to be modelled with imputed values or arguably unsatisfactory proxies such as CEO age. Thus, whilst it is possible to calculate pay-performance sensitivities and to identify some determinants from Compustat information, it is not possible to provide a fundamentally satisfactory answer to the question as to whether options provide incentives to expend more effort or make decisions in shareholders' interests.

Theoretical background

The 'conventional wisdom' amongst practitioners and observers is that stock options provide potentially powerful incentives effects, thereby aligning executive behaviour and interests with those of shareholders. The intellectual backdrop to this view is the principal-agent perspective, which has dominated scholarship on incentives and the firm in the last twenty-five years. This perspective suggests that, where there is separation of ownership and control, there is a divergence of interests between shareholders (principals) and managers/employees, (agents) given utility maximisation amongst agents. Since there is asymmetric distribution of relevant information, it is costly for shareholders to monitor whether 'insiders' are expending appropriate effort or making decisions that benefit shareholder interests. Since the pioneering paper of Jensen and Meckling (1976) stock ownership by managers has been seen as a useful instrument for aligning interests. Stock options are perceived as an especially powerful tool because the capacity to increase wealth is at the core of this instrument. Hence the incentive and alignment effects are potentially highly potent.

The merits of stock options as a tool for monitoring and providing incentives to top managers is that they reward correct decisions rather than effort as such (which is probably not likely to be a problem amongst most Chief Executives). As Murphy (1999) puts it, the merits of stock options from a shareholder's point of view is that they provide contracts which are based on the principal's objective (ie increasing shareholder wealth) rather than on measures that are incrementally informative of CEO actions (such as accounting returns). Information and capability asymmetries do not therefore impair the principal's capacity to monitor the agent, and in principle the widely observed capacity of agents to manipulate performance-based compensation systems by meeting actual rather than intended performance measures is limited (see Baker, Jensen, and Murphy 1988). Whether this is actually the case in practice is another matter. It is arguable that stock-based performance measures lead to managerial actions that prioritise relatively short-term performance outcomes perhaps at the expense of long-term performance (ie high profits rather than high market share). However, there is little firm and reliable evidence for this contention, though

plenty of anecdotal speculation[36]. There is rather more evidence to suggest that executive agents exploit their insider informational advantages to influence the terms of the 'optimal contract' ie by influencing the timing of stock option awards and exercises. There are reasonable grounds for the 'rent extraction' perspective (Bebchek *et al* 2001), which argues that in effect managers are able to award themselves stock options to enhance their returns from employment via their capture or manipulation of shareholder institutions such as compensation committees. It might be argued that stock options have been especially large in the US not because of some inherently entrepreneurial characteristics of the US business system (as is often claimed) but because of the weaknesses of the corporate governance system in that country.

The primary measure for measuring the incentive effects of managerial compensation is pay-performance sensitivity. In other words, how much extra compensation do executives receive for a given performance increase or how responsive is their compensation to changes in performance? In these computations, the value of stock options are computed using the Black-Scholes option pricing formula, and the evidence suggests that pay-performance sensitivity has both grown in recent years and is substantially determined by the stock option component of managerial compensation.

Having reviewed the main papers on this topic, we outline the objections that can be raised to this approach to measuring executive incentives. The most fundamental criticism is that sensitivity measures can never by themselves provide a measure of incentives ie how much a given unit of reward might make someone take a course of action they might not otherwise have taken. There are a host of highly relevant unobserved factors such as risk preferences, wealth, portfolio composition, lifestyle objectives etc. The Black-Scholes formula provides an inadequate (and excessive) valuation of the value of stock options to their recipients (though it may provide a reasonable estimate of the cost to the company of providing options).

[36] There is plenty of evidence that managers take decisions which have a positive short-term impact on share prices but which are arguably harmful to the long-term prospects for the firm. The most obvious

This becomes clear when risk preferences are incorporated into pricing models. Although Black-Scholes suggests that the value of options rises with stock price volatility, intuition (as well as optimal contract theory (eg. Fama and Jensen 1983)), suggests that the more risk averse the recipient, the less value placed on the option when stock prices are highly variable, meaning that 'excessive' and costly grants of options have to be made as a risk premium. As Lambert *et al* (1991) point out, whilst standard option pricing theory indicates that the option pay-off function derived from Black-Scholes is convex (ie. values increase as the variance of stock returns increases), employees' utility function will normally be concave. Risk-averse managers who cannot diversity risk will not want an increase in the variance of stock returns beyond a certain point. They suggest that a small increase in variance will increase the perceived probability that the option will finish in-the-money but once the probability of finishing in-the-money further increases, the recipient's pay-off becomes exposed to the risk of price falls. Thus, the option recipient will become increasingly averse towards an increase in the variance of stock prices.

The literature on pay-performance sensitivity

Although there has been research into pay-performance sensitivities for two decades or more, and some have explicitly dealt with the issue of stock options (eg. Murphy 1985), the 'classic' paper incorporating the role of options in sensitivity analysis is Jensen and Murphy (1990). Jensen and Murphy (1990) found levels of pay-sensitivity that led them to doubt the incentive effects of executive compensation. They found a median sharing rate of about 0.325per cent (ie a 3 dollar increase for every $1000 increase in shareholder value. Jensen and Murphy (1990) argue that

> "in most publicly held companies, the compensation of top executives is virtually independent of performance… on average corporate American pays its most important leaders like bureaucrats…is it any wonder then that so many CEOs act like bureaucrats rather than the value-maximising entrepreneurs companies need to enhance their standing in world markets?" (1990: 226)

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instance here is downsizing decisions. Whether these decisions are taken for managers' own benefit via their stock option holdings has not been systematically investigated.

They argue that the reality of executive compensation, as shown by the results above, is inconsistent with agency theory-based models of optima contracts. They suggest that this arises from political forces impinging on the contracting process. Public disapproval of large salary increases (a 'live' issue in the US in the late 1980s/early 1990s) means that it is difficult for firms to make payments at the top end of the salary distribution, even if linked to performance. They suggest that the greater visibility of pay-setting in large firms means that these political pressures are more pronounced in large firms, where compensation tends to be higher anyway (the 'size effect' widely observed in the managerial compensation literature). Thus, pay sensitivities are much higher in small firms than large firms

There are three main criticisms of the Jensen-Murphy position. The first is that even low sensitivities may be consistent with agency theory predictions, if executives are sufficiently risk averse (see Haubrich 1994). The second is that modest movements in shareholder returns can lead to large swings in wealth for executives (see Hall and Liebman 1998). A third revision that appears to be necessary to the Jensen-Murphy assessment is that the use of options has grown considerably since 1990, with a significant impact on the pay-performance relationship.

Two papers from the end of the 1990s make this clear. In important paper, Hall and Liebman (1998) find that between 1980 and 1994 CEO compensation increased by 136 per cent at the median and 209 at the mean in real terms. Most of this increase was in the form of stock options[37]. The median elasticity of CEO compensation with respect to market value more than tripled from 1.2 to 3.9, and virtually all of this increase derives from changes in the value of stock and stock options. The median wealth change per $1000 change more than doubled from $2.5 to $5,3. The CEO wealth change for a dramatic improvement in firm performance increased by a factor of almost 7, from $1.4 million to more than $9 million. They conclude "there has been a dramatic increase in responsiveness of CEO pay to firm performance during the last fifteen years" (1998: 680). They find that changes in CEO wealth due to

[37] It is worth noting that Hall and Liebman have information on options granted and options held (ie a stocks rather than flow model) and can therefore calculate precisely the value of a CEO's option holdings for a given change in firm value.

stock and stock option revaluations are more than 50 times larger than wealth increases due to salary and bonus changes.

They suggest two reasons for the difference with the landmark findings of Jensen and Murphy. First, the Jensen and Murphy study uses data from the 1970s and early 1980s, prior to the explosion in use of stock options in the 1980s and 1990s. They find that the average value (at 1994 prices) of option grants rose from 155,037 (median = 0) in 1980 to 1,213,180 (median = 324,989) in 1994. They find that the percentage of CEOs receiving stock option awards increased from 30 to 60per cent in the same period. The percentage of CEOs holding any options rose from 57 to 87 per cent. They find that the increase in stock option awards explains much of the increase in CEO pay over the period and is the main factor responsible for the large increase in pay to performance sensitivity.

Second, Jensen and Murphy use a measure of sensitivity whereas Hall and Liebman use elasticity. What looks like a small wealth increase relative to changes in firm value, can represent a large increase in executives' wealth. In fact, Hall and Liebman use four measures of sensitivity. Two show how CEO wealth changes (in dollar and percentage terms) for typical changes in firm performance, the third is an elasticity (percentage increase for a 1 percent increase in firm value), and the fourth is a dollar measure (*pace* Jensen and Murphy): the dollar change in CEO wealth per £1000 change in firm value. They find that including stock and options in elasticity measures increases elasticity by about 30 compared with those studies that use only cash and bonus compensation. They conclude that salary and bonus have a weak relationship with firm performance, and that stock and option holdings are mainly responsible for pay sensitivities.

Murphy (1999) also finds that general pay-performance sensitivity and elasticity has increased since the 1970s, and that much of this increase is due to stock-based compensation (especially stock options). The effect of stock options in this respect was particularly pronounced during the 1990s, and sensitivity had nearly doubled from the Jensen and Murphy (1990) level to around 0.6 per cent. However, as he points out, there is still a large gap between managerial and shareholder interests.

Each $10 million of corporate perquisites (eg on an executive jet) costs the CEO only about $60,000 (about 1 week's compensation for a median S and P 500 CEO).

Like Hall and Liebman, Murphy finds that pay-performance sensitivity is smaller in larger firms, which he attributes to the higher equity share owned by CEOs in smaller firms (wealth and risk constraints preclude a similar level of ownership in large firms) However, the increase in pay sensitivity observed during the 1990s mainly occurred in large companies.

Boschen and Smith (1995) argue that pay-performance sensitivity is much greater in the long-term than contemporaneously. They find that whilst a 10 per cent increase in firm returns in associated with a contemporaneous response of 0.3-0.5 per cent, there is a cumulative response of 3 – 5 per cent over a 10 year period. Using data from 1948 to 1990 they show that stock options contribute a much greater amount to total compensation from the end of the 1970s and rising rapidly through the 1980s.

Although there have been a number of UK studies of pay-performance sensitivity in recent years (eg. Conyon *et al* 1995; Gregg *et al* 1993), virtually none incorporate stock options into the analysis. These studies tend to find low pay-performance sensitivities. However, a recent study by Main *et al* (1996) fully incorporates information on stock options in a study of 60 firms. They find a big increase in the number of stock option grants from the mid-1980s, consistent with the passage of legislation favouring executive options in 1994. Whilst results for current pay are not strongly related to performance, total pay including options exhibits a strong relationship with firm performance. The size effect (usually seen to be the main determinant of salary levels in the UK) becomes insignificant and pay variation is dominated by share performance, owing to the power of share options. However, they find no evidence of a relative performance effect. They conclude that "due to executive share options there is a statistically and empirically significant connection between boardroom pay and company performance" (1996: 1641). An extra £1 million in shareholder value brings the average top executive an extra £239. They suggest that this may be large enough to address the principal-agent problem.

Critique of the sensitivity/elasticity model

There are several important criticisms that can be levelled against the pay-performance approach in the Finance literature. The first is that relates to technical deficiencies of the Black-Scholes model in the specific case of stock options. As Murphy (1999) points out there are several problems with Black-Scholes (see also Chapter on Valuation)

1) the assumption of constant dividend yields and stock price volatility is questionable given the ten year term of most US options.
2) The potential for forfeiture is not captured by the model, but is likely to reduce the value of options. Thus, one of the central incentive features of stock options reduces the value of option grants.
3) It is assumed that options are exercised at or close to expiry whereas the bulk of the research evidence (see chapter on Timing of Exercise) indicates that many employees exercise their options shortly after vesting.

To complicate matters further, option values do not change dollar for dollar with stock price. The Black-Scholes value varies with stock price and exercise price. When the stock price is close to exercise price the value is usually about 0.6 of the dollar value. When options are deep in-the-money this value is higher. Conversely, it is lower when options are out-of-the-money.

Second, the value to recipients is likely to depend on his/her risk preferences, his/her overall wealth, the faction of that wealth in company stock, and the likelihood that he/she will stay with company. In other words, the value of options depends on characteristics of the recipient as well as the option itself and the company it relates to. If option holders are highly risk-averse, the value of the options is likely to be less than in the case where option holders are risk-neutral. Given risk aversion of most employees, the Black-Scholes value is highly likely to over-state option values. All things being equal, the incentive effects of options are likely to be less than Black-Scholes calculations might suggest.

This issue is addressed in an important paper by Hall and Murphy (2000). The kernel of this paper is that there is a divergence between the cost of options to companies and their value to executives. They argue that the Black-Scholes option pricing formula (and its derivatives) provide misleading estimations of the value of options to risk-averse undiversified executives. Company executives cannot trade or sell their options and are also prevented (usually) from hedging by short-selling company stock unlike the investor assumed in the Black-Scholes framework. Furthermore, executives' capital (human, physical, and often financial) are concentrated in their employer so that risk is concentrated. Thus, some of the key assumptions of the standard option pricing models are violated by stock options practice. As a result, options are worth less to employees than the Black-Scholes formula suggests. Options cost more than they are worth to recipients. To offset risk aversion, it is often necessary to pay a risk premium.

These observations suggest that evaluation of incentives should be a derivative of executives' valuation of options not those derived from Black-Scholes. They demonstrate that for options exercised at grant price (of $30 in the example), the Black-Scholes derived sensitivity is $0.86 per dollar change in stock price whereas for executives with moderate risk aversion, the sensitivity is 0.63. Pay-performance sensitivities based on Black-Scholes therefore are overstated, and are particularly overstated for the more risk averse and less diversified executives, and for options that are deeply out-of-the-money (2000: 21). An implication of results of this type is that calculations of pay-performance sensitivities and elasticities can provide only a highly imperfect guide to the incentive effects of options. It may well be preferable to collect attitudinal and behaviour data from recipients themselves to calculate incentive effects.

A fundamental issue is that calculation of incentive effects may well depend critically on the perception of stock option schemes by potential recipients. There may be a critical difference between options that are perceived to be an add-on or perk to salary and those that are awarded as a key component of core salary (as is usually seen to be the case in 'new economy' firms. In a related paper to the one above, Hall and Murphy (2000) illustrate the difference in value that can derive from this difference in function and perception. They show that setting exercise prices at or near the grant-

date market price maximises pay-performance incentives for risk-averse undiversified executives, where options are essentially an add-on to current salary. However, where options substitute for base pay, either a greater level of options or a discount on market price at grant is necessary to achieve equivalent value. Given that such a discount increases costs to the company, restricted stock is cheaper to provide than options. For the same price, the company can grant relatively more shares of stock, thereby providing stronger incentives per dollar of company costs. The implication of this is that 'new economy' firms should have used restricted stock rather than stock options for employee reward.

As Hall and Murphy recognise, the fact that stock options are worth more to executive employees when seen as a 'perk' is deeply problematic from an incentives point of view. The implication is that if insiders have some degree of control over the award of options, as Bebchuk *et al* claim (2001), options will be awarded as a perk rather than as a salary substitute, all other things being equal. If stock was to be used as an incentive-linked component of core salary, firms (shareholders) would choose stock acquisition rather than options. A shortcoming of the Finance literature is that, by a sleight of hand, stock options are usually seen as a core component of compensation (because they are considered together with cash salary, cash bonus, and stock grants to compute total remuneration by value) whereas in fact there is no information to suggest that they are being used for this purpose, or are perceived as such.

Bebchuk *et al* (2001) argue that it is highly unlikely that executive options are used primarily for incentive purposes because options take such a similar form between companies (ie 10 year expiry terms, 3-4 year vesting periods etc). Given variations in circumstances between firms, and hence variations in agency costs, it would be expected that greater variation would be observed in the character of options. This derives from an earlier criticism made by Garen (1994) that a fundamental problem with analyses of pay-performance sensitivity is that it imposes a common value on all corporations. He argues that it is unlikely that all firms would face similar enough circumstances for a given sensitivity value to resolve principal-agent problems equally. As he notes, there is insufficient information in pay-performance sensitivities to determine whether it provides appropriate incentive effects. He points out that,

> "in the standard principal agent model, the appropriate level for the pay-performance sensitivity depends on the parameters of the production function that translates executive effort into output, the form of the CEO's utility function, the degree of risk aversion, and the distribution of disturbances that affect corporate performance" (1994: 1179).

In other words, we need to know more about the firm, the recipients of executive compensation, and the environment in which the firm operates.

Using Jensen and Murphy's (1990) sample, supplemented with additional data from Compustat and proxy statements, he attempts to show the effect of exogenous variables. It should be borne in mind that most of the analysis focuses on total compensation and does not focus specifically on stock options. Using R and D expenditure to proxy for riskiness of the investment set, he finds that pay-performance sensitivity varies inversely with investment risk (though the effects are small and weakly significant). However, the riskiness of the firm's environment raises salaries. In a model focusing just on stock and stock options, Garen finds that size, variance of returns, and industry R and D all tend to have a negative influence on the use of stock/options. It should be emphasised, however, that Garen's results are not particularly strong as the statistical significance of some of the findings is very low.

Whilst the emphasis on insurance through high pay is consistent with the role of risk in principal-agent models and optimal contract models, another interpretation is possible: that executives choose not to use risky rewards in risky situations because of threats to their total compensation, whereas it is in the interests of shareholders in these circumstances for executives to be paid in a risk-responsive form of reward. This finding is consistent with the implication of some of the results presented in the chapter on Determinants that indicate that options are not more prevalent in situations where there is high risk[38].

On the important issue of risk, Aggarwal and Samwick (1999a) find that pay-performance sensitivity is decreasing in the variance of the firm's performance.

[38] Illustrating the point in the Determinants chapter about the variety of uses for particular measures, R and D expenditure is seen here as a measure of risk whereas other studies tend to use it as a measure of monitoring costs.

Their starting point is that the Jensen and Murphy model cannot be used to support the principal-agent model because the average level of sensitivity cannot be used for this purpose. It is necessary to factor in key parameters such as risk preferences (as Murphy 1999 points out). In the standard principal-agent model there is a trade-off between inducing the correct amount of unobservable effort and minimising risk bearing. Therefore, it can be predicted that sensitivity will decrease according to the riskiness or variance of firm performance. They use stock return volatility to test this and find that the prediction is borne out. They find that estimates of sensitivity that do not account for variance in performance tend to be biased towards zero ie they understate average sensitivity. Since their predictions are borne out, they suggest that executive contracts are operated in accordance with the principal-agent model. But it is possible to put another interpretation on this finding: executives have a substantial influence on compensation arrangements and choose options only when they are relatively certain of getting an assured return (ie when risk is perceived to be low). In other words, they are making a safe bet.

This interpretation is consistent with findings from other studies of contingent reward systems that incentive schemes are less likely to be used where risk is perceived to be high (Bloom and Milkovitch 1998; Kraft and Niederprum 1999). The critical issue here is who controls incentive arrangements. If risk-averse managers control compensation arrangements, incentive arrangements are not generally likely to be used. We can anticipate that they are most likely to be used when the measure upon which they are based is relatively likely to be achieved (Baker, Jensen, and Murphy 1988). Much of the argument about the incentive effects of stock options rests on the assumption that shareholders rather than managers control the remuneration process. That grants of stock options are often justified by reference to 'shareholder value' (as has been typically the case from the 1990s onwards) may function as a smokescreen for managerial self-enrichment (cf. Useem and Gager 1996) if managers control the issue of options in practice.

In the US there is a considerable body of evidence that suggests that executive insiders dominate shareholder representatives in pay-setting. As Bebchuk *et al* put it (2001: 13), 'the key problem is the pervasive influence of management, and particularly the CEO, on all facets of the process". The relevant evidence is as

follows: Bertsch *et al* (1998) found that only 27 per cent of S & P 1500 firms had a fully independent committee for dealing with nominations to the board of directors.; the same survey finds that 25 per cent of compensation committee members were CEOs. More generally, Main *et al* (1995) find that directors who serve on compensation committees are influenced by notions of reciprocity, authority, and similarity in setting of executive compensation. There is a considerable tendency to defer to the CEO. A further problem is that compensation consultants are usually appointed by management (The Conference Board 2002). Couple these observations on the social processes of board dynamics and internal pay-setting with (in the US) stock exchange rules that give very considerable latitude to firms to award options, and it is easy to see how managers may use options for 'rent extraction'.

There is some strong evidence that the extent of CEO control over the pay-setting process is reflected in the size of remuneration packages. Core *et* al (1999) find that CEO compensation is higher when the CEO is the Chair of the Board of Directors, and when outside directors are appointed by the CEO. CEO remuneration decreases when there is a large equity holder (greater than 5 per cent). As they put it:

> "Firms with weaker governance structures have greater agency problems: …CEOs at firms with greater agency problems extract greater compensation" (1999: 372

Bertrand and Mullainathan (2001) also examine the impact of governance structures on pay outcomes. They find that CEO remuneration (stock options, bonus, and base salary) responds to 'luck' (ie factors outside the firm's control) and that badly-governed firms pay more for luck. 'Skimming' by CEOs is less likely to occur in firms where there are large shareholders.

However, there is some counter evidence. In a study of a random sample of 200 firms from the Fortune 500, Daily *et al* (1998) found no evidence that 'captured' directors led to greater levels of, or changes in, CEO compensation. Murphy (1999) provides a balanced account of the pay determination process,

> "Based on my own observation and extensive discussions with executives, board members, and compensation consultants, I tend to dismiss the cynical scenario of entrenched compensation committees rubber-stamping increasingly lucrative pay programs with a wink and a nod…However, judgement calls tend systematically to favour the CEO. Faced with a range of

> market data on competitive pay levels, committees tend to err on the high side" (1999: 25)

Relative performance evaluation

A final point to note is that little use is made of relative performance evaluation in executive stock option grants in the US. Relative performance evaluation is where stock option awards are linked to company performance, after controlling for broader industry or market effects. In this way, the benefits accruing to executives from stock options can be linked to firm-specific performance, and hence pay sensitivity is determined by factors over which executives have some degree of control. An optimal contracts perspective requires that 'noise' is screened-out so that there is a tight linkage between performance and rewards. Without relative performance evaluation an executive could be rewarded for generalised industry or market increases in stock prices. As Hall and Liebman put it,

> "one principle of efficient compensation is that managers should be rewarded for outcomes over which they have control, while being insulated from economy-wide or industry-wide shocks" (1998: 683)

Relative performance evaluation can be organised in two ways. The first, referred to in the literature as *explicit relative performance evaluation* is where stock option awards are linked to an index of market or industry stock price movements. Stock option awards may be awarded to the extent that firm performance exceeds that of the benchmark category. *Implicit relative performance evaluation* is where awards are not formally linked to an index but where in practice the size of option awards appears to be based on the firm's performance relative to some benchmark category.

In the US, relative performance evaluation is more or less absent for stock option awards. Murphy (1999) found one case out of a thousand where formal indexing was used. Hall and Liebman (1998), like Gibbons and Murphy (1990), find a significant RPE component for CEO salary and bonus but none for stock options. Bertrand and Mullainathan (2001) examined pay for luck (ie changes in firm performance that are beyond the CEO's control) in three test cases: the oil industry (subject to large price movements), in industries subject to specific exchange rate movements, and in an

examination of year to year differences in industry performance. They found that option grants and other components of pay respond substantially to luck.

As stock options are now often the largest element of executive remuneration, RPE is not a significant component of executive remuneration packages, even where bonuses are based on firm-specific performance measures. The result, as Bebchuk *et al* put it, is that

> "during the 1990s stock market boom, an executive might have made a large amount of money even if her firm's performance was worse than that of every other peer firm" (2001: 52)

There are several possible explanations for the lack of explicit RPE in the US. The first is that indexed (ie performance-based) options attract unfavourable accounting consequences (see Chapter Two). However, it is worth noting that the UK study by Main *et al* (1996) also finds little evidence of relative performance evaluation even though indexing does not attract the adverse accounting consequences found in the US. Recent changes in the regulatory approach of major investors in the UK seem likely to lead to pay-sensitivities that are more firm-specific in character. Other explanations for the lack of RPE in the US include the argument that implicit linking of options to the performance of rival firms softens product market competition (and thereby serves shareholders by facilitating extraction of rent from consumers) (Aggarwal and Samwick 1999b). The basis of this argument is that, whilst RPE reduces the risk exposure of executives to developments outside their firm, it also provides an incentive to lower industry returns. Price-cutting may be the action taken to achieve this. However, all other firms may take the same action, with the result that executives in all firms suffer a decrease in the value of their options. Aggarwal and Samwick propose, therefore, that there will be less RPE in more competitive industries: the perceived need to soften competitive pressures in these industries lies behind this.

The above might be termed the product market explanation for the lack of RPE. There is also a labour market explanation. It has been suggested that the supply of talented executives is relatively inelastic, so that when the economy is performing well (and demand for managers is increasing), firms need to increase executive remuneration to retain them. The lack of RPE allows remuneration to rise with the

market (Himmelberg and Hubbard 1999). Equally, when times are harder (and labour market pressures are weaker) the cost to the firm of using options declines (Oyer 2001; Oyer and Schaeffer 2002).

The final explanation is the governance view. Bebchuk *et al* (2001) argue that the absence of RPE in the US is best explained by the rent extraction view of executive stock options. They argue that weaknesses in the corporate governance system in large US companies allows the recipients of option awards to have disproportionate influence on the design and level of option programmes (see previous section). Executives prefer regular to indexed options because they provide greater net value. Johnson and Tian 2000 show that the value of indexed options is lower than 'traditional options: in fact they have the lowest value of the seven types of options that they examine (see Chapter Two). To secure the same rewards from indexed options would require much larger awards of options. This might, however, attract adverse criticism – they call this 'the outrage factor'. Central to this view is that executives rather than shareholders are the primary decision-makers in option awards. It is notable that investors have much greater power in determining the character of option awards in the UK, and for this reason option awards are now generally indexed.

Summary

In this chapter we have reviewed the main developments in the literature on executive pay-performance sensitivity. As noted at the outset, this literature refers exclusively to executive compensation and grows out of the now long-standing literature on managerial compensation. There is no literature on the sensitivity of rewards in broad-based option plans. The theoretical starting points for the analysis of pay-performance sensitivity are the optimal contracts and principal-agent perspectives. These suggest that rewards for risk-averse agents need to be sizeable if incentive effects are to be realised. It was suggested at the beginning of the 1990s that the sensitivity of managerial compensation was too low for effective incentive effects to be achieved. Subsequently, this view has been criticised on theoretical and empirical grounds: small sensitivities can nevertheless generate significant wealth increases,

whilst the growth in option-based compensation has dramatically increased the sensitivity of total executive remuneration.

A critical issue in this area, however, concerns the merits of the formal valuation models that underpin research in this area. It has been argued that Black-Scholes and its variants over-value the worth of options to risk-averse recipients. It has also been suggested that employees attach different values to options as perks as compared to options as core compensation. In these circumstances, pay sensitivity may be much lower than is suggested in some of the recent literature. If this is the case, it is questionable whether options can function as an effective incentive.

The rent extraction perspective argues that executive options are not primarily used for incentivisation purposes. Instead insiders exploit their informational and power advantages to secure high rewards with little downside risk. It is noted that the similarity of option characteristics between diverse firms suggests that firms do not use options to provide optimal contracts. Furthermore, the failure to link option awards to firm-specific performance suggests that options are not primarily used to provide incentives. However, the relationship between options and incentives may be rather different for broad-based schemes: in the following chapter we consider the literature on the impact of broad-based option schemes on corporate performance.

Chapter Six Broad-based stock options and company performance

Introduction

In this chapter we examine the impact of stock option plans on performance. The literature here is dominated by Economics, Industrial Relations, and Human Resource Management scholars rather than Finance specialists. The reason for this is that the focus on pay-performance sensitivities, discussed in the previous chapter, tends to preclude consideration of the reverse effect ie the impact of pay on performance. However, the extant literature on the performance effects of option plans uses mainly economic measures (ie productivity) rather than accounting or stock-market outcomes. A further feature of this literature is that its primary focus is broad-based plans.

While there is an extensive U.S. literature on broad-based employee ownership and firm performance (see Kruse and Blasi 1997; Blasi and Kruse 1996; Sesil *et al* 2001b), there have been very few studies in the U.S. on broad-based options. This review will consider the three known studies (where econometric methods are used). One of the reasons is attaining a significant sample of broad-based option companies for a statistical study that covers many years was impossible until recently because they are a recent phenomenon. We also refer briefly to studies conducted in Europe.

The 1999 Rutgers Study

This study compared the performance of corporations that offer their employees broad-based stock option plans to those that do not offer their employees broad-based stock option plans (Blasi *et* al 2000; Sesil *et al* 2001; Sesil *et al* 2002). Broad-based stock option plans are important to study because of their possible role in aligning worker and shareholder interests, encouraging job creation in knowledge-related industries, helping corporations cope with tight labour markets, and involving more citizens in sharing the fruits of capitalism. Nevertheless, little was actually known about their objective performance before this study beyond the case histories of specific companies. This study is especially instructive because it essentially

compares a group of firms which emphasized executive stock options to a group of firms that emphasized executive and broad options combined.

The analysis was based on a study of 490 companies: a survey of 105 corporations with broad-based stock option plans and 385 additional companies that were identified as offering broad-based stock options to a majority of their full-time employees. A broad-based stock option plan is one in which a majority of the full-time employees of a corporation actually receive (rather than are merely eligible for) stock options over a reasonable period of time. Unlike corporate plans that only include a small number of top executives, the broad-based plans included in this survey actually distributed an average of 45 per cent of recent stock option grants to non-management employees. The figure is 55 per cent in the biotechnology and computer industries. The study compared stock option companies to all public companies that do not have broad-based stock option plans using Standard and Poor's Compustat database as a source of financial information, and to pairs of similar companies in their industry groups[39]. The performance criteria used were productivity, annual and cumulative total shareholder return over the 1992-1997 period, Tobin's q, return on assets, and fixed wage compensation per employee.

The results of this study suggested that there is no systematic evidence publicly-traded corporations with broad-based stock option plans had worse performance than the larger group of publicly-traded corporations that did not adopt the plans or industry group pairs regarding productivity, total shareholder return, Tobin's q, or return on assets. Indeed, on the contrary, the study provided a lot of evidence that the broad-based companies performed better. There was unambiguous evidence that broad-based stock option companies had statistically significantly higher productivity levels and annual growth rates compared to non-broad-based stock option companies in general and among their peers (peer companies were the next largest and smallest for each broad option company in its industry.) This was clearly demonstrated by evidence comparing the broad-based companies to the non-broad-based firms before

[39] It is possible that the matched firms without broad-based options have narrow-based options but this information is not captured by the study. If all or nearly all of the matches had executive options, this would be powerful evidence for the superiority of broad-based over narrow-based options

they instituted the plans and after they instituted the plans. The study used standard regressions and robust regressions that adjust for outliers[40].

The productivity findings are that stock option companies demonstrated statistically significant higher productivity levels and annual growth rates than non-stock option companies in Compustat in general and among their peers. At the end of the period in which they had broad-based stock option plans (1997), broad-based stock option companies had 31per cent more productivity than non-broad-based stock option companies (and 37 per cent more than their paired peers). Regarding the average annual change in productivity from 1992-1997, broad-based stock option companies had 1 per cent greater average annual productivity than non-broad-based stock option companies (and 2 per cent more than their paired peers). Surveyed broad-based stock option companies had 1 per cent greater average annual productivity than non-broad-based stock option companies. And surveyed broad-based stock option companies with more than 50 per cent non-management employees receiving grants had 1per cent greater average annual productivity than non- broad-based stock option companies (but the same annual productivity growth as their paired peers). While these appear to be positive results, it is entirely possible that differences in company size, capital intensity, and industry group actually have a greater role in accounting for the better performance of the broad-based stock option companies, although this is less likely because the previous comparison also compared the broad-based stock option companies to their peers with similar results. Nevertheless, in order to be more careful about these analyses the researchers did more rigorous tests to control for these features and net out any productivity increases from before a company adapted its broad-based stock option plan.

The study examined the change in productivity levels and annual growth rates from the period 1985-1987 - before the programs were introduced - to the 1995-1997 period after the programs were introduced. This was important because the researchers earlier demonstrated that it was the high productivity companies that generally initiated such plans. Obviously, this analysis relies on a much smaller sample because the researchers were limited to analysing firms that had no missing

[40] (the full text of the entire research report is available at

data in Compustat in all years of both periods. Broad-based stock option companies had 29.4 per cent greater productivity levels in 1995-1997 than non-broad-based stock option companies and the productivity level change for broad-based stock option companies was 14.8 per cent between the two periods. If one adjusts for the performance of the control companies, the broad-based stock option companies still had 24.6 per cent higher productivity levels than the non-broad-based stock option companies. Broad-based stock option companies had 22.2 per cent higher productivity levels than their control companies in 1995-1997 and the productivity level change for the control companies was 16.8 per cent between the two periods. The stock option companies consistently maintained their earlier edge over their peers and over general market companies and expanded this edge significantly between the two periods.

In order to test these findings more fully, the study focused only at those broad-based stock option companies that filled out the survey where we actually know the exact data on which the plan was adopted. These were compared to all non-broad-based stock option companies for which data was available over the entire period and all paired peers. The result was that broad-based stock option companies had 6.3per cent higher productivity levels pre-adoption than non- broad-based stock option companies and they had 14per cent higher productivity levels post adoption than non-broad-based stock option companies. The difference of 7.7 per cent was statistically significant. Broad-based stock option companies had 2.29 per cent higher annual productivity growth rates before adoption but their post-adoption growth rates were 2.3 per cent lower and the –5.2 per cent difference was statistically significant. These findings now suggest that broad-based stock option companies did increase their productivity levels although not their rates after adoption.

The total shareholder return findings are that over the 1992-1997 period broad-based stock option companies perform as well as non-stock option companies in Compustat in general and among their peers and sometimes exceed the total shareholder returns of these comparison groups. These were the results when regression studies were conducted (the details are contained in the full report). Thus, at the minimum these

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http://www.nceo.org/library/optionreport.html)

studies showed that the expected dilution from broad plans did not cause a lessening of shareholder returns. However, these studies controlled for outliers.

The researchers looked at cumulative average total shareholder returns for the entire 1992-1997 period using data on all the companies including outliers. Cumulative total shareholder returns have the twin advantage of summarizing the results of the comparison between broad-based stock option and non-broad based stock option companies in one number AND avoiding an over-emphasis on up or down years. They took all broad-based stock option companies and all non-broad-based stock option companies for which share price data was available in Compustat for every year in the 1992-1997 period and computed each company's cumulative percentage gains during that period. Then, they averaged these cumulative returns. The resultant number gives equal weight to every individual firm. It tells both employees and outside shareholders whether the average cumulative average gains for broad-based stock option companies did better than, worse than, or the same as typical market averages. The market averages used for comparison purposes in this analysis are All Non-Broad-Based Stock Option Companies (in Compustat) - a proxy for the entire stock market - and the Compustat 500, a proxy for the S&P 500).

The results indicated that the average effect of an individual investing $1,000 in a company on January 1, 1992 by December 31, 1997. For example, a cumulative total average shareholder return of 193.1per cent over the period means the $1000 Investor in 1992 would have $1000 + $1931 or $2.931 at the end of the period in 1997. All Compustat non-stock option firms had average individual company cumulative returns of 193.1 per cent (81.8 per cent at the median) while the Compustat 500 had returns of 275 per cent (151.7 per cent at the median). All broad-based stock option companies had average individual company cumulative returns of 303.2per cent (163.9 per cent at the median) over the period. This return was statistically significantly greater than the return for all non- broad-based stock option companies. Broad-based stock option companies with more than 50per cent of non-management actually receiving grants had average individual company cumulative returns of 232.6 per cent (108.9 per cent at the median). And broad-based stock option companies with less than 50 per cent of non-management actually receiving grants had average individual company cumulative returns of 318.9 per cent (128 per cent at the median).

On a 1992-1997 cumulative basis using this measure, the average individual company cumulative return and the median individual company cumulative return of the broad-based stock option companies surpassed that of the non-broad based stock option firms.

For another measure of market value, Tobin's q, the levels of Tobin's q of broad-based stock option companies in general tend to be higher than the Tobin's q levels of the non-broad-based stock option companies although there was some mixed evidence and this is not the case regarding annual growth rates in Tobin's q. The available evidence suggests that the levels of return on assets of broad-based stock option companies may be significantly higher than that of the non broad-based stock option companies although there was inconclusive evidence regarding annual growth rates in return on assets and some mixed evidence of this effect remains. The researchers concluded that the performance of the firms using broad-based stock options appears to equal or exceed the dilution that these plans initially would have caused. Systematic analysis of broad-based stock option companies yielded little evidence of dilution to shareholders over this period and much evidence of opportunities for shareholders and employees.

The Rutgers New Economy Study

This study compared the performance of 229 New Economy firms including: Pharmaceutical, Software, Semi-Conductor, Telecommunications, and High-Technology Manufacturing firms which offer broad-based stock options, to their non-stock option granting counterparts. (While these are termed New Economy firms they were not Internet technology and e-commerce firms). It used a subset of the sample of the previous study and appeared recently in the British Journal of Industrial Relations (Sesil *et al* 2002). This study is important because 'New Economy' companies, such as Pharmaceutical, Software, Semi-conductor and High-Technology Manufacturing, have increasingly becoming the engine of growth in the world and the U.S. economies. This segment of the economy has been characterized by a high degree of R & D activity and a highly skilled workforce. This study was also important because

the new economy firms are often considered the cradle of the broad stock option phenomenon.

According to a recent research study by the Organization for Economic Co-Operation and Development (OECD 2000) both output and employment levels are increasing the fastest in these industries. The study estimated that a full 50per cent of Gross Domestic Product (GDP) in the major OECD economies is derived from 'knowledge-based' industries. This shift has had substantial implications for the composition of jobs and the characteristic of the workforce. Currently, 93 million workers (80per cent of the workforce in the U.S.) do not spend their days making tangible goods but rather are involved in the generation and processing of information and providing services. According to Atkinson and Court (1998) this means that the net stock of intangible capital (e.g. education and research and development) is growing faster then tangible capital (e.g., buildings, transportation, roads and machinery. Despite the harsh sell-off of the tech sector, there is no evidence that technology will be replaced as the basic growth sector of modern economies.

There was relative cumulative gain for shareholders investing in a portfolio of broad-based stock option firms between 1992 – 1997, well before the tech boom and the sell-off, compared to investing in a portfolio of non-SO firms or in a portfolio of large New Economy firms. Using annual returns data from Standard & Poor's Compustat, the researchers constructed 5 portfolios: all non-stock option companies, all stock option companies, large New Economy firms, matched broad-based companies, and matched non-broad-based companies. They assumed equally weighted portfolios that were rebalanced at the beginning of every year (thus distributing the total return earned last year equally across stocks in the next year, also the exit of firms that were de-listed from Compustat and entry of newly listed firms was allowed at the beginning of every year.)

According to these calculations over the 1992-1997 period, an investment of $1,000 in 1992 in a non-broad-based (Compustat listed) New Economy firms portfolio would have appreciated by $2,438 (for a total of $3,823) The same amount invested in New Economy firms with broad-based stock options (Compustat listed) would have earned $3,035 (for a total of 4,035), a difference of 59 per cent In terms of annual dollar

growth rates over the same period, this means that a dollar invested in the broad-based portfolio in 1992 grew at an annual rate of 26.2 per cent, which is 3.3 per cent higher than the annual rate of 22.9 per cent calculated for the non- broad-based portfolio. In comparison, a $1000 investment in the largest New Economy firms (74 firms that rank among the top 500 listed in Compustat based on annual sales in 1997) would have brought in $1,524 for a total of $2,524 These results indicate that the broad-based companies provided superior total returns to their shareholders in the 1992-1997 period. They are especially instructive because they essentially compare a group of firms that emphasized executive stock options to a group of firms that emphasized executive and broad options combined.

One issue with the analysis is these results were not adjusted for market risk (e.g. it may be the case that both large and non-broad-based firms have, on average, lower market risk compared to broad-based firms, hence the lower returns). Industry composition and size, two factors that are know to influence returns, also differ across the two portfolios, which may account for part of the observed differences. To mitigate the effect of size and industry, the researchers compared the returns generated by investing in a non-broad-based portfolio containing firms that match broad-based firms in size and industry. Even though the difference in returns between broad-based and non-broad-based firms decreases under this scenario, it still remained relatively large and positive - total cumulative shareholder return was 33per cent higher for the broad-based firms portfolio, and the annual dollar growth rate is 2.4per cent higher for broad-based companies.

The performance of broad-based stock option companies was also assessed using multiple regression techniques, including robust regressions to control for outliers.) Regarding Economic Value Added, there was strong evidence that the broad-based stock option companies have greater EVA than non-stock option companies. In table 5, stock option firms have 30.5 (log linear model which computes to 35.7per cent) greater EVA than non-stock broad-based option companies and 35.3 log-points (42.3per cent) greater EVA than their non-stock option pair. Additional analyses provided evidence that broad stock option companies have greater levels of economic value-added after their introduction. We see that the difference in EVA change between the two periods is also significantly different 19.9 log points (22per cent)

between the broad stock option and non-broad stock option companies. This result provided evidence that stock option firms have higher levels of value-added activity. EVA is a direct measure of human capital's contribution to output. This study found that firms that use broad-based stock options had substantially higher value-added activity. In firms that use broad-based stock options there was an apparent greater level of employee effort and information sharing.

Finally, the researchers evaluated the impact of a measure of new knowledge generation, both patent application and patent grants normalized by R&D expenditures. Patent applications were significantly higher in new economy firms in 1997 when compared to the full-set of non-stock option firms. This does not hold for either the paired data or the patents grant data. Patent applications and grants were both significantly higher in broad stock option firms when compared to all other firms but not significantly greater on average when compared to paired control. There is also some cross-sectional evidence that new economy firms with broad-based stock option plans have higher levels of patent applications but not patent grants. When the researchers looked at 'pre' and 'post' comparisons for both patent applications and grants they found a significantly higher level of both forms of patent activity after the introduction of broad-based stock options. However, this increase is not significantly greater then their 'non-stock option' counterpart.

The Wharton New Economy Study

Another study (Ittner *et al* 2002) found that options pay off the most when they go to mid- and lower-level employees. Conducted in 2001, this study examined 217 high-tech firms, 70 per cent of which had gone public in the prior ten years earlier and had median market capitalizations in 1999 of about $1.6 billion. The companies were fairly evenly split between new old high tech such as computers, and computer software and new high tech such as e-commerce and Internet. The study used a unique database made available by a leading compensation consultant to high technology firms - iQuantic.com - to analyse the connections between actual records of stock options grants to employees at all levels and shareholder returns. The study has many unique advantages, principally, its ability to provide typically confidential

material from a highly regarded compensation consultancy firm on the actual differences in stock options grants between employee levels.

Between 1998 and 1999, the companies that gave more options to employees posted higher-than-average returns to shareholders. By comparison, those that granted more options to top officers, including the CEO, vice presidents, and directors, did no better for their shareholders than the rest of the group. "The benefits to providing additional grants to mid-level employees can be greater than grants to executives," the study concluded. In other words, options create added value, but only if they go to many levels of employees.

European studies

Meihuizen has analysed longitudinal data on the effects of employee stock ownership and employee stock option plans on the productivity of companies listed on the Amsterdam Stock Exchange between 1992 and 1998. She found that employee stock ownership and options plans had a positive influence on productivity when they are broad-based plans. It appears that there is a more immediate productivity effect in companies in the service sector: positive effects in non-service sector firms are observed in the longer run (see Meihuizen 2000; Poutsma and Bruin 2001).

Conyon and Freeman (2000) conducted an influential study of the productivity effects of share option schemes in the UK. They used two main data sources: a survey in 1999 of 299 firms listed on the London Stock Exchange, and the 1998 Workplace Employee Relations Survey of 2191 workplaces. The former uses 'objective' measures of productivity derived from company accounts information, whilst the latter relies on subjective assessments of relative productivity performance. The findings from the LSE firms indicate that the selective CSOP scheme has a positive relationship with productivity (of the order of 12 per cent) but that the all-employee Save As You Earn option scheme does not. It is argued that the differences in productivity effects can be explained by the disproportionate effect of top managers' behaviour on company activities and performance. However, the WERS findings

indicate that all-employee share schemes (mainly option schemes) do have a positive relationship to productivity performance.

Summary

As noted at the beginning of this chapter, there have been just a few studies of the impact of stock options on company performance. This is probably because widespread use of options is a relatively recent phenomenon and because Financial Economists have been primarily concerned with the impact of (share price) performance on remuneration. There is, however, a larger body of literature concerned with the effects of employee share ownership on performance, generated mainly by Economists, Industrial Relations, and Human Resource Management scholars. The literature on options and performance has tended to deal with the same issues as in the share ownership literature.

A particular concern in this literature (which contrasts with the Financial Economics literature) has been the impact of broad-based option schemes. Most of the studies reviewed in this chapter have shown that broad-based option schemes have stronger productivity effects than narrow-based or executive-only option schemes. The one exception is the Conyon and Freeman study, where the discretionary CSOPs scheme but not the all-employee SAYE scheme has a significant positive effect on productivity. A problem with the Conyon and Freeman study, which is found in many studies of performance effects, is the chicken-and-egg issue. Whilst firms with options have higher productivity, it cannot be concluded that options lead to higher productivity. It is just as likely that firms with higher productivity are more likely to use options. A benefit of the Rutgers studies is that they have information on pre-adoption performance, and that they are thus able to explore productivity effects after schemes have been introduced. They find that firms adopting options have higher productivity but that the productivity differential increases after adoption. The Rutgers studies also found positive associations between broad-based option plans and other measures of performance, such as patent applications and tobin's q. However, whilst the evidence presented in this chapter is supportive of the argument that the presence of option plans is associated with improved performance, it is clear that further studies need to be conducted. In particular, there needs to be research into

the performance effects of options in those European countries where there appears to be a substantial increase in the use of options.

Chapter Seven Market evaluation of stock options

Introduction

A key issue is how markets react to announcements about grants of stock options. Most of this work is on executive stock options. If markets react unfavourably this suggests that stock options are introduced against the wishes or interests of shareholders and investors, and would be strong evidence for the 'rent extraction' view of stock options. Alternatively, if stock markets react positively, this tends to suggest that investors accept the rationale for stock options provided by the 'optimal contracts' perspective. Another possibility is that investors see this as a signal that managers have favourable news about the company prospects and performance (see chapter on Timing of Stock Option Awards). This is more consistent with the 'rent extraction' perspective, as it raises the possibility that insiders schedule the announcement of option plans and awards at a time when stock prices are abnormally low so as to maximise their wealth gains. An especially cynical view is that there is a circularity of effects. Managers know that markets respond favourably to stock option grants *per se* so award themselves stock options (as opposed to other forms of stock compensation) to take advantage of the market evaluation and secure an immediate wealth gain. There is no evidence to support this view, however, and it seems implausible as any temporary abnormal return may well be eliminated during the vesting period.

The literature on market responses to stock option grants is small, and as in every other aspect of stock options covered in this report, dominated by US research. As Brookfield and Ormrod (2000) point out, empirical work in this area has concentrated on two main themes. The first is concerned with whether abnormal stock price returns are observed following the announcement of stock options (the 'price' effect). The second is concerned with whether stock price returns exhibit greater volatility following the approval of an executive share options scheme (the 'volatility' effect).

The arguments in support of each are rather different. As regards the first theme, positive returns are seen to derive from favourable market sentiment towards the

announcement of stock options because of perceived incentive effects, signalling of improvements in future performance[41], or the potential for shared tax benefits (ibid. 276). Against this must be set the dilution implications of increases in the stock of shares, and the market response will be a function of these two countervailing forces.

The second theme relates to the use of options to change risk-averse behaviour amongst managers. It is argued that managerial risk aversion creates agency costs for risk-neutral shareholders. The asymmetric pay-offs (ie protection from downside risk) from share options, coupled with the Black-Scholes-derived observation that option value increases with stock price volatility, induce managers to undertake higher risk projects. For instance, Agrawal and Mandelker (1987) argue that substantial options will lead managers to select variance-increasing investments. They contrast this to situations where managers hold no stock or options: in these situations risky investments threaten human capital investments in the firm (ie the firm may go bankrupt thereby wiping out the investment in human capital). Where options/stock are held by top managers, the Black-Scholes model shows that the value of stock increases when volatility goes up. If options are sufficient large, the value increase arising from stock price volatility can outweigh the human capital risk. Thus, managers have an incentive to increase the variability of equity returns by undertaking riskier projects.

There is a difference in focus between studies of price and volatility effects. Studies of price effects, which are concerned with responses to market-relevant information, typically focus on the period around the announcement of stock options. Studies of volatility are more concerned with the value effects of current managerial behaviour (and how option-induced managerial behaviour leads to value change) and may focus on the whole life of the option. Although managerial behaviour is central conceptually to this approach, managerial behaviour is not directly observed. We also cover the impact of stock options on managerial behaviour in a separate chapter (Stock Options and Managerial Behaviour). Although it is hard to separate out the relevant literature between the two chapters, the primary concern here is how the

[41] See the chapter on the timing of stock option grants.

market responds to the possibility that managerial behaviour will become riskier rather than market evaluation that it has become riskier.

The literature is mainly concerned with executive stock option plans. This is especially true of the volatility literature because only top managers can reasonably be expected to make investment decisions. In principle, the price literature could embrace all-employee option plans but it has not done so to date. The standard methodology in all studies on this topic is event methodology. Researchers look for price movements in affected firms that are greater or lesser than those observed in the market (or sector) as a whole, either immediately before and after the event, or else over a period of time (the cumulative returns).

The literature

Aboody (1996) investigates whether and how investors incorporate the value of employee stock options in stock prices, using a sample of 478 firms during the period 1980-1990. His approach is to estimate the value of all outstanding options for each year using modified option pricing models (a modification of the Cox, Ross, and Rubenstein binomial model and also a Black-Scholes model), and then to examine the association between this value and stock prices. The model includes book value of equity and accounting earnings. The magnitude and direction of this association is viewed to be a function of dilution and incentives.

His first important conclusion is that investors do take stock option value into account when valuing a firm. He then finds that a dollar of ESO value reduces firm value by on average $1.35, suggesting that the dilution effect outweighs the perceived incentive effects. The coefficient on the stock options variable (when the dependent variable is stock price) is negative and significant in all years, though it explains only a small part of the variation in the dependent variable. However, the relationship between options and share prices is found to vary over time. The relationship is positive where options are early in the vesting stage, and negative when they are later in the vesting stage. Aboody argues (1996: 381) that, as time goes by, the benefits of options (from incentives) are incorporated into earnings and book value whilst the

costs (dilution) are not. He also finds that the intrinsic value of vested options is the major influence on the negative association between ESO value and stock prices. He suggests this is consistent with the argument that incentive effects are seen to diminish once options are vested (because the evidence suggests that most options are exercised shortly after vesting, and because the bonding effects are weakened). This evidence also indicates that investors primarily view the cost of options to be the intrinsic value rather than the full 'time' value (ie value derived from a formal valuation model such as Black-Scholes).

Brickley, Bhagat, and Lease (1985) examine stock price reactions to announcements of long-range incentive plans, including stock option plans. They examine several event dates: board meeting, proxy date, SEC stamp date (indicating that the proxy statement becomes publicly-available information), and shareholder meeting date, using standard event study methodology. They use a 2 day announcement period for each of the events. Their first tests, which look for abnormal returns in the announcement period do not find any significant abnormal returns. When they test for cumulative abnormal returns they find significant positive abnormal returns for the period from the Board meeting up to the day after the SEC stamp, whilst the test is insignificant for the following period up to the shareholders' meeting. The conclude that long range plans increase shareholder wealth, and also that the critical information is revealed between the Board meeting and the SEC stamp. They attempt to decompose the types of long range incentive plan by conducting variance tests between the main types of plan in the study (options, performance plans, restricted stock plans) but the F-statistic is insignificant. They conclude from this that positive market returns are not generated by a particular type of plan, and argue that different types of plan may be appropriate in different situations.

DeFusco, Johnson, and Zorn (1990) test for stock price movements after stock option awards have been announced, and are concerned with identifying both price and volatility effects. In line with 'standard' theory in this area, they argue that the asymmetric pay-offs of stock options make it more attractive for managers to undertake risky investments, which would be reflected in increased volatility of stock price movements. They also argue that the perceived incentives effects of options will lead to positive market movements.

They first look for variance in stock price and implied stock values (using Black-Scholes) for a period six months prior and after the proxy statement date using firms with options that were closest to being at the money[42]. The implied stock values before the option plan are subtracted from post-option values to obtain a percentage change. A rank-order test comparison provides a significant Z-score of 2.51. A similar approach is adopted for market stock prices, as adjusted for general market movements. 60 per cent of firms experienced a variance increase (Z = 2.87). Median results indicate that post-plan adoption variance increases from 8 to 16 per cent (market adjusted). Variance is significantly greater than in a control group of NYSE firms without stock option changes.

The second set of tests examines daily and cumulative abnormal returns of stocks of firms announcing stock option plans. The 107 firms with available SEC stamp dates have an average increase of shareholder wealth of approximately 0.68 per cent for the two days around the stamp date (623). 59 per cent of the firms exhibit an abnormal return. At the same time, those firms with traded bonds exhibited significant negative returns. They suggest that their findings are consistent with 'rational investors reacting to the anticipated increases in managerial risk-taking as a consequence of the adoption of executive stock option plans" (1990: 626). Their results, therefore, are consistent are consistent with both predictions concerning price and volatility effects.

Summary

The literature reviewed in this chapter is concerned with two sets of market effects to stock options. The first is a price effect, whereby the market is hypothesised to respond positively to announcements of executive stock option plans and awards. The second is a volatility effect, whereby stock prices are expected to fluctuate because of risky investments undertaken by incentivised managers. To some extent, this second effect is a market response to managerial actions post-option rather than a

[42] On the grounds that Black-Scholes provides unreliable estimates for deep in-the-money and deep out-of-the-money options

market response to the potential effects of options. To separate out these two possibilities, we focus in this chapter on studies that examine volatility effects shortly after the announcement date. It should also be borne in mind that the managerial investment activity is not directly observed. For this reason it seems more appropriate to deal with this topic in this chapter rather than in the chapter on managerial behaviour.

The findings from the small literature on this topic are mainly consistent with theoretical expectations. The main exception is the study by Aboody (1996) in which the positive price effect of options is counterbalanced by negative dilution effects. The important implication of this study is that investors do not evaluate the potential incentive effects of stock options that highly. Other studies find evidence of positive price effects but these need to be interpreted carefully. The data upon which they are based derives from the period before the explosive growth in stock option plans, and it may be that at that time the relatively small number of firms awarding options did so for incentives reasons. It is possible that, as option awards becomes standard practice in most large firms, plan usage will incorporate objectives other than provision of incentives. Furthermore, as the use of options plans moves from abnormal to normal behaviour, the probability of observing abnormal stock returns falls. Thus, more recent data might generate different results to those reported here.

We also need to be careful in our interpretation of price volatility. These studies do not observe directly the events that spark price movements on each occasion, and it can only be speculated that market expectations or observation of riskier investments is the cause. It is equally plausible that use of stock plans signals insider enrichment, and that this causes greater volatility. It must be borne in mind that the key linkage in the theory in this area is the positive impact of volatility on value (as suggested by Black-Scholes). However, this assumes that employees value their options in Black-Scholes terms, and will hence want to invest in riskier projects. We have seen elsewhere in the report that there is evidence that employees do not value their options in this way, and that indeed that they dislike stock price volatility. The conclusion that we draw, therefore, is that whilst price effects may be observed after stock option announcements, we cannot be sure what the reasons for these movements are.

Chapter Eight The effect of stock options on behaviour

Introduction

A key question arising in policy and popular discussions of stock options concerns the extent to which stock options influence behaviour. Most of this research is focused on executive stock options. If stock options provide incentives (as the sensitivity literature argues), what kind of behaviour does option holding encourage? The pro-options literature argues that options serve to align employee interests with those of shareholders, and will therefore encourage actions that are beneficial to shareholders. The counter argument is that options are manipulated by employees, exploiting insider governance and informational advantages, and may therefore function against shareholder interests. The literature on the timing of option awards, for instance, is supportive of this line of argument.[43] The logic of this viewpoint is that options encourage selfish behaviour by recipients which, though superficially in shareholders' interests (both benefit from increases in stock price), is actually harmful to shareholders because it diverts some value away from them.

The pro-options line of argument does not rest on observed managerial or employee behaviour. It suggests that if various performance measures of importance to shareholders are observed to improve in the period after options are awarded, this is evidence that employee behaviour has been influenced in ways that are conducive to shareholder interests. It is possible to argue, however, that these actions may have damaging consequences. One argument is that options encourage actions that are damaging to the long-term interests of the firm and its shareholders. There is an emphasis on relatively short-term share price performance rather than longer-term measures of economic or market success. The recent Worldcom case in the United States is an extreme version of this possibility – managers of this firm stated accounting earnings in a way that boosted earnings, whilst at the same time damaging the long-term balance sheet. This type of argument is based on a long-standing literature in organisation theory that argues that performance-based management regimes generate behaviours that meet immediate targets at the expense of broader

[43] The fact that options are not usually expensed on the profit and loss account is also consistent with this argument ie there is a potential loss of value to shareholders.

goals (Baker, Jensen, and Murphy 1988). It also rests on the argument that the stock market is myopic, and that managers adopt short-term horizons to meet investor expectations.

The second critique of the pro-options argument argues that options induce behaviour which is damaging to other stakeholders, such as employees, customers, or local residents, even though it may be conducive to 'shareholder value'. There may be a net welfare loss induced by stock options. Retrenchment is a good case in point here. This issue is particularly pertinent in some European countries where the growing use of stock options is seen to herald a shift away from corporate governance systems that attempted to integrate the interests of all or most major stakeholders. This is often encapsulated as 'shareholder value' versus 'stakeholder capitalism'.

There is very little literature on either of these two particular critiques of the pro-option model (both of which assume that options have powerful incentives effects). The Finance literature is unable to evaluate the first critique because the 'efficient markets' hypothesis (ie that the stock market price incorporates all known information) means that the primary assessment of managerial actions is the impact on current share prices. As regards the second critique, it is often claimed that stock options cause managers to act against the interests of other stakeholders but there is little empirical assessment of this claim. It requires a demonstration that managers took a certain course of action because of their option holdings, and for obvious practical reasons obtaining reliable information on this score is likely to be difficult[44]. The Finance literature is not well-placed to deal with this claim because of its reliance on quantitative financial data rather than data on observed behaviour or attitudes. However, one item in the following literature does offer some relevant evidence on this issue.

The 'rent extraction' literature referred to at the outset has a somewhat different stance on managerial behaviour. Conceptually, it implies that managerial behaviour pre-dates option holdings rather than vice-versa. In other words, managerial objectives lead them to acquire stock options, and their behaviour surrounding option

acquisition reflects this (ie in the timing of option awards). However, it is also suggested that option holdings influence behaviour subsequently. Here the focus is not so much what these option holders do in relation to the firm's activities generally but their behaviour in the operation of the option scheme (eg when they exercise their options). The one exception to this generalisation is the issue of dividend payments and stock repurchases, where there is evidence that option awards cause a switch from dividends to buybacks. There are fairly substantial literatures on these issues, and these will be examined in subsequent chapters

In this chapter, the primary focus is on stock option induced behaviour in respect of companys' financing activities (eg debt-equity ratios, investment etc). There are several general observations that may be made about the literature in this area. First, despite the topicality, there is not a great deal of it. Second, most of the extent literature focuses on executive rather than all-employee options. This is not surprising as executive decisions are likely to have a greater effect on what the firm does than do rank and file employers. There is also a small literature on key aspects of employee behaviour (eg. absenteeism and labour turnover) but this tends to focus on share ownership rather than options specifically (see Pendleton *et al* 1998 for a summary of this literature).

The literature

It is often argued that the use of stock options may induce managers to take decisions with higher levels of risk (as measured by variance in earnings). The starting point for this argument is the observation that managers are typically risk-averse and have undiversified wealth portfolios. As Agrawal and Mandelker put it,

> "the manager has an incentive to select investment projects that reduce the variability of the firm's earning stream, ceteris paribus, due to the over-investment of his or her human capital in a single firm and the consequent under-diversification of his or her personal wealth portfolio" (1987: 824) [45].

[44] There is a literature which examines stock price reactions to lay-offs but no evidence that managerial decisions are affected by their own option holdings.

[45] A study by Amihud and Lev (1981) found that managerial motives for conglomerate mergers derived from risk reduction. They found that firms where managers had smaller levels of stock ownership were more likely to undertake such mergers.

It is argued that a variance-increasing investment can increase the wealth of managers who hold options because valuation models indicate that variation in earnings increases stock value.

Agrawal and Mandelker (1987) examine the role of managerial stock and option holdings in acquisitions and sell-offs. Their purpose is not to measure whether stock/options render this restructuring activity more or less likely but to determine whether stock/option has an effect on changes to capital structure and risk occurring in the context of acquisitions and sell-offs. Using three measures (value of stock/options in relation to total compensation, value of stock/options in relation to salary plus bonus, and the proportion of outstanding stock held by senior managers) for three groups) they compare high variance/low variance in earnings firms, and debt-equity ratios. Their results show that the value of stock/options held by the top manager and the top two managers are significantly greater in firms with high variance in earnings after the acquisition/sell-off but that the proportion of stock held tends not to be significant. The results are clearer for the acquisition firms rather than the divesting firms but the authors attribute this to differences in sample size. They conclude from this that executives' security holdings induce them to make investment decisions that are in the interests of shareholders.

The second set of findings indicate that the top manager (and the next most well-paid) has a larger holding of stock plus options in firms that experience an increase in their debt-equity ratios post-restructuring. They argue that this favours the hypothesis that security holdings tend to reduce agency problems between managers and shareholders. The theoretical basis of this claim is not made entirely clear in the paper but could derive from two, related sources. The first is the argument that debt is a powerful governance tool that constrains managers to take value-enhancing actions (Hart 1995). The second, that Agrawal and Mandelker appear to make, is that debt reduces the value of human capital in the firm (because bankruptcy is more likely) and thus shifts the balance away from protection of employee interests to those of shareholders. However, an alternative argument is possible: the threat to employment posed by high levels of debt may make employees concentrate on taking actions that preserve their employment.

There are several criticisms that can be made of this approach. First, it is a simple comparison of firms in relation to compensation values and earnings variance. Other potential factors are not controlled for. Thus, we cannot be sure that the apparent relationship between stock/options and earnings variance is a direct one. For instance, the proportion of total compensation contributed by stock plus options may differ between size and sector of firm (see chapter on Incidence of Stock Options**)**, whilst earnings variance is likely to differ by size of firm (on the basis that a larger firm will be more diversified and hence will display less variance in earnings). Second, stock ownership and stock options are not differentiated in the empirical results[46]. Third, it is assumed that stock holdings would be valued by these managers in accordance with the theoretical valuation model used in the research, and hence would have an effect on behaviour in the way predicted. If, however, managers value options and stock differently, with the result that the proportion of total salary accounted for by stock plus options is lower, then a different set of results might be obtained. The problem in brief is that managerial behaviour is not directly observed. Actually, managers with options may prefer lower variability of earnings because they dislike stock volatility. In other words, stock volatility may have a depressing effect on their valuations of options, entirely contrary to formal valuation models.

The key argument advanced by Brookfield and Ormrod (2000) (using UK data) is that studies of volatility need to examine the whole life of options because the asymmetric nature of pay-offs is reduced over time as underlying stock prices rise and the option becomes in-the-money. Once options become in-the-money, downside risk increases (ie that managers could 'lose' the gains 'secured' so far). This feature rests on the non-tradable and non-hedging characteristics of stock options. As a result, the incentive to take on risky investments declines over time. They predict that stock price volatility will decrease over time as options become increasingly in-the-money and managers share increasingly in the downside potential of their decisions (2000: 281). To test these arguments they examine stock price volatility over a four year period post grant (divided into 8 half year observation periods).

Their results are supportive of these suppositions. In the first instance, the test of their ex ante model finds that variance increases significantly in the post-grant period, and they conclude therefore that options appear to incentivise managers to increase the risk profile of their companies. To test their ex post model, they divide the sample into in- and out-of-the-money options. The in-the-money sub-sample display an initial increase in variance compared with pre-grant period followed by ratios which indicate a decline. Thus, they argue that "the continued existence of option contracts does not consistently incentivise managers to undertake risky projects over a time horizon that matches more closely that of the option contract" (2000: 288). Indeed there seems to be a perverse result that options *increase* the risk aversion of managers, when set against a background of generally rising prices. By contrast, the small group of out-of-the-money option firms show significantly different volatility patterns to pre-grant prices, suggesting that managers choose risky projects on the basis that they have little to lose personally[47]. These managers have done especially badly given the background of rising stock prices. To induce them to undertake riskier projects may well be harmful to shareholder wealth (2000: 289).

Bliss and Rosen (2001) examine the relationship between CEO compensation and acquisitions. They argue that acquisitions can reduce the income and wealth of top managers because of the negative stock market reaction to acquisition announcements. The implication of this is that the greater the proportion of income that takes the form of stock options, the more adverse the consequences of acquisition activity. However, they argue that these losses are more than offset by the increases in compensation associated with the effect of mergers on firm size. Their empirical results support these suppositions. The median increase in compensation is 20-30per cent of a CEO's pre-merger compensation but this is offset by declines in wealth of around 40per cent of the median compensation increase. The net median increase is 18 per cent in the first year after the merger. The propensity to engage in merger activity is likely to be a function of these two countervailing forces, and they find that higher levels of stock compensation reduce the probability of acquisition activity. After splitting the sample into high and low merger-activity banks, they find that

[46] This study was conducted before the growth in the use of options (and the literature on this) and hence the reason for separating options from stock holdings was arguably less pertinent

higher-merger bank CEOs have 69 per cent of their compensation in cash whilst low-merger CEOs have 62 per cent in cash, with this 7 percentage point difference being statistically significant.

One study that considers the argument that options encourage managers to engage in activities that are harmful to other stakeholders, is that by Mehran *et al* (1998). This examines the impact of CEO stock ownership and stock options on voluntary liquidation decisions. They find that the probability of a voluntary liquidation is positively related to the percentage of shares held by the CEO and the sensitivity of the CEO's option wealth to changes in share price. They find that voluntary liquidations enhance shareholder value, and there suggest that their findings are consistent with the argument that incentive plans motivate CEOs to improve firm performance. They find that 70 per cent of CEOs do not become officers in public firms for at least three years following liquidation. They note, however, that 41 per cent of CEOs are made better off by liquidation. The argument, following Jensen and Meckling (1976) is that CEOs' incentive to waste corporate resources declines as their stock ownership percentage increases, and thus, if the firm's value can be enhanced through liquidation (ie where present value of future cash flows less than net liquidation value) the likelihood that CEOs will make such a decision is expected to increase with their stock ownership (1998: 322). In their sample, the level of stock ownership and the value of option-based compensation appear large enough to significantly influence investment decisions.

They argue that options can motivate CEOs to consider liquidation for two reasons. First, if the liquidation raises stock prices, unexercised options become more valuable. Second, liquidation normally provides for accelerated vesting. Whilst this means CEOs forego value on options that have some time to expiry, their insider power means they can usually gain some compensation for this. This, of course, may appear to reward CEOs for poor performance.

Their results show that the percentage of stock held and the pay-performance sensitivity of executive stock options are positive and significant. They also find in a

[47] It could be argued that threats to reputation, the potential for unemployment, and the difficulties of

separate regression that the ratio of the sum of the shares and options held by CEOs to total shares outstanding is also positive and significant. The size of the firm (log of total assets) is not significant[48]. In a separate analysis, using event methods, they find positive cumulative abnormal returns (CAR) from liquidation, indicating that shareholders gain from liquidation and that CEO's gains are directly related to their stock and options holdings.

Importantly for the argument about the impact on other stakeholders, a sub-sample had been the subject of bids for control just before liquidation. Mehran *et al* find that the liquidation distributions to shareholders are on average just over 10per cent higher than the offer price. They suggest that this may be due to the tax advantages of liquidation (exemption from capital gains tax at the time) or the fact that high insider ownership tends to depress offer prices in mergers[49] . They argue that rejection of a takeover bid is consistent with shareholder wealth maximisation. An alternative explanation is that the CEO persuades the board to liquidate because of their own interest in realising wealth. Furthermore, the interests of other stakeholders (eg employees) may be better served by takeover (ie higher probability of continued employment), and it could be argued that the incentives available to the CEO cause him or her to take actions that are harmful to their employees.

The significance of this study is that it demonstrates that possession of stock options can lead top managers to take decisions which, whilst supportive of their own and shareholder interests, is harmful to other stakeholders (assuming that employees in these firms prefer continued employment to redundancy).

Summary

The literature reviewed in this chapter demonstrates that stock options have an effect on managerial decisions and behaviour concerning the firm. Two studies examine

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securing re-engagement help to control unreasonably risky behaviour.

[48] They test whether high ownership levels causes managers to avoid liquidation but the variable used was not statistically significant. This implies that the wealth effects of liquidation outweigh private benefits of control arising from high levels of CEO ownership

propensity to engage in risky investments induced by stock options. One of them suggests that options do function in this way, whilst the other emphasises that the power of stock options varies according to the market value of the options relative to exercise price. Neither study (nor other studies of investment decisions covered in previous chapters) observes investment decisions directly. In both cases, the presence of risky investments is derived from stock price volatility, and we cannot be sure that volatility arises for this reason.

The other studies reviewed in this chapter observe managerial decisions/behaviour more directly. One is concerned with acquisition decisions and one with liquidation decisions. In both cases, the presence of stock options appears to make a difference to decisions. These are important results given public debates on stock options, and further research is clearly desirable in this area. Nevertheless, this research does not address the impact of broad-based employee ownership on behaviour.

[49] Because firms with high insider stakes are less likely to attract competitive offers because the probability of a takeover is low, and bidders discount their offers in anticipation of insider resistance

Chapter Nine The Timing of Stock Option Awards

Introduction

The timing of awards of stock options has important implications for the two main perspectives on stock options: the optimal contracts view and the rent-extraction view. In the listed firm sector, it would appear to be in the interests of the beneficiaries of stock options to manipulate the timing and content of market-sensitive information around the time that options are awarded. They might be expected to rush forward bad news (to depress the strike price) and delay announcements of good news (to secure stock price rises once the exercise price has been set). Such a proposition is consistent with earlier work on managerial compensation, where it was found that managers manipulate aspects of operating or disclosure practice to secure favourable compensation outcomes (eg Healy 1985), and also to a wider body of literature on the manipulation of information disclosure to achieve managerial/corporate objectives. As yet, there is little work specifically on the relationship between information disclosure and award of stock options but the extant evidence is strongly supportive of the case that managers behave opportunistically. Such a finding is perhaps not surprising given that the initiative for awarding options often comes from top managers themselves or from compensation/remuneration committees whose members (even non-executives) have strong ties to Chief Executive Officers[50]. The evidence, therefore, is consistent with our over-riding argument that the use of stock options reflects and embodies the governance problem rather than resolving it.

The issue is well-stated by Chauvin and Shenoy,

> "Insiders generate and process fundamental information about the value of the firm. Their decisions, communications and other actions all convey information to the market, and stock price changes reflect the market's valuation of the information. Given inside information as well as discretion over how and when the market will be informed, insiders have knowledge of both the direction and timing of future price changes. Insiders may appropriate for themselves at least a portion of the value of the expected price changes by buying (selling) based on

[50] For instance, compensation committees take advice from managers, with the committee in effect ratifying management proposals. Some Fortune 500 companies have CEOs on the compensation committee. Some companies have CEOs sitting on each others remuneration committees. Also CEO control of appointment of board members, including independents. Check other US evidence on boards

> the knowledge that current prices undervalue (overvalue) the firm. Those insiders who are willing to engage in insider trading base their decision of when to trade on their knowledge of when good news or bad news is forthcoming" (2001: 53-54)

The literature on timing of stock option awards is exclusively American. The focus to date has been awards of options to Chief Executives rather than a wider group of employees. This is not surprising given that top managers have control of information flows. The literature is to be found in Finance and Financial Economics, and the main data sources are proxy statements (and associated information) and stock price movements. No study to date directly examines managers themselves. As well as being more labour-intensive, it is questionable whether reliable information on this issue could be obtained directly from managers themselves. The approach used in these studies is event methodology. Researchers examine stock price movements around key information disclosure dates and use abnormal returns as a key indicator of strategic uses of information by insiders.

The literature

There are in principle several different ways in which insiders could link information disclosure to the award of stock option for the purposes of enhancing their returns. As outlined above, bad news could be released shortly before an award of options to abnormally depress the strike price, in the expectation that stock prices would recover during the life of the option. Alternatively, good news might be delayed until after the exercise price has been set so that option holders benefit from subsequent increases in share prices. In either case, there are in principle two ways of linking information disclosure with option awards. Where options are awarded according to a fixed schedule, executives might manipulate the timing of information disclosures. In this instance, executives can be said to be actively managing investor expectations for personal gain. This possibility is investigated by Aboody and Kasznik, (2000). The alternative approach, especially where information is released according to a fixed schedule is for options to be awarded to fit with information disclosure. This possibility is investigated by Yermack (1997).

The literature focuses on the *timing* of information disclosure and option awards. The possibility that erroneous information (ie the *content* of disclosure) might be released to influence stock prices in relation to option awards has not been considered. This is not surprising. Aside from the practical methodological difficulties of investigating such a phenomenon, it is a highly unlikely to take place (at least in a strong sense of telling lies). In fact, the only situation that might realistically occur is the disclosure of information that presents a worse picture than the reality (so as to achieve a temporary dip in stock price at the point of option grant). However, since the pay-off is achieved by subsequent discovery that the information is erroneous, the clear breach of trust may have severe reputational consequences that may outweigh any value benefits arising from movements in stock price. In reality, in the few cases where clearly erroneous information is released to investors (eg. Enron, Maxwell etc), the practice is the reverse. Managers tell good news when they should be releasing bad news. In so far as this links with stock option behaviour, this is unlikely to influence the award of options (because it is known they will decline in price and even become worthless), though it may influence exercise behaviour (as in the Enron case). Reputation may be more important than stock options because it has a significant influence on the size of remuneration packages and executive employability.

Yermack (1997), in his study of 620 option awards to CEOs, finds that the timing of awards coincides with favourable movements in company stock prices. Patterns of quarterly earnings announcements are consistent with an interpretation that CEO's receive stock option awards shortly before favourable operating news. He finds that companies making awards outperform the market by just over 2 per cent from just after the award is made for a period of around ten weeks. The abnormal returns then level off but, importantly, remain permanently embodied in stock prices (1997: 450). A key element of his argument is that news of option awards are typically undisclosed for some time (until proxy statements are published): thus the award of the option does not function as a signal to investors that good times are coming. In other words, the increase in stock price cannot be due to the award of the option. Furthermore, earnings news will almost certainly be known in advance by Chief Executive Officers. He argues that

> "CEOs exert influence over their compensation committees…and that they exploit this power to increase the value and lower the riskiness of their compensation" (1997: 453).

Indeed, he presents evidence that the CEO's success in receiving options at a favourable time depends on the degree of influence he/she holds over the compensation committee (1997: 461)[51].

It is striking that the most frequent day for CEOs to receive stock option grants is the day prior to earnings announcements, with the announcement day itself being the next most popular day (1997: 463). Furthermore, abnormal stock returns are higher when earnings announcements are made after option awards, than where announcements precede option awards.

Yermack considers various possible explanations of the timing of option awards in relation to favourable stock price movements. One possibility is that those with inside information about option awards buy stock to push the price up, and Yermack suggests that such activity would commence before the award date. To test this possibility he investigates the volume of trading around the date of the award but finds that whilst there is some abnormal trading volume it is far too small to account for the abnormal stock returns. He also rejects the argument that insider trading by executives themselves may be pushing prices up on the grounds that such activity is clearly illegal[52]. Further explanations are that grants are time in this way to provide in effect a discount on strike price without incurring the accounting requirement that intrinsic value of options is expensed on the profit and loss account. Alternatively, boards may wish to reward executives for generating the good news that is expected to increase stock price. Yermack rejects these arguments, in part on the grounds that they would appear to violate the spirit, and possibly the letter, of insider trading laws.

Yermack's findings have extremely important implications for optimal contract views of stock options as they suggest that CEOs are able to manipulate information to secure rent extraction. As Yermack puts it,

[51] Where the committee consists entirely of directors not appointed by the CEO, the average abnormal returns is lower than in other cases

> "because CEO option recipients benefit from the remarkable good timing of their awards, their compensation appears to increase for reasons that have little to do with managerial skill, effort, or performance" (1997: 451).

His study provides powerful support for the rent-extraction perspective on stock options, and suggests that insiders exploit corporate governance weaknesses for their own benefit.

The focus of Aboody and Kasznk's paper is the obverse to that of Yermack's: they examine the pattern of voluntary disclosure of information in relation to stock option awards, where the latter is on a fixed schedule. They also examine voluntary disclosures, which might be aimed at influencing investor and analyst sentiment, whereas Yermack focuses on fixed, quasi-mandatory announcements. The implications, however, are similar to those of Yermack. As they put it, "CEOs make opportunistic voluntary disclosure decisions that maximise their stock option compensation" (2000: 73). Arguably, Aboody and Kasznik's findings have more serious consequences for they suggest that even if stock option grants are awarded on a fixed schedule to preclude opportunistic grant-making behaviour, senior executives will find other ways of manipulating information so as to enhance their returns from stock options.

They use two types of information to determine whether companies attempt to delay good news and rush forward bad news so as to change investors' expectations: analysts earnings forecasts and share prices. First they determine whether analysts' judgements are less optimistic just prior to option awards than at other times (given the known tendency for analysts to provide optimistic assessments of future earnings performance). They find that they are abnormally low prior to option awards, even after controlling for other factors that vary systematically with analyst forecast characteristics (firm size, sales growth, earnings variability etc). Second, they calculate cumulative abnormal returns for 30 days each side of the award date. They find significant positive abnormal returns after the option date, consistent with the argument that executives delay good news. Negative abnormal returns prior to option grants, however, are not statistically significant. They also analyse a sub-sample of

[52] the prohibition in the 1934 Securities Exchange Act on acquisition of stock by executives with

firms with variable award schedules but find no evidence that opportunistic voluntary disclosure explains asymmetric share price movements. They suggest, *pace* Yermack, that the increase in share prices following these grants should be understood in relation to opportunistic timing of awards.

Aboody and Kaznik also attempt a preliminary assessment of the worth of opportunistic behaviour to CEOs. They find on average that the estimated gain based on a 90 day period is about 16 per cent of award value. They find that average actual gains are greater where options are not awarded according to a fixed schedule (ie where there is opportunistic timing of awards), partly because stock price movements are greater and partly because the average number of options granted is twice that of scheduled awards.

Chauvin and Shenoy (2001) also estimate the worth of opportunistic behaviour. They find that on average abnormal returns reduce the cost of exercising options on average by about $20,000 for the period day –10 to day 0. This figure is low probably because it includes all option holders not just those who release bad news. However, they argue that the exceptional gains made by some ($100-200K) may be sufficient to encourage some CEOs to manipulate information

Chauvin and Shenoy (2001) examine abnormal stock price changes *prior* to option grants (they do not look at the actual news announcements because of the complexity of how these are communicated to the market). Their concern is to investigate "the hypothesis that grants of stock options may lead insiders to take actions to reduce the likelihood of anything good happening prior to the grants" (2001: 55). Like Aboody and Kasznik, their focus is the manipulation of information rather than the manipulation of grant date. They point out that in many cases the timing of awards is fixed, partly to avoid charges of opportunistic timing. They find a cumulative negative abnormal return in the 10 days prior to option grants to be of the order of –0.57 per cent

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private knowledge of significant future public announcements

Summary

The extant literature clearly supports the proposition that executives receiving stock option awards engage in opportunistic behaviour, exploiting their insider informational advantages. They exploit their information about option awards and market-sensitive information, and align this to enhance the value of their options. As such, this evidence is more consistent with the rent-extraction perspective on stock options than the optimal contract view. This type of evidence suggests that the announcement of option awards when the performance of the firm has been relatively poor is not so much a perverse and difficult-to-understand reward for failure, as critics of options often allege, but a strategic use of insider advantage for rent extraction. This behaviour becomes easier to understand if it is recognised that the impetus for the award of option programmes comes to a large extent from within management rather than directly from shareholders.

Chapter Ten The Timing of Stock Option Exercises

Introduction

An important topic within the stock options literature is that of exercise behaviour. What is the nature of employee exercise behaviour, and what are the influences upon it? Employee behaviour in this area raises several important issues, many of which have fundamental implications for the use of stock options. The first issue concerns the timing of option exercises. Since exercise before the option term expires leads to a loss of Black-Scholes value, the implication is that employees do not value their options in the same way as formal pricing models. Variation in employee exercise behaviour also makes calculation of the value of options at grant rather more difficult, even assuming Black-Scholes provides a good pricing model (Huddart and Lang 1996: 6). It also has difficult policy and management consequences should stock options be expensed onto profit and loss accounts, as the International Accounting Standards Board is proposing.

The second issue, connected to the first, concerns the incentive effects of stock options. Once employees exercise options and, assuming the shares are sold more or less straight away, the direct incentive effects of options ebb away. Furthermore, since premature exercise leads to a loss in Black-Scholes value, and is apparently very common, the sensitivity/elasticity value is likely to be lower than predicted by formal pricing models. Assuming that incentives are correlated with sensitivity/elasticity this implies that the *ex ante* incentive value of options may be lower than generally thought.

A third question concerns the influences on exercise timing and behaviour. What makes employees exercise their options when they do? Is exercise behaviour a function of stock price movements, and in what ways? Do patterns of behaviour differ between employees of different job levels, with the expectation that more senior employees may differ in risk preferences and liquidity needs (Huddart and Lang 1996). The role of information asymmetries is potentially a critical one, given that we

have found earlier that employees exploit insider information in the timing of option grants. A troubling question, which is especially pertinent post-Enron, is whether employees draw on private, insider information in calculating when to exercise options. A positive answer to this question would be further evidence against the 'optimal contracts' perspective on options and evidence for the 'rent extraction' point of view. Behaviour may also differ between types of firm, with variations in information provision providing a key influence. For instance, option exercise behaviour may be different in small, unlisted firms because of irregular valuation.

Although the literature on these topics is not large, it is quite rich. A wider set of data sources are drawn upon than is typical in much of the research on stock options, and the most important contributions to the literature draw on individual-level data. As ever, the research is sited in the United States, and indeed we have not been able to identify any non-American papers on this topic. To some extent, this may reflect the use of 'American options' in the US, whereby employees have discretion over the timing of exercise. In the UK, by contrast, the main all-employee scheme is a European style option with a fixed exercise date.

In this chapter, we review the literature in relation to two main questions: when do employees exercise options, and what appear to be the factors that influence the timing of exercise.

The timing of exercises

The available research evidence indicates that relatively few employees wait until the expiry date to exercise their options. Bearing in mind that the typical option term is ten years, Carpenter (1998) showed that options are exercised after an average of 5.8 years. By contrast, Huddart and Lang (1996) showed that the average time of exercise is 3.4 years. Huddart and Lang (1996) find that the typical employees exercises options in a few large transactions prior to the expiration date. The most common block sizes of exercised options are 25, 50, 75 and 100 per cent of the options granted, with many employees exercising within a year or so of vesting.

Both Huddart and Lang (1996) and Carpenter (1994) find that the rate of exercise increases as the expiry date approaches, though time itself is not a key predictor of exercise.

There is substantial evidence that volatility of stock prices influences exercise decisions. Hemmer *et al* (1994) examine the influence of risk diversification on exercise decisions by top executives, and find that early exercise is an increasing function of the volatility of option value. They also find that the strength of the relationship between risk and early exercise is reduced by the extent the firm hedges the returns on the option. Similar results are found in Kulatilaka and Marcus (1994) and Huddart and Lang (1996): reductions in stock price volatility lead to later exercise.

The implication of these findings is that risk aversion is a powerful influence on exercise behaviour. At one level this result is not surprising: most employees are likely to be risk averse, and this is at the core of optimal contract theory. It is at odds, however, with formal valuation models such as Black-Scholes. In these models stock price volatility adds value whereas it is apparent that for employees it increases their preference for liquidity. This disparity in valuation between formal pricing models and employees' psychological standpoints raises questions about valuation models themselves and also puts into question the calculations of incentive effects based on these models. Volatility appears to decrease rather than increase incentives.

An interesting question is whether exercise behaviour differs between types of employee because risk preferences vary between them. Huddart and Lang attempt to differentiate between classes of employee by looking at different sizes of option grant (on the assumption that higher graded, higher income employees will have more options). They find that patterns of behaviour are generally similar. But these similarities suggest one important difference. The volatility of stock returns had no significant influence on the timing of exercises, indicating that top executives (who are more exposed to options) are less susceptible to risk influences.

A further important determinant of exercises appears to be upwards price movements. Huddart and Lang find that exercises cluster in certain months, coinciding with

periods of substantial stock appreciation, and they conclude that "stock price movements appear to be an important determinant of exercise for in-the-money options". This finding is echoed by Carpenter and Remmer (2001). They find that exercises by top exercises increase after increases in stock price.

Huddart and Lang also find a high exercise rate when options are highly in-the-money after controlling for recent rises in stock price. Carpenter (1994) also finds that the exercise decision is correlated with stock price level.

An important issue is whether employees exploit inside information when deciding when to exercise options. A key test for this in publicly-listed firms is whether stock prices decline after exercise activity, assuming that exercised options are sold more or less immediately. Carpenter and Remmer (2001) found that prices increased before exercises by top executives, but no evidence of stock declines after exercise. This suggests that executives do not exercise options on insider knowledge of subsequent performance, and also that market does not interpret exercise events as indicating future deterioration in performance. Their study examines two sets of stock option exercises: those occurring prior to May 1991 when insiders were required to hold stock for 6 months after exercise, and those after this date when this requirement in effect was lifted. It is suggested that after this date virtually all sales of stock derived from options will occur simultaneously with exercise (though the data does not capture sales), and therefore that exercise behaviour should be different between the two periods. If sales can occur simultaneously with exercise, the use of insider information should manifest itself as negative abnormal stock price performance post-exercise (ie insiders know that bad news is coming and time their exercises/sales accordingly). However, only in a small fraction of the sample are significant negative stock price movements observed, suggesting that insider information is not a factor in most exercise decisions. Stock option exercises are observed to occur after large stock price increases. Prior to 1991 exercises precede positive abnormal returns, suggesting that insiders timed exercises so that forced investment in company stock coincided with favourable stock performance.

The exception to these findings concerns smaller firms and the most senior managers. In each instance, exercises are slightly better-timed: preceding higher returns pre-

1991 and lower returns post-1991. However, top managers in smaller firms do appear to utilise insider information because there are significantly negative abnormal returns post-1991. However, Carpenter and Remmers do not indicate whether these are listed or unlisted firms so the precise nature of the informational advantage remains somewhat opaque. Overall, they conclude that, except in the case of top managers at small firms, insiders' potential information advantage in timing exercises is not an important issue in valuing executive stock options (2001: 515). They suggest that most executives will not have relevant informational advantages that might exercise timing, and that exercises occur primarily for diversification and liquidity reasons (given that exercise/sales occur mainly simultaneously).

Huddart and Lang (1996) argue that exercises not likely to be influenced by insider information because most employees will not have this (plus legal sanctions on those that do). Empirically, they find no systematic relationship between exercise behaviour and subsequent movements in stock price.

Exercise behaviour in smaller firms

Unusually for US research on stock options, Huddart and Lang (1996) have three companies with under 1,000 employees as well as five larger firms. These three smaller companies are all computer firms and are listed on NASDAQ (one of the larger firms is privately owned). The computer firms do not pay dividends. They have greater volatility than the other firms. The Black-Scholes value of the options granted in 1992 per optionee was considerably higher in two of the companies (though the third was much lower) than in the NYSE firms. The Black-Scholes value as a proportion of net income was much higher (20.41, 77.90, 85.93) compared with the NYSE firms (4.99, 15, 5.93, 20.41). The vesting schedules tend to be more complex. One company issued different classes of option with different vesting and expiration dates, over various schedules. Another issued options that vested monthly over 4-5 years. The larger companies tended to offer 10 year options that vest at 25 per cent year.

However, the evidence on exercise behaviour from the privately owned firms is rather different from the norm outlined earlier in the chapter. Most employees at the privately-owned (also employee-owned) firm wait until just before expiration to exercise. This company's stock price is much less volatile and more predictable than the stock price of other firms (the company's stock price is n internally generated function of financial accounting earnings and book value). Mean annual volatility of stock price is 0.04 compared with 0.22 – 0.35 for NYSE firms in the sample and 0.59, 0.47 and 0.62 for computer firms. Therefore options are much less risky than in listed firm environments.

Regression analysis shows important differences between privately-owned company and NYSE firms in the influences on the timing of exercise. In the privately-owned firms, the relationship between exercise and both growth in returns and market to strike ratios is weak. This differs from the findings reviewed earlier. Instead, the primary determinant of exercise timing is the time left to expiry.

Summary

The evidence from studies of option exercises indicates that, when there is employee choice over the timing of exercise, most employees exercise their options well before the expiry date and not long after vesting. The primary influences on exercise behaviour appear to be volatility and price rises. To some extent this is at odds with formal valuation models as these suggest that volatility should enhance the value of options and also that value increases as expiry approaches. However, this behaviour is perhaps not surprising given risk aversion. Brookfield and Ormrod (see chapter on The Effects of Stock Options on Behaviour) show that downside risk increases as options become increasingly in-the-money post-vesting because of the danger that any subsequent falls in stock price mean that option holders lose the gains 'secured' so far.

A key assumption in the observations above, and indeed in much of the literature, is that exercised options are sold more or less straight away. On the whole, the evidence tends to support this (Carpenter 1998; Core and Guay 2001). This is to be expected if

options are seen as core compensation. The problem with this is that this unwinds stock-based incentives. This has been a policy issue in countries such as the UK where the value of broad-based share option schemes is seen to be their capacity to provide a low-risk portal to employee share ownership. Exercise and sale behaviour raises fundamental questions about the objectives and perceptions of share option schemes.

Chapter Eleven Dividends and Share Repurchases

Introduction

There has been considerable interest in the last few years in the potential relationship between stock options and the firm's use of free cash-flow. Are there any clear relationships between the use of stock ownership programmes and firms' preferences to pay out earnings to shareholders in the form of dividends or stock repurchases, or alternatively to retain earnings within the firm? As in most other areas of the literature reviewed so far, most of the work in this area has focused on executive and not broad-based option programmes. It has been hypothesised in the stock options literature that executive stock options will be associated with relatively low dividends to shareholders. The primary rationale for this argument is that the payment of dividends during the period of the option will reduce the value of the firm by the time the options are exercised. Thus, *ceteris paribus*, there is an incentive for top managers holding stock options to reduce the level of dividend pay-outs. Weisbenner (2000) calculates that reducing dividend yield from 2 to 1 percent could increase the Black-Scholes value of an option by 18 per cent, and eliminating it entirely would increase it by 39 per cent over ten years[53]

Alternatively, the funds that might have been used for dividend payments might be used to finance share repurchases. In Fenn and Liang's words, there might be an "option-induced substitution of repurchases for dividends". Stock repurchases have become of increasing significance in recent years, and it has been argued that the growth in management stock options is associated with this. Funds used to buyback stock have accounted for between 30-40 per cent of distributions to shareholders in the first half of the 1990s (Fenn and Liang 1997). Liang and Sharpe (1999) note that repurchases by S & P 500 companies exceeded dividend payments during 1997 and 1998.

[53] Assuming stock volatility of 30 per cent and a risk-free rate of 5 per cent

Kahle (2002) notes that there are two 'traditional' arguments for the use of repurchases, the signalling hypothesis and the free cash-flow hypothesis. The first suggests that repurchases signal management's belief that the stock is undervalued, and that management has favourable new information about the firm's prospects. The second suggests repurchases mitigate agency conflicts by returning free cash flow to shareholders in a more flexible way than other instruments (eg. debt for equity swops, leveraged recapitalisations etc). Whilst not discounting the explanatory power of these two perspectives, it has been argued that neither fully explain the surge of repurchases in the 1990s.

Two additional reasons for the current popularity of share buy-backs can be discerned, both relating to stock options (Weisbenner 1999; Kahle 2002). The first relates to the dilution effects of stock options on reported Earnings Per Share (EPS)[54]. Repurchases not only lower the number of shares in the denominator but also the cash used for repurchases is not deducted from earnings in these calculations. In effect, share buybacks provide a means for providing the equity resources for option exercises, and help to mitigate the 'overhang' effects of regular stock option awards The second is that, as option holders do not usually receive dividends on their options[55], executives have an incentive to repurchase shares or retain earnings to maximise the future value of the options. This argument is referred to as the 'agency view' by Weisbenner and the 'substitution hypothesis' by Kahle. The dilution effects explanation may also have an agency dimension in that executive bonuses are often based on an EPS-derived measure (in the UK stock option awards are also commonly linked to EPS growth). Also, EPS is an important valuation tool for investors, and a good EPS helps to keep investors 'on-side'.

Weisbenner (2000) argues that the value of outstanding options will be the same whether a reduction in dividends is used to repurchase shares or to retain more earnings, assuming no signalling effect. However, a signalling effect might be important – repurchases signal to shareholders that managers will use free cash-flow to benefit shareholders. There is the danger that free cashflow (from which

[54] SFAS 128 requires companies to report basic EPS and diluted EPS. The latter includes the effect of stock options. Prior to 1997 the requirement to report 'primary EPS' also incorporated options.

shareholders could benefit from the corresponding value in the firm) could be used for management perks or bad investments. If managers plan to exercise options in the near future, the positive announcement return typically associated with repurchases could further increase managerial wealth (Kahle 2002: 242)

General comments on the literature

The literature in this area is so far entirely American, and dates mainly from the last ten years or so. This literature is almost entirely quantitative in character: it is based on information available in accounting and regulatory returns, and examines relationships between the incidence/size of option holdings and measures of retained earnings, dividend payments, and share buybacks. Behavioural aspects of dividend/repurchase decisions are imputed from these findings. There appears to be no academic literature dealing directly with managerial motivations or shareholder responses.

The literature is also limited to large companies (by market capitalisation). As with much of the literature on stock options, the data sources limit the investigation to firms that are listed and relatively large (typically the S & P 1500 or a sub-sector of this). The focus is also almost entirely exclusively on options for top managers. In part, this is driven by practical considerations. The most extensive disclosure requirements in the US relate to options held by the top five managers. Also, findings relating to top managers have clearer theoretical implications (given the predominance of agency theoretic perspectives in discussions of stock options) than those for wider groups of employees.

Consideration of how dividend policies are affected by stock option plans need to be situated in a broader discussion of the determinants of corporate dividend policy, as Lambert *et al* (1989) make clear. In the perfect market model of Miller and Modigliani (1958) shareholders will be indifferent as to dividend policies. Once tax regimes are introduced into the calculus there may well be a preference amongst

[55] A small number of executives (around 1 per cent Murphy 1998) have options with dividend

shareholders for retaining earnings or for share repurchases rather than dividend pay-outs because capital gains tax treatment is often more favourable than income tax (on dividends). However, dividends may also provide a signalling function. High or growing dividend payments may signal to stock markets that managers believe the future prospects of the firm to be good. They may also provide a signal to shareholders that managers are responsive to the (short-term) requirements of investors for a return on their investment. In this sense dividends may demonstrate the commitment of managers to 'shareholder value'. The long-term growth in dividend pay-outs, at least until the 1990s, may be a reflection of the growing power of institutional investors and the rise of the ideology of 'shareholder value'.

The suggestion, therefore, is that dividend payments are a component of the strategies by which managers attempt to influence investor sentiment towards the firm and its management. There is some evidence from the UK in the 1960s that troubled firms increased dividends at the time their performance was deteriorating in an attempt to keep investors 'on-side'. There is a demonstration effect that managers are putting shareholders interests first (especially if dividend increases are accompanied by corrective actions such as employment reductions) in other areas of the firm's activities. In other words, corporate governance considerations are important in the determination of dividend policies. Our emphasis on the strategic exploitation of information by managers can be carried over into the analysis of the impact of stock options on dividends and repurchases. The evidence from the literature is that managers exploit their power over dividend payments and use of free cash-flow to pursue policies which lead to increases in wealth.

Studies

One of the earliest studies of stock repurchases where options have been awarded was conducted by Jolls (1998). The distinctive contribution of her study at the time was that she focused on the incentives of the agents who run firms rather than that on the incentives of *firms* to repurchase stock. She argues that stock options provide a

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protection. This protection changes the accounting treatment of options – check -

distinct set of incentives to repurchase stock: repurchases, unlike dividends, do not have dilution effects – the outflow of earnings is matched by a proportionate reduction in the number of outstanding shares. Her results provide substantial support for her hypothesis: repurchases are significantly more likely when executives have many stock options than when they have few. She finds that the median value of the stock options held by top executives would have been worth $74,000 less as a result of a dividend increase rather than an a repurchase in 1993. The magnitude of this effect leads her to conclude that the increase in stock options since the late 1970s may have played a significant role in the increase in repurchase activity since that time (1998: 17). She also finds that other form of stock-based compensation do not have these effects. The use of restricted stock (and indeed other non-stock based compensation) has a negative effect on repurchases. Although Jolls' work provides striking results, it has been criticised on the grounds that the repurchase data relates to *intentions* to repurchase rather than the *act* of repurchasing. Most studies focus on the actual sums of money used for repurchasing transactions. It is argued that the weakness of Joll's approach is that, because the actual costs of a repurchasing intention may be spread over several accounting years, it provides an inaccurate account of the relationship between the variables of interest at any given time. It also assumes that intentions are fully implemented.

Lambert *et al* (1989) examine the changes in dividend policy that occur after the initial adoption of an executive stock option plan. They hypothesise that stock options will induce top managers to reduce the level of dividends relative to the level of dividends that would have been paid in the absence of the plan. To undertake this analysis they therefore need to compute a dividend expectation model. They utilise a model developed by Marsh and Merton (1987), which specifies that dividends (log form) are a linear function of permanent earnings, a drift term and a disturbance term, and calculate the level of expected dividends over a five year period following the adoption of the stock option plan. These were then compared with the actual level of dividends over the period. They found that dividends were 15 per cent below the level expected given past dividend and stock price behaviour over a five-year period after the initial adoption of the stock option plan. They also controlled for wider market developments by investigating the difference between forecast errors for individual firms and the market as a whole, and found that dividends were between 6

and 6 and 7 per cent lower than expected. They also investigated whether the size of stock option grants was correlated with the forecast error but the results are mixed in statistical significance, and the authors conclude that there is modest support for an inverse relationship between change in dividend policy and the size of stock options (1989: 423).

Fenn and Liang (1999) examine how firm characteristics influence dividend and repurchase policy over a 3-5 year period, using a sample of over 1100 firms. They find, controlling for free cash flow, a strong negative relationship between dividends and management stock options. They also find a significant positive relationship between stock repurchases and management stock options, and they suggest that the combination of the two results helps to explain the rise of repurchases in recent years at the expense of dividends. Their estimates suggest that between one-third and two-thirds of option-induced reductions in dividends are redirected towards repurchases, with the remainder retained by the firm.

They also find that *management share ownership* encourages higher dividend pay-outs by firms with lower market-to-book ratios and low management ownership (ie those with the greatest agency problems) but no corresponding results for firms with high market-to-book ratios/high management ownership. They conclude that management stock incentives mitigate agency costs at those firms with the most serious excess cash-flow problems. A further result is that repurchases and dividends are positively related to net operating cash flow and negatively related to market-to-book and leverage, as would be predicted by agency theoretic perspectives.

Overall, Fenn and Liang conclude that whereas the incentive effects of stock ownership appears to exist for only certain kinds of firms, the incentive effects of stock options are strong for all firms. They induce a substitution away from dividends to share repurchases.

Liang and Sharpe (1999) offer a framework for assessing the implications of stock repurchases for stock market valuations, taking into account the growth in stock options. They do not, however, attempt to assess the relationship between stock options and repurchases. Their primary conclusion is that the growth in share

issuance from exercises of employee stock options has offset a good deal of the growth in share retirements. Specifically, they find that share repurchases have reduced the outstanding shares of large S & P 500 companies by about 2 per cent each year in the mid-1990s, but the exercise of stock options had a countervailing effect of about 1 per cent of outstanding equity each year.

Weisbenner (2000) finds that the overall size of a firm's stock option programme is a strong predictor of subsequent share repurchase but there is no correlation between the holdings of top executives and share buybacks once this is taken into account (though there is a strong correlation between option holdings and buybacks considered in isolation). A 5 percentage point increase in options outstanding (relative to all shares outstanding) is associated with a 0.4 percentage point increase in the percentage of shares repurchased. The options-repurchase link is strongest in firms with higher stock returns (a rising stock price makes options deeper in-the-money and thus increases their dilutive effect on EPS).[56] The importance of these results is that this sample represents 70 per cent of the capitalisation of the NYSE and 90 per cent of stock repurchases in the year of observation (1994).

His results suggest that payout policies are affected by who holds options. Holding the size of the option programme constant, firms in which top five executives have large holdings retain significantly and substantially more of their earnings. Those holding 1 per cent or more of outstanding shares retain 2.7 percentage points more of earnings. This could be interpreted as strong evidence for the self-enrichment perspective but he argues that other explanations are credible. Firms with good growth opportunities will probably retain more earnings so as to finance growth, whilst executives in such firms may prefer to hold more options in such firms because of the growth opportunities.

Consistent with earlier work, he finds a negative correlation between dividends and executive options. However, he finds no evidence that option-reduced dividend reductions are channelled into repurchases. They are retained instead. This contrasts

[56] Other results are that stock repurchases respond more to temporary non-operating income than normal operating income, low leverage, and lower investment opportunities (as measured by market-to-book ratio)

with the all-employee programmes, where stock option programmes in general are associated with buybacks and decreased retentions.

Overall, his results from the cross-sectional data set indicate that stock option programmes in general are associated with increased stock buybacks, which is largely financed by decreased earnings retention. The funding of option programmes with repurchased shares is stronger in firms with greater share-price appreciation.

Drawing also on findings from a 10-year panel of 144 large firms, he finds a gradual repurchase of shares over the lifetime of the option to undo much of the dilutions. The presence of stock option programmes boosts the fraction of shares repurchased by around 0.5 percentage points each year in mid-late 1990s. The *increase* in stock option grants in the 1990s increased the fraction of shares repurchased by around 0.2 percentage points in the mid-1990s, and accounts for approximately one-third of repurchases in those years. He argues that firms do not repurchase shares when options are exercised to distribute the proceeds from option exercises: instead firms gradually repurchase the amount necessary to undo the EPS dilution.

Like Weisbenner, Kahle (2002) focuses on both executive and total options outstanding, and unlike previous work, is able to separate options into exercisable (ie outstanding) and as yet un-exercisable options. By so doing, she is able to disentangle substitution effects from option funding effects more clearly than is the case in previous work (2002: 243). Unlike earlier work, she also examines the market reaction to repurchase announcements as well as the actual repurchases that take place during the year of observation.

Her results support both the option funding and substitution perspectives on share options. She finds that firms are more likely to announce a repurchase when total options exercisable (as a proportion of shares outstanding) are high and when many options have recently been exercised. The decision to repurchase is positively related to the number of executive options outstanding, even after controlling for total options outstanding. Furthermore, though the repurchase decision is not related to total un-exercisable options (ie those not close to vesting), un-exercisable executive options have a positive effect. She concludes,

> "overall, my results provide evidence that firms repurchase shares to fund employee option exercises, but beyond that, firms are more likely to repurchase if managerial wealth would be negatively impacted by the payment of dividends" (2002: 238).

Once the decision to repurchase is made, managerial options provide no additional incentive beyond that of employee options in determining the number of shares repurchased.

Kahle finds that the market reaction to repurchase announcements is lower than in other studies of repurchases (1.6 per cent abnormal returns compared with 3-4 per cent), and that the announcement return to repurchasing firms is significantly lower for firms with large numbers of employee stock options. She suggests that this indicates market recognition that repurchases are undertaken to fund employee stock option exercises rather than to signal better prospects or to restrict free cash-flow.

Summary

The evidence on this topic indicates overwhelmingly that share option plans are associated with the replacement of dividends by share-buybacks. This can be seen as conclusive evidence for the rent-extraction view of share options because option holders clearly benefit from reducing the volume of shares in circulation whereas they do not benefit from dividend payments. As well as increasing the value of equity, buy-backs also resource future share option grants whilst minimising their contribution to dilution or 'overhang'. There is a further argument that the repurchase announcement generates abnormal returns from which option holders or those with exercised options may benefit.

Whilst share buy-backs clearly benefit the holders of stock options, it is debatable whether this occurs at shareholders' expense. The positive stock market reactions to buyback announcements, even where it is recognised that buy-backs are associated with resourcing option plans, would suggest that it does not. Some suggest that institutional shareholders will be indifferent as to whether they receive value in the form of dividend payments or enhanced equity value (given tax credits on dividends).

However, the value that is channelled into insiders' option holdings as a result of buybacks can be seen as an increase in opportunity cost to shareholders, given that share options are not expensed onto the profit and loss. In the US, though, the tax deductibility (for corporations) of dollar gains on exercise (relative to strike price) will counteract this. In other national contexts, buybacks might be viewed differently. A further caveat is that most of this work focuses on narrow-based executive option programs versus broad-based programs.

Chapter Twelve The Re-setting of Stock Options

Introduction

The substantial growth in the use of stock options for both executives and all-employees over the last fifteen years may be seen as a phenomenon linked to steadily rising stock prices on major exchanges. Since the turn of the twenty-first century, however, this growth has faltered and in some instances reversed. In 2002 there have been major market-wide falls in stock prices in the US and elsewhere. There have also been significant sector-specific falls in stock prices, the most dramatic of which has been the collapse of market value of 'new economy' stocks. An important question is what happens to stock options in these circumstances. Should recipients be required to accept these falls in value as a 'fact of life', or should firms take action to restore the value of these rewards? The foremost case of the latter is the re-setting of stock options. This might take the form of an overt change to the strike price of existing options or, more implicitly, a new award of a higher level of options to compensate for the loss of value of outstanding options.

There are two competing perspectives on the implications of this. The first is that downside risk is an inevitable component of incentive-based reward systems, and hence adverse circumstances should be accepted as 'a fact of life'. Indeed, downside risk is part and parcel of the incentive. In any case, stock options have truncated downside risk, and recipients do not actually lose money as a result of stock price falls. Furthermore, falls in market price do not necessarily imply a fall in value if there is substantial time left to expiry. Indeed, underwater options with a long time to expiration should provide a powerful incentive. A further argument still is that *ex ante* knowledge that re-setting might take place weakens incentives *ex post.*

The alternative perspective is that when the strike price exceeds the current market value, the worth of options as an incentive declines. To maintain employee incentives, therefore, it is necessary either to reset the terms of existing options or else to issue new options to compensate for the de facto loss of the existing ones. Much of the argument here turns on whether stock price falls are firm-specific or wider

sectoral or market-wide phenomenon. If the former, re-setting can be seen as a reward for failure whereas re-setting can be justified to restore incentives when the reason for price falls is beyond executives' control. Failure to re-set penalises option holders, and a risk premium might be necessary to offset this. Thus, ruling out re-setting at the outset can make options more costly. Furthermore, if executives anticipate resetting, this may give incentives to engage in riskier, though NPV positive, projects. For these reasons, Saly (1994) argues that repricing of options is optimal after a market downturn. However, a contrary argument, put forward by Acharya *et al* (2000), is that the less control the manager has over returns, the less optimal resetting becomes. Where factors are beyond the manager's control (background risk), it is less practicable to incentivise managers by fine tuning compensation contracts.

Both of these perspectives assume that stock options are used primarily to provide incentives. However, it can be argued that stock options are an instrument largely controlled by insiders for the purposes of maximising their wealth at shareholders' expense. In these circumstances recipients may argue that re-setting is necessary to maintain incentives but the motives may be less worthy. If options are viewed as a 'low-risk' 'soft' reward, option holders are likely to want to protect what had been seen as a more or less guaranteed pay-off. In broad-based schemes, resetting of options by managers may be viewed as less self-interested. Where options are viewed as soft-rewards they nevertheless may have asymmetric incentive properties: though in-the-money options may have weak incentive effects, out-of-the-money options may have powerful dis-incentive effects. Re-setting may therefore be seen to be necessary to restore employee morale.

There is anecdotal evidence (see Acharya *et al* 2000) that re-setting is often undertaken to restore employee morale. Employees dislike out-of-the-money options. This observation is further evidence that employees may value options quite differently to formal evaluation models. Out-of-the-money options may still have value, and share prices may rally.

One of the interesting features of the use of options in the US, which is strongly supportive of the 'rent extraction' view, is that the relationship of options to market

prices is asymmetric in practice. The practice of re-setting options removes the downwards removes effects of the market but there are few corresponding attempts to reset upwards when market rises because options are rarely indexed or linked to performance. This is not so pronounced a problem elsewhere as it is common for options to incorporate some performance requirements whilst re-setting is prevented by investors. In the UK, for instance, the Association of British Insurers requires that option awards are linked to relative performance whilst their rules prohibit re-pricing.

There are several important questions concerning the re-pricing of options that we address in the chapter:

1) how widespread is the practice?
2) What is the extent of strike price changes?
3) At what point do firms choose to re-set options?
4) What kind of firms re-set options?

The incidence of re-setting

There are substantial differences between economies in the incidence of stock option re-pricing. In the USA, this has been a widespread phenomenon in the twenty first century. Most of the data however focuses on repricing in executive option programs and does not deal with broad-based plans. The regulatory requirements imposed by the SEC (since 1992) are that companies must publish details of re-pricing events. There is not, however, a requirement to publish details of changes to maturity dates. Although, activist institutional investors in the US are hostile to the practice (Acharaya *et al* 2000), in most companies shareholder approval is not necessary for option re-pricing. However, there are some obstacles to re-pricing. In March 2000 the Financial Accounting Standards Board (FASB) issued *Interpretation 44: Accounting for Certain Transactions Involving Stock Compensation – an Interpretation of APB Opinion No. 25*, which required that companies repricing options must report compensation expense. Where repricing or a change in the number of shares under a fixed option takes place, the options plan is assumed to become a variable option plan, and hence requires variable plan accounting (see chapter on The Character of Stock Options for further details).

In the UK, by contrast, re-pricing is rare, and is in effect prohibited by the investor associations who regulate the use of share options such as the Association of British Insurers and the National Association of Pension Funds. The ABI guidelines state that "repricing or surrender and re-grant of awards or 'underwater share options is not appropriate" (ABI 2002: 9). Re-pricing is frowned upon because it is seen to weaken the incentive effects believed to be the primary justification of options. Requests for re-pricing (which do occur from time to time) are viewed with alarm by investors because they are seen as a signal that the firm is in distress, and that insiders have information that suggests that further falls in share value may well occur. Elsewhere, re-pricing does not appear to have occurred to any significant extent (partly because the use of options is in its infancy) but the collapse of 'new economy' share prices have led to discussions about the possibility of lowering exercise prices or extending expiry terms in countries such as the Netherlands (Couwenberg and Smid 2001).

Since widespread re-pricing appears to be a US phenomenon, it is not surprising that the literature is entirely American. US evidence indicates that two types of explicit re-setting can occur. One is a change to the strike price, the other is a change to the maturity date. Bremner *et al* find that most changes occur to the price with maturity terms left unaltered or else reset to 10 years, the length of the original option (2000: 1060.

Gilson and Vetsuypens (1992) found that 25 of 77 companies in their study of distressed companies re-priced their outstanding options. Saly (1994)'s empirical results show that 121 of 187 companies renegotiated contracts after the 1987 crash. Bremner *et al* (2000) find that re-setting events occurred in 1.3 per cent of cases where executives held options in the period 1992-1995. 396 events occurred in 134 companies during the period. Detailed information from proxy statements yielded information on 333 executives experiencing re-setting, and changes to 806 tranches of options. Yermack (1995) found that 1.5 per cent change the terms of option awards in any given year. A survey by the Investor Responsibility Research Centre found that 5 per cent of the 1800 firms they monitor reprised their options in 1996. However, repricing appears to be more common amongst new economy firms. A Deloitte and

Touche study found that 23 out of 68 large Silicon Valley firms re-priced options in 1996 (quoted in Corrado *et al* 2001).

In Bremner *et al* (2000), 79 per cent of re-pricings involved the re-setting of the strike price to the current market price, 19 per cent involved a lowering of strike price but still above market price, and just over 1 per cent involved a lowering to below current market price. These findings are consistent with those of Chance *et al* (1997). In 51 per cent of cases the maturity date was left unchanged but in 45 per cent it was extended. These findings differ from those of Chance *et al*, who find that only about one-tenth of option re-sets had their term extended. In about 80 per cent of these cases, the new maturity date was 10 years from the time of re-setting, meaning that in re-set options were essentially like new options. In 36 per cent of cases overall the resetting involved reduction in strike price to current market price and a lengthening of the maturation period.

As for the extent of re-settings, Bremner *et al* (2000) find that on average price changes were substantial. The mean change was a reduction of 39 per cent (median = 40 per cent) of the old price. In over one third of cases the strike price was lowered by 50 per cent. The average reduction in strike price is very similar to that found in Chance *et al* (1997). Gilson and Vetsuypens (1993) found that the typical repricing is a 50 per cent reduction in exercise price. Chance *et al* find an average price reduction of 41 per cent.

The other form of re-pricing is where firms grant 'excess' awards of options to compensate for the loss of market worth of existing grants. Saly (1994) found that after the 1987 crash most firms in the sample had numbers of grants that were more than 15 per cent higher than in the years immediately preceding the crash, and suggests that the magnitude of this supports repricing rather than a general increase in grants over time (p.343). This increase in the number of grants could be a reflection of low stock prices but her results suggest that overall option values (calculated using Black-Scholes) are also significantly higher than options granted before the crash. The difference in option grants is most significant for firms experiencing the largest drop in stock prices during the crash. Furthermore, firms with underwater options have significantly larger post-crash grants than pre-crash grants, whereas firms with

in-the-money options have no difference in pre and post-crash grants. The number of options granted one year after the crash is higher than that two years after the crash, suggesting a temporary re-pricing effect. These practices are contributing to a potentially substantial dilution effect in the US. A recent study has found that, on average, 'overhang' (options granted plus options to be granted divided by total shares outstanding) was 14.6 per cent in 2000, and that this has grown from just over 5 per cent in 1990 (Watson Wyatt 2002). This study argues that there is an optimal level of overhang (associated with superior returns to shareholders emanating from options) but that in most cases overhang exceeds this optimum point.

An interesting issue is whether strike price changes and changes to maturity are substitutes for each other. In other words, do some firms extend the maturity dates of options rather than changing price? Bremner *et al* find that longer maturity and price reductions complement each other to an extent. Nearly half of cases where strike price was re-set to prevailing market prices, the maturity was also extended. This is compatible with insider dominance rather than principal-agent perspectives.

Bremner *et al* (2000) find, unsurprisingly, that the less the time left to maturity or the lower the stock price at reset time, the greater the benefit from resetting. As an example, they show that an option reset (to at the money price) when the stock price is 30 per cent below its original value could give a gain ranging from 37 to 67 per cent, depending on the time left to maturity (2000: 118). Where maturity is extended, the increase in value can be nearly 120 per cent when five years have elapsed. They conclude, therefore, that in all cases resetting results in a substantial benefit to the option holder.

Which firms do re-setting?

Bremner *et al* find that resetting is more common in smaller firms: only 0.3 per cent of executives in the S and P 500 had options reset, whereas more than 2 per cent did in the SmallCap. They argue this is consistent with incentives arguments since pay-performance sensitivity is greater in small firms; there is no evidence that higher share volatility amongst smaller firms is a factor (2000: 123). However, it is possible to

argue that the pay-performance sensitivity proxies for relatively larger option holdings in smaller firms, which may in turn reflect larger stock ownership by insiders. The implication of this is that the governance regime in smaller firms makes it easier to re-set options. Thus, resetting may be a phenomenon arising from insider dominance, and be aimed at protecting rewards rather than provision of incentives to secure shareholder returns. Consistent with this, Bremner *et al* note that these firms have less ownership by powerful institutional investors and are less monitored by financial press.

Carter and Lynch point out that repricing might be more common in smaller firms for three reasons. One, governance mechanisms and outside scrutiny are easier in smaller firms. Institutional investors are known to be hostile to repricing. Two, it might be easier to renegotiate contracts in smaller firms. Three, small firms might experience more turnover, and also talented people may be more difficult to replace. Replacing an executive can be more costly in smaller firms, making repricing a less costly alternative.

Carter and Lynch find that high technology firms and younger firms are more likely to re-price. The extent to which options are out-of-the-money is also significant. Firm-specific returns are significantly negatively related to repricing but no relation is observed with industry returns. There is also no relationship between institutional ownership or conflict of interest reasons, "suggesting that repricing does not result from self-serving behaviour by executives" (2001: 222). Carter and Lynch's results are "consistent with the claim that repricing rewards poor performance". However, they suggest the combination of results suggests an alternative explanation,

> "If young, high technology firms operate in tight labour markets, our results are consistent with firms repricing to restore the incentive effects of options and to retain employees in competitive labour markets " (2001: 223).

Chidambaran and Prabhala (2000) find that firms in technology, service, trade and manufacturing industries re-pricere-price more than other firms. Chance *et al* find that repricing is more likely in smaller firms, with insider dominated boards and 'greater agency problems'. However, insider ownership has no effect on the tendency to re-price.

A response to firm-specific or market events?

An important issue is whether re-setting is a response to industry-wide or firm-specific declines in share prices. There are important differences between the two. In the first it can be argued that re-setting helps to retain managers in adverse circumstances that are no fault of the managers themselves. In the other, however, resetting can be said to reward managers who perform badly, and this is incompatible with incentives-based and principal-agent views about stock options. Bremner *et al* find that resetting activity occurs in good performing industries as well as poor ones, and indeed the distribution of returns across industries with some resetting is almost identical to that across industries with none. Those industries with resetting include both human capital and physical capital-intensive industries. Their important conclusion is that resetting does not generally occur as a result of industry-wide shocks and is not concentrated in industries where managerial talent is important. This suggests once again the primacy of insider dominance arguments rather than principal-agent views.

Chance *et al* (2000) also find that repricing follows poor firm specific performance, not market or industry factors, and that there is no consistent pattern of repricing between industries.

An optimal solution?

It is argued by Bebchuk *et al* (2001) that the fairly widespread practice of re-pricing options in executive plans is one of the major pieces of evidence supporting the rent extraction view of options rather than the optimal contracts perspective. They argue that the capacity of insiders to 'unwind' incentives to maintain employee rewards when things get tough is compelling evidence against the view that the primary use of options is to provide incentives.

There are various ways that this hypothesis can be tested. One is to see whether measures of insider dominance are associated with greater use of re-pricing. On the

whole, the evidence is consistent though not fully supportive of this. Chance *et al* (2000) find that conflicts of interest on the compensation committee increase the likelihood of repricing (cf. Murphy 1999). However, they do not find evidence for a strong version of the claim that large insider stock ownership or insider board memberships makes re-setting more likely.

Another test is whether firms make corresponding reductions in other forms of compensation to off-set the impact of re-pricing and hence restore incentives. Bremner test whether resetting substitutes for other compensation rewards that executives might ordinarily expect to receive. This might be predicted as a way of maintaining incentives and avoiding moral hazard. However, they find that resetting and additional compensation complement each other. Similarly, Chance *et al* find that resetting is not accompanied by offsetting factors either in option terms or other cash compensation. They therefore draw the important conclusion that

> "resetting represents a windfall for poorly performing managers rather than a necessary adjustment in incentives or a device for retaining talent" (2000: 123).

Summary

Re-setting of options in executive plans is a pervasive feature of the US options scene and appears to be growing in extent as many options become underwater. We have seen that dilution arising from stock options nearly tripled during the 1990s. Re-setting might be justified to remove the 'noise' from market movements but in practice the evidence suggests that re-setting occurs in response to firm-specific movements in share value. Some argue that this appropriate because incentive contracts should be related to what the managers can reasonably affect and because re-setting can restore incentives. However, Chance *et al* find no significant improvement in shareholder returns after re-setting events, whilst the Watson Wyatt study calculates that overhang levels are sub-optimal from the point of view of shareholder returns. A more common view, then, is that this practice rewards failure. A further problem for the optimal contract perspective is that the knowledge *ex ante* that options may be re-set dilutes incentives from the outset. On the whole, the evidence in this area, coupled with the lack of indexing of options to upward

movements in share prices, appears to be more consistent with the 'rent extraction' rather than 'optimal contracts' view. Insiders in US firms are able to re-set options because of weak corporate governance arrangements. This may well change post-Enron.

Chapter Thirteen Summary of findings on SMEs

Introduction

It will certainly be clear by now that there is very little research indeed on the use of stock options in SMEs (defined as companies with 250 employees or less). This generalisation applies across the US and European economies. There are several reasons for this gap. The first is that the stock options literature shows that overwhelmingly stock options are a characteristic of larger, typically stock-market-listed, firms. There are several factors that explain this distribution of schemes, which will be considered more fully later. Since, there is little evidence of stock options in small and medium-sized firms, those interested in this topic have generally not chosen to examine option use in SME settings. A second reason is that US researchers, who have conducted the bulk of sustained, in-depth research on the use of stock options, have chosen to use readily-usable commercially-available datasets rather than to collect their own firm-level data. Key datasets, such as ExecuComp, contain data only on larger, listed firms (for example, the S & P 1500). A third reason is that small business researchers have not picked up any substantial or widespread evidence of stock options in small businesses, and hence have not highlighted this as an interesting research topic.

Nevertheless, in the review of the mainly American literature that has been presented so far, some findings have emerged that specifically relate to SMEs or else are related inversely to size. We re-present them here as 'stylised facts' of the use of stock options in small firms.

Stylised facts: stock options in SMEs

Incidence

It is clear that the typical incidence overall of stock option schemes in small businesses is typically of the order of 1-3 per cent. Information from the US, UK, and Australia confirms this to be the case though the size categories used for these

calculations are not necessarily directly comparable across studies. It should be emphasised that these proportions do not relate to SMEs in their entirety. Generally, micro-firms (typically the largest single component of the SME population) are excluded from these analyses. For instance, the UK WERS survey examines the incidence of share ownership schemes (most will probably be options-based) in small business with 10-99 employees. They find an incidence of 1 per cent. A recent Dutch study also excludes enterprises with fewer than 10 employees. They find that 7 per cent of firms with 10-49 employees have a share plan of any sort, whilst 6 per cent of companies with 50-200 employees have one (NPI/PSPS 2002). This level of incidence is very high for small firms: whilst it could partially reflect sampling bias, it may also reflect the vigour of the 'new economy' in the Netherlands.

We know very little about the characteristics of these firms or their stock option schemes. It is not possible to determine whether these schemes are broad-based or restricted to top executives. We are unable to say which characteristics of these firms makes them more likely to use stock options than other small firms. We can speculate that some critical factor (s) might be responsible, such as ownership structure or management objectives but this has to remain at the level of speculation.

In contrast to the incidence for the SME sector as a whole, the extant evidence indicates that stock options are widespread in 'new economy' firms. Typically, 60 per cent of such firms use stock options, with a very high proportion of these being open to all employees rather than just top executives. We should nevertheless be careful in our use of this data: new economy firms do not necessarily meet the criteria for SMEs. The median size of firms in some studies of new economy firms (eg. Ittner *et al* 2001; Sesil *et al* 2002) is considerably larger than the SME maximum. If we restrict our attention to dot.coms, however, the same picture emerges of option usage in 60 per cent plus of companies emerges, with a tendency to extend schemes beyond managerial employees.

Incentives

The incentives literature is concerned with the sensitivity and/or elasticity of total compensation (including stock options) to changes in stock prices. It has been found that pay sensitivities are higher in smaller firms, and hence the incentive effects of

options should, ceteris paribus, be greater in small firm settings. The work of Jensen and Murphy (1990) and others suggests there are two main reasons for this. The first is that liquidity constraints and risk aversion amongst option recipients are likely to have a larger constraining effect on incentives in larger firms. To achieve the same sensitivity as in smaller firms, the recipient would need to devote a much greater proportion of their personal wealth portfolio to the acquisition of options. The second factor is that pay-setting is more visible in larger firms, and the 'outrage' factor may truncate the upper-end of the pay distribution in these firms. Thus, Jensen and Murphy find that the average compensation-related wealth consequences for a $1000 dollar change in shareholder value is four times greater in small firms than large firms[57].

Other studies have shown that company size is associated with heterogeneity in pay sensitivity. Murphy (1999) finds that the 1996 median sensitivity for the S&P Small-Cap is over $28 per increase of $1000 in shareholder wealth compared with just over $4 in the top half of the S &P 500. Huddart and Lang (1996) find that the Black-Scholes value of the options granted in 1992 per option-ee was considerably higher in two of their three smaller firms. The Black-Scholes value as a proportion of net income was much higher (20.41, 77.90, 85.93) compared with the NYSE firms (4.99, 15, 5.93, 20.41).

These findings present something of a puzzle. If incentives provided by options (the most important contributor to pay sensitivity in recent years) are so strong in smaller firms why don't more SMEs use them? There is no research directly on this issue but there are a host of possible reasons: owners' unwillingness to dilute ownership, lack of a traded equity market, the high set-up costs of operating an option scheme etc. Furthermore, if top managers in SMEs are subject to closer governance constraints by owners than their counterparts in large listed firms, the utility of options as a tool for reducing monitoring costs would appear to be less. Furthermore, managers may be less able to capture the pay-setting process in small firms. Thus, the lower use of options in small firms, despite their apparent power as incentives, may be consistent with both optimal contracts and rent extraction perspectives.

[57] Small firms are defined as those in the lower half of the distribution below the median market

Determinants

There are no studies that specifically examine the determinants of stock options in small firms. The only results from studies of determinants that relate directly to SMEs is the near unanimous finding[58] from the literature that firm size (whether measured by employees, sales, or market capitalisation) is strongly and positively correlated with use of stock options, especially broad-based stock options, even after controlling for other factors.

This can be explained as follows. Establishing and maintaining a stock option plan takes time and consumes resources. Small companies may use other compensation tools to duplicate the incentive effects of such plans at a lower cost (e.g. firm-wide bonuses tied to stock price, phantom stock, etc.). Large companies face larger monitoring costs, hence the greater need to align employee compensation with firm performance. Of course, the benefits of options as a monitoring instrument in larger firms should be counterbalanced by the free rider effect, as far as broad-based schemes are concerned, but the distribution of stock option schemes does not bear this out. This might be taken as evidence that firms use broad-based stock options for reasons other than optimal contracts.

Option exercises

The literature on option exercises is unusual in the stock options literature in that company size is an explicit unit of analysis. Furthermore, there is at least one study where data is collected on employees in small, unlisted firms (rather than smaller firms within the listed sector). There is some evidence from the literature that managers in smaller firms are able to exploit insider information about likely influences on stock returns. Carpenter and Remmers find that exercises are slightly better-timed in small firms: preceding higher returns pre-1991 and significantly lower abnormal returns post-1991. The significance of 1991 here is that prior to that year option holders were required to hold stock for six months after exercise. There was therefore an incentive to exercise stock some time before anticipated price rises. After 1991, the holding period was abolished so that sales could take place

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capitalisation.

simultaneously with exercises. In this case, exercises might be expected just before bad news. Whereas they conclude that most executives will not have relevant informational advantages (exercises are governed by concerns to diversity and achieve liquidity), they suggest that top managers at smaller firms may well exploit an informational advantage in the timing of exercises.

In the case of smaller, listed firms (Carpenter and Remmers do not indicate the balance of listed and unlisted firms in their data-source), there should not be any significant differences with larger firms in information about key disclosure events, such as quarterly earnings figures, and therefore any influence of size on exercises in relation to these might be attributed to governance differences. Smaller, listed firms tend to be less tightly monitored by major institutional investors, and top managers therefore might be less inhibited in exploiting informational advantages.

In their study of option exercises in broad-based schemes in eight firms, Huddart and Lang (1996) do not find any major differences in exercise behaviour between small, listed (on NASDAQ) and larger firms. Exercises tend to take place well before expiry, though the vesting schedules tended to be more complex (by contrast the larger firms offered ten year options vesting at 25 per cent per year over four years). However, the major difference from the norm is to be observed in the smaller, private firm. Most employees at the privately-owned firm wait until just before expiration to exercise. Furthermore, the relationship between exercise timing and both growth in returns and the ratio of market to strike price is weak. Instead, the time left to expiry is the primary determinant of option exercise timing.

There are several characteristics that might explain this. The first is that stock price in this firm is much less volatile and more predictable than the stock price of other firms as it is an internally calculated function of financial accounting earnings and book value). Mean annual volatility of stock price is 0.04 compared with 0.22 – 0.35 for NYSE firms in the sample and 0.59, 0.47 and 0.62 for computer firms. This fits with other evidence that volatility is a major influence on stock option exercises (despite the contribution to value emanating from volatility in the Black-Scholes valuation

[58] Yermack (1995) does not find this size effect but his sample is restricted to large firms

approach). Since unlisted firms, that are otherwise similar in performance to similar listed firms, have lower volatility because of the approach to share valuation (less frequent, and not driven by the stock market), we would generally expect that options would be held for longer in small, unlisted firms than in large, listed firms[59]. This implies that, ceteris paribus, options could have a more durable influence on employee behaviour in small firm settings.

A second factor explaining longer option holdings is related to the first. The absence of a public market for shares removes a constantly updated source of information on valuations of the firm. There are no signals from the market to employees on how the firm is perceived to be performing. The removal of market sentiment removes a potential influence on employee exercise behaviour. Furthermore, by removing a highly visible source of information, it may make stock prices less salient to employees.

A third factor relevant to this particular case is that the firm is employee-owned. This *may* give employees effective control rights (it cannot be necessarily assumed that de jure control is translated into de facto control), and this attenuates any pressures towards early exercise. So, a note a caution must be sounded about the representative-ness of this case, and the dangers of drawing wider generalisations from it.

Re-setting of options

One of the few clear findings in the literature on stock options concerning smaller firms relates to re-setting of options. A widespread finding is that re-setting is more common in smaller firms. For instance, Bremner *et al* find that more than 2 per cent of executives in the S & P Small Cap had options re-set compared with just 0.3 per cent of executives in the S and P 500. Carter and Lynch find that high technology firms and younger firms (who can be assumed to be smaller) are more likely to re-price. Chance *et al* find that repricing is more likely in smaller firms,

[59] The obvious exception to this is where options are awarded in expectation of an IPO or takeover

Carter and Lynch point out that repricing might be more common in smaller firms for three reasons. One, governance mechanisms and outside scrutiny are easier in smaller firms. Institutional investors are known to be hostile to repricing. They find no evidence that lower institutional ownership amongst smaller firms leads to greater re-pricing, though it remains a highly plausible explanation. In the UK, for instance, institutional investor codes of practice prohibit re-pricing but active monitoring takes place only for the largest thousand or so firms. Two, it might be easier to renegotiate contracts in smaller firms. Three, small firms might experience more turnover, and also talented people may be more difficult to replace. Replacing an executive can be more costly in smaller firms, making repricing a less costly alternative. They subscribe to the third argument: where young, high technology firms operate in tight labour markets (the 'classic' Silicon Valley case), options are re-priced to restore incentive effects and to retain employees in tight labour markets. A further argument is that the substantially higher levels of pay-performance sensitivity in smaller firms (see section above on Incentives) means that falls in stock price have a correspondingly greater impact on incentives.

In summary, the literature does not conclusively tell us why re-repricing is more common in smaller firms but the extant evidence is consistent with both optimal contracts and rent extraction explanations.

The implications of the findings in the literature for small firms

Although the volume of findings that are directly based on small firms is very small, it is possible to draw out inferences from the literature that may be applied to SMEs. This will help to explain the very low use of stock options amongst SMEs, and also explain why some small firms buck the trend.

Listing

One of the clear findings from the determinants literature is that stock market listing has a very powerful effect on the probability of having a stock option plan or any stock-ownership scheme (be it executive-only or broad-based) (see Pendleton *et al* 2001; Pendleton 1997). In fact, stock market listing increases the odds of having a

stock plan more than size. It is not difficult to identify reasons for the impact of market listing. The availability of a trading market provides that potential for liquidity which is likely to be extremely important to risk-averse employees. Absence of a public market seems likely to lower the value of options to risk-averse employees, and may well need larger awards of options to achieve the required incentive effects. The presence of a market for shares externalises some of the costs of share trading by employees to sellers and purchasers (in private firms the firm has to bear the costs of establishing a market). Market listing also provides a constant stream of information on market assessments of the firm's worth (performance and expected performance) and share value. This helps to align employee incentives and behaviour by providing constant feedback on what the market sees as worthwhile actions.

There are several clear implications of this finding. One, the extent of market listing is likely to be related to cross-national differences in the incidence of stock option plans. Broadly speaking, the evidence bears this out, with the use of stock options highest in those economies with the largest stock markets (by number of firms listed). The extent of market listing incorporates two dimensions: the proportion of large firms that are listed, and the extent to which listing extends down the size hierarchy. It is not surprising therefore that stock options are used more widely in the US and UK than the mainland European economies. We do not conclusively know whether the incidence of stock option plans amongst SMEs is higher in these economies but the balance of probability suggests that they are. Two, the fact that the vast majority of SMEs are not listed on stock markets, and do not aspire to be, suggests that the incidence of stock option plans amongst SMEs will never be very high. The key policy objective, should options be judged to be a valuable instrument, should be to encourage the use of options amongst that minority of SMEs with credible growth prospects and objectives. The third implication is that to facilitate the use of options amongst this group, such firms should either be encouraged to seek a listing on a small or new market or should utilise options as part of a growth trajectory explicitly leading to an IPO. This poses two challenges to policy makers. One is to change small firm behaviour. The second is to further develop alternative stock markets for smaller firms.

Size and agency costs

We have already noted the widespread results from the determinants literature that size of firm has a significant positive impact on the odds of having a stock option plan. The primary explanation in the literature for this finding is that monitoring costs increase with firm size. A secondary explanation is the high fixed costs of establishing an option plan. These observations pose major difficulties for those wanting to extend the use of options amongst small firms. If options are primarily an instrument for providing incentives, then the demand for them amongst SMEs is almost always likely to be less than for large firms. The prevailing patterns of management in most SMEs are likely to facilitate close monitoring of worker performance for a myriad of reasons. Leaving aside the obvious argument that top management can more directly scrutinise ground-level workers in these firms because there are fewer of them, the social norms in SMEs are likely to reduce direct monitoring costs. Recruitment of workers from localised and 'tight' networks (eg kinship) helps to impose norms of worker effort. The tendency for managers to involve themselves directly in shop-floor work tasks in many SMEs also facilitates direct observation of worker behaviour. In owner-managed firms (43 per cent of firms with less than 100 employees according to the UK Workplace Employee Relations Survey) (see Cully *et al* 1999), the owner's direct involvement in work discipline helps to ensure that the interests of principals are 'reflected' in agents' behaviour. The personal and informal character of hierarchy relationships may also encourage information-sharing between workers and bosses. In any case, in small firms, those in authority are also likely to be highly knowledgeable about work processes (especially in firms characterised by 'fraternal' employment relations ie where owner-managers work alongside employees on the 'shop floor').

There are also likely to be lower agency costs in the owner/manager relationship in the typical SME. In cases where SMEs are run by owner-managers, the separation of ownership and control which provides the governance starting point for the use of options in large firms is absent. In those cases where SMEs are run by professional managers, ownership is typically concentrated amongst a small number of owners. The net cost of monitoring for these owners is lower than where ownership is more dispersed because they secure proportionally more of the gains from active monitoring. Furthermore, except in a relatively small number of cases where owners

are diversified investors, company ownership will form a very significant component of owners' wealth. Thus, risk aversion is likely to provide a strong incentive to engage in active monitoring in many cases[60].

To summarise, the existing literature primarily sees options as contributing to an 'optimal contract'. We have suggested earlier in the report that it is questionable whether this is the primary reason for their usage in executive remuneration in large, US firms. The implication of the above discussion of typical SME characteristics is that the optimal contracts can be achieved in alternative ways in SMEs.

The investment set

One of the key findings from the determinants literature is that firms with better growth opportunities are more likely to use option plans. This argument is located in an agency context. Where there is a range of investment opportunities, there is a range of managerial decisions and actions that can be taken, and it is not clear which decisions will be best. Thus, it is difficult to monitor managers (and employees) in this context. Options are used in these circumstances to provide managers with incentives to take actions that are in shareholders' interests. On the face of it, this argument appears to be extendable to SMEs, and there are grounds for anticipating that the use of stock options in SMEs is concentrated amongst those with high growth potential. Certainly, the very high incidence of option plans amongst dot.coms compared with typical SMEs is consistent with this argument.

Unfortunately, the literature as it stands it not directly extendable to SMEs because all of the measures for investment opportunities are based on stock market information (book to market value, ratio of R and D expenditure to market value etc). A further problem with this type of argument is that the type of measures may relate to human capital richness as much as growth opportunities per se. Indeed Core and Guay (2001) argue that options are most likely in firms with high growth potential that are reliant on skilled human capital. We pursue this line of argument further shortly.

[60] This is not to imply that this monitoring is efficient or effective, only that it is active and interventionist. This is critical for perceptions of the utility of stock options.

Liquidity

One of the key suggestions in the determinants literature is that firms facing liquidity constraints are more likely to use stock option plans. There are two sets of arguments here. The first is that payment of a component of wages and salaries in stock options reduces pressure on cash-flow. The second is that the cash inflows from exercises of options provides a source of funds. The evidence is generally supportive of this line of argument (though difficulties arise from the use of common measures to proxy for different processes). Mehran and Tracy (2001 find that firms with cash constraints award more options. Core and Guay (2001) find that option grants are more heavily used by firms with cash constraints, high capital needs[61], and high costs of accessing capital markets.

Although these findings are derived from larger, listed firms they appear capable of extension to small firms. Younger firms in particular seem likely to have lower cash reserves and to have more acute cash-flow constraints. It is difficult to fund investment out of earnings in these circumstances. At the same time, the cost of external capital is known to be high for small businesses. Thus stock options appear to be a highly suitable instrument for SMEs because they can reduce the wage bill and generate low cost capital inflows.

Although this context is common to an enormous number of SMEs and younger firms, only a tiny minority of such firms use options as a solution to these problems. The evidence suggests that only those with a highly pronounced growth orientation (typically the dot.coms) use options, and this suggests that investment opportunities need to combine with these cash constraints for options to be perceived as a useful instrument (cf. Core and Guay 2001).

A further restricting factor is the perceived function of stock options on the part of recipients. These arguments assumed that stock options can be used as core compensation in small firms. It is assumed in the Finance literature, which admittedly mainly focuses on CEOs, that options do form part of core compensation. However, there is no evidence in this literature that recipients perceive stock options in these

[61] Note that that measure of capital needs is R & D expenditure

terms. Meanwhile, there is a lot of anecdotal evidence that participants see share schemes as a 'perk' or *supplement* to compensation. Furthermore, there is evidence from the Labour Economics and Human Resource Management literature that firms who provide share-based rewards, provide cash salaries that are higher than the labour market norm (Whadwani and Wall 1990; Pendleton 1997). There is also a consensus in current policy discussions with the European Union that financial participation should be a supplement not a substitute for core salaries. It is interesting to note that Murphy (1999) finds that the non-option component of US CEO reward packages remained constant in real terms over the 1990s. Risk aversion is the obvious impediment to use of options as core remuneration.

If stock options are seen as a 'perk' their capacity to ease liquidity constraints is likely to be minimal in most cases. Indeed, stock options as a perk are likely to intensify cash constraints, and it is interesting to note that Kroumouva and Sesil (2002) find that higher rather than lower levels of cash flow are associated with the use and adoption of broad-based stock options in 'new economy' firms. This suggests that in most cases, stock options will be not be perceived to be relevant to SME circumstances. The one exception is where employees' risk aversion is very low, and they are thereby prepared to accept options in lieu of cash wages. On the face of it, even leaving aside the risk effects related to the function of options in this instance (ie as a substitute not a supplement), the level of risk is high because the survival rate of small firms is lower than large firms and because high growth potential may not be realised in practice. This suggests that a very substantial risk premium will need to be paid. Hall and Murphy (2000) show that, in these circumstances, additional options or discounts on market value at grant will be necessary to achieve the requisite value to the employee. In these circumstances, stock rather than stock options are a cheaper option for the firm. In any case, the likelihood of small numbers of highly risk-positive employees is likely to restrict the use of stock options for liquidity reasons to a very small number of SMEs.

Summary

In this chapter we have collated information from the literature as it specifically relates to SMEs. As has been mentioned throughout the report, there is very little use in the literature of data derived from small firms and hence our direct knowledge of the use of stock options amongst SMEs is very limited indeed. To partially overcome this, we have attempted to extrapolate from the findings in the literature those factors which appear to be either conducive to the use of stock options in these firms or else barriers to their adoption. Inevitably, much of these comments have to be speculative in nature and it is clear that further research focusing specifically on SMEs is necessary. In the next chapter we attempt to take the discussion further by identifying specific SME contexts where stock options might be developed further.

Chapter Fourteen Contexts for stock options in SMEs

Introduction

In the previous chapter we attempted to extend the extant literature to consider the potential use of stock options in SMEs. We identified factors associated with stock options plans that appeared to be relevant to the use or failure to use stock options in SMEs. In this chapter we build on this discussion by considering those small business contexts where stock options might be more relevant than the norm. This chapter takes a more holistic approach than the previous chapter. Before considering these specific contexts we first note some general issues concerning SMEs that limit the applicability of stock-based rewards.

Barriers to the use of stock options in SMEs

In this section we identify three main sets of barriers to the use of stock-based rewards in SMEs. The first of these concerns the financial and organisational structures of SMEs. The first point to bear in mind is that most SMEs are tiny: a large proportion of registered small companies have neither a share capital nor a workforce. In the UK, for instance, around a third of small businesses are companies with employees, and most of these are very small. In the Netherlands, over 98 per cent of small businesses have less than 50 employees (indeed these firms contribute 98 per cent of the total number of firms in that country). Given the optimal contract arguments discussed at various points in the report, we would expect that share schemes are most likely to be observed at the upper end of the SME sector. Yet, clearly this sub-sector of SMEs is a very small proportion of the SME population. Given that a sizeable proportion of the set-up costs of a stock options plan are likely to be fixed, the cost-benefit evaluation of using a stock option scheme in the typical SME is likely to produce negative results.

Given the earlier findings regarding the importance of stock market listing, the propensity of SMEs to use stock options would probably be substantially enhanced if

equity were to be used more widely for financing. However, equity is rarely used for financing of SMEs: in the UK, for instance, the main source of external finance for SMEs is short-term loans and bank overdrafts (Storey 1994). Leaving aside the direct demand-side costs of raising equity finance, supply side explanations are very important. Equity providers are generally unwilling to shoulder the level of risk involved. It should be noted that, historically, equity has rarely been used as a source of investment finance, even in nations with a long tradition of active stock markets such as the US, because of the level of risk of investing in new ventures (Baskin and Miranti 1997). Even those investors who are more willing to shoulder risk, such as venture capitalists are unwilling to participate in equity offerings by small firms. This is because the transaction costs are high relative to the level of finance involved. The costs of undertaking risk assessments are relatively high for equity acquisitions of under £0.5 million or thereabouts (Gavron *et al* 1998), and hence venture capitalists tend to shun equity issues (except in the case of MBOs). Institutional investors (pension funds, insurance companies etc) are also reluctant to invest in the small firm and private equity sector because of liquidity constraints[62].

It has been argued that historically the primary function of equity has not been to raise investment capital but to facilitate restructuring transactions, thereby enabling owners to make full or partial exits (O'Sullivan 2000). Bearing this mind, options might be a useful instrument for executive rewards where an Initial Public Offering is expected at some point in the future. However, this possibility should not be overstated. The IPO market is not large. In 1999, for instance, the whole of Europe managed under 300 IPOs, of which most were technology-related flotations (see Golding 2001: 189).

On the whole, then, the financial context in which small firms operate does not encourage the development of company structures that are facilitative of share option schemes.

A second major set of barriers may be located in the approach to human resource management in SMEs. On the whole, SMEs are not noted for well-developed human resource management strategies, institutions, and policies. For instance, the UK

[62] There is relatively little trading in small and medium-cap stocks on the London Stock Exchange,

Workplace Employee Relations Survey 1998 found that just 9 per cent of small businesses (of under 100 employees) have a specialist personnel manager. The reasons for this state of affairs include employer aversion to formal employee involvement, lack of belief or knowledge that HRM practices are relevant to the small business situation, and an emphasis on the merits of informality (see Bacon *et al* 1996).

Two particular aspects of this may be viewed as antithetical to the use of employee share schemes. The first is that pay practices in SMEs tend to be ad hoc and responsive to the imperatives of short-term labour and product market pressures at the micro level (Gilman *et al* 2002). Where contingent forms of payment system are used, they tend to take the form of individual Payment By Results, and tend to be used in an ad hoc and mechanistic fashion (Cox 1999). Overall, that strategic dimension to reward systems which is necessary to justify the investment in the establishment and operation of a share scheme tends to be absent.

The second is that there is an aversion to formal structures of employee involvement in most SMEs. The industrial relations literature on small firms has emphasised the autocratic or 'unitary' nature of employment relations in small firms (Ram 1991). Employment relationships of this sort, whether they take a paternalistic, 'fraternalistic', or clearly autocratic form are not conducive to formal kinds of employee involvement. This emphasis on informality is a major barrier to employee share schemes because share option schemes require some degree of bureaucratic formality and administration. Furthermore, the determinants of stock options literature shows both theoretically and empirically that employee participation goes together with stock options. It is difficult to mount successful broad-based stock options plans (especially in unlisted firms) without extensive information procedures because otherwise employees have few means of monitoring their investment or of determining whether option-induced behaviour is paying-off. Furthermore, participation and information-sharing mechanisms tend to be necessary to translate incentivised attitudes into appropriate task behaviour.

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leading to circular problems with liquidity. See Golding 2001

The lesson from the literature is that stock options are unlikely instruments in SMEs because the general approach to human resource management and employee participation is unsophisticated in most cases. Furthermore, those additional instruments that appear to be necessary to achieve the full performance benefits of broad-based stock options, are not widely found in SMEs. In part, this is because of lack of sophistication in HRM policies, and in part reluctance on the part of small business owners and managers to share control of the workplace with employees. The policy lesson arising from these observations is that any significant increase in the use of stock options will require measures to improve the quality of human resource management in SMEs.

A third major obstacle concerns the attitude of owners to sharing control of the company with others. Typically, owner-managers are highly reluctant to share control with others, and ownership tends to be highly concentrated. In the UK, the Cambridge Small Business Survey conducted in the early 1990s found that in firms with 500 or less employees, 75 per cent of company boards held on average over 75 per cent of the stock, with a median level of 100 per cent ownership (Cosh and Hughes 1994). We know from the US literature reviewed earlier, that those with stock ownership adjust their ownership when they are granted options so as to re-balance their portfolios. If these firms were to offer options to their top managers, it is likely (given this evidence) that those managers with substantial stock holdings would sell some of their stock-holdings. The danger here is that this will dilute owners' control of the enterprise unless there is an internal market within the firm. A more fundamental question is whether options are needed for top managerial compensation if they have equity holdings of this magnitude. Where options extend share-based rewards outside the circle of those with already substantial stock holdings, the problems of establishing liquidity are heightened by the possibility that employees will want to participate in control (especially if there are liquidity constraints).

In these circumstances, it is arguable that incentive-based compensation is best provided by other means. Phantom-stock or Stock Appreciation Rights is a means of providing stock-related bonuses without leading to dilution. Alternatively, the lack of sophistication in many SMEs' human resource management capabilities suggests that a simple, less formal cash profit sharing arrangement may be simpler and cheaper. In

Germany there is evidence that profit-related bonuses are quite widely used for managers in SMEs (see Gerlach and Jirjahn 2001 for relevant evidence on profit sharing from the Hannover panel), and it is arguable that this is preferable to the wholesale adoption of equity-based incentives.

Stock option scenarios

For the reasons outlined above, alongside those outlined in the previous chapter, stock options and indeed employee share programmes more generally are a rare phenomenon amongst SMEs. However, there are some circumstances where share ownership is more widely used (see Pendleton 2003). Three types of context where share-based rewards are more common or are seen to be more readily applicable are discerned: management buy-outs (and its variants), dot.coms and 'new economy' firms, and growth firms experiencing difficulties in recruitment and retention. We deal with each of these in turn.

Management Buy-Outs: employee stock options in restructuring transactions

A management buy-out is where the management of a subsidiary or business unit of a firm buy-out the parent company. In many cases the new company that is created can be classed as an SME. Research by the Centre for Management Buy-out Research shows that over three-quarters of UK management buy-out transactions in 1997 were less than £10 million in value (CMBOR 1998). The potential role of stock options in these new enterprises is linked to the financing of buy-outs and the approaches taken to devise appropriate incentives structures. Typically, MBOs are mainly financed by venture capitalists. Given their short-time frame for returns, coupled with the level of risk attached to the finance contract, venture capitalists tend to seek more explicit contracts with managers of the firm than is usual in other circumstances. Venture capitalists appear to pay particular attention to managerial compensation in the design of their contract with the MBO (see Kaplan and Stromberg 2000; Bacon and Wright 1999). In this sense, MBOs are a solution to the agency costs of investor-manager relationships in larger firms (Wright and Robbie 1996).

A key element of the performance contract adopted in most MBOs is that the managers mounting the buy-out acquire some of the equity in the new firm. Often the loan-finance is made available on a 'ratchet' basis: as the firm repays the loan to the venture capitalists, the equity stake of these financiers is transferred to those within the firm. There is plenty of acecdotal evidence from the US that options are widely provided in MBO firms and that these are typically made available to the whole workforce, but no systematic research evidence that we could uncover. There is UK evidence that MBOs make relatively high use of equity-based rewards, and are more likely than other firms to make them available to all employees, but unfortunately this research does not distinguish share options from other forms of share acquisition (see Bacon and Wright 1999).

There are a couple of features of MBOs that seem to make them especially suitable for the use of stock options. The first is that the corporate governance framework is much tighter than is the norm in listed firms, as outlined above. Whereas it can be argued that options reflect but do not resolve corporate governance problems in large, listed firms, the performance contracts in MBOs set up a situation where incentive-based remuneration can be effectively used by investors to control managers. The second is that investors are usually seeking a liquidity-producing event (ie an IPO or takeover) that will provide the opportunity for the value of options to be realised. In this respect MBOs differ markedly from the mass of SMEs. We have seen earlier that stock market listing is a key influence on the use of stock options. The appeal of stock options amongst unlisted firms seems likely to be greatest (by a considerable margin) amongst those that are planning to become listed in the short or medium term. The fact that those involved in financing and organising MBOs usually seek to exit within a short space of time (5 years or less) means that these circumstances that favour stock options are much, much more likely to be found in MBOs than in the SME population as a whole.

However, two notes of caution need to be sounded. The first is that MBOs are not common events in Europe. The European buy-out market is highly skewed towards the UK, with the value and number of buy-outs in the UK in the late 1990s exceeding that for Europe as whole. Within Europe, France, Germany and the Netherlands appear to be the largest MBO markets (see Wright *et al* 1999). As things stand,

therefore, management buy-outs are not likely to be a major contributor to stock option plans in mainland Europe, even taking into account their apparently greater propensity to use stock options. However, the policy lesson is that encouragement of the venture capital industry in Europe might generate an increase in the use of stock option plans. Furthermore, IPOs are not a common event either. We noted earlier that there were just 300 IPOs across Europe in 1999. This no doubt reflects the lesser development of stock markets (including 'alternative' and 'new' markets) in mainland Europe compared with the US. IPOs are also highly cyclical phenomenon, and in bear markets the volume of IPOs all but disappears. Although there is no research on this issue, this may well reduce the appeal of stock options in MBOs.

'Dot.coms' and new economy firms: employee stock options as pay substitution

The second main set of cases where employee stock options can be observed is in the internet-based companies that sprang up towards the end of the 1990s (the so-called 'dot.com' companies). The function of stock options is typically rather different from that found in the management buy-outs considered above, and there is a different set of theoretical arguments that explains the popularity of share ownership schemes in these companies. In MBOs the use of stock options can be seen as a central component of very 'tight' contracts between investors, managers, and employees. In 'new economy' firms, the function of stock options appears to be rather different. Two key functions of stock options stand out: one is as a device to protect and develop human capital, the other is as a means to overcome liquidity constraints. In fact, employee share ownership has been seen as central to the nature and functioning of 'new economy' firms. Charles Leadbetter, an influential writer on the 'new economy' has argued that employee ownership is the 'glue' that binds knowledge economy companies together (Leadbetter 1998).

There is now considerable evidence that share option schemes are very widespread in 'new economy' firms. We saw earlier that evidence from a range of countries suggests that around two-thirds or more of these firms operate broad-based stock options. Share options are attractive in firms with high growth potential because of the benefits that will flow from increases in company value. This was exemplified by dot.com companies, which experienced huge rises in market valuation in 2000. At one stage, the size of the market valuations of dot.com companies in the UK was such

that several were admitted to the FTSE 100[63]. The remarkable feature of these companies was that in terms of turnover, number of employees, and gross assets they clearly m*et al*l of the criteria to be considered SMEs. Some had very little in the way of physical assets, and many of them were loss-making. Between them, the new economy entrants to the FTSE 100 in March 2000 earned just 516 million pounds, compared with 3.5 billion pounds of the 'blue chip' companies they replaced (*Financial Times* 8 March 2000).

Nearly all of the market capitalisation of these companies was based on market assessments of their potential, based on the 'knowledge economy' attributes of their products and human resources. This is consistent with the arguments explored in the chapter on Determinants that firms with high growth potential (as measured by high market to book valuations) are more likely to use stock options. In studies of larger firms it was argued that the costs of monitoring managers in these circumstances was the key reason for this finding. However, in the case of dot.coms this reason is less likely to be relevant. First, share option schemes are nearly always open to all employees. Second, employees are seen to be highly motivated. Third, employees are seen to have low levels of risk-aversion, and appear less wary of undertaking risky investments than in firms in other sectors[64].

Instead, share options appear to be a means of binding key knowledge workers to the firm and to encourage investments in human capital (Leadbetter 1998). If we draw on arguments put forward by Margaret Blair in *Ownership and Control* (1995), we can see that share options help to deal with the problem of both firm-specific and general human capital investments. The danger of asset specificity, as has been shown by Williamson (1985), is opportunism and 'hold-up'. From an employer point of view, in knowledge-based firms in rapidly developing markets there is a high dependence on the knowledge of key employees. It is vital that employees commit to building up their human capital. In other words, they need employees to make the investments. Furthermore, one of the features of dot.com activities is that there is a high level of

[63] Freeserve, Thus, Baltimore Technologies, Psion, Nycomed Amersham, Celltech Group, EMAP, and Capital Group were admitted to the FTSE 100 in March 2000

[64] It might be argued that stock options provide a means to constrain risky investments ie to ensure that employee behaviour focuses on projects with some prospect of a pay-off rather than the pursuit of knowledge for knowledge's sake. There is, however, no research evidence on this score.

industry-general rather than firm-specific skills (eg. programming ability), though applications of these are firm-specific. Indeed, in these early phases of the product cycle, competitive success appears to depend largely on unique (or first to market) applications of general skills. The danger with this is that, in the particular market context of the dot.coms, employees could take their knowledge of the firm's products and plans elsewhere (perhaps even establishing their own firms, given low barriers to entry) or could use their pivotal position to 'hold-up' the firm (Smith 1988). In these circumstances, employee share option schemes provide an important means to align employee interests with those of the firm, and to encourage co-operation. More specifically, option schemes also 'lock-in' the worker because of vesting provisions. From an employee point of view, share options are a control on managerial opportunism. Given the huge potential market growth of dot.com firms, there is the possibility that the managers and primary owners of dot.coms could make a fortune on the back of worker investments in human capital. Employee share option schemes provide a signal that the benefits of growth will be shared with employees. They also counter the opportunity costs of concentrating personal investments in one firm where alternative opportunities are available. It is for these kinds of reasons that observers such as Leadbetter emphasise the role of share schemes as 'corporate glue'.

Oyer (2002) and Oyer and Schaefer (2002) develop these kinds of arguments to explain the use of stock options in new economy firms. His starting point is that traditional agency theory would not predict such a high level of use of all-employee stock options in these sectors. One, some new economy firms (eg Microsoft) are large and hence the incentive effects of options is likely to be small. Two, the extant evidence predicts relatively little contingent pay in industries where there are large industry shocks to firm performance and wages (in other words, high risk industries). He argues that stock options are a useful employee retention device in the kinds of industries, such as the 'new economy', where workers labour market opportunities are correlated with the success of the firm. In other words, employees in firms who succeed in emerging sectors tend to be in high demand from firms who seek to imitate their success. Thus, options can be an effective device for labour retention with the value of the option rising with the success of the firm (and the threat of alternative job offers). The argument depends partly on general skills: the costs of switching jobs for

the worker are relatively small. At the same time, the high demand for such workers means that it is difficult for firms to fill jobs.

A further novelty in the use of stock options by 'new economy' firms is that options provide deferred compensation or pay substitution. Employees are paid partly in share options rather than 'cash' salaries, on the basis that the options will provide considerable returns in the future, given the prevailing patterns of capital growth. This use of share options contrasts with the case of larger firms, where all-employee option schemes appear to be supplements rather than substitutes for salary. This use of share options resolved a particular problem faced by dot.coms: the need to remunerate valuable workers, essential to product development, when the duration and nature of the product development cycle was such that revenues were some way from being generated. In other words, the liquidity argument for share options (see Determinants chapter) was a powerful one in the case of dot.coms[65]. The problem of meeting the wage bill out of the profit and loss account was in effect transferred to the balance sheet. At the same time, options are said to have provided a selection device so that less risk-averse employees were attracted to high-risk company environments. met the needs of both employer and employee. From an employee point of view options were highly attractive. Many dot.com workers were young, often recent graduates, with relatively few fixed outgoings. Thus, they could take-on a higher level of salary risk than many employees. The potential rewards, given that what appeared to be a potentially huge market was only just emerging, outweighed the level of risk and the short-term limits on salaries and consumption.

The potential rewards from option schemes were much in the news in the year 2000 but since then the gloss has worn-off this form of reward. With the collapse in market value of many dot.com PLCs, the value of share options has plummeted. For those dot.coms planning to realise value by floating, the fall in capitalisation has inevitably led to the postponement of Initial Public Offerings, thereby preventing option holders from realising value. Worse still, many dot.coms have gone bankrupt so that employees have both lost their jobs and the value of their options (the 'double-risk'

[65] However, we have seen evidence from Kroumouva and Sesil that new economy firms with broad-based stock options have higher rather than lower liquidity. It should be borne in mind that the average

that opponents of employee share ownership schemes have traditionally emphasised). In the US, the evidence suggests that re-pricing of options has been most common in technology and younger firms (see Chapter on Re-setting of Options), and also that levels of option-induced dilution are greatest in technology and media firms.

Even without these difficulties, the current proposals of the Accounting Standards Board to require firms to enter the 'real' costs of options onto their profit and loss accounts present major threats to the liquidity constraints use of stock options. It has been said that Microsoft would never have made a profit if it had been required to enter the full value of its employee option schemes onto its profit and loss account. If the new accounting standard is enacted, the attraction of options as a way of providing off-profit and loss account rewards in a context of limited revenue will be eliminated.

Share option schemes as an instrument for recruitment and retention

The final use of stock option schemes is as a tool for recruiting high calibre employees. Aside from the dot.com companies, where shares were widely targeted at all levels of employees, this mainly affects managerial employees. Here, the argument derives from the observation that SMEs lack managerial skills, and that a major challenge is to import and develop management skills in these firms. Evidence from the UK shows that fast-growth SMES are much more likely than other SMEs to have managers with a large-firm background (Stanworth and Gray 1991: 226). Even where they attract high quality managers from outside, they find it difficult to keep them. Management turnover in SMEs is relatively high (Stanworth and Gray 1991: 213). This is not at all surprising. By virtue of their size, SMEs typically lack the well-developed and extensive internal labour markets found in many large firms, with the result that promotional opportunities are typically very limited. This also means that the use of promotion 'tournaments' as a way of motivating managers is highly limited. The challenge for SMEs is to attract experienced managers, to motivate them, and to retain them once they have them.

In principle, share options provide a way of attracting experienced managers from large successful firms to small and medium-sized firms. Not only do they enhance

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and median size of their sample was larger than the SME category, and that whilst their firms operated

the level of potential rewards, but they also imitate the typical reward packages of large PLCs. Once these managers have been attracted to the SME, the deferral provisions of share ownership schemes or the gap between grant and exercise in stock options schemes provide a degree of 'lock-in'. In this way, share schemes can help with managerial retention as well as recruitment. However, whether options are an appropriate way of rewarding risk-averse employees is open to question. In a sense reliance on options magnifies the risk of moving from relatively secure employment[66] to a firm that may not survive. Against this, the riskiness of options can be seen as a useful device for attracting those risk-positive individuals who might be able to exploit growth potential where it is present. However, there is no research that deals with these issues that we have been able to uncover so these possibilities have to remain at the level of conjecture.

The barriers to the use of share options for the purposes of managerial recruitment and retention should not be underestimated. We know that many SMEs lack the awareness and information of sophisticated HR instruments and in any case are reluctant to use them even when they are familiar with them. The obstacles to the use of share options already discussed seem likely to outweigh any perceived benefits of options in the vast majority of cases. It is a reasonable assumption that the SMEs that are most likely to use share options for managerial recruitment are those with high growth potential and the intention to float at some point in the near to medium future.

It is interesting to note that assisting managerial recruitment was an explicit and important policy objective behind the Enterprise Management Incentives share options arrangements in the UK (introduced in 2000). Each firm operating this scheme (initially restricted to those with gross assets of £15 million or less, now £30 million or less) could allow up to 15 individuals to participate (since widened to all employees)**.** The taxation arrangements are extremely favourable since the capital gains tax taper relief 'clock' starts 'ticking' when the options are granted. Thus, much of the CGT liability may well have been dissipated by the time the option is exercised. A further element of the scheme aimed particularly at small businesses is a 'light touch' approvals regime. In fact, unlike other share schemes, firms operating EMI do

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in the new economy they were not necessarily especially young firms

not have to seek scheme approval from the Inland Revenue. Instead, firms simply make awards to individuals in keeping with the rules of the schemes, whilst information on individual tax returns ensures that the limits for each individual are adhered to. This was designed to keep the 'bureaucratic burden' on small firms to a minimum[67]. In terms of take-up this scheme has been highly successful. Over 2000 firms have made option grants to 20,000 employees in the two years since the scheme was introduced. However, as yet there has been no research on the operation of this scheme and we are unable to say whether the primary reason for the use of EMI options has actually been managerial recruitment and retention. Nor are we able to say what kinds of smaller firms are using this option plan.

Summary

In this chapter we have identified three SME contexts where options-based rewards appear to be relevant. There is some evidence that options are used more extensively in two of these settings (venture-capital-backed MBOs and 'new economy firms). They appear to be fairly widespread in 'new economy' firms in the US, and many US policy-makers view stock options in these firms as essential to creating innovation and entrepreneurship. However, with the exception of a small American literature, we know very little about the operation of options in these companies and much of the evidence is anecdotal. Options also seem to be applicable to SMEs that are attempting to recruit high quality managers from larger firms, though there is little evidence that they are used for this purpose. Extrapolating from this discussion, and from the earlier discussion of barriers to the use of options, it seems that the most favourable environments for the use of share options in SMEs are firms with recognised high growth potential that are aiming to float at some point in the near future. However, as is the case with much of the discussion of share options in SMEs, the lack of research in this area means that much of this remains at the level of supposition. Clearly, more research is needed in this area both to extend our knowledge and to underwrite policy discussions and measures.

[66] Contrary to popular view, job tenure in large firms appears to be lengthening not shortening

Overall, the evidence suggests that the use of share-based rewards is growing in the SME sector, albeit from a very low base. However, it is clear that share schemes are attractive to only a very small segment of the total SME population, for the reasons outlined earlier. Most SMEs do not perceive a need for them, and there are also a host of reasons why share schemes are difficult to operate in typical SMEs. The formalised nature of employee share schemes, especially those aimed at all employees, does not sit easily with the informality and flexibility that are central to the management of SMEs, and which indeed are often seen as integral to the appeal of SMEs. Further development of share option programmes in SMEs will probably require less onerous administrative requirements than are the norm in most contexts. So, whilst we can anticipate further growth in the use of share-based rewards in SMEs, share ownership will remain a minority pursuit in the SME sector.

[67] However, there is some anxiety amongst SMEs that, in the absence of prior approval by the Inland Revenue, they cannot be sure that they have not violated the rules of the scheme.

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