Antecedents and Consequences of All-Employee Equity-Based Pay in Germany

DISSERTATION

der Universität St. Gallen,

Hochschule für Wirtschafts-,

Rechts- und Sozialwissenschaften (HSG)

zur Erlangung der Würde eines Doktorin der Wirtschaftswissenschaften

vorgelegt von

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von

Ramosch (Graubünden) und Winterthur (Zürich)

Genehmigt auf Antrag der Herren

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Dissertation Nr. 2914

Difo-Druck GmbH, Bamberg 2004

Die Universität St. Gallen, Hochschule für Wirtschafts-, Rechts- und Sozialwissenschaften (HSG), gestattet hiermit die Drucklegung der vorliegenden Dissertation, ohne damit zu den darin ausgesprochenen Anschauungen Stellung zu nehmen.

St. Gallen, den 4. Mai 2004

Der Rektor:

Prof. Dr. Peter Gomez

Acknowledgements

This dissertation represents my research on all equity-based pay and its antecedents and consequences. I would like to acknowledge the many people involved in developing and finalizing this work.

First, I want to thank my supervisor Professor Winfried Ruigrok for his support and guidance. My thanks also go to Professor Simon Gächter, who agreed to be my co-advisor and shaped my dissertation greatly. I am also grateful to Professor Simon Peck of Case Western Reserve University, Weatherhead School of Management for the ongoing discussions, his valuable input and his great expertise.

In addition, this dissertation has benefited from the critiques, suggestions and support of the doctoral students and researchers I had the privilege to meet and work with during my doctoral studies at the University of St. Gallen. In particular, I want to thank my work colleagues at the Research Institute of International Management (FIM-HSG) who made this time exceptional: Martin Birkner, Peder Greve, Yan Hu, Sabina Tacheva and Isabelle Chemelli, to name a few. I would also like to thank the people I met at the University of St. Gallen: Barbara Kaes, Dr. des Corinne Mühlebach, Ines Mergel, Dr. Hansueli Keller, Mladen Rikanovic, Dr. Yvonne Wicki, Dr. Mark Macus, Dr. Sascha Spoun and my students.

I am thankful to many other persons who supported me during my academic life and helped me during the last phase of the dissertation. My thanks go especially to Beatrice Eichenberger Schäpper, Gerhard Schäpper-Eichenberger and my godchild Raoul Simon Schäpper, Marie Langenfeld and Dr. Marzena Kopp-Podlewski.

This dissertation has also benefited greatly from extensive discussions with my husband Dr. Simon Grand-Raschle. I would like to thank him for his support and the careful critique that improved this dissertation. His sharp thinking, his encouragement, and his love have always been a great help.

To my parents-in-law, Dr. Jon and Ruth Grand-Ritschard, I extend my thanks for their having been always full of understanding and support during my studies.

Last but not least, I would like to thank my mother Brigitta Tschol-Raschle and my grandmother Lisa Raschle-Küffer. Their unconditional support, faith and patience throughout my education provided the foundation for this work. The dissertation presented here is a personal sign of my gratitude.

Wermatswil, May 2004 Micaëla B. Raschle Grand

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1 Introduction

1.1 Research Context

Equity-based pay has received considerable attention during recent years. However, most management-oriented literature, as well as academic studies, has concentrated on equity-based plans for executives. Consequently, much has been written on the link between equity-based pay and performance (e.g., Murphy, 1999), remuneration committees and the setting of equity-based pay (e.g., Conyon & Peck, 1998), impact of equity-based pay on the stock price (see for an overview, Murphy, 1999) and other issues related to executive performance.

To analyse executive pay, researchers have predominantly used a corporate governance lens and agency theory (Core, Guay, & Larcker, 2001). One common argument is that equity-based pay is one of the structural elements "to protect shareholders from the self-interested whims of executives" (Daily, Dalton, & Cannella, 2003: 371), because the adoption of incentives may govern the relationship between shareholders – those who own the company – and management – those who are appointed to manage and guide companies in the interests of the former.

Equity-based pay plans for broad-based employees have been promoted for the same reasons. According to a recent study, in Germany firms introduce equity-based pay for broad-based employees first to align employee goals with the goals of the employing company, and second to improve company performance (Deutsches Aktieninstitut & Hewitt, 2001). Moreover, several corporate governance guidelines encourage firms to establish equity-based pay plans for their employees. For example, the Organisation for Economic Co-operation and Development (OECD, 1999) emphasises in its (non-binding) principles of corporate governance that "[c]ompetitiveness and ultimate success [of corporations] are the results of teamwork involving contributions from employees and other resource providers" (1999: 8). In addition, the OECD suggests that the corporate governance framework "should permit performance-enhancing mechanisms for stakeholder participation" (1999: 36) – for instance, equity-based pay plans for broad-based employees.

Workers in many countries receive stakes in the company for which they work. For example, Corey Rosen, executive director of the U.S. National Center of Employee Ownership (NCEO), estimates that about 15% of the U.S. private-sector work force is involved in either an employee share ownership plan (ESOP) or option plan through which more than 50% of the company's full-time employees receive stock options (Burlingham, 2000: 108)[1]. While exact figures are missing, the NCEO (2002) estimates that "employees own, or have option to own, stock worth about US$ 800 billion, or about 8% of all the stock in the U.S.". Such evidence underscores the importance of equity-based pay plans.

However, executive plans differ from those for workers in two important ways. First, they differ according to the level of organisation at which the incentive is issued. Whereas all-employee equity-based pay plans go to average employees, executives usually receive in their pay package equity-based pay plans designed especially for upper-echelon management. Second, the nature of the incentive and the expected performance consequences are different from those of equity-based pay plans designed for all employees. Most particularly, executive equity-based pay plans are individual incentive plans, meaning that the individual performance may be allocated to individual executives. Because of this direct allocation, firms may expect a positive impact of these executive plans on performance, always assuming that these plans are structured correctly and no other issues disturb the link between equity-based pay and performance[2]. This direct allocation of the individual performance is not the case for equity-based pay plans for employees. Rather, these plans are group incentives, meaning that they are issued over the whole firm or over a whole team and the individual employee only gets a proportion, namely 1/N, of the output, independent of individual performance. This problem is commonly known as the free-rider problem because the individual has an incentive to shirk on the contributions of other recipients. That is, no matter his or her own performance, she or he gets 1/N of the total. This problem implies that even though firms may consider performance considerations when adopting equity-based pay plans for broad-based employees, they cannot not simply assume a positive performance impact.

[1] Equity-based pay plans may have different forms of which share and option plans are the most common.

[2] The evidence on the link between executive compensation and performance is however mixed. For an overview, see for example Gomez-Mejia and Wiseman (1997) and Murphy (1999).

1.2 Research Objectives and Research Questions

Much has been written about equity-based pay plans, most specifically under the umbrella of employee ownership[3]. While some researchers have investigated the link between employee ownership and work attitudes (French & Rosenstein, 1984: 868) or employee ownership and psychological ownership (Pierce, Kostova, & Dirks, 2001; Pierce, Rubenfeld, & Morgan, 1991), others have examined the impact of employee ownership on employee involvement (Florkowski, 1987) and satisfaction (Long, 1980). Some researchers have studied employee ownership and absenteeism (Brown, Farhfakh, & Sessions, 1999; Wilson & Peel, 1991), and explored whether employees who take up a stake in their company are more likely to remain with their organisation (Wilson & Peel, 1991). While the latter stream of research is most concerned with behavioural and psychological aspects of employee ownership, another stream of research has investigated whether employees are more stable shareholders and whether companies held substantially by their employees are less affected by takeovers (e.g. Beatty, 1995; Chaplinsky & Niehaus, 1994). Finally, a wide body of literature derived mainly from economic theory has concentrated on the link between the existence of employee ownership plans like share and option plans and firm performance (e.g., Kruse & Blasi, 1995).

Despite many studies linking equity-based pay and performance and much discussion of the determinants of equity-based pay, an explicit discussion of why firms adopt broad-based equity-based pay plans is missing, with the exception of Kruse's (1996) study of employee ownership plans and Kroumova and Sesil's (2003) investigation of stock option plans, both of which take an agency theory approach. One explanation might be that analysing the link between equity-based pay and performance implies automatically an efficiency-driven adoption of equity-based pay. However, while agency theory provides an important stream of explanation for the adoption of equity-based plans, it has a number of restrictions. First, efforts to use agency theory to explain the equity-performance link and adoption of equity-based pay are dispersed. Second, agency theory "fails to consider the broader intercorporate environment in which management acts" (Davis, 1991: 591). In other words, the agent works in an environment in which

[3] It should be noted that the current study uses the terms 'employee ownership plan(s)', 'equity-based pay plan(s)', and 'shared compensation scheme(s)' as synonyms.

individual action is primarily separated from social context and behaviour is stimulated by pecuniary self-interest. Yet, as theory and behavioural research have shown, the social context greatly impacts organisational and managerial action (Davis, 1991).

Taking into account those considerations neglected by agency theory, this dissertation argues that institutional theory could deliver useful explanations of why firms adopt equity-based plans. From the perspective of institutional theory, firm adoption of equity-based pay is less driven by considerations of efficiency than " […] by organizations' conformity to institutional pressures driven by legitimacy motives" (Kostova & Roth, 2002: 215), meaning that firms search for legitimacy in the adoption of equity-based pay plans by referring to others that have implemented these plans. Nonetheless, an institutional perspective does not imply that agency theory is irrelevant in explaining equity-based pay plan adoption. Rather, the phenomenon of equity-based pay adoption can be complemented by other theoretical explanations.

The objective of this dissertation is to study antecedents and consequences of equity-based pay plans. To achieve its aims, this dissertation *first* investigates company rationale for adopting equity-based pay plans from two theoretical perspectives: agency theory[4] and institutional theory. To achieve this goal, it formulates the first research question: "*Why do firms adopt equity-based pay plans?*" It should be noted that the investigative aim is not to show one theory as being superior to the other but rather to produce more comprehensive theoretical explanations for patterns of equity-pay adoption.

Despite all the theoretical arguments and the high numbers of employee owners, empirical evidence on the link between equity-based pay and performance reveals a mixed picture. In fact, in a meta-analysis of relevant literature, Kruse and Blasi (1995) conclude that only a few studies have individually discovered strong and statistically significant effects of employee ownership on company performance. The free-rider effect, if not in concert with mechanisms that may override it, is most often too strong to generate a positive impact on performance. While institutional theory conducts no discussion on the effects of equity-based pay

[4] This study uses an agency theory approach as used in management literature that may diverge from the agency theory used in economics.

plans, any discussion here of the consequences of such plans aims to draw upon agency theory and literature on peer pressure, as well as on empirical evidence, to further elucidate the equity-based pay plan-performance connection. Thus, this dissertation also conducts a *second* investigation of the effects of broad-based equity pay plans represented by the second research question: "*What are the effects of equity-based pay plans on firm performance?*"

Given the lack of consensus in extant theoretical and empirical research, promising work for the link between equity-based pay and performance is based on complementarity theory. Research based upon this theory (e.g. Ichniowski, Shaw, & Prennushi, 1997; Milgrom & Roberts, 1995a), which emphasises the importance of connections or complementarities among certain human resource management practices, provides evidence that the highest levels of productivity result from implementing an entire set of human management resource (HRM) practices. Thus, from this viewpoint, group incentives like equity-based pay plans only increase productivity if the plans are adopted together with other human resource management practices that are mutually complementary. Consequently, a *third* focus of this dissertation is to investigate whether equity-based pay plans complemented by sets of innovative HRM activities that are mutually complementary lead to substantially better company performance than employing individual work practices, which observation leads to the third research question: "*What are the effects of equity-based pay plans complemented with innovative HRM activities on firm performance?*"

1.3 Focus of the Dissertation

This study investigates the antecedents and consequences of equity-based pay and equity-based pay complemented with HRM activities of German stock-listed companies by conducting a survey and limited document analysis of the 500 largest companies in Germany. There are several reasons for this choice. To date, even though in terms of gross domestic product Germany is the third largest economy in the world behind the U.S. and Japan (OECD, 2003), most analyses on equity-based pay have concentrated on the U.S. and the U.K. Even though one million employees of stock-listed companies in Germany own shares in the firm (Deutsches Aktieninstitut, 2003) and employee shares have a long tradition in German companies, little is known about what kinds of plan companies use, the

workforce covered, time of introduction, or impact on firm performance, with perhaps the exception of Möller (2000) and Fitzroy and Kraft (1985; 1987) on the link between equity-based pay and performance. In addition, representative and comprehensive evidence on the existence and productivity impact of complementary HRM practices is scarce, with perhaps the exception of Ludewig (2002) and Wolf and Zwick (2002) on complementarity theory.

Apart from the limited empirical evidence for Germany, theoretical arguments support the necessity for studies referring to German firms, because equity-based pay practices and human resource practices may display different effects in Anglo-Saxon countries and Germany. Moreover, the German corporate governance structure is very different from that of the U.S. and the U.K. Taking into account these large differences between industrial relations and work culture in the Anglo-Saxon and German economies, it cannot simply be assumed that equity-based pay plans and innovative personnel methods have comparable productivity effects in both regions.

An important assumption of agency theory is that incentive pay like share and option plans alters, to a certain extent, the behaviour of employees (as will be explained during the course of this study). Thus, because adoption of a stock option plan is a relatively new phenomenon in Germany and paying top executives with stock options is also claimed to be a "largely foreign concept" (Cheffins, 2001: 509), it provides an interesting context in which to analyse the effects of equity-based pay.

This study contributes to the literature on equity-based pay by providing supplementary theoretical explanations, as well as empirical evidence on equity-based pay plan adoption and ways equity-based pay plans impact firm performance. Further, the extant combination of theories on and empirical research into the antecedents and consequences of equity-based pay, and consequences of equity-based pay complemented with HRM-practices, are themselves novel, not only for Germany but also for other industrialised companies.

1.4 Structure of the Dissertation

This study is structured as follows. Section 2 provides an introduction to the German equity pay scene and to German equity-based pay plans. Section 3 provides an overview of the relevant literature on antecedents of equity-based pay. To explain adoption of equity-based pay, this section develops two hypotheses on plan adoption, one based on agency theory and one on institutional theory. Section 4 provides an overview of the relevant theoretical literature on agency theory and empirical evidence on consequences of equity-based pay from which a set of hypotheses are developed. Section 5 provides an overview of the relevant theoretical literature on complementarity theory and empirical evidence on the consequences of equity-based pay complemented with HRM activities from which one hypothesis is developed. Section 6, which presents the research method applied to resolve the respective research questions, comprises a detailed discussion of data collection, data analysis, variable conceptualisation and operationalisation, and the questionnaire. Section 7 presents a summary of the descriptive statistics (structure of the responding companies and summary of questionnaire results) and statistical analysis (regression results of the hypotheses). The results and conclusions of the study are discussed in Section 8.

2 Equity Pay in Germany

The following section, which provides an overview of German equity pay, is structured as follows. It begins by portraying the institutional scene to assist an understanding of the institutional background in which equity-based pay plans are introduced. Subsequently, it outlines the most common German equity-pay plans.

2.1 The Institutional Scene

Stock-listed companies in Germany work on a two-tier board structure, meaning that companies have a management board (*Vorstand*), resembling the American top management team, and a supervisory board (*Aufsichtsrat*), a rough equivalent of the American board of directors (Kaplan, 1995; Tuschke & Sanders, 2003). The management board is appointed by and reports to the supervisory board, whose key distinctive feature is the co-determination system. This system, determined by law, requires that in publicly traded companies with 2,000 or more employees, 50% of the supervisory board representatives be employees and the other half shareholders (Vitols, 2001). This edict means that half the board seats stand for workers' interests and the other half for ownership interests (Tuschke & Sanders, 2003). Therefore, employees in large German companies have a strong voice, not only through the co-determination system but also at the shop-floor level through work councils (Pistor, 1999). These work councils (*Betriebsräte*) "are designed to give labour the right to participate in and receive information about the management of the shop floor" (O'Sullivan, 2000: 245). However, such councils are mandatory not automatic; that is, they must be elected (Addison, Schnabel, & Wagner, 1996) and once elected are a *fait accompli* (Addison, Schnabel, & Wagner, 1996: 557; 2001: 663).

International comparative studies on the relationship between employers and employees in Germany describe it as being based on trust (Wolf & Zwick, 2002). From this viewpoint, the German institutional arrangement can be defined as a system fostering stable employment relationships and integration of workers into the corporation (Jackson, 2001). Such stability is indicated by fewer German employees than U.S. workers holding jobs for less than two years: only 19% of German workers have a job tenure of less than two years compared to 39% of their

American colleagues (Thomas & Waring, 1999: 734). Conversely, in Germany, 17% of employees enjoy a job tenure of 20 years or more compared to only 9% of their U.S. counterparts (Jackson, 2001: 124).

Employment relationships are also shaped by differences in corporate goals. For example, whereas U.K. firms pursue profitability as their primary goal, German firms pursue multiple goals like profitability, market share, and employment security (Vitols, 2001). Additionally, in contrast to a British CEO who tends to introduce shareholder value principles unilaterally, in Germany, prior to implementation, such principles must be negotiated consensually not only among top management and supervisory board but between management and the work council (Vitols, 2001: 350). Thus, Vitols (2001) concludes, Germany practices a "negotiated shareholder value" that shapes both performance incentives and employment relations. It is in this context that Wever (1995) refers to Germany's "negotiating competitiveness".

Work councils also play an important role in the introduction and application of new forms of compensation such as equity-based pay (Kurdelbusch, 2002; Tepass, 2000). Typically, in Germany the adoption of an equity-based pay plan depends on actual annual profits and is negotiated between the executive board and the firm's work council (Carstensen, Gerlach, & Hübler, 1995), whose influence on the acceptance of equity-based pay plans within a company is substantial (Wulfmeyer, 1997).

2.2 Equity-Based Pay Plans

Whereas, in negotiating equity-based pay with employers, work councils strive primarily to secure a pay rise for workers, companies introduce equity-based pay plans for number of other reasons. According to a recent study of the German Stock Institute (Deutsches Aktieninstitut & Hewitt, 2001), the following objectives are the most prevalent: (1) aligning employee goals with the goals of the employing company, (2) improving company performance, (3) developing an ownership behaviour, (4) strengthening employee identification with the company, (5) sharing company success with employees, (6) investing in competitiveness, and (7) signalling positively to investors. In addition to influencing these

productivity and motivational factors, equity-based pay gives more flexibility for business cost structures (Kurdelbusch, 2002).

Employees can participate in company equity through a number of vehicles, the most popular being (1) employee share plans, (2) stock purchase plans financed through interest-reduced loans, (3) stock savings plans financed through employee contributions, (4) stock option plans with a one time, unique offer, and (5) stock option plans with repeated offers – a total of three share and two stock option plans.

The most traditional form of equity pay in Germany is employee share plans, which give shares of a joint stock company (Aktiengesellschaft) to its employees (Carstensen, Gerlach, & Hübler, 1995). Employee shares originated in 1922 when German company Friedrich Krupp AG, for several years, issued shares for its employees (Petterssen, 1968: 18), a type of plan that became more widespread as other established companies, including Siemens, Bayer, Mannesmann, Rosenthal, and Allianz, introduced their first employee share plans during the 1950s and '60s (Petterssen, 1968: 19-20). According to one recent study of 114 large German companies from the top 100 rankings who were still in existence in the year 2000, 30% reported introducing employee share plans between 1962 and 1977 (Kurdelbusch, 2002: 329). These figures imply a long tradition in Germany of employee share plans.

Currently, one million German employees of stock-listed companies own shares in the firm, a number that represents almost 20% of the total shareholders in Germany (Deutsches Aktieninstitut, 2003). Typically, employees can buy the share(s) at preference price, meaning below actual market value, or are even granted them free (Von Rosen & Leven, 2000). In addition, with shares are granted voting rights, meaning that through share plans, employees have the same rights as other shareholders (Reuschenbach, 2000: 139). Most important, of the five most popular equity pay plans, the share plan is the only one to include employee tax advantages; not only can shares be offered at a specific price but they are tax free and social security free up to Euro 154 per calendar year. Nonetheless, to earn this premium, employees must retain the shares for an agreed-upon period of time (Carstensen, Gerlach, & Hübler, 1995).

	Employee share plan
Principle	Employees earn shares at a price of up to 50% reduction compared to the actual share price (or are granted them free)
Characterisation of the participation	Equity participation of the employee
Holding period	6 years
Tax advantage	Yes
Own resources of the employees	100% of the purchase price

Source: Based on Scholand (1999: 57).

Table 1: Summary of Employee Share Plan

Two related equity vehicles are stock *purchase* plans and stock *savings* plans (Köhler & Scholand, 1999: 347; Scholand, 1999: 9). In stock purchase plans, also called leveraged employee stock ownership plans (ESOPs), employees purchase the shares at the actual share price, but the employing company finances the transaction through interest-free loans. In addition, this type of plan grants voting rights, meaning that through leveraged ESOPs, employees have the same rights as other shareholders (Scholand, 1999: 57).

	Stock purchase plan (leveraged ESOPs)
Principle	Employees buy the shares for the actual share price financed through interest-free loans from the employer
Characterisation of the participation	Equity participation of the employee
Holding period	2-3 years
Tax advantage	No
Own resources of the employees	10-20% of the purchase price; the rest to be paid by interest-free loan from the employing company

Source: Based on Scholand (1999: 57).

Table 2: Summary of Stock Purchase Plan (Leveraged ESOP)

Similar in nature are stock *savings* plans financed through employee contributions, meaning employees save a certain amount of money to buy shares regularly from

their company. A typical plan is that offered by HP Germany into whose optional stock savings plan participants pay up to 10% of their salaries monthly. Every six months, when HP buys shares at a reduced price, employees can use their savings to buy and resell these shares immediately (HP Deutschland, 2002). Nonetheless, even though the stock is often issued at market discount, these saving plans are without tax benefits. For this type of plan, voting rights are normally granted.

	Stock savings plan
Principle	Employees regularly save a certain amount of their salaries and pay into a stock savings plan of the employing company. Shares are purchased on a regular basis.
Characterisation of the participation	Equity participation of the employee
Holding period	Mostly not
Tax advantage	No
Own resources of the employees	Depending on the company, employees can buy shares at a reduced price. Shares are paid by employee savings.

Source: Author

Table 3: Summary of Stock Savings Plan

A fourth alternative is the stock *option* plan that gives employees the right to buy employing company stock at a certain time for an ex-ante specified price. These plans – offered either as a one time, unique offer celebrating a special occasion (e.g., a firm's jubilee) or repeated offers – are similar to regular "call" financial options. Depending on the share price, after a so-called vesting period (and before an option lapses) the employee can decide whether to exercise the options or not. Only if the employee exercises the option are the same rights granted as for shareholders, meaning that employees have the right to vote.

In Germany, option plans work mostly on a blocking period of two to three years (Von Rosen & Leven, 2000). For stock option grants, the legal framework remained unclear until 1998, and thus their usage remained low until a new law on control and transparency in business (Gesetz zur Kontrolle und Transparenz im Unternehmensbereich; KonTraG) made the option more favourable for companies. Not only does this new law regulate the two sources of share capital – increase and

re-acquisition of own shares – from which firms can choose to fund these options, but only since its introduction has re-acquisition of own shares been allowed to fund share option plans. Thus, as a result of this legislation, companies can introduce share option plans without having to construct convertible debenture bonds (Winter, 2000: 190-191).

	Stock option plan
Principle	Employees are given the opportunity, but not the obligation, to buy the stock of their company at a fixed price for a certain number of years in the future.
Characterisation of the participation	Employees are given the option of equity participation
Blocking period	2 to 3 years
State support	No
Own resources of the employees	100% of the option

Source: Author

Table 4: Summary of Stock Option Plan

Theoretically, both share plans and option plans reduce agency problems by directly linking company performance with employee wealth. However, differing properties exist for share plans and option plans. While share plans represent ownership in the company, ownership for option can only be achieved when recipients of options actually exercise their right to purchase their shares. Consequently, only employees with shares enjoy voting rights and dividends (even though companies can in some cases regulate voting rights). Recipients of options must wait until they exercise their right to purchase their shares. Compared to pure share-based schemes, option plans are more risky – they require a certain contribution of the employee to exercise the option and have uncertain pay-offs and differing tax advantages for holders. Because options are so complicated, employees must realise the mechanism of options and know vesting periods. In contrast, share plans are easy to understand and therefore much less complex.

	Share plans	**Option plans**
Ownership	Yes	No
Voting rights	Yes (although companies can regulate in some cases voting rights)	No
Dividends	Yes	No
Risk	Low	High
Gains	Moderate	Large potential gains possible
Tax advantage	Yes, for employee shares	No
Complexity	Low	High
Tradition	Long tradition	Recent concept, often used in new market firms

Source: Author

Table 5: Differences between Share and Option Plans

Not only do employee shares have a long tradition in Germany, while option plans have only been introduced recently, but a high proportion of option plans are adopted by new market firms[5]. Research (e.g., Core & Guay, 2001: 259) finds that option plans are granted not only for incentive purposes but also "as a substitute for cash compensation" because new market firms often operate under cash constraints and options do not require contemporaneous cash payouts. Recent work emphasises that, rather than being awarded as effort incentives, options are granted for attraction and retention purposes (Ittner, Lambert, & Larcker, 2001). Indeed, this dynamic seems to be occurring most especially in new market firms: "The prevalence of vesting periods options and the requirement that employees immediately exercise option when they leave the company suggests that firms use option to retain employees" (Core & Guay, 2001: 257). In contrast, shares of a stock-listed company may remain in the portfolio of employees even when they decide to leave the firm. Studies (e.g., Brandes, Dharwadkar, & Lemesis, 2003: 82) suggest that during the recent stock market hype-phase employees would not accept an offer from a company that did not grant options and preferred options to

[5] New market companies are companies such as pharmaceuticals, software, semi-conductor, internet and high-technology manufacturing. Some researchers refer to these companies as new economy firm (e.g., Sesil, Kroumova, Blasi, and Kruse, 2002). In the context of Germany, new market firms represent those companies that were listed in the NEMAX index of the German stock exchange (See Section 6.4).

other varieties of reward instruments. This observation suggests that firms adopted option plans to attract employees and remain competitive during "the war of talents" during this time.

In Germany, companies can choose different methods for implementing a stock option plan. However, the way companies finance their option plans depends primarily upon tax-deductible operational expenditures. Most often, companies choose a conditional capital increase that avoids any possibility of charges under commercial law; however, this solution is not optimal in terms of company taxes. Indeed, Wenger and Knoll (2003: 38) argue that a pathological fear of such legal charges drives companies to accept constructions that are actually tax unfavourable, a finding that echoes Murphy's (2002) conclusion that option-granting practices are often decided upon because of the "perceived cost" of options rather than their economic cost. As a result, companies perceive options as economically viable solutions to the compensation conveyance problem.

Compared to other countries, the German tax system shows little favour for employees who receive equity-based pay plans. Only one of the above share plans receives a somewhat favourable tax treatment, but compared to international standards, the tax advantage is very low. In addition, many companies that establish this one employee ownership plan fail to benefit from favourable tax treatment because of high administrative costs (Barthel, 1998). Liebig (2001: 1), studying the taxation of employee stock options in Germany, concludes that compared to other countries that have introduced quite favourable tax regimes, the German tax treatment can only be described as rather unfavourable. In addition, tax treatment for stock options tends to be quite complex, which, arguably, makes dealing with it rather difficult for some workers.

2.3 Conclusions

The institutional background of Germany is characterised by a system in which employees have a strong voice. Consequently, via their work councils, employees play an important role in the adoption of equity-based pay plans. Even though share plans have a long tradition in Germany, option plans are a newer concept. In addition, besides their novelty, option plans differ from share plans in terms of ownership, complexity, gain potential, and tax system.

3 Antecedents of Equity-Based Pay

The following section discusses why firms adopt group incentive systems, which differ in several ways from individual incentives and require certain conditions if they are to be considered. All-employee equity-based pay plans, being incentives for teams, are group incentives. The section is structured as follows. It begins with a discussion of why and when firms introduce teams because the answers to these questions help explain why and when team production is useful. Theoretically, teams are a prerequisite for the adoption of group incentives; that is, group incentives are adopted because teams need specially designed incentive systems. Next, an agency theory perspective is applied to why and when firms adopt incentives in order to explain the situations in which firms adopt incentive systems 1) in general and 2) specifically for teams. Then, to understand group incentive adoption from a differing perspective, the reasons for adoption are examined from an institutional perspective. The section concludes with a description of other reasons for incentive adoption that will not be discussed further in this dissertation.

3.1 When Do Firms Use Teams?

Firms use teams rather than individuals for certain activities and teams require different types of incentive systems than individuals, meaning the existence of teams requires the adoption of group incentive systems. The following section provides a discussion of when firms should use teams and why team structures imply group incentive pay systems.

When should firms use teams? At the most abstract level, the answer to this question is very simple: "Teams should be used when the benefits from using them are high and when the costs of using them are low" (Lazear, 1998: 307). However, when are benefits high and costs low? What must be taken into consideration? According to Lazear (1998: 307), the benefits of team work are greatest when there are large complementarities between what one worker does and what another worker does, meaning that teams are used because of their joint production effects (Alchian & Demsetz, 1972b). The following two examples show a general principal borrowed from an old expression: "… teams should be used when the

whole is greater than the sum of its parts" (Lazear, 1998: 307)[6]. As a first illustration, certain activities – for example, moving a heavy object through physical labour – cannot be performed by one individual alone. However, through the addition of other individual forces, such objects can be moved. In this situation, the output of an individual would be zero, whereas the output of the team could be anything greater than zero. As a second example, an individual may be unable to complete a task in time to meet the deadline, but a group of individuals is able to finish the particular job assignment within the given time limit. Here, a team is useful because cooperation of the team members enables growing economies of scale.

Specialisation and knowledge transfer are two specific benefits associated with team production (Lazear, 1998: 307-308). Specialisation refers to work situations in which team members are specialised in one small and well-defined task. The typical factory assembly line, as epitomised by Adam Smith's classical pin factory example (Becker & Murphy, 1992; Lazear, 1998: 307-308; Milgrom & Roberts, 1992: 25), is team production. Specialisation leads to efficiency advantages because the worker who performs a specific task is an expert and has a high degree of professionalism that allows him or her to do the job at maximum speed. A typical example is a car assembly line on which the building of one car entirely by one worker would not only take a great deal of time and be more costly but would produce lower quality than if the car had been built by a team of specialists. An assembly line requires teamwork because each job performed is linked to another job on the same assembly line. Therefore, workers are heavily dependent on each other because if one worker has done a poor job, the next worker in the assembly line cannot complete his or her task. Individual performance can seldom be assigned and only at very high cost.

In contrast to specialisation, benefits from knowledge transfer in teams occur when specialisation of individual team members is rather low. Valuable knowledge transfer requires an idiosyncratic set of information on the part of each team member that must also be relevant for the other team members: "If there is too much information overlap, teamwork does not produce much knowledge

[6] Other reasons to use teams, such as the use of temporary teams to recommend actions after whose completion they normally disband, are not discussed in depth here.

transfer. If the information that one has is irrelevant to another, then knowledge transfer has no value" (Lazear, 1998: 310).

Table 6 shows an example of a fishing firm. In this illustration, the use of teams is desirable if the production activities rank high (i.e., 1) on the benefits scale and low (i.e., 5) on the cost scale. The 1 on the benefit rank signifies highest benefit; correspondingly, the 1 on the cost rank signifies highest cost. However, not all five activities in the fishing firm are ideally performed by teams. For the activity of "selecting the fishing site", it is not obvious whether the task should be performed by a team or an individual. Both work structures have benefits and costs (3 on benefit rank, as well as 3 on cost rank). For other activities, the decision is more obvious. The activity "fishing on a large boat" is ideally performed by an individual (benefit rank 1), but this activity also involves some cost when performed by a team (cost rank 4). In contrast, the activity "selling the fish wholesale" is ideally performed by an individual (benefit rank 5) because team performance would involve enormous cost given that shirking of individual team members and the cost of controlling team member performance are very high (cost rank 1).

Activity	*Benefit Rank: 1 = Highest benefits*	*Cost Rank: 1 = Highest Cost*	*Comments*
Fishing on a small boat	2	5	Fishing requires tasks that cannot be performed single-handedly. The cost of monitoring other team members is low. Unproductive team members can be thrown off the team by other members.
Fishing on a large boat	1	4	Teamwork is probably more important on a large boat, where the tasks are larger in scale, than on a small boat. Setting very large nets requires a number of hands and some machinery. The larger the team, the more difficult the team monitoring problem, and the free-rider effects are more significant.
Selling the fish wholesale	5	1	Salespersons can work alone. Monitoring them as a group involves enormous free-rider problems since peer monitoring is difficult.
Accounting for sales	4	2	There is not a great deal of benefit associated with accountants working together, especially if one individual can handle all of the books alone. Additionally, since accountants' work can be monitored individually, but is difficult to monitor in a team setting, the costs associated with team production are high.
Selecting the fishing site	3	3	Multiple judgments may prove useful and discussion matters. But, committee decision making is slow and difficult.

Source: Lazear, 1998: 309.

Table 6: Costs and Benefits of Teamwork

3.2 Incentive Adoption Explanations Based on Agency Theory

From an agency theory perspective[7], incentive problems exist because of conflicts of interest between employers (principal) and employees (agent) (Berle & Means, 1932; Eisenhardt, 1989; Fama & Jensen, 1983; Jensen & Meckling, 1976; Ross, 1973). These problems are easily resolved when actions are costlessly observable. Firms can identify the most efficient actions by employees and pay employees only if actions are taken. However, in most situations, employee actions are not observable at low cost. Information asymmetries – "situations in which the parties to a potential or actual transaction do not have all the relevant information needed to determine whether the terms of an agreement are mutually acceptable and whether terms are actually being met" (Milgrom & Roberts, 1992: 30) – create a potential conflict of interest between the agent and principal. Here, firms can motivate employees through incentive compensation. The following section discusses two specific situations of high information asymmetry – 1) high information asymmetry in a high-discretion environment and 2) high information asymmetry in an international environment – together with the related adoption of incentive pay structures.

High Information Asymmetry in a High-Discretion Environment

The cost to directly monitor agents' actions may be significantly higher in environments subject to high agent discretion due to high information asymmetry. In high-discretion environments, agents have a "high latitude of action" and need to weigh multiple courses of action based on a combination of environmental, organisational, and individual characteristics (Finkelstein & Hambrick, 1996: 26). The agent's ability to impact organisational outcomes is referred to as *managerial discretion* (Carpenter & Golden, 1997: 187), a function of (1) the task environment, (2) the internal organisation, and (3) the managerial characteristics (Finkelstein & Hambrick, 1996: 26-27; Hambrick & Finkelstein, 1987: 379). Hambrick and Finkelstein (1987) suggest the following industry determinants of managerial discretion: high product differentiability, high market growth, demand instability, low capital intensity, monopolistic and purely competitive industry structures (as opposed to oligopolies), absence of legal and quasi-legal constraints

[7] This study uses an agency theory approach as used in management literature that may diverge from the agency theory used in economics.

(e.g., regulation), and absence of powerful outside forces (e.g., large concentrated customers, suppliers, and funding sources). Not only do variations in such managerial discretion "manifest themselves in variations in the availability of multiple options […]" (Rajagopalan, 1997: 765), but Datta, Rajagopalan, and Zhang (2003: 105) argue that "a differentiable industry increases the scope for managerial discretion, providing managers with a wider latitude for strategic choice and greater possibilities for breaking away from past practices and norms".

Managerial discretion can also be expected to impact a variety of other phenomena. Hambrick and Finkelstein (1987) argue that low managerial discretion is often combined with low compensation packages, little use of particular incentive compensation packages, and stable strategy. High managerial discretion, in contrast, has a propensity to cause opposite results. Therefore, it might be expected that in environments where agents can have a greater effect on firm performance and courses of action are multiple and barely observable due to high information asymmetry, contracts between principals and agents are of major importance. In such a situation, principals might need to engage in greater incentive compensation to ensure that agents take courses of action in their interests. This assumption is supported by Balkin and Gomez-Mejia (1987) who find that high-technology firms, typically characterised by greater levels of discretion (Hambrick & Abrahamson, 1995), adopt incentive pay plans more than do other companies.

Core and Guay (2001: 272) find evidence that firms provide greater option incentives when the costs of direct monitoring of employees are high. These costs could stem from larger firm size and more decentralised firm structure, from greater noise in the firm's operating environment (i.e., equity incentives increasing because of risk aversion), and from the firm enjoying greater than normal growth opportunities. Additionally, Kroumova and Sesil (2003: 20) show that higher monitoring costs encourage companies to implement employee stock option plans. These authors argue that higher monitoring costs occur in companies "that are large, have experienced high growth, have high levels of intellectual capital and expected growth, and high capital intensity".

These findings indicate that a high-discretion environment is characterised by a situation of high information asymmetry and costly monitoring because of the

wide latitude of agent action. Therefore, principals need to adopt equity pay arrangements in order to ensure the interest alignment that facilitates achievement of goal congruence.

High Information Asymmetry in an International Environment

Internationalisation has changed the boundaries and nature of strategy, competition, and competitive advantage (Bartlett & Ghosal, 1989; Melin, 1992; Porter, 1986; Prahalad & Hamel, 1994). Most particularly, firms that are exposed to internationalisation experience a redefinition of their internal roles. Thus, headquarters must fulfil their monitoring function more accurately and spend time and effort on incentivising subsidiaries in order to achieve maximum productivity. The subsidiaries, in turn, become more tightly integrated with other sub-units within corporations (Roth & O'Donnell, 1996), so that subsidiary performance becomes multi-faceted and defined by both local and world-wide corporate goals. As a result, this fundamental change in the role and focus of subsidiaries – induced primarily by increased conflict between headquarters and subsidiary – should presumably be supported by a properly configured incentive structure.

Because the headquarters-foreign subsidiary relationship is so often characterised by conflict of interest, it bears inherent agency problems. From a theoretical perspective, the headquarters-foreign subsidiary structure can better be described as a principal-agent structure in which the subsidiary acts as agent, performing work and responsibilities delegated by headquarters (Doz & Prahalad, 1991; Nohria & Ghosal, 1994; Roth & O'Donnell, 1996). However, the headquarters, despite being principal, "cannot effectively make all the decisions in the MNC [multinational corporation] since it does not possess and must, therefore, depend on the unique knowledge of the subsidiaries" that perform as its agents (Nohria & Ghosal, 1994: 492).

In addition, the local concerns and interests of the MNC's foreign subsidiaries may not always be aligned with those of the parent corporation. Such misalignment may lead to control problems for whose explanation agency theory is most relevant. When misalignment occurs, one solution is for the management of headquarters to design and implement monitoring mechanisms that aim at aligning the subsidiary's objective with the objectives the headquarters has for that

particular subsidiary. Thus, in the context of an MNC, monitoring can be defined as activities or mechanisms employed by headquarters to obtain information about the behaviours, actions, and decisions of subsidiary management (Watson O'Donnell, 2000: 526).

The dependence of headquarters on foreign subsidiaries (Roth & O'Donnell, 1996) is further increased by geographical distance, as well as cultural distance, defined by the degree to which the cultural characteristics common to the headquarters market differ from those of the foreign subsidiary market (Erez & Earley, 1993). When distance prevents headquarters from employing the most direct form of behaviour monitoring – personal supervision of managers and employees (Eisenhardt, 1985; Ouchi, 1977) – it can be assumed that other monitoring mechanisms will be used. One alternative for monitoring subsidiary management behaviours is through the use of expatriates in top management positions at the foreign subsidiary. These top expatriate managers are then considered an extended form of headquarters supervision (Boyacigiller, 1990; Egelhoff, 1988). Nonetheless, expatriates working in top management can be expected to experience agency problems with the foreign subsidiary employees equal to those discussed previously. A third approach to monitoring subsidiary management behaviours is for headquarters to use bureaucratic monitoring mechanisms – including rules, programmes, and procedures (Galbraith, 1973) – that Watson O'Donnell (2000: 527) defines as information assembled by headquarters about the activities and decisions of subsidiary management.

Agency theory predicts that monitoring will become more difficult as the principal-agent relationship becomes increasingly characterised by high information asymmetry (Fama & Jensen, 1983), additionally influenced in this context by cultural and geographical distance, subsidiary strategic role, and subsidiary autonomy. From an agency theory perspective, the strategic role of the subsidiary is particularly difficult to monitor when foreign subsidiary management has a high level of specialised information unavailable to headquarters (Watson O'Donnell, 2000: 527). Indeed, the greater the degree to which the foreign subsidiary of an MNC has strategic and operational decision-making authority (Watson O'Donnell, 2000: 528) – that is, *subsidiary autonomy* – the more difficult direct monitoring of agent behaviour and the less effective the means of control.

Under such conditions, agency theory suggests that instead of monitoring, the principal has the option of introducing incentives to achieve goal congruence between headquarters and the foreign subsidiary. Both monitoring and incentives are considered options for controlling the agency problem, with an inherent trade-off between their respective costs or difficulties (Eisenhardt, 1989). Essentially, as the effort and costs of monitoring increase, incentive alignment becomes a far more viable approach to addressing the agency problem. Tosi and Gomez-Mejia (1989: 171) define incentive alignment as the extent to which the reward structure is designed to encourage agents to make decisions that are in compliance with the principal's interests. Particularly in cases in which the headquarters-foreign subsidiary relationship information asymmetry is extreme and monitoring is difficult, incentives can operate as substitute mechanisms for hierarchical management. Thus, several authors propose the compensation design as a method of control in the MNC (Doz & Prahalad, 1991; Gupta & Govindarajan, 1986; Hedlund, 1986; Hedlund & Rolander, 1990).

In addition, the higher the degree of firm internationalisation, the more prevalent incentive systems are, because a firm's degree of internationalisation mirrors its dependence on foreign markets for customers and factors of production and the geographical dispersion of this dependence (Sullivan, 1994). In this context, equity-based pay plans represent ideal forms of incentive because they raise goal congruence between headquarters and foreign subsidiary.

In sum, from an agency theory perspective, firms adopt equity-based pay plans to overcome imperfect monitoring in situations of high information asymmetry and to align the agent's interests with those of the principal in order to lift corporate productivity. Thus, equity-based plans may potentially be suitable for achieving an alignment that exhibits high degrees of managerial discretion and global information asymmetry. This assumption leads to the following hypothesis:

> *Hypothesis 1: A firm's decision to adopt equity-based pay is positively related to the organization's (1) degree of managerial discretion and (2) degree of internationalisation.*

Incentives in Teams

To make team performance effective, team members must be compensated according to their team effort. For example, in the case of a small research team working on a new medication for a terminal illness, if the knowledge set that each researcher possesses is not idiosyncratic, new knowledge will not flow among team members. Rather, the knowledge will only flow provided that the knowledge set each team member has is valuable to the other team members. After a new medication has been developed, it is very difficult to assess the team member's efforts. However, the output (e.g., a new medication) could only have been achieved through the team's common effort. Therefore, team production implies that individual members of a team should be rewarded according to team production, meaning that the existence of teamwork leads the adoption of group incentives such as equity-based pay. Such adoption reflects the fact that the work performed by the team cannot be allocated to each individual. Referring back to the example of a job assignment deadline given in section 3.1, team production and the use of teams allows an increase in economies of scale, meaning that through the cooperation of all team members, the given deadline can be achieved. The incentive problem occurs because the team output can not be allocated to individual team members. Therefore, the team must be motivated by setting group incentives for which each individual will be rewarded according to the output of the team, with each member receiving an equal part of the team reward. However, such equal reward leads to a major drawback of group incentives, namely the free-rider problem: "The individual member of the group bears fully the personal costs of her efforts but shares the gains from those efforts, in terms of improved performance and hence increased compensation, with members of the group" (Baron & Kreps, 1999: 262). The consequences of the free-rider problem, its potential resolution, and the impact of group incentives on firm performance will be discussed in section 4.

3.3 Adoption Explanations Based on Institutional Theory

From an institutional theory perspective, firm adoption of equity-based pay is less driven by efficiency concerns than by the nature of the institutional environment (Abrahamson, 1991; DiMaggio & Powell, 1983; Meyer & Rownan, 1977). The term *institutional environment* refers to a "set of highly established and culturally

sanctioned action patterns and expectations" (Lincoln, Hanada, & McBride, 1986: 340) among which cultural and legal systems are particularly important elements (Rosenzweig & Singh, 1991). This line of thought examines "how practices travel from one organization or social setting to another" (Guler, Guillén, & Macpherson, 2002: 207) and argues that the diffusion of practices in single industries, fields, sectors, or countries follows a process of institutionalisation (e.g., Baron, Dobbin, & Jennings, 1986; Davis, 1991; Davis & Greve, 1997; Galaskiewicz & Burt, 1991; Galaskiewicz & Wasserman, 1989; Haunschild, 1993; Westphal, Gulati, & Shorthell, 1997). For example, Baron, Dobbin, and Jennings (1986) find that the rapid diffusion of bureaucratic employment practices within U.S. industry stems from institutional effects, while Galaskiewicz and Wasserman (1989: 454) conclude "that under conditions of uncertainty organisations will mimic the behavior of other organizations in their environment".

Kostova and Roth (2002), in a study of organisational practice adoption by MNC subsidiaries, find that the institutional profile of the host country – "the issue-specific set of regulatory, cognitive, and normative institutions" – and the relational context within the MNC – the pressures a subsidiary confronts to conform to the MNC organisation-based structures and practices – strongly influence the implementation of organisational practices. In another investigation of determinants of organisational practice adoption in firms located in six European countries, Gooderham, Nordhaug, and Ringdal (1999) find strong support that national institutional determinants, "national embededness", play a strong role in implementing organisational structures, and Guler, Guillén, and Macpherson (2002) also find a strong impact of institutional effects in their examination of the cross-national diffusion of ISO 9000 quality certificates.

This institutional effect leads to an increasing similarity between organisations (Scott, 1995: 31), an environmental isomorphism that DiMaggio and Powell (1983) suggest occurs through *coercive, normative, and mimetic pressures*. In addition, "[t]hese three mechanisms operate through the agency of influential (generally large and/or successful) organizations or the knowledge bearing professions and because of contact diffusion through networks of ties linking adopters to non-adopters" (Guler, Guillén, & Macpherson, 2002: 211). Haunschild and Miner (1997: 496) also find "that both frequency of use and use by large, successful others enhances imitation", while Abrahamson and Rosenkopf (1997:

306) argue the ability of networks to influence "the extent of innovation diffusion" and "the number of links between potential adopters in a network … to affect the extent of bandwagon diffusion".

When formal and informal pressures are exerted on organisations – either by other organisations upon which they are dependent or by cultural expectations in the society within which they function (DiMaggio & Powell, 1983) – the result is *coercive isomorphism*. DiMaggio and Powell (1983: 150) also point out that organisations may perceive these pressures "as force, as persuasion, or invitation to join in collusion". Particularly when authorities more powerful than the organisation itself impose pressure and force the organisation to correspond to their institutional environment, their rules, laws, and sanctions may be indicators of such coercive isomorphism (Scott, 1995: 35). Thus, Baron, Dobbin, and Jennings (1986) highlight the important role of the state in imposing the adoption of human resource management practices.

In contrast, normative pressures stem not only from formal training but also primarily from professionalisation, "a collective struggle of members of an occupation to define the conditions and methods of their work" (DiMaggio & Powell, 1983: 152). Both activities establish an environment through shared social rules (Meyer & Rownan, 1977). Thus, organisations adopt patterns deemed to be appropriate in the environment, leading to *normative isomorphism* (Kostova & Roth, 2002). As such practices become institutionalised, they also become viewed as socially legitimate and may be adopted by organisations for reasons of legitimacy rather than efficiency (Kostova & Roth, 2002; Meyer & Rownan, 1977; Suchman, 1995).

The achievement of conformity through imitation, or *mimetic isomorphism*, (DiMaggio & Powell, 1983: 151-152; Haveman, 1993: 595) occurs when organisations implement the patterns used by other organisations in their environment. Mimetic isomorphism occurs when enough social actors have adopted certain practices or begun to do certain things in a specific manner "that a particular course of action becomes taken for granted or institutionalized, and thereafter, other social actors will undertake that course of action without thinking" (Haveman, 1993: 595). Such imitation may be expected in situations characterised by high uncertainty when successful organisations "tend to model

themselves after similar organizations in their field that they perceive to be more legitimate or successful" (DiMaggio & Powell, 1983: 154). For example, Burns and Wholey (1993) find evidence that mimetic change takes place when hospitals adopt matrix management programs. Similarly, Haveman (1993) finds that certain savings and loan associations imitate other large and profitable firms when entering new markets.

Another possible source of mimicry is competition (DiMaggio & Powell, 1983; Guler, Guillén, & Macpherson, 2002; Haunschild & Miner, 1997), because "competitive imitation" allows organisations to "learn from each other how to become better at what they do" and such mimicry may "minimize the competitive risk of losing a market or a source of supply" (Guler, Guillén, & Macpherson, 2002: 216). Conversely, not adopting organisational practices may disadvantage firms relative to the competitors that have implemented them. Therefore, the greater the number of firms that have adopted a certain organisational practice, the more pressure impinges on those firms that have not yet adopted it. As a consequence, the rate of diffusion may be expected to increase. Such pressure to conform to the environment may also stem from the industry or sector in which a company competes. For example, Fliegstein (1985) finds evidence that firms alter their organisational structure when other firms in the same industry alter their structures. While Gomez-Mejia and Wiseman (1997) highlight legitimacy as playing an important role in the adoption of executive compensation designs, Westphal and Zajac (1994) report that firms defend executive compensation design with reference to industry and national practices, in whose adoption these firms seemingly find credibility. Indeed, economic research (e.g. Krueger & Summers, 1988) has empirically confirmed that industry has an impact on pay level.

In sum, institutional theory argues that, when adopting equity-based pay plans, companies reflect their institutional environment, one shaped not only by the national context but also by the industry in which the company competes. As a result, equity-based pay plan diffusion can be expected among certain industries and the following hypothesis should hold:

Hypothesis 2: A firm's decision to adopt equity-based pay is positively related to the extent of industry adoption.

It should also here be noted that firms introduce incentives for a number of other reasons that are not the focus of this dissertation but are still worth mentioning (see also section 2.2 for the reasons for introducing equity-based pay reported by the German Stock Institute). First, the structure prior to adoption influences the incentive adoption itself. As described in section 2.2, research finds that "firms use non-executive option grants as a substitute for cash compensation to a greater extent when they face cash flow constraints and when the costs of external capital are greater". Second, firms seek to be more flexible in their compensation arrangements. Variable pay systems such as equity-based pay plans allow firms to increase the flexibility of their business cost structures (Kruse, 1996; Kurdelbusch, 2002). Consequently, when the overall performance of the firm is good, compensation is higher, but if the performance is lower one year, equity-based pay plans give firms flexibility to lower the overall pay. As a result, it is assumed that firms ultimately consider their overall performance when introducing incentive plans. The research evidence for such an assumption, however, is mixed. Some studies report worse performance as a predictor of plan introduction, while others report better performance (see for a summary Kruse, 1996: 517). Third, it can be expected that the forms of existing incentive, as well as the level of existing pay, influence the adoption of equity-based pay. Finally, firms in the U.S. have adopted equity-based pay plans based on the discovery that companies held substantially by their employees are less affected by takeovers (e.g. Beatty, 1995; Chaplinsky & Niehaus, 1994).

3.4 Conclusions

To summarise, firms should use teams when there are large complementarities between what one worker does and what another worker does, as exemplified by the two situations in which a team of individuals is able to 1) move a heavy object that one individual could not move alone and 2) finish a task in time to meet the deadline, where one individual could not possibly meet the time line. Specific advantages of team production are specialisation (as shown in the classic example of the car assembly line), and knowledge transfer (as illustrated by the research team developing a new medication). Thus, firms should use teams in specific work situations where team production is most beneficial.

However, team structures need appropriate group incentive design because individual incentives do not work when individual performance cannot be assigned to individual team members. As shown by the research team example in section 3.2, once the new medication has been developed, it is not possible to determine the performance of each team member because the team output has been larger than the sum of each team member's performance. As a result, in situations where teams are introduced, firms need to set group incentives like equity-based pay plans to reward team performance. Yet, as will be discussed in section 4, such group incentives also require consideration of certain conditions and have specific disadvantages.

Most particularly, incentives exist when situations are characterised by high information asymmetry, such as in a high-discretion environment or international environment. High information asymmetry implies that direct monitoring is either extremely costly or not possible. Therefore, as a substitute for such costly hierarchies, firms adopt incentives such as equity-based pay plans.

Nonetheless, firms do not only introduce incentives for the above reasons. Research from an institutional theory perspective argues that pressure to conform to the institutional environment forces firms to introduce incentives like equity-based pay plans. Further on, there are other reasons as the structure prior to adoption influences, forms of existing incentive, as well as the level of existing pay, compensation flexibility considerations, and finally firms have adopted equity-based pay plans as takeover defence strategies.

4 Consequences of Equity-Based Pay

The following section discusses when and how group incentives such as equity-based pay plans have a positive impact on firm performance. The section is structured as follows. To provide an understanding of the conditions under which group incentives may impact positively on firm performance, it opens with a discussion of the free-rider effect and its resolution. Next comes a discussion of the formal structure of group incentives; that is, it examines the three different forms of group incentives – 1) share and option plans, 2) profit sharing plans, and 3) team bonuses – and their impact on employee motivation. Finally, empirical evidence is presented on the link between all-employee equity-based pay plans and performance.

As shown in the previous section, institutional theory explains a firm's adoption of equity-based pay plans in terms of pressure from the institutional environment. However, outcomes of such plans are not discussed in institutional theory. Thus, whereas institutional theory can contribute to the explanation of why firms adopt equity-based plans, it cannot explain the performance related effects of such plans. Consequently, this section uses agency theory to explain theoretically under what conditions equity-based pay has an impact on firm performance, and it presents empirical evidence of the link between equity-based pay and performance.

4.1 The Free-Rider Problem and Its Resolution

Team production leads to a problem of allocation of individual performance to the team output. In such situations, individual incentives are not possible, which is why firms can only reward team output through the use of group incentives. The chief liability of group incentives is the free-rider problem, which encompasses an inherent problem of shirking (Alchian & Demsetz, 1972a). The potential production growth from team production is lost if each worker tries to free-ride on the contributions made by others. This problem is also known as the "1/N problem", in which N is the total number of employees in the team. The employee has an incentive to shirk because no matter what input she or he makes, the employee will get 1/N of the gains from increased effort (Kandel & Lazear, 1992).

How can this free-rider problem be overcome? Generally speaking, it must be in the best interest of the agent not to free-ride. The material incentive of each individual agent is 1/N, meaning that the team return is shared equally among the team members. This material incentive per se implies free-rider effects. Therefore, the material payoff must be complemented with non-economic – that is, psychological and social – payoffs to generate beneficial group incentive effects. However, psychological and social payoffs do not work automatically; rather, it is a managerial task to make them work. The following discussion addresses different forms of such social and psychological payoffs.

Social and Psychological Payoffs

Holmstrom (1983) has shown that the free-rider problem is exacerbated in large firms because employees in small firms share their rewards with fewer colleagues and mutual monitoring may work. Therefore, one important factor in the success of *mutual monitoring* is the *size of the team*. The team must be small enough so that team members can control each other's efforts at a lower cost and more efficiently than can the employer. Referring again to the example of the fishing firm presented in Section 3.1 (and more precisely to the case of fishing on a small boat), each member of the team can monitor what the other has done. Therefore, shirking is less of a concern. Those members who are not productive can be thrown off the team by other team members.

This dynamic is not the case for large teams. Rather, employees in large teams are often unable to examine the effort of every single colleague. Moreover, they are less keen to bring upon themselves the costs of monitoring and sanctioning their colleagues (Coleman, 1990; Heckathorn, 1988; Kandel & Lazear, 1992). The example of the fishing firm shows that teamwork on a large boat is very important. However the larger the team, the more difficult peer monitoring and the greater the concern about shirking. This finding implies that the free-rider effect is more prevalent in larger teams. Therefore, team size is a critical source for calibrating the free-rider effect.

In addition, it is important that team members have *frequent and repeated social interactions* (Baron & Kreps, 1999: 262). For example, in the case of the research team developing a new medication (discussed in Section 3.2), if the team members

have frequent interactions and depend on each other, the team may enter into a cooperative scheme of working harder for the common good (Baron & Kreps, 1999; Milgrom & Roberts, 1992), always under the condition that mutual monitoring is possible and the size of the team is small enough. It must however be recognized that anyone who shirks necessarily affects someone else's utility. Moreover, workers empathize more with their fellow workers than they do with faceless colleagues (Lazear, 1995: 49). Therefore, it is important that team members work closely together, have frequent social interactions, and form some sort of partnership. In addition, it is critical that the incentive is provided to members of the team that depend, at least partially, on the team's performance.

Homogeneity in teams favours the forming of partnerships, which are desirable because the internalisation of others' welfare and the efficacy of social sanctions is higher among individuals of similar type and quality (Baron & Kreps, 1999: 264-265; Kandel & Lazear, 1992: 813-814). Non-homogeneous teams tend to adopt a dysfunctional "us-them" attitude that may work against the interest of the firm; for instance, through concealment of information and unwillingness to cooperate and discipline team members who underperform.

Social sanctions within a team are a means to calibrate the free-rider effect. Such sanctions, imposed by team members on other team members who are not willing to work as hard as others for the common good, serve to increase the cooperative behaviours of slackers (Baron & Kreps, 1999: 262). In this manner, social sanctions allow team members to effectively discipline idlers. Nonetheless, for social sanctions to be effective, it is critical that the team be small enough to ameliorate the free-rider effect.

Peer Pressure

The psychological and social payoffs discussed so far describe what is commonly termed 'peer pressure'. Such peer pressure may be a potential means to combat free-rider effects (Ichniowski & Shaw, 2003; Kreps, 1990; MacLeod, 1988). Two components serve as prerequisites for peer pressure to work as a motivational device (Kandel & Lazear, 1992: 806). First, the effort of one team member must impact the utility function of the rest of the team so they can exert pressure on him or her. Second, the team members that exert pressure must be able to impact the

choices of the shirking team member. Group incentives give workers the motivation to exert pressure on one member because if the slacking team member shirks, the rest of the team is no better than the idler.

According to Kandel and Lazear (1992), the pressure that employees exert on employees may be classified into two categories: 1) internal pressure and 2) external pressure. Internal pressure is said to exist "when an individual gets disutility from hurting others, even if others cannot identify the offender" (Kandel & Lazear, 1992: 806). The creation of external pressure occurs "when the disutility depends specifically on the identification by others" (Kandel & Lazear, 1992: 806). To achieve this classification, the authors make a distinction between two terms employed by sociologists, namely shame and guilt. Whereas guilt describes an internal pressure, shame refers to an external pressure. Nonetheless, it is essential that the action be observable; if not, only guilt is an effective pressure because shame requires that others can observe the team member's actions.

Shame and guilt also differ in their amount of past investment; specifically, guilt may need a substantial amount of past investment, which ensures that individuals feel a loss of utility the moment they shirk even when other team members cannot observe their actions. Therefore, even though the actions are not observable, "individuals are motivated to do well not so much by the direct pressure of their peers but by feelings internalized towards their comrades" (Lazear, 1995: 48). The mechanism for shame is different. Workers may feel ashamed when their team members can observe the actions during which they are slacking. The military provides an excellent example: "A fighter pilot may be alone on a mission in which bravery or cowardice is difficult to observe by others. Still, the safety of his squadron may depend on his success. Guilt, in the form of loyalty to his comrades provides incentives that operate even in the absence of observability. Thus the military spends much time and money creating loyalty and team spirit" (Kandel & Lazear, 1992: 806-807).

The Dysfunctional Flip-Side of Peer Pressure

The encouragement of peer pressure may nonetheless produce opposite results, as for instance in a dysfunctional "us-them" attitude towards management. When group incentives are set, the following non-economic caveats must be taken into

consideration because they may affect the dysfunctional flip-side of peer pressure. First, whatever team compensation design is chosen, teams and their members must evaluate it in terms of the fairness of outcomes. In addition, the process by which team performance is evaluated and rewarded must be assessed carefully. Therefore, *distributive* and *procedural justice* needs to be consigned (e.g., Folger & Konovsky, 1989; Kim & Mauborgne, 1993). Moreover, teams and their members necessarily engage in *social comparisons* (e.g., Baron & Kreps, 1999: 256) not so much to judge performance on an absolute scale but rather to gauge the compensation of peer teams against the compensation of ones own team – a mechanism that is well known in the setting of executive pay (e.g., O'Reilly, Main, & Crystal, 1988).

Second, a company's reward system should not only be consistent with its *strategy* (e.g., Boyd & Salamin, 2001) but also with the company's *culture* (e.g., Baron & Kreps, 1999; Flannery, Hofrichter, & Platten, 1996): "For instance, incentive compensation leading to enormous cross-sectional or temporal variation in wages might be entirely acceptable in organizations with a 'market-like' culture, as long as those [teams] who get more are viewed having earned what they get. The same compensation system may be woefully inappropriate, however, for an enterprise that otherwise promotes familiar culture" (Baron & Kreps, 1999: 256).

Third, *intrinsic motivation* inhibits the effect of an incentive system. To understand this inhibition it is important to make a distinction between intrinsic and extrinsic motivation, both of which motivate employees. Intrinsic motivation refers to the fact that an employee acts for immediate needs satisfaction, meaning that such motivation "is valued for its own sake and appears to be self sustained" (Deci 1975: p. 105). In contrast, extrinsic motivation refers to the means by which employees can satisfy their needs indirectly, especially through monetary compensation: "Extrinsically motivated coordination in firms is achieved by linking employee's monetary motives to the goals of the firm. The ideal incentive system is strict pay-for-performance" (Osterloh & Frey, 2000: 6).

Thus, intrinsic motivation, because it should serve to support a company's orientation, is not a goal in itself. Rather, employees should be motivated according to the firm's goal(s). However, the induction of intrinsic motivation through exact alignment of the company's goal(s) with the wishes of the

employees is very difficult because not every employee's wishes are compatible with the firm's orientation. As a result, intrinsic motivation can have an undesirable component (e.g., envy, hate, vengeance). Moreover, intrinsic motivation has disadvantages; for example, in some cases it can be superior to extrinsic motivation. Osterloh and Frey (2000) argue that intrinsic motivation is needed for tasks that require creativity because extrinsically motivated persons tend to produce stereotyped repetition of what already works. Thus, intrinsic motivation is crucial for the transfer and creation of tacit knowledge.

In addition, there exists a trade-off between extrinsic and intrinsic motivation. Rewards can crowd out intrinsic motivation under particular conditions. First, and most important, the task must be considered interesting (i.e., there must initially be an intrinsic motivation in place), and second, the reward must be perceived to be controlled by the recipient (Osterloh & Frey, 2000). This effect, which has been called the 'corruption effect of extrinsic motivation' (Deci, 1975), was introduced into microeconomics by Frey (1997) as 'crowding-out theory'. The effect can be that a reward system makes employees lose interest in the immediate goal (such as serving customers), thereby lowering their performance.

The crowding-out effect can be explained by cognitive evaluation theory (Deci, 1975), according to which intrinsic motivation depends on the perceived locus of control. Each external intervention (e.g., a reward) has two aspects – a controlling and an informing one: "The controlling aspect strengthens perceived external control and the feeling of being stressed from the outside. The informing aspect influences one's perceived competence and strengthens the feeling of internal control. Depending on which aspect is prominent, intrinsic motivation is reduced or raised" (Osterloh & Frey, 2000: 12). A negative effect on intrinsic motivation, meaning a reduction in intrinsic incentive, is called a crowding-out effect. In contrast, a positive effect, called a crowding-in effect, raises intrinsic motivation. These assumptions imply that intrinsic and extrinsic motivation together are always effective but not always additive.

Research has revealed certain factors that favour a higher degree of intrinsic motivation. Frey and Bohnet (1995) have found through a number of experiments that communication strongly increases intrinsic motivation to cooperate. Personal relationships help employees identify each other's cooperation and contribution.

Thus, participation is of major importance. The more numerous the opportunities to cooperate, the more employees engage in mutually set goals and adopt them as their own, thereby allowing intrinsic motivation to be raised. Of additional importance is interest in the activity. The more employees are aware of the results of their impact and consider their work meaningful, the more they are motivated to work.

Whether intrinsic motivation declines is determined by the following factors (Osterloh & Frey, 2000). First, the closer the dependence of a reward on the required performance, the more strongly intrinsic motivation is undermined. Second, a command restricts the perceived self-termination of the persons affected more strongly than would a corresponding reward. Third, if employees feel they are being unjustly paid, intrinsic motivation is reduced: "It is more critical how their pay compares to the pay of others than what they make in absolute dollars and cents" (Lawler, 1999: 24).

4.2 Forms of Group Incentives and Their Impact on Motivation

This section discusses the formal implications of the insights given in the previous section on group incentive pay. Specifically, it addresses the fact that firms can use different forms of incentives that have different expected impacts on employee motivation. The most prevalent of these forms are share and option plans, profit-sharing schemes, and team bonuses. In line with the focus of this dissertation, this section discusses share and option plans in depth but only mentions team bonuses and profit-sharing schemes to round out the picture.

Share and Option Plans

The first form of team compensation, share and option plans for workers (already discussed in section 2.2), is most prevalent for executives. However, executive plans differ from those for workers in two important ways. First, they differ according to the level of organisation at which the incentive is issued. Whereas all-employee equity-based pay plans go to average employees, executives usually receive in their pay package share and option plans designed especially for upper-echelon management. Thus, executives may participate in all-employee equity-based pay plans, but this participation represents only a marginal part of their total

salary (Murphy, 1999). Second, the nature of the incentive and the expected performance consequences are different from those of equity-based pay plans designed for all employees. Most particularly, executive equity-based pay plans are individual incentive plans. Therefore, in contrast to employee group incentives, the individual performance may be allocated to individual executives: "The principal of value maximization actually makes the task of motivating senior executives appear relatively simple: Executives should be guided to maximize value" (Milgrom & Roberts, 1992: 436). Further, under the assumption of efficient capital markets, "determining whether they are doing this is also straightforward" (Milgrom & Roberts, 1992: 436). Therefore, it might be assumed that firms introduce executive pay plans, because of their expected impact on performance[8].

Because of these differences, share and option plans designed for all employees always imply free-rider effect. Why, then, do firms use these group incentives? From the perspective of agency theory and risk sharing, the use of such group incentives is not only mysterious because of the existence of free-rider effects, but also because "[e]mployees have a lot of human capital tied up in the fortunes of their employer [and so] should diversify their financial capital holdings into other industries. By the same general argument, basing compensation on the performance of the firm subjects employees to all sorts of risks they can't control" (Baron & Kreps, 1999: 263-264). Nonetheless, Baron and Kreps suggest that the mystery is not so hard to resolve once freed from "the economic principle that individual preferences are given and unalterable":

> Precisely because it is hard to provide good extrinsic motivation, […] firms want their employees to internalize the welfare of the firm. And the symbolic content of ESOP plans […] can be quite powerful—it takes a market relationship, in which the employee is paid for a of service provided according to the market wage for those services, and replace it with a team-member relationship in which the employee shares in the success (and unhappily, sometimes the failures) of the team/firm. This symbolism is heightened when everyone in the organization is on the same "plan," albeit perhaps on different scales: Treating everyone the same terms of incentive

[8] The evidence on the link between executive compensation and performance is however mixed. For an overview, see for example Gomez-Mejia and Wiseman (1997) and Murphy (1999).

compensation lowers perceptions of differentiation (Baron & Kreps, 1999: 264).

This proposition is confirmed by Conyon and Freeman (2001: 14) who suggest that "firms that use all-employee stock options or other ownership schemes … to help create a culture of teamwork and co-operative company spirit that over-rides the free rider problem". This latter assumption is supported by the suggestion that firms implement such group incentive plans to foster an egalitarian work environment, which could encourage cooperative behaviour and therefore discourage employees from shirking (FitzRoy & Kraft, 1987: 33-34; Kroumova & Sesil, 2003: 9; Kruse, 1996: 516).

In addition, Blair (1995: 298) refers to employee ownership as one of the most direct ways to tie employee pay to firm performance, arguing that giving employees a stake in their companies is the ultimate governance structure for empowering them and aligning their interests so as to lift firm performance and reduce worker-management conflict: "The argument that employees would use the physical capital inefficiently derives from the restrictive assumption that employee stakes in the firm are not marketable. If employees can sell their stakes in the company in a public market, the market price of those shares would reflect the full loss of value that would result from neglecting to maintain the physical capital. With marketable shares, employees would have the same incentive as other shareholder in seeing that the physical capital is efficiently maintained" (Blair, 1995: 299-300).

Profit-Sharing Plans

The second common form of team compensation used as a group incentive is profit sharing. Company profit is the basis of the profit-sharing plan, which is usually given during one year (Lazear, 1998: 316). The share that employees receive is dependent on their salaries and is therefore not equal for all employees. The chief liability of such plans is that the number of relevant employees who work together, and consequently the number of recipients of this reward, is high (Lazear, 1998: 316-317). As a result, the free-rider effects may be very large. Therefore, it can be expected that profit-sharing plans will fail to provide enough motivation for employees to work harder: "A more appropriate interpretation of

profit sharing is […], that is [that it] spreads risk between capital owners and labor. When the firm does well, shareholders and workers do well together. When the firm does poorly, shareholders bear some of the cost, but so do workers. The fact that workers' wages are tied to company profits means that shareholder returns do not fall by as much in downturns nor rise as much in boom periods as they would if the worker wages were constant" (Lazear, 1998: 317).

Team Bonuses

The third form of compensation, team bonuses, is given mostly for projects of relatively short duration (Lazear, 1998: 316). However, because the free-rider effect is so prevalent in large groups, the teams must be small enough to make the incentive work. Thus, prerequisites of team bonuses are that the team be small enough, the output be sufficiently well defined to make an even split among team members possible, and the project on which the reward is based be short enough that the team remains largely the same over the period of collaboration. A classical example is a sports team that earns a bonus for winning the national league title: the bonus is shared among the team members, the team consists of a relatively small number of members, and the "project" is of short duration.

4.3 Empirical Evidence on the Link between Equity-Based Pay and Performance

From the above, it might be assumed that equity-based pay plans for workers have a positive impact on performance when peer pressure can override the free-rider problem. In addition, share and option plans have a strong symbolic content and may increase worker internalisation of the welfare of the firm. The following section reveals how far these theoretical arguments can be confirmed through empirical results.

A wide body of empirical literature exists on the overarching theme of the employee ownership-corporate performance link. In addition, studies have addressed a large variety of ownership types (stock purchase plans, stock option plans, and profit sharing combined with stock ownership), as well as a variety of measures and interactions. For example, several studies have employed profitability as a performance measure; others have focused on sales or sales per

employee; while still others have employed value added, return on capital, return on equity, or Tobin's Q. Thus, summarising *all* studies linking equity-based pay and performance has proven particularly difficult (see Table 6 for a summary of *major* studies in the field grouped by results).

Kruse and Blasi (1995), conducting a meta-analysis of studies that have examined the link between the existence of equity-based pay plans and performance, report on nine comparative studies of ESOP and non-ESOP firms (using cross-sectional comparisons at one point in time) before and after adoption of ESOP and/or rates of post-adoption growth. The preponderance of studies find positive but mostly statistically insignificant effects of ESOP adoption on output (Kruse & Blasi, 1995: 50). In addition, further examination of ten studies comparing other forms of employee ownership (including stock options, stock purchase plans, and direct ownership) also reveals findings that are dispersed: positive findings for small U.S. public companies, negative findings for old stock purchase plans, and neutral or mixed findings across other studies (Kruse & Blasi, 1995: 52). The following description of major studies groups them by result.

Negative Impact of ESOPs on Performance

In one of few studies finding a *negative* impact on performance, Livingston and Henry (1980) report that, for the period from 1967 to 1976, profitability ratios for 51 ESOP companies are significantly different from profitability ratios for 51 comparable non-ESOP companies, with ESOP companies having lower profitability. The authors remark that "one important and possible explanation for this difference in profits may be that less profitable firms formed ESOPs in an attempt to improve their competitive position by using the plans as employee motivators" (Livingston & Henry, 1980: 502). It must be noted that the plans included in this sample were initiated between 1916 and 1966 and therefore before the 1973 Employee Retirement Income Security Act and the succeeding legislation that introduced tax incentives for ESOPs. In fact, according to the U.S. General Accounting Office (GAO), they were actually old-type stock purchase plans (GAO, in: Conte & Svejnar, 1990: 158).

Author(s) and year	**Dependent variable**	**Employee ownership measures**	**Major finding(s)**
Livingston & Henry, 1980	Profitability	Presence of stock purchase plan	Companies with stock purchase plans for at least 10 years had lower average profitability ratios
U.S. General Accounting Office (GAO), 1987	Profitability, Value-added/labour expense	Presence of employee ownership plans	Neither the extent nor the type of employee ownership impacts performance levels
Bloom, 1985	Sales/employee	Presence of employee ownership plans	Positive (but mostly insignificant) effects of ESOPs
Conte & Svejnar 1988, 1990	Value added	Presence of employee ownership, Percentage owned by employees	Small amount of employee ownership impacts positively on productivity, although positive effect shrinks as the percent of non-managerial direct ownership augments
Blasi, Conte, & Kruse, 1996	Profitability levels, Profitability change	Presence of employee-owned stock, Percent owned by employees	Little evidence of plan-to-performance levels and growth, except positive profitability growth for small companies
Lougee, 1999	Cumulative abnormal return, Return on equity	Percent of firms shares outstanding owned by the ESOP	No significant performance differences for those with ESOPs and similar firms without ESOPs
Peck & Jensen, 2000	Sales	Presence of share or option plan	No support for positive impact on firm performance; however, high-coverage share plan firms are associated with substantial productivity growth (no support for high-coverage option plan firms)

Conyon & Freeman, 2001	Sales	Presence of equity-based pay	Positive impact of share plans on firm performance, no support for impact of option plans on firm performance
Conte & Tannenbaum, 1978	Profitability	Percent owned by employees, Percentage of employees in plan	Positive relation with percent owned by employees but not with other measures
FitzRoy & Kraft, 1985/1987	Value added, Return on capital	Worker's capital/total capital	Mean value of ownership measure doubles the mean return on capital
Kumbhakar & Dunbar, 1993	Sales	Presence of employee ownership	Positive effects of ESOP
Beatty, 1995	Sales/employee	ESOP benefits = amount of the ESOP funding less the value of deductible dividends to repay the ESOP loan.	Amount of ESOP benefits is positively related to subsequent sales growth per employee
Möller, 2000	Value added	Presence of employee ownership plans	Companies with employee participation report higher productivity
Sesil, Kroumova, Kruse, and Blasi, 2000	Value added, Total shareholder return, Tobin's Q, Return on assets	Presence of stock option plan	Companies with broad-based stock options perform better, and average compensation levels are higher
Sesil, Kroumova, Blasi, and Kruse, 2002	Value added/employee Tobin's Q	Presence of stock option plan	Evidence could be found that stock option plans result in higher levels of value added per employee; however, no evidence could be found for superior growth in Tobin's Q

Source: Adapted from Kruse & Blasi (1995) and supplemented with studies published after 1995.

Table 6: Empirical Studies of Consequences of Equity-Based Pay

Mixed or Neutral Impact of ESOPs on Performance

Some authors report *mixed or neutral* results. In most cases, they first find neutral results and then extend their models with some moderating variable to produce positive, or yet again neutral, results. The U.S. General Accounting Office (GAO, 1987) concludes that ESOPs have no significant effect on firm profitability; that is, neither the extent nor type of employee ownership impacts performance levels. However, the results of one study, based on a representative sample covering ESOP firms and non-ESOP firms, suggest that "level of participation" is the only significant coefficient (GAO, 1987), implying that, other things being equal, firms whose managers employ a participative management style have a 52 % more rapid rate of productivity growth than firms with non-participative management. However, a second study (Bloom, 1985) using a production function approach to assess whether ESOPs have little or no positive impact on firm performance as measured by sales per employee finds neutral results. Indeed, the results are identical over a variety of different methodological approaches: even though "ESOP firms as a group may appear to outperform non-ESOP firms as a group on the basis of productivity, employment, and profits", the positive results seem to disappear when other appropriate firm characteristics are included (Bloom, 1985: 249). Bloom's analysis comprises primarily large and solely publicly traded companies (a dataset of over 600 ESOP firms and over 2,600 non-ESOP firms).

Conte and Svejnar's (1988; in: 1990) 1987 and 1988 production function analyses of 40 U.S. companies (23 with employee ownership), which differs from earlier studies (e.g., Conte & Tannenbaum, 1978; Livingston & Henry, 1980) in using value added instead of profitability as a dependent variable, shows that a small amount of employee ownership impacts positively on productivity, even though this positive effect shrinks as the percent of non-managerial direct ownership augments. In addition, the authors conclude that participation in management has a positive effect: "Hence, our results allow for the possibility that firms which have substantial direct share ownership and which simultaneously place emphasis on employee decision-making rights (worker co-operatives, for example) may be more productive than firms which have neither direct employee ownership nor employee participation in decision-making" (Conte & Svejnar, 1988: 149). Blasi, Conte, and Kruse (1996), using a Cobb-Douglas production function specification to cluster a large dataset of 562 U.S. public companies into firms whose

employees hold more than 5% of company stock and all others, also found mixed results. Their results show no strong link between employee stock ownership levels and profitability, "but where differences are found, they are favourable to companies with employee ownership, especially among companies of small size" (Blasi, Conte, & Kruse, 1996: 60).

In contrast to previously mentioned studies using a production function (as most recent studies have) or measuring performance with sales, profit, value-added Lougee (1999: 89-90) investigates implications of employee ownership for the agency problem and the information content of earnings and cumulative abnormal return and return on equity as performance measurement. This study, whose sample consists of 96 U.S. companies, reports no significant performance differences for firms with ESOPs and similar firms without ESOPs and concludes that ESOPs do not mitigate the agency problem.

Two studies of stock market-listed companies in the U.K. that incorporate share and option plans (Conyon & Freeman, 2001; Peck & Jensen, 2000) also report mixed results. Peck and Jensen's (2000) employment of a Cobb-Douglas production function analysis to investigate a number of hypotheses relating to employee share ownership and corporate performance finds no support that equity-based pay per se (whether share or option plans) leads to increased performance. However, they do find evidence that high share coverage firms are associated with substantial productivity growth. Nonetheless, for option plans, the authors find no positive impact. Similarly, Conyon and Freeman's (2001) examination of the effect of shared compensation plans on economic outcomes in listed U.K. firms (also employing a Cobb-Douglas production function analysis) finds a positive impact of share plans on firm performance but no positive impact of option plans on firm performance.

Positive Impact of ESOPs on Performance

A number of studies report a *positive* relationship between ESOP and firm performance. For example, Conte and Tannenbaum's (1978) study of 30 U.S. companies with ESOP or direct ownership discovers 98 employee-owned firms to be between 50 to 70% more profitable than comparable non-employee owned firms. The greater the share scheme coverage by employees, ceteris paribus, the

greater the company's degree of profitability. However, the results could not be repeated for other measures. FitzRoy and Kraft (1985: 32; 1987: 34), using a Cobb-Douglas production function, find in their sample of 65 medium-sized metalworking companies in Germany a strong influence of profit sharing on productivity. In an additional test on capital sharing, they report that, even though the ratio of worker capital to total capital is very small in all firms, firm capital sharing has strong effects on productivity as measured by both value added and return on capital.

Kumbhakar and Dunbar (1993), using a production function together with sales as a productivity measure to study 123 companies that adopted ESOPs (54 firms) and profit-sharing schemes (63 firms) during the period from 1982-1987, find a positive and statistically significant relationship between the presence of an ESOP and firm productivity (as measured by sales).

Beatty (1995), following the specification used by Bloom (1985), uses a Cobb-Douglas production function to establish the link between ESOP and productivity in a sample of 122 firms that established ESOPs in 1988 (including those that introduced an ESOP prior to 1988 if both company and ESOP still existed in 1988). She finds that, where the amount of ESOP benefits is defined as the amount of ESOP funding less the value of deductible dividends used to repay the ESOP debt, "[t]he amount of ESOP benefits is positively related to subsequent sales growth per employee" (1995: 236).

Möller (2000), in a study for the Institute for Employment Research (*Institut für Arbeitsmarkt- und Berufsforschung IAB*) of the Federal Employment Services that focuses on employee participation and productivity in Germany, concludes that companies with employee participation report higher productivity as measured by value added. However, data were derived from the IAB establishment panel, an annual survey ascertained since 1993 in Western Germany and since 1996 in Eastern Germany (Bellmann, 1997; Bellmann, Kölling, Kistler, Hilpert, Huber, & Conrads, 1999), and the population from which the sample was drawn consisted of all establishments with at least one employee in employment, subject to social security contributions. In addition, it must be noted that the variable of employee participation was either profit sharing or capital sharing (Möller, 2000: 566).

Few U.S. studies examine the link between stock option plans for employees and firm performance (most concentrate on executives). However, an analysis of data from 490 companies with broad-based (i.e., owned by >50% of employees) stock options by Sesil, Kroumova, Blasi, and Kruse (2000) finds that stock option companies perform better than and their average compensation levels are higher than those for non-stock companies. These same authors, using the identical dataset to investigate whether adoption of stock option plans results in higher performance levels (Sesil, Kroumova, Blasi, & Kruse, 2002), find evidence for stock option plans resulting in higher levels of value added per employee but no evidence for superior growth in Tobin's Q.

Nonetheless, the following arguments by Blair and Kruse (1999: 26) further support the hypothesis that equity-based pay encourages employee commitment and increases corporate productivity: (1) equity-based pay is given mostly on top of other compensation, (2) overall compensation is somewhat higher among firms with considerable employee share ownership and increases with the percentage of shares owned by employees, and (3) companies with a high percentage of employees as shareholders have a propensity to be more stable in their employment levels. In addition, "[f]rom an economic perspective limiting group incentives to smaller groups seems sensible, because usually in larger teams the free-rider effect is exacerbated and measures of output are subject to more uncontrollable uncertainty. But there are rebuttals that emphasize the symbolic content and effects of plans as equity-based plans that tie compensation to organization-level performance" (Baron & Kreps, 1999: 278).

In sum, the theoretical arguments of the previous sections and the empirical evidence generally suggest a positive impact of employee ownership on corporate performance leading to hypotheses 3 and 4.

Hypothesis 3. Firms with equity-based pay plans in place will report higher corporate productivity growth due to improved incentive and monitoring effects than firms without any equity-based pay plans.

Hypothesis 4. Firms with high plan coverage will report high corporate productivity growth.

Staiman and Tompson (1998) suggest that communication about equity-based pay plans to a broad base of employees is of major importance for the success of such plans, a finding echoed by a study by the German Stock Institute (Deutsches Aktieninstitut & Hewitt, 2001) in which 84% (517) of the participating companies believed internal communication to be important to plan success. Reuschenbach (2000: 140-143) documents intensive communication as being of major importance to the successful implementation of the equity-based pay plan for broad-based employees of *Deutsche Telekom AG,* Europe's largest communication company.

Generally, employees are unfamiliar with shares or options; therefore, communication should reflect this lack of familiarity and include not only information on shares and options but also the employee's role in affecting shares and options. This suggestion is in line with the theoretical arguments that ownership entitles owners to access information about firm activities (Hart, 1995) and the OECD claim that "where laws and practice of corporate governance systems provide for participation of stakeholders, it is important that stakeholders have access to information necessary to fulfil their responsibilities" (1999: 36). In addition, as already pointed out, access to financial information may improve employee job performance (Ferrante & Rousseau, 2001: Rousseau & Shperling, 2003: 558).

Based on this assumption that implementing equity-based pay combined with information-sharing activities about the plans will positively impact firm performance, the following hypotheses are put forth:

Hypothesis 5. Firms with equity-based pay plans combined with information-sharing about these plans will experience high corporate productivity growth.

Hypothesis 6. Firms with a high coverage of equity-based pay plans combined with a high level of information sharing about these plans will experience a productivity growth.

4.4 Conclusions

Because the free-rider problem is inherent to group incentives like share and option plans, such incentives can only be beneficial if teams can overcome the free-rider problem through social and psychological payoffs. These social and psychological payoffs are commonly grouped under the umbrella term 'peer pressure'. Use of such payoffs is effective if the team is small enough for mutual monitoring to work and consists of individuals of similar type, if the team members have frequent and repeated social interactions, and if social sanctions can be successfully used on slacking team members. Therefore, group incentives can be powerful if teams can solve the free-rider problem using peer pressure and individual employees internalise the team's welfare. It is a managerial task to make peer-pressure work by creating feelings of loyalty and responsibility toward the firm and team.

Nonetheless, firms must recognise that peer pressure can also have a dysfunctional side – for example, a negative attitude towards management – and that, besides pure economic considerations, there exist non-economic caveats capable of inducing negative peer pressure and distorting group incentives. Thus, firms must embed group incentive plans in a coherent system of HRM strategies. The next section illustrates why a coherent HRM systems is desirable and how complementary HRM practices can achieve positive peer pressure and, with that, a positive impact on firm performance.

5 Consequences of Equity-Based Pay Complemented with HRM Activities

The following section discusses why it is beneficial for firms to adopt a whole bundle of HRM practices that are mutually complementary. Equity-based pay plans are considered one type of such mutually complementary HRM practices, which are often termed 'innovative HRM practices'. The section is structured as follows. It begins with a discussion of why certain HRM practices are called innovative and why firms introduce them. This introduction is followed by an explanation of how bundles of mutually complementary innovative HRM practices work and what barriers exist to broader adoption of innovative HRM practices. The section ends by providing empirical evidence on the link between complementary work practices and performance.

Despite the large body of literature on the equity-based pay-performance link, conclusive and clear results are lacking (see Section 4.3). Theoretically, the chief liability of equity-based pay plans is the free-rider problem that, as already discussed, can only be overcome in concert with positive peer pressure. Further, it is a managerial task to enable an environment that creates positive peer pressure and thus increases firm performance.

Complementarity theory offers promising additional answers to the question of how firms can increase firm performance through the use of equity-based pay. This theory points to the importance of connections or complementarities among certain HRM practices (Baker, Gibbons, & Murphy, 1994; Delaney & Huselid, 1996; Ichniowski & Shaw, 2003; Ichniowski, Shaw, & Prennushi, 1997; Milgrom, Qian, & Roberts, 1991; Milgrom & Roberts, 1995a). It posits that rather than introducing single HRM practices such as equity-based pay and teamwork, firms should think and act in terms of coherent systems of HRM practices that are mutually complementary. Thus, equity-based pay plans should be embedded in a system of mutually complementary HRM practices.

5.1 What Are Innovative HRM Practices?

Any discussion of innovative HRM practices first requires a clear definition of such practices. What are innovative HRM practices and what is their objective?

How do innovative HRM practices differ from non-innovative – that is, traditional – HRM practices? Authors often describe certain practices as innovative. For example, incentives are described as innovative if they provide the employee with an incentive for greater effort (Ichniowski & Shaw, 2003: 157), as well as if they reward the employee for involvement in decision making. Thus, innovative HRM practices are incentives that emphasise teamwork and ownership. That is why equity-based pay systems are considered an innovative HRM practice. Traditional systems, in contrast, reward employees with hourly or salaried pay with little connection of pay with performance outcomes and do not offer shares or options.

Teamwork is another HRM practice that is considered innovative and that is used for problem solving. By rotating workers across different jobs, innovative HRM systems increase worker flexibility and teamwork. Traditional systems, in contrast, assign workers to narrowly defined jobs with no job rotation or work teams. In addition, innovative systems strongly emphasise worker communication and "provide the information and motivation for greater job involvements and decision making" (Ichniowski & Shaw, 2003: 157). In contrast, traditional systems implement limited information sharing of operating data with employees.

Nonetheless, it must be admitted that even though the literature labels HRM practices 'innovative', the practices chosen for both this study and comparable studies are not as pioneering and recent as the name would suggest; most were already known in the 1980s and 1990s. Rather, the literature refers to these HRM practices as innovative based on evidence from several recent surveys of "a significant increase in their use among U.S. businesses over the last twenty years. Prior to that time, more 'traditional' human resource management practices […] were much more common among U.S. businesses" (Ichniowski & Shaw, 2003: 157).

5.2 Why Do Firms Adopt Mutually Complementary Work Practices?

Work practices complement each other "when using one more intensely increases the marginal benefits of using others more intensely" (Holmstrom & Milgrom, 1994: 976). Why do firms adopt multiple HRM practices that are complementary? A number of theoretical studies suggest three primary reasons.

First, firms introduce complementary work practices to *reduce free-rider problems*. As discussed in Section 4.1, firms use group incentives when they cannot accurately measure the performance of the individual; however, group incentives have an inherent drawback, namely the free-rider effect. However, several studies argue that free-rider problems can be overcome if group incentives work together with peer pressure (Kandel & Lazear, 1992; Kreps, 1990; MacLeod, 1988). Kandel and Lazear (1992) illustrate that appropriate group incentives can impact performance if coupled with other HRM practices that can reduce the free-rider issue. In addition, they propose that practices such as work teams, quality circles, and other forms of employee involvement may play an important role in cultural effects on team spirit and opportunities given employees to monitor each other. They show that the effectiveness of incentive-based pay systems can be enhanced when free-rider problems are reduced by careful employee selection and team-oriented work groups. Implementing complementary work practices could mitigate the free-rider problem caused by group incentive pay. Thus, complementarity theory offers promising answers to the inherent problem of shirking and imperfect monitoring.

Second, firms introduce complementary work practices to *elicit workers' ideas*. Firms increasingly emphasise the necessity of eliciting valuable ideas from shop to floor workers (Ichniowski & Shaw, 2003). One way of achieving this is by moving decision making to lower levels of the organisation. Decentralised decision making can be achieved when multiple HRM practices are implemented. However, firms must give employees the opportunity, the incentive, and the skills to share ideas. By adopting multiple HRM practices that support decentralised decision making, firms give employees the incentive, the opportunity, and the skills to share their ideas with the firm. Boning, Ichniowski, and Shaw (2001) show that firms in complex production environments, in which worker participation in the problem-solving process is needed, can benefit from the introduction of complementary work practices like group-incentive pay and problem-solving teams and thereby increase worker involvement.

Third, firms introduce complementary work practices in *multitasking work settings*. Studies on employees who perform multiple tasks offer another reason for complementarities among HRM practices (e.g., Holmstrom & Milgrom, 1994: 990). Many work settings require that employees perform a number of different

tasks and produce different kinds of output. For example, the research team working on a new medication for a terminal illness (see Section 3.2) may work on different tasks at the same time – that is, on the long-term project of developing the new medication and on short-term problems like improving existing measurement and testing. Researchers at universities may also be involved in teaching activities as well as research projects.

The key difficulty is to incentivise employees to be diligent in their multiple tasks. For example, the researchers in the above example should give full attention to the development of the new medication (one task) as well as to the problems with existing measurement and testing (second task). Therefore, firms need to adopt and balance multiple HRM practices "that address incentive issues for the different tasks" (Ichniowski & Shaw, 2003: 161). Holmstrom and Milgrom (1994: 990) conclude their multitasking model with the observation that it is essential to analyse individual work practices "not in isolation, but as part of a coherent incentive system", meaning that certain combinations of HRM practices are much more effective when adopted together rather than singly.

Thus, the reasons that firms adopt complementary work practices range from reducing free-rider problems to eliciting workers ideas to accomplishing multitasking work environments. The next section discusses how such complementarities in production work.

5.3 How Do Complementarities among Innovative HRM Practices Work?

How Do Complementarities among Innovative HRM Practices Impact Firm Performance?

The underlying assumption is that groups or clusters of complementary HRM practices have a tremendous impact on productivity, while changes in individual work practices have little or none (Ichniowski, Shaw, & Prennushi, 1997). Among the most prominent representatives of this school of thought are Milgrom and Roberts (1995a), who established the theory of complementarity and provide a framework for the analysis of systems marked by complementarity. They note that "complementarity is a matter of order" in the sense that "doing more of one thing

increases the returns to doing more of another" (Milgrom & Roberts, 1995a: 181). Formally, Milgrom and Roberts (1995) demonstrate that the marginal returns from one activity increase with an increase in another.

Milgrom and Roberts (1995a) further suggest that coherence and fit be thought of as elements of strategy, structure, and process. Complementarities among specific practices that span seven different HRM policy areas have been identified (Baker, Gibbons, & Murphy, 1994; Holmstrom & Milgrom, 1994; Kandel & Lazear, 1992; Milgrom & Roberts, 1995b): incentive compensation plans, extensive recruiting and selection, work teams, employment security, flexible job assignment, skills training, and labour-management communication. Implementing a combination of practices across all seven HRM policy areas can be expected to produce the highest levels of productivity (Ichniowski, Shaw, & Prennushi, 1997: 295), because the evidence indicates that "*systems of HRM practices determine productivity and quality while marginal changes in individual work practices have little effect*" (Ichniowski, Shaw, & Prennushi, 1997: 311).

Ichniowski, Shaw and Prennushi (1997) have studied 36 homogenous production lines and identified the most common combinations of innovative HRM practices used in them. Specifically, they have inspected a broad set of variables that illustrate the seven HRM policy areas. Then, by inspection of the distribution of the HRM variables, the authors have isolated four distinctive combinations, which they refer to as 'HRM systems'. These four systems "map out a hierarchy from most 'traditional' to most 'innovative'" (Ichniowski, Shaw, & Prennushi, 1997: 296). The most "traditional" HRM system does not contain any of the innovative work practices. In contrast, the most "innovative" HRM system has implemented HRM practices in all seven HRM policy areas. Their results show that lines that adopt a full bundle of innovative work practices achieve the highest levels of productivity, whereas the traditional system produces the lowest performance. They have also estimated "the productivity effects of changes in individual human resource management practises, and in no case did an individual resource management innovation […] have a measurable effect on productivity itself. These patterns assume that important complementarities exist among innovative human resource management practices. As a bundle, the innovative human resource management practices work, but there are ineffective when individual practices are instituted" (Ichniowski & Shaw, 2003: 164).

What Are the Barriers to the Broader Adoption of Innovative Work Practices?

If complementarities among innovative HRM practices produce the highest levels of productivity, why are these practices not adopted more broadly? Ichniowski and Shaw (2003: 165) suggest two main classes of explanations: "First, work-place specific factors, even for workplaces in the same industry, may mean that nonadopters would not experience the gains in productivity as adopters have". In their study of minimill production lines, Boning, Ichniowski, and Shaw (2001) show that workplace-specific factors in lines that benefit from complementary work practices differ from those of firms that do not experience productivity gains. More precisely, "lines with more complex production processes that make more complex steel shapes can increase productivity more form innovative human resource management practices and so are more likely to adopt them" (Ichniowski & Shaw, 2003: 166).

In their study of steel production lines, Ichniowski, Shaw, and Prennushi (1997) cannot confirm the argument that differing degrees of complexity across work sites influence whether firms adopt complementary work practices or not. However, in their later study, Ichniowski and Shaw (2003: 165) suggest a second explanation, namely that "transition costs associated with switching from traditional to innovative human resource management practices may limit the diffusion of these practices". In contrast to the minimill production lines, the steel finishing lines appear very homogenous. The authors find evidence that traditional HRM practices are more prevalent in old production sites that have remained in continuous operation: "Innovative [HRM] practices are much more common among old lines that have been closed but later reopened by new owners, […] and are almost universal in brand new lines" (Ichniowski & Shaw, 2003: 166). Moreover, non-adopters employ "older production workers and managers who have longer tenure at their mills, suggesting either that older workers or managers do not have the skills needed for the new human resource management environments or that they perceive that they will not benefit from their investments in new skills" (Ichniowski & Shaw, 2003: 166).

If HRM practices do impact performance, does this ultimately mean that work is done differently under innovative and traditional HRM systems? There exists evidence that workers in environments with innovative HRM practices "are not

simply working harder, they are working smarter", suggesting that workers in innovative working environments "engage in significant amounts of problem-solving activity that improves […] performance" (Ichniowski & Shaw, 2003: 167). Additionally, workers in innovative work settings have different patterns of work relationships: these workers interact with most of the other production workers. Thus, Ichniowski and Shaw (2003) suggest that workplaces with more traditional HRM practices would need to create an entirely different set of relations among workers when replacing the existing work system with an innovative work system[9].

5.4 Empirical Evidence on the Link between Complementarities and Performance

From the above it might be assumed that adopting complementary work practices has a positive impact on performance. The following section reveals how far these theoretical arguments can be confirmed through empirical results.

Overall, there does exist a body of literature empirically investigating the link between complementary work systems and firm performance. Indeed, "[a] review of available studies suggests that there is a positive relationship between [so called] new work practices and firm-level performance" (Arnal, Ok, & Torres, 2001: 28). Whereas a few studies report mixed or neutral findings, the rest provide positive results. The following section presents a summary of the existing empirical literature grouped by major findings (see Table 7 for a summary of *major* studies in the field)[10].

[9] These barriers to broader adoption found in production environments can be confirmed for other industries; see Ichniowski and Shaw (2003) for an overview.
[10] To the knowledge of author, no study on complementarities has found a negative effect on performance.

Author(s) and year	**Dependent variable**	**HRM practices: Complementarities**	**Major finding(s)**
Conyon & Freeman, 2001	Sales	Interactions among equity-based pay and certain information-sharing, communication and consultation between managers and employees	No support for performance increase of interaction of equity-based pay and information-sharing
Delaney & Huselid, 1996	Perceptual measures of organisational performance and market performance	HRM practices such as sensitivity in staffing, training, incentive compensation Interactions among HRM practices	Support that progressive HRM practices will be positively related to organisational performance; No support that complementarities among progressive HRM practices will be positively related to organisational performance
Wolf & Zwick, 2002	Value added	Two systems: "organisation changes fostering employee involvement " (participation) and "incentives" Interaction between the two systems	Positive impact of participation system, no effect of incentives, No effect of interaction between participation and incentive systems
Arthur, 1994	Manufacturing performance (the mill's labour efficiency)	Two dominant human resource systems (a certain combination of HRM practices) "commitment" and "control"	Companies with commitment to a human resource system report higher performance than firms with a control human resource system
MacDuffie, 1995	Productivity of labour (defined as hours of actual effort)	Organisation-wide human resource policies that affect employee commitment and motivation	Support of positive relationship between innovative human resource practices and firm performance

Ichniowski, Shaw, & Prennushi, 1997	Productivity of steel finishing production lines	HRM practices, such as incentive pay, team work practices, training, communication Combinations of practices (systems), from most "traditional" to most "innovative"	Innovative HRM practices impact positively on productivity Systems of innovative HRM practices have largest effects on productivity
Boning, Ichniowski, & Shaw 2001	Productivity of steel minimill production lines, as measured by "good tons" produced (tons that meet industry-established quality standards) divided by the tons that enter the production process	HRM practices, such as group-based incentive pay and problem-solving teams, and a term capturing the interaction between the two HRM practices	Problem-solving teams, when combined with group-based incentive pay, increase productivity; however, productivity benefits occur exclusively in more complex production lines
Peck & Jensen, 2000	Sales	Interactions among equity-based pay and certain HRM practices, such as autonomous work groups, circulars, information sheets, TQM	Support that share-based pay associated with participative management styles leads to additional productivity increase
Ludewig, 2001	Value added	Combinations of practices (systems) from "high performance system" to "cost control system"	High performance systems have positive impact on firm performance

Source: Author

Table 7: Consequences of Complementary Work Practices

Neutral and Mixed Impact of Complementary Work Practices on Performance

One study that reports *neutral* results is that of Conyon and Freeman (2001), who examine whether firms in the U.K. employ participative workplace activities. In contrast to the other studies cited here, this investigation looks at HRM practices in general with a focus on the complementarity between shared compensation practices and allocation of decision-making rights/information sharing with workers. The results do not support the interaction of shared compensation schemes and information sharing but find that formal communication channels and consultation between managers and employees brings extra productivity lift. In addition, the authors find that firms with shared compensation scheme arrangements "are more likely to establish formal communication and consultation channels with workers than other establishments" (Conyon & Freeman, 2001: 5).

Mixed results are reported by Delaney and Huselid's (1996) study of 590 for-profit and non-profit U.S. organisations, which finds that progressive HRM practices affecting employee skills, employee motivation, and the structure of work (e.g., selectivity in staffing, training, and incentive compensation) positively relate to firm performance. However, these authors find no support that complementarities among progressive HRM practices are positively related to organisational performance. Moreover, a study by Wolf and Zwick (2002: 23) (using large establishment panel data for Germany from 1996 to 2000), while showing that implemented bundles of human resource activities – especially, those that encourage employee involvement – have a significantly positive impact on firm performance, find that a combination of greater employee involvement and incentive schemes fails to achieve a productivity premium. These authors apply a main component factor analysis and reduce their seven measures of high-performance work places (shift of responsibility to lower levels of hierarchy, team work and self-responsible teams, work groups with independent budgets, employee share ownership, profit sharing, training to support organisational change, and training as an incentive scheme) to two independent factors, "organisation changes" and "incentives".

Positive Impact of Complementary Work Practices on Performance

Among the studies that report *positive* results, Arthur (1994: 672) finds evidence that companies with a "commitment" human resource system, defined as one that focuses on the development of "committed employees who can be trusted to use their discretion to carry out job tasks in ways that are consistent with organizational goals", report higher performance than firms with a "control" human resource system, defined as one that aims to reduce direct labour costs and bases employee rewards on some measurable output criteria. Whereas in control-type systems, employee compliance is achieved through specified rules and procedures, commitment-type human resource systems "shape desired employee behaviours and attitudes by forging psychological links between organisational and employee goals" (Arthur, 1994: 672).

In line with complementarity theory, MacDuffie (1995: 218) studies a sample of international firms whose systems of innovative human resource practices have a positive impact on firm performance: "Overall, the evidence strongly supports the hypothesis that assembly plants using flexible production systems, which bundle human resource practices into a system that is integrated with production/business strategy, outperform plants using traditional mass production systems in both productivity and quality".

Further support for this significant positive effect of systems of innovative HRM practices on productivity and quality is also provided by Ichniowski, Shaw, and Prennushi's (1997) study of 36 U.S. steel production lines owned by 17 companies. According to the authors, "the preponderance of the evidence suggests that in these steel finishing lines, innovative employment practices tend to be complements, as is proposed in the recent theoretical work on optimal incentive structures. That is, workers' performance is substantially better under incentive pay plans that are coupled with supporting innovative work practice – such as flexible job design, employee participation in problem-solving teams, training to provide workers with multiple skill, extensive screening and communication, and employment security – than it is under more traditional practices" (Ichniowski, Shaw, & Prennushi, 1997: 311/312).

Positive results are also confirmed by Boning, Ichniowski, and Shaw (2001), who use data from 34 minimill production lines. The authors "provide direct evidence on productivity effects of group incentives and problem-solving teams" (Boning, Ichniowski, & Shaw, 2001: 21). However, the productivity increase "occurs exclusively in more complex production lines" (Boning, Ichniowski, & Shaw, 2001: 3), meaning in those lines with more complex production technologies and products. This finding signifies that production lines which require workers to be involved in the production process by using their knowledge to solve problems and make improvements in operations could benefit more from adoption of complementary work practices than could less complex production lines, or, as Boning, Ichniowski, and Shaw formulate it, "following standard operating procedures appears to suffice in less complex environments".

Peck and Jensen (2000), using a sample of U.K. stock mark listed companies, find evidence of complementarities between employee ownership schemes and certain human resource practices like autonomous work groups, circulars, information sheets, communication meetings, joint consultative committees, joint health and safety committees, quality circles, trade union recognition, staff councils, and total quality management (TQM). Their findings indicate that share schemes associated with participative management styles lead to additional productivity increase. Ludewig (2001), in a test of complementarity theory assumptions for a sample of German firms, shows that firms that implemented systems of complementary activities enjoy higher productivity impact.

In sum, the theoretical arguments and empirical evidence generally suggest a positive impact of bundles of innovative human resource practices combined with equity-based pay plans on corporate performance, producing hypothesis 7:

> *Hypothesis 7. Equity-based pay plans combined with innovative systems of HRM activities lead firms to experience productivity growth.*

5.5 Conclusions

This section has shown that it may be beneficial for firms to introduce coherent systems of innovative work practices that are mutually complementary. However, the notion of complementarities means that adopting complementary work

practices leads to predictable relationship among these practices (Milgrom & Roberts, 1992: 108). Such predictability makes the cost of failure to match or fit the parts together high, and adopting complementary work practices requires much priori information about the form of the optimal solution (Milgrom & Roberts, 1992: 91). There may be several coherent options, but only one will generally be optimal. In addition, it is complicated for managers to describe precisely each of the coherent strategies, even if they consolidate all their corresponding information. One key difficulty is that the environment changes constantly due to variations in demand conditions, cost, and productivity of different technologies (Milgrom & Roberts, 1992: 112). The key role of management in such situations is to guarantee coordination and so ensure an efficient choice. Therefore, management must "craft a web of human resource management practices that motivate workers to contribute and effort and ideas to the goals of their firm" (Ichniowski & Shaw, 2003: 175-176). If management is able to achieve this, complementary work systems are most beneficial in terms of productivity growth.

For the setting of equity-based pay plans, the findings of this section have several implications. First (as discussed in Section 3), group incentives like equity-based pay plans must be adopted in concert with other innovative HRM practices, thereby inducing positive peer pressure. Second, equity-based pay plans cannot be implemented in isolation; they must be part of a coherent system of HRM practices, spanning across extensive recruiting and selection, work teams, employment security, flexible job assignment, skills training, and labour-management communication. Third, firms must consider their working environment when adopting bundles of HRM practices. As shown above, in certain work settings, complementarities will not produced the desired impact on firm performance.

6 Research Methods

6.1 Overview of Research Methods

This section is structured as follows. It begins with a general overview of research methods then outlines the data collection method for this study, followed by data analysis and variable conceptualisation and operationalisation. The section ends with the presentation of the questionnaire used in this study.

The quantitative techniques chosen for this study concentrate on the measuring of countable elements "using predetermined categories that can be treated as internal or ordinal data and subjected to statistical analysis" (Patton, 1997: 273). Quantitative research originates from a positivist approach to science[11], whose underlying assumptions are (1) quantifiable observations (social reality is external and objective), (2) an independent observer, and (3) a value-free attitude towards science (Easterby-Smith, Thorpe, & Lowe, 1991). The end product of such research can be the derivation of laws or law-like (i.e., statistical) generalisations (Yin, 1994: 36) similar to those produced by physical and natural scientists (Remenyi, Willams, Money, & Swartz, 1998).

One central principle of critical rationalism, introduced by Popper (1934), is falsification; that is, an idea must be falsifiable to be considered scientific. A second central element, a reductionist approach to discovering the relationships among variables being studied (Remenyi, Willams, Money, & Swartz, 1998: 35), is essential to controlling the experiment or investigation, because a reductionist attitude permits a realisation of how the relevant variables are behaving. Nonetheless, because reductionism is close to simplification, in positivist research some complicating, and possibly interesting, factors are stripped out (Remenyi, Willams, Money, & Swartz, 1998: 36).

Of primary importance to research design implementation are viable and relevant research questions that help direct and focus the researcher's thinking in the creation of new knowledge. Such questions describe potential relationships among certain variables (Black, 1999: 30), make theoretical assumptions even more

[11] It is not the intention of this section to discuss the topic in the context of philosophy of science but to distinguish the research design chosen from other research designs (e.g., qualitative research).

explicit, and tell the researcher what she or he wants to know most or first (Miles & Huberman, 1994: 22). Thus, all energy is channelled in a certain direction and data collection can be more focused. At the same time, data may also be limited because, after having decided on the questions, the researcher starts to make some implicit sampling decisions and looks "only at *some* actors in *some* contexts dealing with *some* issues" (Miles & Huberman 1994: 22). As a result, the procedure of formulating research questions may be seen as a process of choice, limitation, and exclusion.

Three primary research questions meet the overall objective of this investigation into the antecedents and consequences of equity-based pay and consequences of equity-based pay complemented with HRM activities: (1) *Why do firms adopt equity-based pay plans?* (2) *What are the effects of equity-based pay plans on firm performance?* and (3) *What are the effects of equity-based pay plans complemented with innovative HRM activities on firm performance*"

These three research questions are of explanatory character (Black, 1999: 31-33), meaning they seek to investigate causes of an observed outcome. Of most interest is the testing of proposed causal relationships to identify one or more potential independent variable and its outcome on the dependent variable.

To answer these questions, a quantitative, correlative approach is chosen for its capacity to include larger representative samples. In addition, a quantitative approach enables statistical generalisations and control of the results by an estimated standard error, while correlative designs not only explore relationships among pairs of variables but identify how they vary with respect to each other. For data collection, a survey questionnaire is deemed the most efficient and accurate means of collecting information (Zikmund, 2000) while eliminating interviewer bias.

6.2 Data Collection

The collection of data used in this study was carried out in 2002 as part of this dissertation research. The original sampling frame consisted of the 535 largest German companies (as measured by number of employees) including the DAX 30 (excluding investment trusts) index of the German stock exchange: "DAX 30

measures the performance of the Prime Standard's 30 largest German companies in terms of order book volume and market capitalization" (Deutsche Börse Group, 2003). The human resource director, CEO, or another member of the management board was targeted as the key person with the most appropriate knowledge set.

The three-page, highly focused survey, accompanied by a letter outlining the survey rationale, was administered in three waves: the first (February 2002) and second (April 2002) were postal surveys and the third (May/June 2002) was a telephone follow-up to non-responding companies. In total, 115 completed, usable forms were returned, yielding a response rate of 21.5%, including 19 (63% of the) DAX 30 companies, a usable response rate considered respectable by comparative standards. A further 75 responses indicated company inability to participate (for reasons such as company policy against responding to surveys, not having the relevant statistics, too busy, and not applicable to that company).

Data obtained directly from the survey covers equity-based pay plans, information-sharing practices, and human resource practices (see Sections 6.4 and 6.5). Other company-specific data (e.g., market value, net sales, employees, and total capital) were downloaded either from the databases Worldscope and Thomson Analytics or from direct email correspondence with the participating companies and searches of annual reports (foreign employees to total employees). Because the survey instrument allowed dating of the introduction of equity-based pay plans, a time series element could be built onto the cross-section of companies. Overall, based on responses from the 115 companies, the sample data include firm and industry characteristics for a five-year period (1997-2001).

6.3 Data Analysis

Testing the hypotheses regarding *adoption* of equity-based pay plans involves modelling the use of share schemes and option schemes as a discrete choice variable. More formally, the equation determines that the choice of share or option scheme be

$$z_i^* = \alpha_i + \beta X_i + u_{i,}$$

where z is the selection variable (1 if the firm has a share or option scheme; 0 if not); X_i is the matrix of economic variables explaining plan selection – namely, Tobin's q, foreign sales to total sales (and foreign employees to total employees and two additional variables capturing the degree of firm's internationalisation), and prior sectoral adoption; u is white noise. Technically, the use of equity-based pay plans is calculated by a maximum-likelihood probit estimation.

Productivity effects are measured by the estimation of an unrestricted Cobb-Douglas production function, a descriptive relation that connects input with output. This modelling procedure is conventional for most of the studies assessing the link between equity-based pay plans and performance (see Section 4.3). The basic model is of the following form:

$$y = e^{\beta o} l^{\beta 1},$$

where y is productivity, l is labour, k is capital, and α and β are positive fractions.

To assess the productivity effects of different equity-based pay plans on firm level performance, taking logs of the above expression and augmenting with a term reflecting the existence of share plans or option plans yields a Cobb-Douglas production function.

The augmented production function for firm i in year t is considered:

$$y_{it} = \alpha_i + \alpha_t + \beta_0 e_{it} + \beta_1 k_{it} + \beta_2 \text{EquityPay}_{it} + \varepsilon_{it},$$

where y is ln (productivity), e and k are labour and capital factor inputs (in natural logs), and *EquityPay* is the existence of a share or option plan with which the production function is augmented. α_i is a firm-specific "fixed effect" that captures the effects of those unobserved time-invariant features of firm i that affect y, while α_t is a time effect common to all firms included to control for aggregate macroeconomic factors and ε_{it} is the idiosyncratic error term. β_0, β_1 and β_2 represent the associated coefficients.

To consider the impact of various influences on productivity growth rather than levels, the first-difference form is needed, yielding the following equation (note that the firm fixed effects disappear on first differencing).

$$\Delta y_{it} = \Delta\alpha_t + \beta_0 \Delta e_{it} + \beta_1 \Delta k_{it} + \beta_2 \text{EquityPay}_{it} + \Delta\varepsilon_{it},$$

where Δ is the first-difference operator (so, $\Delta \log X_{it} = \log X_{it} - \log X_{it,\, t-1}$).

A primary advantage of the first-difference form is that it reduces problems of multi-collinearity (Gujarati, 2003: 417-418). One reason for multi-collinearity in time series data is that data like sales, capital, and employment tend to move in the same direction over time. One way of minimising this dependence is the use of the first-difference form. The regression runs not on the original variables but on the differences of successive values. The first-difference regression often reduces the severity of multi-collinearity because, although the levels of two variables may be highly correlated, there is no a priori reason to believe that their differences will also be highly correlated (Gujarati, 2003: 417-418).

The R-square (R^2; goodness of fit of the fitted regression) is generally lower for the first-difference form because taking the first differences measures the behaviour of the variables around their (linear) trend value (Gujarati, 2003: 417-418). The secondary advantage of the first-difference transformation is that it may make non-stationary time series data stationary; that is, means and variances will be constant over time (Gujarati, 2003: 417-418).

To assess the productivity growth effects of high coverage of share or option plans, existence of high coverage is included in the equation:

$$\Delta y_{it} = \Delta\alpha_t + \beta_0 \Delta e_{it} + \beta_1 \Delta k_{it} + \beta_2 \text{EquityPay}_{it} + \beta_3 \text{HighCov} + \Delta\varepsilon_{it},$$

in which the term *HighCov* captures the existence of high coverage of share or option plans.

To assess the productivity growth effects of information sharing on equity-based pay productivity growth, the above mentioned equation is augmented with a term reflecting the equity information sharing (*InfoSharing*):

$$\Delta y_{it} = \Delta\alpha_t + \beta_0\Delta e_{it} + \beta_1\Delta k_{it} + \beta_2 \text{EquityPay}_{it} + \beta_4 \text{InfoSharing}_{it} + \Delta\varepsilon_{it.}$$

To test for the existence of interaction effects, linear effects between equity information sharing and the presence of share schemes or option plan are examined.

The estimated productivity equation then becomes

$$\Delta y_{it} = \Delta\alpha_t + \beta_0\Delta e_{it} + \beta_1\Delta k_{it} + \beta_2 \text{EquityPay}_{it} + \beta_3 \text{HighCov} + \beta_4 \text{InfoSharing}_{it} + \beta_4 \text{INT1}_{it} + \Delta\varepsilon_{it},$$

in which the term *INT1* (InfoSharing_{it} x High-Coverage Pay Plan_{it}) captures the interactions between the equity-information sharing, as well as the existence of high coverage of share or option plans.

To test for the existence of complementarities, linear interaction effects between each of the systems and the presence of share schemes or option plan are examined.

The estimated productivity equation then becomes

$$\Delta y_{it} = \Delta\alpha_t + \beta_0\Delta e_{it} + \beta_1\Delta k_{it} + \beta_2 \text{EquityPay}_{it} + \beta_3 \text{HighCov} + \beta_5 \text{Systems}_{it} + \beta_6 \text{INT2}_{it}\ \Delta\varepsilon_{it},$$

in which the term *INT2* (System_{it} x Share_{it}) captures the interactions between the systems, as well as the existence of share or option schemes.

Technically, the regression models are calculated by a robust standard errors regression technique, one with heteroscedasticity-corrected standard errors and variances (Gujarati, 2003: 417-418).

It must be acknowledged here that this type of work is often surrounded by an endogeneity problem (see, e.g., Conyon & Freeman, 2001): Do equity-based pay plans lead to higher performance or do high-performance firms introduce equity-based plans? This question is not easy to answer, indicating that studies in this field must be particularly attentive to the potential problem of endogeneity.

6.4 Variable Conceptualisation and Operationalisation

Addressing the three major research questions regarding (1) antecedents of equity-based pay, (2) consequences of equity-based pay, and (3) consequences of equity-based pay complemented with HRM-practices implies the following variables of interest:

Antecedents of equity-based pay: (1) those relating to the existence of equity-based plans; (2) those needed to test for antecedents of equity-based pay plans – for example, (a) firm degree of managerial discretion, (b) firm degree of internationalisation, and (c) sectoral coverage; and (3) control variables. The independent variable is antecedents of equity-based pay plans (2); the dependent variable is existence of equity-based pay plans (1).

Consequences of equity-based pay: (1) those relating to the existence of equity-based plans, (2) the prevalence of certain information-sharing practices, (3) HRM activities as an indicator for complementarities, and (4) control variables. Independent variables are represented by consequences (1) to (3); the dependent variable is performance.

The subsequent section provides detailed descriptions of these variables of interest, which are also summarised in Table 8.

Variable name	**Description**
Equity-based pay plans	*Share plan:* Dummy variable equal to one if the company reports the existence of a share plan.
	Option plan: Dummy variable equal to one if the company reports the existence of an option plan.
	Any plan: Dummy variable equal to one if the company reports the existence of a share plan, an option plan, or both.
High coverage of employee by equity-based pay plans	*High-coverage share plan 1:* Dummy variable equal to one if the extent of coverage of the company's equity- based pay plan as measured by the percentage of the workforce covered by the company's employee share plan is above the mean. *High-coverage share plans 1-3:* Dummy variable equal to one if the extent of coverage of the company's equity-based pay plan as measured by the percentage of the workforce covered by the company's share plans (over all three share plans) is above the mean.
	High-coverage option plan 5: Dummy variable equal to one if the extent of coverage of the company's equity-based pay plan as measured by the percentage of the workforce covered by the company's option plan with several offers is above the mean. *High-coverage option plans 4&5:* Dummy variable equal to one if the extent of coverage of the company's equity-based pay plan as measured by the percentage of the workforce covered by the company's option plans (over both option plans) is above the mean.
New market companies	*Nemax:* Dummy variable equal to one if the company was listed in the new market index NEMAX of the German stock exchange (as per May 15, 2000).
Degree of managerial discretion	*Tobin's Q:* Environments with high with high latitude of agent's action and high monitoring costs due to specific industry determinants like high market growth and demand instability as measured by Tobin's Q.
DOI	*FSTS:* Foreign sales as a percentage of total sales (FSTS).
	FETE: Number of foreign employees as a percentage of total employees.
	Factor: Compiled through factor analysis between FSTS and FETE.
	Countries with subsidiaries: Number of countries in which the company operates foreign subsidiaries.

Sectoral adoption	*Sectoral adoption:* Prior sectoral adoption of equity-based pay plans for share and option plans.
Training	*Training:* Dummy variable equal to one if the company reports the existence of training and seminars lasting several days.
Teamwork	*Teamwork:* Dummy variable equal to one if the company reports the existence of four activities: (1) quality circle schemes, (2) autonomous work groups, (3) total quality management, and (4) overlapping departmental work groups.
Communication	*Communication:* Dummy variable equal to one if the company reports the existence of three activities: (1) information system based on Intranet, Internet or database; (2) communication brochures and newsletters; and (3) a formal structure for sharing information with employees (e.g. provision of data on financial status, firm and market strategy, stock market price).
Complementary Systems	*System1:* Dummy variable equal to one if the company reports the existence of the three groups "training", "teamwork", and "communication".
	System2: Dummy variable equal to one if the company reports the existence of two of the "training", "teamwork", and "communication" Groups.
	System3: Dummy variable equal to one if the company reports the existence of one of the "training", "teamwork", and "communication" Groups.
Firm size	*Employment:* Logarithm of total number of employees. Δ *Employment:* Logarithm of the first-difference form of total number of employees.
Capital	*Total capital:* Logarithm of total capital represents the total investment in the company. It is the sum of common equity, preferred stock, minority interest, long-term debt, non-equity reserves, and deferred tax liability in untaxed reserves. Δ *Total capital:* Logarithm of the first-difference form of total capital represents the total investment in the company. It is the sum of common equity, preferred stock, minority interest, long-term debt, non-equity reserves, and deferred tax liability in untaxed reserves.
Performance	*Sales:* Logarithm of gross sales and other operating revenue less discounts, returns, and allowances. Δ *Sale:* Logarithm of the first difference form of gross sales and other operating revenue less discounts, returns, and allowances.
	Δ *Sales/employee:* Logarithm of the first difference form of gross sales and other operating revenue less discounts,

	returns, and allowances divided by total number of employees.
	Δ *EBIT:* First difference form of earnings of a company before interest expense and income taxes. It is calculated by taking the pre-tax income, adding back interest expense on debt, and then subtracting interest capitalised.
	Δ *Net income:* Net income represents the fiscal period income or loss reported by a company after subtraction of expenses and losses from all revenues and gains.
	Perceived productivity: Based on the companies' opinion on whether equity-based pay performance has a positive impact on productivity.
	Information productivity Based on the companies' opinion on whether equity-based pay plans combined with equity information-sharing leads to superior performance.
Control variables	*Time*, and *Industry*

Source: Author

Table 8: Summary of Variable Descriptions

Indicators for equity-based pay plans. The existence of equity-based pay plans is measured in two ways, both of which are based on information reported in the survey. First, a dummy variable is created, equal to one if the company reports the existence of either (1) a share plan (if the company reports either an employee share plan, stock purchase plan, or a stock savings plan) or (2) an option plan (if the company reports either an option plan having a one-time unique offer or an option plan with repeated offers). The creation of the dummy variable equal to one implies that if the company reports more than one share plan and/or more than one option plan the dummy variable stills equals one. Second, the extent of the coverage of the company's equity-based pay plan is assessed using the percentage of the workforce covered by the company's scheme.

High coverage of share plans/option plans. Because the questionnaire asks companies for the percentage of employees covered by the schemes, a dummy variable equal to one is created if the extent of coverage is above the mean. High coverage of share plans/option plans is measured at two levels: first, for the extent of coverage of the company's employee share plan and for the extent of coverage of the company's option plan with several offers; second for the extent of coverage of the company's share plans (over all three share plans) and for the extent of coverage of the company's option plan (over both option plans).

Nemax. The existence of new market (or internet companies) is measured as follows: A dummy variable is created, equal to one if the company was listed in the NEMAX index of the German stock exchange on May 15, 2000, the date on which the German stock exchange introduced the NEMAX sector indices and issued a list with all companies listed in NEMAX.

Indicator for managerial discretion. This term refers to an environment in which agents have a wide latitude of action described by a number of dimensions (e.g., Finkelstein & Boyd, 1998: 182): market growth, R&D intensity, advertising intensity, demand instability, capital intensity, industry concentration, and regulation. Although this variable is widely cited, little emphasis has been placed on its operational definition (Finkelstein & Boyd, 1998), even though some researchers have operationalised discretion at the industry level (e.g., Datta, Rajagopalan, & Zhang, 2003; Hambrick & Abrahamson, 1995) and others at the firm levels of analysis (e.g., Finkelstein & Boyd, 1998; Wright & Kroll, 2002). In

line with Finkelstein and Boyd (1998), this dissertation suggests the firm level of analysis as the appropriate level for the hypotheses presented. However, because of restricted data availability in the German setting – particularly, on market growth – in contrast to Finkelstein and Boyd (1998), this dissertation relies on one single measure of managerial discretion, namely Tobin's Q, "the ratio of the firm's market value and long-term debt to the replacement value of its capital stock plus its net current assets" (Sesil, Kroumova, Blasi, & Kruse, 2002: 279), as an accurate measure for firm growth. Most specifically, Tobin's Q is regarded as a "forward-looking measure of firm performance which captures the firm's perceived growth opportunities and expected future stream of earnings" (Sesil, Kroumova, Blasi, & Kruse, 2002: 279).

Sectoral coverage. To measure prior sectoral adoption of equity-based pay plans, companies are categorised according to their primary SIC sector, which is then aggregated at the one-digit level. The average number of equity-based pay plans in each sector is calculated per year[12].

Indicators for internationalisation. Firm degree of internationalisation (DOI) mirrors its dependence on foreign markets for customers and factors of production, as well as the geographical dispersion of this dependence (Sullivan, 1994), which factors are used as indicators for internationalisation. In addition, the literature suggests that a firm's DOI consists of three dimensions: financial, structural, and, psychological (also called attitudinal) (Sullivan, 1994: 331). The financial dimension measures a company's monetary activities abroad; structural internationalisation captures a company's foreign assets, subsidiaries, resources or employees; while the attitudinal dimension refers to the firm's international top management orientation. In addition, whereas the financial and structural dimension can be quantified relatively easily, the psychological/attitudinal dimension, being inherently qualitative, is more difficult to capture. The following table summarises the operationalisation of the respective dimensions as conceptualised throughout the literature.

[12] As the average number of schemes varies per year, this is not the same as simply including industry variables.

Financial DOI	Structural DOI	Psychological DOI
• Foreign sales as a percentage of total sales (FSTS) • Foreign earnings • Foreign investment to total investment	• Export sales to total sales • Foreign assets as a percentage of total assets • Number of subsidiaries • Number of foreign employees to total employees	• International experience of top management • Foreigners within top management • Inter-cultural dispersion of international operations

Source: According to Ramaswamy, Kroeck, & Renforth (1996) and Sullivan (1994; 1996).

Table 9: Operationalisation of DOI

In the German setting, because of restricted data availability, researchers traditionally rely on the ratio of foreign sales-to-total sales (i.e., financial degree of internationalisation) as the measure of a firm's foreign market exposure (Ruigrok & Wagner, 2003). Thus, for this dissertation, data for firm foreign sales-to-total sales (FSTS) and foreign employees-to-total employees (FETE) are obtained through a supplementary email survey to the participating companies and a search of annual reports put out by relevant firms. In addition, a variable (factor) is created by applying a factor analysis between FSTS and FETE (thus combining a financial and structural dimension of DOI). The survey questionnaire responses yield the data on the number of foreign subsidiaries (not varying over five years).

Equity information sharing. Four mechanisms specialised for employee ownership are included in the research design to determine whether they are associated with higher productivity conditional on shared compensation: (1) consultation and feedback channels for employees, (2) introductory informational brochures for employees, (3) regular circulars and newsletters, and (4) training and seminars. A dummy variable is created, equal to one if the company has equal to or more than two (above mean) of the four mechanisms specialised for equity-based pay.

Indicators for complementarities. The following HRM activities test for the existence of complementarities: (1) quality circle schemes; (2) autonomous work groups; (3) total quality management; (4) overlapping departmental work groups; (5) training and seminars lasting several days; (6) information systems based on Intranet, Internet, or database; (7) communication brochures and newsletters; and

(8) a formal structure for sharing information with employees (e.g., provision of data on financial status, firm and market strategy, stock market price).

Three primary motivations underlie the choice of these indicators. First, they mostly correspond to the HRM policy areas identified by complementarity theory (Ichniowski, Shaw, & Prennushi, 1997); namely, incentive compensation plans, extensive recruiting and selection, work teams, employment security, flexible job assignment, skills training, and labour-management communication. Second, other studies in the field have already successfully employed them. For example, Peck and Jensen (2000) use quality circle schemes, autonomous work groups, and total quality management. Third, workplaces with extensive use of employee involvement show the highest productivity performance measured both on labour productivity levels relative to similar workplaces and on the growth of labour productivity (Fernie & Metcalf, 1995). Such employee involvement has been measured, inter alia, by the existence of (1) quality circles and other problem-solving groups, (2) briefing groups and team briefings, (3) regular meetings between senior managers and all sections of the workforce, (4) systematic use of the management chain for communication with all employees, (5) suggestion schemes, and (6) regular newsletters.

To test for complementarities, four systems are created, ranging from most "traditional" to most "innovative"[13] (see also Section 5.1). First, the eight HRM activities are categorised into three different groups: (1) training, (2) teamwork, and (3) communication, meaning that (1) training consists of one variable – training and seminars lasting several days; (2) teamwork consists of the four variables – quality circle schemes, autonomous work groups, total quality management, and overlapping departmental work groups; and (3) communication consists of three variables – an information system, communication brochures and newsletters, and a formal structure for information-sharing. Next, dummy variables are created for the three groups: training equals 1 if system (1) is in practice, teamwork equals 1 if system (2) is in practice, and communication equals 1 if system (3) is in practice. Subsequently, the four systems from "traditional" to

[13] Some studies (e.g., Ichniowski, Shaw, & Prennushi, 1997; MacDuffie, 1995, Wolf & Zwick, 2002) use factor analysis methods that, for the purposes of this dissertation, provide no useful results based on which to conduct a complementary systems analysis.

most "innovative" (dummy variables) are created. System1, the most innovative system, exists when a company has implemented all three groups – training, teamwork, and communication. System2, the second innovative system, exists if a company has adopted two of the three groups, and System3, the third innovative system, exists if a company has adopted only one of the three groups. The most traditional system, System4, characterises only companies that have implemented none of the three groups.

Indicators for firm size as a modelling variable. Firm size is measured by the logarithm of the firm's total number of employees.

Indicators for capital as a modelling variable. Capital is measured in two ways: first by the logarithm of the firm's total capital – the sum of common equity, preferred stock, minority interest, long-term debt, non-equity reserves, and deferred tax liability in untaxed reserves that represent the total investment in the company (for the model with perceived productivity, see Table 14, Section 8); and second, by calculation of the logarithm of the first-difference form of capital (for all productivity models besides the model with perceived productivity, see Table 12, 15 and 16, Section 8).

Indicators for performance. Firm performance issues focus on the question of whether employee ownership leads to a performance increase. This focus leads ultimately to the question of how performance is defined and measured. Several previously mentioned studies employ profitability as a performance measure (see Blasi, Conte, & Kruse, 1996; Conte & Tannenbaum, 1978; Livingston & Henry, 1980), while others use productivity as measured either by sales, value added, physical output per labour-hour, or total factor productivity, with the most prominent studies on equity-based pay and productivity using either sales (Bloom, 1985; Conyon & Freeman, 2001; Kumbhakar & Dunbar, 1993; Peck & Jensen, 2000) or value added (Conte & Svejnar, 1988; 1987, in: Conte & Svejnar, 1990; FitzRoy & Kraft, 1985, 1987; Möller, 2000).

In the absence of good measures for value added, this study uses a measure of sales as a dependent variable. Therefore, sales represent gross sales and other operating revenue less discounts, returns, and allowances. In addition, further tests to confirm initial results employ several different performance measures. First, the

logarithm of the first difference of sales per employee is used, and then two accounting-based performance measures are introduced: company earnings before interest expense and income taxes (EBIT; earnings before interest and taxes) and net income. EBIT is calculated by taking the pre-tax income, adding back interest expense on debt, and then subtracting interest capitalised. Net income represents the fiscal period income or loss reported by a company after subtraction of expenses and losses from all revenues and gains. For both performance measures, EBIT and net income, the first-difference form has been created. Subsequently, a perceived performance measure is introduced based on a survey prompt asking companies to share their opinions on whether equity-based pay impacts performance. These individual answers are introduced in the regressions. For the hypothesis on equity information sharing, a separate perceived productivity measure is introduced, one based on survey responses as to whether respondents believe that equity-based pay plans combined with equity information sharing lead to superior performance.

Control variables. Because other variables may influence the research outcomes – for example, industry effects or downturns in certain years – control variables, for industry and time, are also included in the models.

6.5 Questionnaire

The questionnaire (see Appendix I) is comprised of five parts structured as follows. The first section consists of ten different statements arranged on a five-point Likert scale that allow companies to indicate their perceptions of employee ownership, the second contains questions about different equity-based pay plans, and the third asks about eight different HRM activities and four different equity information-sharing practices. The fourth section is comprised of questions on company internationalisation practices related to equity-based pay, and the fifth and final section asks companies about corporate productivity. Details of the five sections are given below.

Perceptions. The *first* Likert-scale statement inviting companies to share their perceptions claims that the existence of equity-based pay plans leads to superior performance. This claim originates in empirical and theoretical evidence on employee ownership impact on corporate productivity (see Section 4). The *second*

statement argues that tax advantages of equity-based pay plans are too small to affect corporate productivity. According to German income tax law, (*Einkommenssteuergesetz*) companies can offer shares with a tax-free (and social security free) amount of maximum Euro 154 per calendar year. Several employee ownership specialists in Germany argue that this amount is not attractive enough to promote employee ownership (Von Rosen & Leven, 2000; Wagner, 1995). The *third* statement proposes that the administrative costs of share plans reduce their attractiveness, so that companies tend to establish employee ownership plans without benefiting from the law of wealth creation (Barthel, 1998).

The *fourth* statement claims that it would be desirable to use employee ownership to provide for retirement funding, a concept related to the idea of introducing shared compensation schemes that follow the American example. For example, the 401(k) retirement plan, like an ESOP, is a tax-qualified plan that generally must include all full-time employees meeting age and service requirements. However, unlike an ESOP, the 401(k) is designed to provide the employee with a diversified portfolio of investments. Employee 401(k) contributions, which are automatically deducted from each pay-check before tax, are invested at the employee's direction into one or more funds provided by the plan. Many companies not only match the employee contribution with company stock but allow employees to choose company stocks as one investment option. While the investments grow in the employees' 401(k) account, companies pay no taxes on them (401k help center, 2002). However, it must noted that 401(k) plans have been much criticised since the disclosure of the Enron case (e.g. McNulty, 2001).

The *fifth* statement probes for the desirability of new schemes by claiming that current schemes are optimal, whereas the *sixth* statement suggests that equity-based pay plans associated with internal information-sharing measures lead to superior corporate productivity. The rationale underlying this latter claim also derives from firms reporting the importance of information sharing and empirical evidence on this issue (see Section 4.3). The *seventh* statement proposes that employee ownership positively influences employee loyalty, a notion originating with the findings that employee ownership may positively impact employee involvement (Florkowski, 1987) and satisfaction (Long, 1980). The *eighth* statement posits that firms with equity-based pay plans have lower average absenteeism than firms without such plans, an assumption supported empirically

by several studies (Brown, Farhfakh, & Sessions, 1999; Wilson & Peel, 1991). The *ninth* statement argues in line with empirical evidence that employees who take up shares or options are more likely to remain with their organisation (Wilson & Peel, 1991). The *tenth* statement maintains that employee ownership leads to greater long-term company stability, a notion also influenced by empirical evidence on employee ownership and corporate productivity (see Section 4) and employee ownership and takeovers. It has further been discovered that companies substantially held by their employees are less affected by takeovers (e.g. Beatty, 1995; Chaplinsky & Niehaus, 1994). This finding has led to the conclusion that both employees and employee benefit plans are stable shareholders (e.g. Beatty, 1995; Chaplinsky & Niehaus, 1994).

Equity-reward mechanisms. The second section of the questionnaire asks company representatives to select from five different equity-reward mechanisms by checking the appropriate boxes to indicate which they currently operate (multiple answers are possible). In addition, they are asked to supply the year the schemes were introduced, the percentage of managers covered by the schemes, the percentage of employees covered by the schemes, and whether the introduction of one of the schemes is planned within the next twelve months.

Human resource management practices. To test for the existence of complementarities, the third section of the questionnaire lists eight human resource management practices, each with a check box in which the respondent can simply tick yes or no: (1) quality circle schemes, (2) autonomous work groups, (3) total quality management, (4) overlapping departmental work groups, (5) training and seminars lasting several days, (6) information systems based on Intranet, Internet, or database, (7) communication brochures and newsletters, (8) and a formal structure for sharing information with employees (e.g., provision of data on financial status, firm and market strategy, stock market price).

Equity information sharing. To test for the existence of equity information-sharing practices, the third section of the questionnaire lists four equity information-sharing practices, each with a check box in which the respondent can simply tick yes or no: (1) consultation and feedback channels for employees, (2) introductory information brochure for employees, (3) regular circulars and newsletters, and (4) trainings and seminars.

Degree of internationalisation. The fourth questionnaire section invites companies to share their internationalisation practices. First, companies are asked to supply the number of countries in which they own foreign subsidiaries. Second, they are asked for the number of countries with foreign subsidiaries in which employees can buy shares or options. Third, companies are asked to indicate by checking the appropriate boxes whether the scheme is a globally unified plan, one that differs from country to country, or a unified scheme allowing for local modifications. Fourth, companies are asked to select from the following options the most important adoption criteria (multiple answers are possible): (1) local laws and/or rules, (2) local culture, (3) decisions of the foreign subsidiary, and (4) decisions of headquarters. Finally, companies are asked to indicate whether the percentage of employees covered by schemes in a foreign subsidiary is (1) higher than, (2) equal to, or (3) lower than the percentage of employees covered by schemes in Germany.

Productivity. The fifth survey section probes for measures for internal productivity by asking companies whether they measure internal productivity, and if so, what unit of analysis productivity is employed. Respondents can choose from among the following five units by checking the appropriate boxes (multiple answers are possible): (1) individual, (2) team or project, (3) division or business unit, (4) foreign subsidiary and (5) group.

7 Results

7.1 Descriptive Results

Structure of the Responding Companies

The following section outlines the structure of the 115 responding companies in 2001 (for a more detailed description, see Appendix II). This selection raises the question as to whether the findings derived from the sample are representative of the underlying population. To examine whether the responding companies are indeed representative of the underlying population, the sample selection test (see Table 10) has been performed. A logit model was estimated, and statistical significance on any variable signifies some bias in the probability of response. The results show a significant firm bias, which may partially be explained by the fact that larger firms have more resources than smaller firms and therefore more time to deal with surveys.

Variable [a]	**SURVEY DUMMY** [c]	
Employment	0.00** (3.59)	
Employment [b]		0.31** (0.64)
_cons	-0.14** (0.11)	-3.66** (0.52)
Number of observations	535	535
LR chi2 (1) =	18.40	24.09
Prob > chi2 =	0.00	0.00

[a] Standard errors are in parentheses.
[b] Logarithm.
[c] Dichotomous variable (0, 1).
† p < .10
* p < .05
** p < .01

Table 10: Sample Selection Test

The structure of the responding companies gives the following picture. All major industry groups are represented except for agriculture/forestry/fishing (see Figure 1). Fifty-five percent of the companies that responded to the questionnaire represent the manufacturing industry. The second largest industry represented is the finance/insurance/real estate sector (15%), followed by the service sector (11%), transportation/communications/electric/gas/sanitary services (7%), wholesale trade (5%), retail trade (3%), mining (2%), and construction (2%).

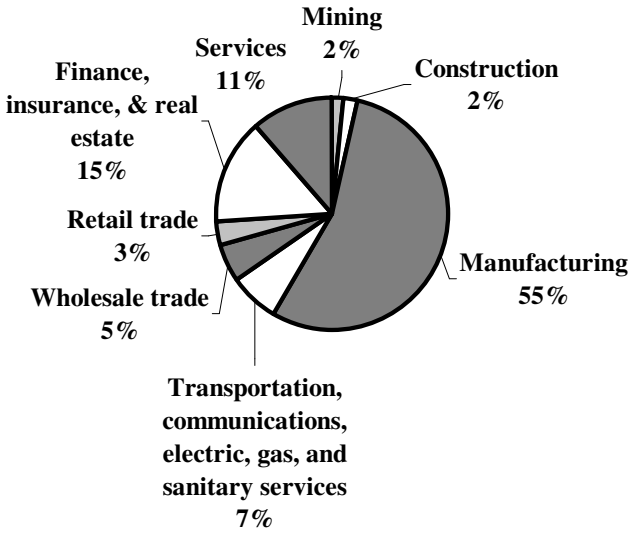

Figure 1: Structure of the Responding Firms by Industry Group in 2001

Firms with between 1,000 and 9,999 employees constitute the largest group represented (50%). The second largest group (17%) of companies has 10,000 to 99,999 employees, closely followed by companies with 500 to 900 (14%) and 10 to 499 (13%) employees, respectively. The smallest group (6%) of companies has 100,000 or more employees. Therefore, the sample covers a wide range of firms from small to medium to large. Figure 2 illustrates the structure of the responding companies by firm size.

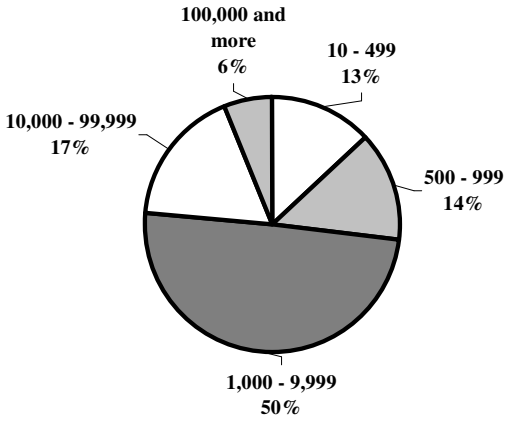

Figure 2: Structure of the Responding Firms by Size in 2001[14]

[14] The figures "10 – 499", "500 – 999", "1,000 – 9,999", "10,000 – 99,999", "100,000 or more" represent the number of employees.

Half of the responding companies (50.4%) have either a share or an option plan in place; almost half (49.6%) have no plans at all. Figure 3 breaks down the equity-based plan distribution by firm size.

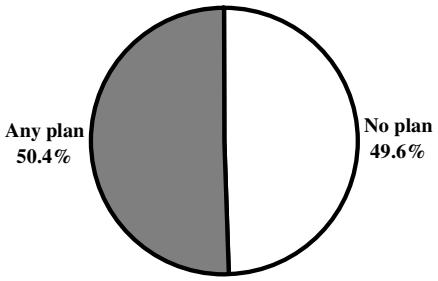

Figure 3: Evidence on Plan Existence in 2001

Thirty-nine companies have a share plan, 26 companies have a stock option plan, and 7 companies have both types of plan in place[15]. Figure 4 presents the equity plan distribution.

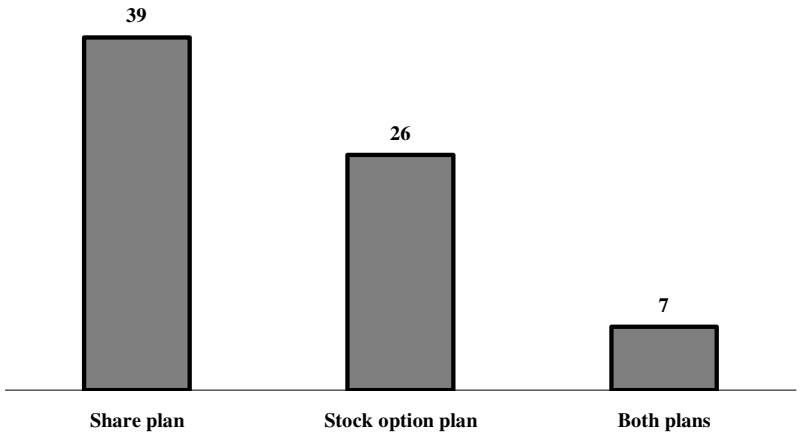

Figure 4: Equity Plan Distribution in 2001

[15] Share plan is a dummy variable and is calculated as follows: The existence of a share plan equals one even if the firm has several share plans in operation. The same procedure is valid for option plans, too. To calculate the total number of companies with equity-based pay (58), the companies with both share and option plans must be subtracted (39+26-7).

Questionnaire Results

The following section outlines a summary of the responses of the 115 responding companies to the company statements[16] of the questionnaire[17] (for a more detailed description of all responses, see Appendix II).

Sixty-nine percent of company respondents agreed that there is a positive relationship between equity-based pay plans and superior performance (see Figure 5). Of these, around half represent companies that have implemented equity-based pay plans, while the rest work without any equity-based pay plan. Twenty-six percent of respondents were neutral about this statement; of these, around two thirds represent firms that have adopted equity-based pay plans, while the rest work without any plans. Five percent of respondents – half with equity-based pay plans, half without – disagreed that equity-based pay plans lead to superior performance.

A comparison of these company statement results with the hypothesis outlined in Section 3 and 4 suggests that (1) companies may adopt such plans because of productivity-enhancing considerations and (2) equity-based pay plans may impact productivity growth.

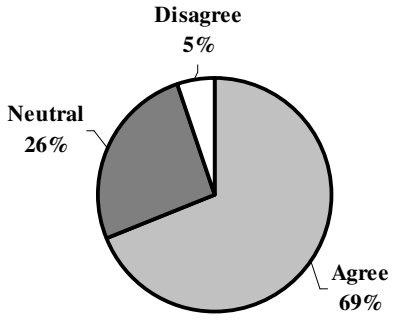

Figure 5: Equity-Based Pay Plans and Firm Performance

[16] For a detailed discussion of the statements, see Section 6.5 as well as Appendix I, Questionnaire part 1.
[17] See Appendix I, Questionnaire parts 1-5.

Sixty-five percent of the company respondents agreed that equity-based pay plans associated with internal information-sharing measures lead to superior corporate productivity (see Figure 6). Of these, more than half represent firms that have already implemented equity-based pay plans, while the rest work without any equity-based pay plans. Seven percent of respondents disagreed with this statement; half representing firms with equity-based pay plans in place, and half representing companies without. Twenty-eight percent of respondents were neutral on this statement; half from firms with and half from firms without equity-based plans.

A comparison of these company statement results with the hypothesis outlined in Section 4 suggests that equity-based pay plans complemented with equity information sharing may impact productivity growth.

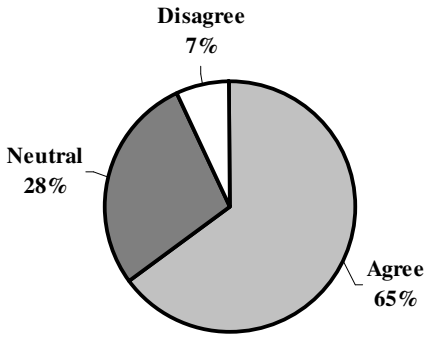

Figure 6: Equity Information-Sharing and Firm Performance

A large majority of firm respondents (81%) agreed that equity-based pay plans positively impact employee loyalty (see Figure 7). Of these, more than half represent firms that have equity-based pay plans in place, and the rest represent firms that work without any such plans. Thirteen percent of respondents were neutral on this statement; around two thirds from firms that have adopted equity-based pay plans and the rest from firms that have not. A minority of firm representatives (6%) disagreed with this statement; around two thirds representing firms that have not implemented any equity-based pay plan and the rest representing firms that have implemented such plans.

A comparison of the results for this company statement with the hypothesis outlined in Section 4 and 5 suggests that equity-based pay plans may be complemented with the necessary ingredients to induce positive peer pressure.

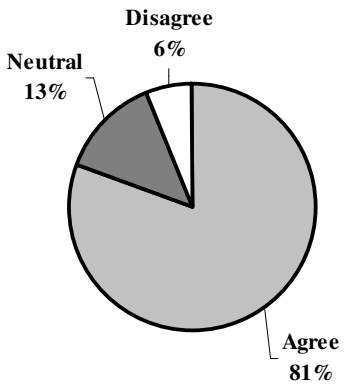

Figure 7: Equity-Based Pay Plans and Employee Loyalty

7.2 Statistical Results

The following section describes the statistical results of this study. Table 11 presents the means, standard deviations, and correlation matrix of the key research variables. As this dissertation presents a panel of companies in the data set, the means over time underreport the extent of equity-based pay plan usage at the end of the time period.

Evidence on Antecedents of Equity-Based Pay

Table 12 displays the results of the models predicting company choice as to whether and what type of equity-based pay plan to adopt. The Wald chi-square test (Wald chi2) reveals no problems with any of the relevant columns discussed in this section.

> *Hypothesis 1: A firm's decision to adopt equity-based pay is positively related to the organization's (1) degree of managerial discretion and (2) degree of internationalisation.*

Hypothesis 1 predicts that there will be a positive relationship between the existence of an equity-based pay plan and (1) environments with high degree of managerial discretion and (2) the extent of firm internationalisation. Columns (1) and (7) of Table 12 report whether equity-based pay plan adoption is positively related to the firm's degree of managerial discretion as measured by Tobin's Q and the extent of firm internationalisation *as measured by the firm's foreign sales to total sales.* Examination of the incidence of share-based plans provides no support for these propositions (Table 12, column 1) but does provide strongly significant results for the use of option plans in environments with high degree of managerial discretion (Table 12, column 7). However, no support is found for adoption due to internationalisation (column 7). Columns (2) and (8) of Table 12 include Nemax companies into the model and report whether equity-based pay plan adoption is positively related to 1) the firm's degree of managerial discretion as measured by Tobin's Q and 2) the extent of firm internationalisation *as measured by the firm's foreign sales to total sales.* No support is found for the impact of Nemax companies (a dummy variable equal to one for new market firms) on the adoption

of share plans (column 2); however, strongly significant results are found for the impact of Nemax companies on the adoption of option plans (column 8).

Columns (3) and (9) of Table 12 report whether share plan and/or option plan adoption is positively related to the firm's degree of managerial discretion as measured by Tobin's Q and the extent of firm internationalisation *as measured by the firm's foreign employees to total employees*. Examination of the incidence of share-based plans produces no support for hypothesis 1 (Table 12, column 3) but does provide strongly significant results for the use of option plans in environments with a high degree of managerial discretion and, in contrast to results for share plans, strongly significant results for the extent of firm internationalisation (column 9). Columns (4) and (10) of Table 12 include Nemax companies into the model and report whether equity-based pay plan adoption is positively related to (1) the firm's degree of managerial discretion as measured by Tobin's Q and (2) the extent of firm internationalisation *as measured by the firm's foreign employees to total employees*. No support is found for the impact of Nemax companies on the adoption of share plans (column 4); however, strongly significant results are found for the impact of Nemax companies on the adoption of option plans (column 10).

Columns (5) and (11) of Table 12 report whether equity-based pay plan adoption is positively related to the firm's degree of managerial discretion as measured by Tobin's Q and the extent of firm internationalisation *as measured by a factor combining foreign sales to total sales and foreign employees to total employees* (compiled through factor analysis). Again, examination of the incidence of share-based plans produces no support for hypothesis 1 (Table 12, column 5) but does provide strongly significant results for the adoption of option plans in environments with a high degree of managerial discretion and significant evidence for adoption due to internationalisation (column 11).

Columns (6) and (12) of Table 12 report whether equity-based pay plan adoption is positively related to the firm's degree of managerial discretion as measured by Tobin's Q and the extent of firm internationalisation *as measured by the numbers of different countries with own foreign subsidiaries* (not varying over five years). Once again, examining the incidence of share-based plans produces no support for hypothesis 1 (Table 12, column 6), but does provide strongly significant results for

the adoption of option plans in environments with a high degree of managerial discretion. However, no support is found for adoption due to internationalisation (column 12).

Hypothesis 2: A firm's decision to adopt equity-based pay is positively related to the extent of industry adoption.

Hypothesis 2 proposes a positive relationship between the firm's decision to implement equity-based pay and prior sectoral (industry) adoption. All results reported in Table 12 (columns 1-6 for the adoption of share plans; columns 7-12 for the adoption of option plans) provide strongly significant support for this proposition. Therefore, even when different measures for firm internationalisation are employed, all four models provide strongly significant results for a positive relationship between the firm's decision to adopt equity-based pay plans and prior sectoral adoption. Columns (2) and (4) of Table 12 for share plans and columns (8) and (10) of Table 12 for option plans include Nemax companies into the model. No support is found for the impact of Nemax companies on the adoption of share plans (columns 2 and 4); however, strongly significant results are found for the impact of Nemax companies on the adoption of option plans (columns 8 and 10).

Variable[a]	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Any plan [c]	0.36	0.48																
2. Share plan [c]	0.26	0.44	0.76															
3. Option plan [c]	0.14	0.34	0.49	-0.11														
4. High-coverage share plan 1 [c]	0.25	0.43	0.32	0.52	-0.14													
5. High-coverage option plan 5 [c]	0.16	0.37	0.24	-0.13	0.60	-0.09												
6. High-coverage share plan 1-3 [c]	0.32	0.47	0.43	0.67	-0.18	0.82	-0.10											
7. High-coverage option plan 4&5 [c]	0.22	0.42	0.24	-0.20	0.70	-0.13	0.79	-0.16										
8. Nemax [c]	0.12	0.32	0.11	-0.11	0.33	-0.03	0.40	-0.09	0.50									
9. Employment [b]	8.10	1.95	0.19	0.34	-0.12	0.32	-0.14	0.36	-0.21	-0.34								
10. Total capital [b]	6.31	2.43	0.30	0.38	-0.00	0.31	-0.10	0.36	-0.11	-0.21	0.86							
11. Δ Employment [C]	0.08	0.32	0.08	-0.06	0.21	-0.04	0.24	-0.08	0.32	0.35	0.01	-0.03						
12. Δ Total capital [b]	0.24	0.83	0.09	-0.04	0.17	-0.04	0.13	-0.06	0.16	0.19	-0.07	0.17	0.24					
13. Δ Sales [b]	0.14	0.36	0.12	-0.07	0.27	-0.07	0.33	-0.09	0.40	0.47	-0.13	-0.10	0.55	0.28				
14. Δ Sales/employee [b]	0.04	0.30	0.00	0.02	-0.02	-0.01	-0.02	0.02	-0.04	-0.03	-0.12	-0.05	-0.73	-0.05	0.17			
15. Δ Ebit	-23.94	1697.76	-0.04	-0.05	-0.09	0.00	-0.04	-0.00	-0.04	-0.01	-0.04	-0.07	0.01	-0.00	0.06	0.04		
16. Δ Net income	-35.17	1334.34	-0.06	-0.08	-0.07	-0.03	-0.01	-0.03	-0.01	0.00	-0.09	-0.13	-0.02	-0.00	0.02	0.04	0.82	
17. Perceived productivity	3.73	0.74	-0.03	-0.05	0.05	-0.06	0.10	-0.11	0.16	0.10	-0.01	0.04	0.07	0.02	0.08	-0.02	-0.02	-0.03
18. Information productivity	3.64	0.75	0.07	0.05	0.02	-0.02	0.08	-0.07	0.02	0.01	0.06	0.05	0.09	0.04	0.07	-0.05	-0.01	-0.02
19. Tobin's Q	1.27	2.00	0.09	-0.12	0.30	-0.14	0.42	-0.18	0.40	0.28	-0.18	-0.14	0.26	0.10	0.34	-0.02	0.02	0.03
20. FSTS	25.63	30.50	0.12	0.16	-0.02	0.07	-0.04	0.15	-0.08	-0.12	0.34	-0.30	-0.08	-0.10	-0.04	0.06	-0.03	-0.01
21. FETE	20.04	25.17	0.18	0.18	0.05	0.13	0.00	0.21	-0.00	-0.15	0.46	0.41	-0.01	-0.00	0.01	0.02	0.01	-0.03
22. Factor	1.35	0.65	0.18	0.21	0.02	0.12	-0.02	0.22	-0.05	-0.17	0.49	0.43	-0.06	-0.06	-0.02	0.05	-0.01	-0.02
23. Countries with subsidiaries	18.48	28.35	0.12	0.21	-0.10	0.30	-0.13	0.25	-0.16	-0.18	0.60	0.54	-0.06	-0.03	-0.08	0.00	0.05	0.02
24. Sectoral adoption share plan	0.26	0.15	0.25	0.23	0.09	0.09	0.03	0.08	-0.03	-0.02	0.12	0.24	0.00	0.08	0.08	0.06	-0.10	-0.11
25. Sectoral adoption option plan	0.14	0.19	0.29	0.02	0.44	0.01	0.36	-0.03	0.35	0.32	-0.11	-0.01	0.01	0.12	0.19	0.04	-0.02	-0.03
26. Equity information sharing [c]	0.17	0.38	0.55	0.41	0.26	0.22	0.16	0.30	0.12	0.03	0.26	0.28	0.09	0.11	0.10	-0.02	0.01	-0.02
27. System 1 [c]	0.13	0.33	0.08	0.11	-0.07	-0.08	0.04	-0.01	-0.03	-0.12	0.24	0.19	0.02	-0.02	-0.03	-0.04	0.02	0.03
28. System 2 [c]	0.46	0.50	0.01	0.04	-0.02	0.17	-0.00	0.15	-0.01	0.13	0.05	0.08	0.16	0.02	0.13	-0.09	0.01	-0.01
29. System 3 [c]	0.27	0.45	-0.06	-0.08	0.02	-0.04	0.00	-0.04	0.07	-0.03	-0.13	-0.12	-0.07	0.03	-0.04	0.06	-0.00	0.02

Variable [a]	17	18	19	20	21	22	23	24	25	26	27	28
17. Perceived productivity												
18. Information productivity	0.59											
19. Tobin's Q	0.15	0.01										
20. FSTS	-0.06	0.10	0.02									
21. FETE	-0.06	0.06	-0.08	0.38								
22. Factor	-0.07	0.10	-0.04	0.83	0.83							
23. Countries with subsidiaries	0.05	0.11	-0.04	0.36	0.53	0.54						
24. Sectoral adoption share plan	0.00	-0.03	-0.01	-0.02	0.11	0.06	-0.02					
25. Sectoral adoption option plan	0.04	0.05	0.18	-0.12	0.01	-0.06	-0.07	0.16				
26. Equity information sharing [c]	0.05	0.08	0.09	0.05	0.14	0.11	0.18	0.25	.22			
27. System 1 [c]	-0.06	0.07	-0.04	0.14	0.11	0.15	0.16	0.07	-0.07	0.26		
28. System 2 [c]	0.19	0.11	0.07	-0.13	-0.04	-0.10	-0.09	-0.06	0.16	0.02	-0.39	
29. System 3 [c]	-0.09	-0.08	-0.08	0.01	0.02	0.02	0.05	-0.06	-0.08	-0.17	-0.25	-0.60

[a] n = 535.
[b] Logarithm.
[c] Dichotomous variable (0, 1).

Table 11: Descriptive Statistics and Correlations

Variable[a]	Share plan						Option plan					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Employment [b]	0.24** (0.03)	0.24** (0.04)	0.25** (0.04)	0.25** (0.04)	0.24** (0.04)	0.26** (0.04)	-0.01 (0.05)	0.05 (0.05)	-0.07 (0.05)	-0.02 (0.06)	-0.06 (0.05)	0.04 (0.06)
Tobin's Q	-0.05 (0.03)	-0.05 (0.03)	-0.04 (0.03)	-0.04 (0.03)	-0.05 (0.03)	-0.05 (0.03)	0.15** (0.04)	0.15** (0.04)	0.15** (0.04)	0.14** (0.04)	0.14** (0.04)	0.16** (0.04)
FSTS	0.00 (0.00)	0.00 (0.00)					0.00 (0.00)	0.00 (0.00)				
FETE			0.00 (0.00)	0.00 (0.00)					0.01** (0.00)	0.01** (0.00)		
Factor					0.14 (0.13)						0.33* (0.17)	
Countries with subsidiaries						0.00 (0.00)						-0.01 (0.00)
Sectoral adoption	4.44** (1.47)	4.42** (1.47)	4.55** (1.45)	4.54** (1.47)	4.45** (1.48)	4.63** (1.50)	4.04** (1.17)	4.20** (1.03)	4.33** (1.25)	4.40** (1.07)	4.13** (1.23)	3.99** (1.17)
Nemax [c]		-0.05 (0.26)		-0.03 (0.26)				0.97** (0.24)		0.98** (0.25)		
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	543	543	542	542	542	518	525	525	524	534	524	500
Wald chi2 (15) =	91.78	91.93	91.96	92.20	91.91	96.00	79.85	102.95	78.30	104.14	79.23	84.63
Prob > chi2 =	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[a] Robust standard errors are in parentheses.
[b] Logarithm.
[c] Dichotomous variable (0, 1).
† p < .10
* p < .05
** p < .01

Table 12: Adoption of Equity-Based Pay

Evidence on Consequences of Equity-Based Pay

> *Hypothesis 3. Firms with equity-based pay plans in place will report higher corporate productivity growth due to improved incentive and monitoring effects than firms without any equity-based pay plans.*

Table 13 displays the results of the models predicting that companies with equity-based pay plans will experience higher corporate productivity growth than those without, as proposed by hypothesis 3. Columns (1 to 10) report the results of modelling a Cobb-Douglas production function (with a robust standard errors regression technique having heteroscedasticity-corrected standard errors and variances). Column (1) shows no support between share plans and productivity growth as measured by the first-difference form of net sales. The R-square (R^2; goodness of fit of the fitted regression) for column 1 is 0.33, meaning that about 33% of the variation in the (log of) output is explained by the variables in the model (for which regression function the F-test reveals no problems [see column 1]). Challenging these results by testing the model with different performance measures (the first-difference form is used) also produces no support for sales per employee, for profit as measured by earnings before interests and taxes (EBIT), or for net income (columns 1, 2 and 3 of Table 14). When regressed with perceived productivity as measured by the perceptions companies attributed to themselves in the first statement of the questionnaire (column 1 of Table 15)[18], the model also provides no significant results. The goodness of fit of the fitted regressions (R^2) for the columns (1), (2), and (3) of Table 14 is relatively low; the F-test does not reveal any problems for the relevant columns.

Column (4) of Table 13 shows no support for option plans and corporate growth productivity as measured by the first-difference form of net sales. The R-square (R^2; goodness of fit of the fitted regression) for column 3 is 0.33, meaning that about 33% of the variation in the (log of) output is explained by the variables in the model (for which regression function the F-test reveals no problems). Challenging these results using different performance measures (i.e., using the first difference form) produces no significant results for sales per employee, profit as measured by earnings before interests and taxes (EBIT), net income (columns 4, 5,

[18] Because the measures obtained for perceived productivity are ordinal (see Appendix I, part 1, first statement), the results are obtained by a maximum-likelihood ordered probit estimation.

and 6 of Table 14), or perceived productivity as measured by the perceptions companies attributed to themselves in the first statement of the questionnaire (column 2 of Table 15)[19]. The goodness of fit of the fitted regressions (R^2) for columns (4), (5), and (6) of Table 13 is relatively low; the F-test revealed no problems for the relevant columns.

Column (2) of Table 13 for share plans and column (4) of Table 13 for option plans include Nemax companies into the model. Columns (2) and (4) provide strongly significant results for the impact of Nemax companies on productivity growth.

Hypothesis 4. Firms with high plan coverage will report high corporate productivity growth.

Hypothesis 4 predicts that firms with high-coverage, equity-based plans in place will report high productivity growth. For this regression, the previous model is augmented with information on the high share-/high option-plan coverage. Columns (5) to (10) of Table 13 present the results. No support is found for the impact of share plans on productivity, and no evidence is found that firms with high share-plan coverage (as measured by the coverage over mean for employee share plan [column 5] or as measured by the coverage over mean for all three share plans [column 7]) enjoy further productivity gains. Columns (6) and (7) include Nemax companies into the model and provide strongly significant results for the impact of Nemax companies on productivity growth.

Column (8) reports the results for option plans. Significant results are found for the positive impact of high option-plan coverage (as measured by the coverage over mean for option plans with several offers) on productivity growth. The same significantly positive results can be reported for high option-plan coverage (as measured by the coverage over mean for both option plans [column 10]). Columns (9) and (10) include Nemax companies into the model and provide significant results for the impact of Nemax companies on productivity growth.

Hypothesis 5. Firms with equity-based pay plans combined with information sharing about these plans will experience a productivity growth.

[19] See note 18.

Hypothesis 5 predicts that firms with high levels of information sharing about their equity-based pay plans will experience higher productivity growth than firms with lower (or no) levels of information sharing. Table 16 reports the results. No evidence is found for this hypothesis, neither for firms with share plans (column 1) nor for those with option plans (columns 5)[20] [21].

Hypothesis 6. Firms with a high coverage of equity-based pay plans combined with a high level of information sharing about these plans will experience a productivity growth.

Hypothesis 6 predicts that firms with a high coverage of equity-based pay plans combined with information-sharing practices related to these plans will experience high productivity growth. For this regression, the previous model is augmented with (1) the extent of share/option plan coverage; (2) a variable reflecting those firms with equity-plan information sharing, and (3) an interaction effect capturing the joint effect between the two. Column (3) of Table 16 presents the results for share plans. No evidence is found that firms with high coverage (as measured by the coverage over mean for employee share plan) enjoy further productivity gains. No evidence is found that information sharing has an effect on productivity growth; however, the interaction with levels of coverage appears to have no positive significant impact on productivity growth. The results for column (2) can be confirmed when high share-plan coverage (as measured by the coverage over mean for all three share plans [column 3]) is introduced. Column (6) of Table 16 presents the results for option plans. Whereas strongly significant evidence is found for the positive productivity growth effects of high option-plan coverage (as measured by the coverage over mean for option plan with several offers), no evidence is found for either information sharing or interaction. The strongly significant results for column (6) can be confirmed when high option-plan coverage (as measured by the coverage over mean for both option plans [column 7]) is introduced.

[20] Further tests with a productivity variable created out of the responses to statement number 6 in the questionnaire (that equity-based pay plans associated with internal equity information-sharing measures lead to superior corporate productivity) do not alter these results.

[21] Because the measures obtained for perceived productivity are ordinal (see Appendix I, part 1, sixth statement), the results are obtained by a maximum-likelihood ordered probit estimation.

Variable[a]	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	Δ Sales[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]
Δ Total capital[b]	0.05* (0.03)	0.05† (0.03)	0.05† (0.03)	0.05† (0.03)	0.05* (0.03)	0.05† (0.03)	0.05† (0.03)	0.05† (0.03)	0.05† (0.03)	0.05† (0.03)
Δ Employment[b]	0.33** (0.10)	0.29** (0.09)	0.32** (0.19)	0.29** (0.09)	0.33** (0.10)	0.29** (0.09)	0.29** (0.09)	0.31** (0.09)	0.28** (0.09)	0.27** (0.08)
Share plan[c]	-0.02 (0.02)	-0.01 (0.02)			-0.01 (0.02)	0.00 (0.02)	-0.00 (0.02)			
Option plan[c]			0.05 (0.04)	0.03 (0.03)				-0.03 (0.06)	-0.03 (0.06)	-0.08 (0.07)
Cov. p1[d]					-0.01 (0.02)	-0.22 (0.02)				
Cov. p5[e]								0.14* (0.06)	0.11 (0.07)	
Cov. p1-3[f]							-0.01 (0.02)			
Cov. p4&5[g]										0.15* (0.07)
Nemax[c]		0.16** (0.05)		0.16** (0.05)		0.16** (0.05)	0.16** (0.05)		0.13* (0.05)	0.10† (0.06)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations =	415	415	415	415	415	415	415	415	415	415
Prob > F =	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.00	0.00
R^2 =	0.33	0.34	0.33	0.36	0.33	0.36	0.36	0.35	0.37	0.38

[a] Robust standard errors are in parentheses.
[b] Logarithm.
[c] Dichotomous variable (0, 1).
[d] High coverage share plan (plan 1).
[e] High coverage option plan (plan 5).
[f] High coverage share plan (plan 1 - 3).
[g] High coverage option plan (plan 4 & 5).
† $p < .10$
* $p < .05$
** $p < .01$

Table 13: Consequences of Equity-Based Pay – Basic Model

Variable[a]	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Δ Sales/employee[b]	**Δ EBIT**	**Δ Net income**	**Δ Sales/employee**[b]	**Δ EBIT**	**Δ Net income**
Δ Employment[b]		-8.22 (115.2)	-100.12 (67.53)		80.90 (165.43)	-77.24 (112.77)
Share plan[c]	0.01	-100.73 (261.95)	-120.11 (192.82)			
Option plan[c]				-0.04	-430.52 (458.89)	-63.90 (421.66)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations =	420	392	419	420	392	419
Prob > F =	0.47	0.31	0.40	0.23	0.36	0.36
R^2 =	0.01	0.03	0.04	0.02	0.04	0.04

[a] Robust standard errors are in parentheses.
[b] Logarithm.
[c] Dichotomous variable (0, 1).
† $p < .10$
* $p < .05$
** $p < .01$

Table 14: Consequences of Equity-Based Pay – with Different Productivity Measures

Variable[a]	**(1)**	**(2)**	**(3)**
	Perceived productivity	**Perceived productivity**	**Perceived productivity**
Total capital [b]	0.08 (0.04) *	0.08† (0.04)	0.08* (0.04)
Employment [b]	-0.08 (0.05)	-0.07 (0.05)	-0.08 (0.05)
Share plan [c]	0.00 (0.12)		
Option plan [c]		0.16 (0.17)	
Any plan [c]			-0.00 (0.11)
Industry effects	Yes	Yes	Yes
Time effects	Yes	Yes	Yes
Number of observations =	529	529	529
Wald chi2 (15) =	71.24	71.37	71.31
Prob > chi2 =	0.00	0.00	0.00

[a] Robust standard errors are in parentheses.
[b] Logarithm.
[c] Dichotomous variable (0, 1).
† p < .10
* p < .05
** p < .01

Table 15: Consequences of Equity-Based Pay – with Perceived Productivity

Variable[a]	**(1)**	**(2)**	**(3)**	**(5)**	**(6)**	**(7)**
	Δ Sales[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]
Δ Total capital[b]	0.05[†] (0.03)	0.05[†] (0.03)	0.05[†] (0.03)	0.05[†] (0.03)	0.05[†] (0.03)	0.05[†] (0.03)
Δ Employment[b]	0.33[**] (0.10)	0.33[**] (0.10)	0.33[**] (0.10)	0.32[**] (0.10)	0.31[**] (0.09)	0.29[**] (0.09)
Share plan[c]	-0.02 (0.02)	-0.01 (0.03)	-0.01 (0.02)			
Option plan[c]				0.06 (0.04)	-0.03 (0.06)	-0.10 (0.07)
Cov. p1[d]		0.01 (0.02)				
Cov. p5[e]					0.13[†] (0.07)	
Cov. p1-3[f]			0.01 (0.02)			
Cov. p4&5[g]						0.18[**] (0.06)
Equity information-sharing (EIS)	-0.00 (0.03)	0.03 (0.04)	0.05 (0.05)	-0.02 (0.03)	-0.03 (0.02)	-0.03 (0.02)
EIS x cov. p1		-0.07[†] (0.04)				
EIS x cov. p5					0.04 (0.08)	
EIS x cov. p1-3			-0.09[†] (0.05)			
EIS x cov. p4&5						0.06 (0.07)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations =	415	415	415	415	415	415
Prob > F =	0.00	0.00	0.00	0.00	0.00	0.00
R^2 =	0.33	0.33	0.33	0.33	0.35	0.37

[a] Robust standard errors are in parentheses.
[b] Logarithm.
[c] Dichotomous variable (0, 1).
[d] High coverage share plan (plan 1).
[e] High coverage option plan (plan 5).
[f] High coverage share plan (plans 1 - 3).
[g] High coverage option plan (plans 4 & 5).
[†] p < .10
[*] p < .05
[**] p < .01

Table 16: Consequences of Equity-Based Pay – with Equity Information Sharing and High Coverage

Variable[a]	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Δ Sales[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]	**Δ Sales**[b]
Δ Total capital[b]	0.05† (0.03)	0.05† (0.03)	0.05† (0.03)	0.05† (0.03)	0.05† (0.03)	0.05† (0.03)
Δ Employment[b]	0.29** (0.09)	0.28** (0.09)	0.28** (0.09)	0.28** (0.09)	0.28** (0.09)	0.27** (0.09)
Share plan[c]	-0.01 (0.02)	0.00 (0.02)	0.00 (0.02)			
Option plan[c]				0.03 (0.03)	-0.04 (0.07)	-0.08 (0.08)
Cov. p1[d]		-0.01 (0.05)				
Cov. p5[e]					0.20* (0.08)	
Cov. p1-3[f]			-0.01 (0.05)			
Cov. p4&5[g]						0.16† (0.08)
System1[c]	0.04 (0.03)	0.04 (0.04)	0.03 (0.05)	0.04 (0.03)	0.03 (0.04)	0.03 (0.04)
System2[c]	0.05† (0.03)	0.06† (0.03)	0.06† (0.03)	0.05* (0.03)	0.05† (0.03)	0.04 (0.03)
System3[c]	0.05 (0.03)	0.05 (0.04)	0.05 (0.04)	0.05 (0.03)	0.06† (0.03)	0.04 (0.04)
System1 x cov. p1		-0.02 (0.07)				
System2 x cov. p1		-0.03 (0.05)				
System3 x cov. p1		-0.01 (0.06)				
System1 x cov. p5					-0.13 (0.09)	
System2 x cov. p5					-0.07 (0.12)	
System3 x cov. p5					-0.12 (0.12)	
System1 x cov. p1-3			0.01 (0.07)			
System2 x cov. p1-3			-0.03 (0.05)			
System3 x cov. p1-3			0.00 (0.06)			
System1 x cov. p4&5						-0.06 (0.08)
System2 x cov. p4&5						0.02 (0.10)
System3 x cov. p4&5						-0.01 (0.08)
Nemax	0.16** (0.05)	0.17** (0.05)	0.16** (0.05)	0.16** (0.05)	0.14* (0.05)	0.10† (0.06)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations =	415	415	415	415	415	415
Prob > F =	0.00	0.00	0.00	0.00	0.00	0.00
R^2 =	0.36	0.36	0.36	0.36	0.37	0.38

[a] Robust standard errors are in parentheses.
[b] Logarithm.
[c] Dichotomous variable (0, 1).
[d] High coverage share plan (plan 1).
[e] High coverage option plan (plan 5).
[f] High coverage share plans (plans 1 - 3).
[g] High coverage option plans (plan 4 & 5).
† p < .10
* p < .05
** p < .01

Table 17: Consequences of Equity-Based Pay Complemented with HRM Activities

Evidence on Consequences of Equity-Based Pay Complemented with HRM Activities

Hypothesis 7. Equity-based pay plans combined with innovative systems of HRM activities lead firms to experience productivity growth.

Hypothesis 7 predicts that equity-based pay plans combined with innovative systems of HRM activities will lead firms to experience high productivity growth. Column (1) of Table 17 presents the results for share plans. No evidence is found that share plans combined with innovative systems of human resource management practices will impact productivity growth. Column (2) presents the results of the previous model augmented with (1) the extent of share plan coverage (as measured by the coverage over mean for employee share plan), (2) a variable reflecting those firms with systems of innovative human resource management practice, and (3) an interaction effect capturing the joint effect between the two. No evidence is found for the positive impact of share plans, and no significant evidence is found that systems of innovative human resource management practices produce productivity growth. Column (3) presents the results of the previous model augmented with (1) the extent of share plan coverage (as measured by the coverage over mean for all three share plans), (2) a variable reflecting those firms with systems of innovative human resource management practice, and (3) an interaction effect capturing the joint effect between the two. No evidence is found for the positive impact of share plans, and no significant evidence is found that systems of innovative human resource management practices produce productivity growth. Column (4) presents the results for option plans. No significant results are found that option plans combined with innovative systems of human resource management practices impact productivity growth. Column (5) presents the results of the previous model augmented with (1) the extent of option plan coverage (as measured by the coverage over mean for option plan with several offers), (2) a variable reflecting those firms with systems of innovative human resource management practices, and (3) an interaction effect capturing the joint effect between the two. No evidence is found of the positive impact of option plans on firm performance, and no significant results are found that high option-plan coverage impacts positively on productivity growth. In addition, no evidence is found that systems of innovative human resource management practices impact productivity growth nor for interaction with levels of coverage. Column (6)

presents the results of the previous model augmented with (1) the extent of option plan coverage (as measured by the coverage over mean for both option plans), (2) a variable reflecting those firms with systems of innovative human resource management practice, and (3) an interaction effect capturing the joint effect between the two. The same results as for column (5) are found. Columns (1) to (6) have included Nemax companies into the model and provide strongly significant results for the impact of Nemax companies on productivity growth.

Hypotheses	**Share plan**	**p <**	**Option plan**	**p <**
1. A firm's decision to adopt equity-based pay is positively related to the organization's (1) degree of managerial discretion and (2) degree of internationalisation.	 Rejected Rejected		 Confirmed Confirmed Confirmed Rejected	 0.01 (FETE) 0.05 (Factor) (FSTS & Countries with subsidiaries)
2. A firm's decision to adopt equity-based pay is positively related to the extent of industry adoption.	Confirmed	0.01	Confirmed	0.01
3. Firms with equity-based pay plans in place will report higher corporate productivity growth due to improved incentive and monitoring effects than firms without any equity-based pay plans.	Rejected		Rejected	
4. Firms with high plan coverage will report high corporate productivity growth.	Rejected		Confirmed	0.05
5. Firms with equity-based pay plans combined with information sharing about these plans will experience a productivity growth.	Rejected		Rejected	
6. Firms with a high coverage of equity-based pay plans combined with a high level of information sharing about these plans will experience a productivity growth.	Rejected	Negative relationship at 0.1	Rejected	
7. Equity-based pay plans combined with innovative systems of HRM activities lead firms to experience productivity growth.	Rejected		Rejected	

Table 18: Summary of the Results

8 Discussion and Conclusions

The overall goal of this study was to capture antecedents and consequents of equity-based pay by providing answers to the following three research questions:

(1) "*Why do firms adopt equity-based pay plans?*" (= antecedents of equity-based pay);

(2) "*What are the effects of equity-based pay plans on firm performance?*" (= consequences of equity-based pay); and

(3) "*What are the effects of equity-based pay plans complemented with innovative HRM activities on firm performance?*" (= consequences of equity-based pay plans complemented with innovative HRM activities).

In addition, this analysis of data from a large-scale survey of stock-listed German companies combined with performance data from annual reports and databases presents evidence on the extent of equity-based pay plans in Germany. The analytical findings support a number of propositions from agency theory and institutional theory regarding antecedents and consequences of equity-based pay. Overall, the results attest to the increasing significance of equity forms of incentives in German companies. The key findings – structured along the seven hypotheses – are summarised in the following sections.

8.1 Key Findings: Antecedents of Equity-Based Pay

Adoption Hypothesis Based on Agency Theory

> *Hypothesis 1: A firm's decision to adopt equity-based pay is positively related to the organization's (1) degree of managerial discretion and (2) degree of internationalisation.*

As discussed in Section 3.2, the results of this study support the assumption that option plans are introduced in environments subject to a high degree of managerial discretion and/or in which monitoring costs may be particularly high. This finding suggests that firms in a high-discretion environment find option plans especially suitable for aligning agents. A high-discretion environment is characterised by

high information asymmetry and a wide latitude of action for agents. This profile makes monitoring difficult and, most especially, costly. In such situations, incentives can operate as substitute mechanisms for hierarchical management, especially for new market firms whose financial resources are limited and "where intellectual capital and other more difficult-to-monitor intangible inputs (e.g. new ideas or customer service orientation) are critical components for success" (Sesil, Kroumova, Blasi, & Kruse, 2002)[22]. Not only do new market firms have high levels of intangible intellectual capital – for example, firms with large investments in research and development may find it costly to supervise their employees and assess quantity and quality of the efforts performed by the employees – but "it may be appropriate to leave it to the stock market to market that assessment, and reward employees, at least partially, with market based incentives" (Kroumova & Sesil, 2003: 5).

The analysis performed for this dissertation suggests that German companies adopt option plans in response to the agency costs associated with internationalisation. This finding implies that not only firms in high-discretion environments but also those that are highly internationalised find option plans especially suitable for aligning agents. This latter derives from the fact that highly internationalised firms face particular challenges when incentivising their foreign subsidiaries: the headquarters does not have the knowledge needed for every single situation within the MNC and therefore depends on the subsidiary's unique knowledge (Nohria & Ghosal, 1994: 492). This dependence is especially true for new market firms characterised by rapid internationalisation at an early stage of their development (Ohlen, 2002; Quelch & Klein, 1996)[23]. However, due to financial constraints, especially in the early stage of development, new market firms are unable to personally supervise their subsidiaries; therefore, once again, incentives like option plans operate as substitute mechanisms for hierarchical management. In addition, given situations in which headquarters invest, for example, in research and development (e.g., high-tech companies) within their

[22] This study finds a strong positive significant impact of new market firms on the adoption of equity-based pay. The sample selection test has been performed to examine whether the responding new market companies are representative of the underlying population. A logit model was estimated, and statistical significance on any variable would signify some bias in the probability of response. The results show no bias between responding new market companies and non-responding new market companies; therefore, the number of responding new market companies mirrors the number in the whole data set.

[23] See note 22.

subsidiaries and can minimally control the quality and quantity of work performed by their highly skilled agents, option plans seem an appropriate means of aligning interests.

A highly significant result is achieved for FETE and for a factor consisting of FSTS and FETE, but no significant results are produced either for FSTS on its own or for the number of countries with subsidiaries. This outcome can be explained in several ways. First, FETE captures the essence of the internationalisation variable of this study; that is, it mirrors the firm's foreign employees-to-total employees. Therefore, the higher the percentage of employees abroad, the higher the probability that headquarters should engage in monitoring activities by using incentive structures. Second, even though the impact internationalisation is lower, the strong impact of FETE has lead to a significant result for the variable "factor" created by applying a factor analysis between FSTS and FETE. Third, although FSTS is used by most studies of German settings (see Section 6.4), it represents only the firm's financial degree of internationalisation. FSTS describes the firm's foreign market exposure and thus does not capture the essence of the internationalisation variable used in the context of this dissertation. Fourth, the number of countries with subsidiaries is derived from the questionnaire and does not vary over five years, nor does it represent a ratio to the total number of subsidiaries. Given these difficulties of measuring the number of subsidiaries, it is difficult to say whether the neutral results are a product of poor measures of this construct or the absence of its impact in the sample.

In sum, support was found for the first hypothesis as regards option plans but not share plans. Rather, the analysis suggests that German companies do not adopt share plans in response to a high-discretion environment nor in response to agency cost associated with firm internationalisation. This finding suggests a qualitative difference between share and option plans: whereas, in situations where monitoring is costly, option plans offer large potential gains because of (and work as a substitute for) cash compensation, share plans offer employees only moderate potential gains. This difference is especially important for firms that want to adequately compensate highly knowledgeable workers for jobs performed in the interest of the firm. Companies reward agents' efforts in the belief that efforts made in the interests of the firms will be rewarded by the stock market. However, even though holders of shares also benefit from the stock market, the leverage for

option plans is much higher. Thus, because of the characteristics outlined above, options plans seem to be globally compatible with situations of high information asymmetry and costly supervision. Nonetheless, this finding does not necessarily mean that highly internationalised firms do not implement share plans.

Adoption Hypothesis Based on Institutional Theory

> *Hypothesis 2: A firm's decision to adopt equity-based pay is positively related to the extent of industry adoption.*

As discussed in Section 3.3, this study finds strong support for hypothesis 2 derived from institutional theory, meaning that companies adopt plans in response to perceived pressure from their industry. Evidence supporting this hypothesis exists for both share and option plans.

One explanation for such adoption may be that firm managers examine industry norms of compensation and decide to adopt the compensation policy they perceive to be standard for their sector. Such selection is particularly the case when "firms rely on various industry norms and other rules of thumb in setting their compensation policies" (Eisenhardt, 1988). It may also be that employees, looking at the share or option plan policy of competitors, drive their employers to adopt this standard compensation practice.

Such imitation can derive not only internally from employees but also externally from competitive pressures (e.g., DiMaggio & Powell, 1983; Guler, Guillén, & Macpherson, 2002). Firms identify the successful patterns of other successful firms and, to minimise the risk of losing market, adopt these patterns. Consequently, the fear of being disadvantaged drives companies to imitate their competitors and adopt the same practices. Not only have successful, large, and long-established companies in Germany introduced share plans, but the literature attributes to share plans a strong symbolic content that creates a type of ownership culture that ties employees to their employer, strengthens their loyalty, and drives employees to deliver the highest possible performance for the wealth of their company (see Section 4.2). Therefore, it may be that share plans are identified as a means for competitive advantage and firms with share plans serve as role models for other (less successful) firms in the same industry. These imitation patterns are

most likely to take place in situations where uncertainty is high, such as when firms enter new markets or when larger firms announce new compensation strategies like share or option plans.

In recent years, new market firms[24] have enjoyed extravagant praise and publicity. Valuations of technology on stock markets have been expected to rise indefinitely, and enthusiastic projections have predicted that the Internet will revolutionise everything formerly standard (e.g., Scholtens & Snijder, 2001, in: Arni, 2003). Not surprisingly, employees, wanting also to benefit from the rosy picture, have expected companies to pay them in stock options. As a result, stock option plans have become a very popular recruiting tool in new market firms, both to attract the best people and stay competitive in the sectoral labour market (Brandes, Dharwadkar, & Lemesis, 2003).

After such recruiting practices became widespread in new market firms, other companies (i.e., non-new market firms), faced with difficulty retaining people (e.g., when "almost everybody" wanted to work for a new market firm), were forced to adopt option plans to retain their own employees. Not doing so would have disadvantaged them. Therefore, some firms, after having compared the "cost of recruiting and replacing employees with those offering stock options to employees who will leave if they don't get them" (Brandes, Dharwadkar, & Lemesis, 2003: 82), decided to implement options plans as a means of employee retention.

Another explanatory factor for option plan adoption stems from the important role played by compensation consultants in setting executive pay, which "may serve as a 'conduit' for such isomorphism" (Conyon & Peck, 2002: 9). This influence may also extend to compensation arrangements for broad-based employees. As consultants recommend pay strategies to one firm then use their expertise for another firm, payment practices can travel from one company to the other. Even when consultants agree not to advise other companies in the same sector, they may still serve as the conduit for isomorphism through board-level ties or individual directors. Indeed, research has highlighted the importance of such networks for the diffusion of practices (e.g., Abrahamson & Rosenkopf, 1997). Therefore, over any

[24] See note 22.

type of network through which firms can learn more about share and option plans, compensation practices can travel across industries.

In addition, executives can promote change when migrating from one firm to another: "Executive migration may disrupt the institutional status quo simply by introducing new knowledge, insights, and human resources that make change feasible and functionally attractive" (Kraatz & Moore, 2002: 123). Such introduction of innovative and varied executive skills, understandings, assumptions, and/or values, leads to consideration of alternative compensation practices. Therefore, as executives trigger adoption of share and option plans, isomorphism may then occur within or outside the industry.

Another trigger for share or option plan adoption may be coercive pressure from new state or industry regulations. For instance, in 1999, the OECD issued its corporate governance rules and promoted a corporate governance framework that permits performance-enhancing mechanisms for stakeholder participation as employee share ownership plans (1999: Section III.C). In addition, German Chancellor (*Bundeskanzler*) Gerhard Schröder called on firms to adopt equity-based pay plans for their employees and noted that employees who have a share in their company produce far better results (Schröder, 2000).

In sum, the second hypothesis can be supported for both share and option plans. Both plans are adopted in response to the extent of their industry adoption. Consequently, from an institutional perspective, the type of plan the company considers for adoption is also influenced by the nature of the institutional environment. Specifically, the type of equity-based plan considered depends on both the industry institutional profile – the issue-specific set of regulatory, cognitive, and normative properties – and the relational context within the firm.

The results of this study also indicate qualitative differences between pure share-based schemes and those based on stock options and are therefore supportive of recent investigative advances in this area. One rationale suggested in the literature is that, compared to pure share-based schemes, option plans are more risky: they require a certain employee contribution by exercising the option and offer uncertain pay-offs and differing tax advantages for holders. Oyer (2002) suggests that, besides pure incentive effects, firms may also use option plans to attract a

certain kind of employee (or to allow some sorting of potential applicants). Only those employees with positive beliefs about the future performance of the company and those with low risk aversion prefer a package of options to a pure cash, or equivalent, alternative (Core & Guay, 2001: 256).

In addition, there may be company reasons for preferring options to pure share schemes. For example, companies with closely held equity arrangements may prefer options (which may or may not finally involve equity dilution), as might companies with limited cash flow; for the latter, options allow compensation of employees in a manner that does not affect current trading arrangements. Accounting conventions – in which options do not have to be expensed – may also reinforce this demand.

8.2 Key Findings: Consequences of Equity-Based Pay

> *Hypothesis 3. Firms with equity-based pay plans in place will report higher corporate productivity growth due to improved incentive and monitoring effects than firms without any equity-based pay plans.*

This study finds no support for the third hypothesis, neither using the economic consequences of employee share schemes nor the economic consequences of option plans. This result – however consistent with empirical studies (e.g., Lougee, 1999; Peck & Jensen, 2000) – is not consistent with theoretical considerations (agency theory plus peer-pressure) of the link between equity-based pay and firm performance (see Section 4). These findings suggest that equity-based pay plans have no impact on whether employees contribute more of the effort that results in higher productivity. Agency theory suggests that group incentives on their own have an inherent problem of shirking; the free-rider problem can only be overcome with peer pressure (see Section 4.1). Therefore, several possible explanations exist for the findings that equity-based plans do not impact productivity growth. First, firms usually introduce equity-based pay plans across the whole organization rather than in small teams. Therefore, it may be assumed here that mutual monitoring was not possible. In contrast, as described in Section 4.2, rebuttals of introducing plans in smaller teams "emphasize the symbolic content and effects of plans as equity-based plans that tie compensation to organization-level performance" (Baron & Kreps, 1999: 278). However, the findings presented here

suggest that the symbolic content was either not strong enough to incentivise employees to higher effort and thus lift performance and/or it was not in concert with peer pressure. As discussed in Section 4.1, peer pressure may take different forms: frequent and repeated social interactions – because workers' empathise more with fellow workers than they do with faceless colleagues; homogenous teams – because internalisation of others' welfare is higher among individuals of similar type; and social sanctions – to punish slackers. Consequently, it may be that these different forms did not function or were not in place, either because management could not fulfil their managerial task of creating positive peer pressure or because a negative peer pressure had been induced. Such negative peer pressure may have several sources, including workers feeling they have not been treated fairly or perceiving a misfit between the pay system, culture, and/or strategy.

In addition, in tests using different measures for performance, the results do not alter; the productivity models with perceived productivity as a dependent variable also produce no significant results for either share or option plans. Presumably, the perceived productivity performance measure, which stems from the Likert-scale questionnaire and represents company perception of the link between equity-based pay and performance, is hard to translate into a measurement instrument; in addition to which, these data, unlike all the other financial data, show no variation over five years. Therefore, these results complement the other results.

The neutral results on productivity may also suggest that firms introduce share and option plans for other reasons than increasing productivity. This outcome may be an indication of what has been called "negotiated shareholder value" (see Section 2.1). As Vitols (2001) emphasises, in Germany, prior to implementation, certain management practices, including compensation plans, must be negotiated consensually not only among top management and the supervisory board but between management and the workers' council. This requirement may imply that, for German companies, the German co-determination system shapes adoption of equity-based pay plans for broad-based employees in a particular way. Top executives in Germany may pursue goals other than performance enhancement – specifically, the mitigation of social freedom – meaning that their performance goals become (for the moment) secondary (see Section 2.1).

In addition, in Germany, share plans (especially employee share plans) have a very long tradition. Therefore, it may be that firms adopt share plans for their strong symbolic content (as discussed in Section 4.2 and in Section 9.1 on the results of antecedents of equity-based pay) but not for their ability to lift performance. Moreover, research indicates that when confronted with financial constraints and capital requirements, new market firms typically use greater levels of stock option compensation (Ittner, Lambert, & Larcker, 2001; Core & Guay 2000, in: Kroumova & Sesil, 2003). Such was the case following the initial new market euphoria: most new market firms have since found themselves facing financial constraints as a consequence of the higher cost of capital (Ittner, Lambert, & Larcker, 2001).

Thus, this finding suggests that neither share nor option schemes help to mitigate the agency problem in situations of high information asymmetry; nor do they promote greater productivity. It may be assumed that the material incentive is not in concert with positive peer pressure (see Section 4.1). Further, it must be assumed that share and option plans are introduced across a large part of the company, which makes the free-rider effect even more prevalent. Therefore, the material incentive per se cannot override the free-rider problem. Finally, it may be assumed that firms' adoption of share and option plans arises out of other motivations than productivity enhancement (see also Sections 4.2 and 9.1).

> *Hypothesis 4. Firms with high plan coverage will report high corporate productivity growth.*

The results for this hypothesis paint a different picture for share and option plans. In contrast to theoretical assumptions and empirical studies (e.g., Peck & Jensen, 2000), results for this hypothesis suggest that high levels of share plan coverage per se *do not* contribute to better *performance*; however, the results for option plan coverage confirm the hypothesis. In line with theoretical assumptions but in contrast to empirical studies (e.g., Peck & Jensen, 2000), results for option plans suggest that high levels of company option plan coverage *do* contribute to better performance, meaning that the high percentage of the employees covered by the option plan may imply that a large part or even all of the employees participate in option plans. Specifically, a direct, positive effect on corporate productivity growth – including sector and time effects – is observable for a panel of

companies with option plans. In fact, firms with option plans enjoy a productivity increase of 16.2%[25].

As already pointed out, agency theory proposes that shirking is an inherent problem of group incentives and the resulting free-rider problem can only be overcome using peer pressure (see Section 4.1). As a result, even though firms usually introduce equity-based pay plans for broad-based employees across the entire organisation, the relevant teams are small enough to allow mutual monitoring so positive peer pressure can work. This scenario may be especially true for new market companies, which are in general rather small. It may be assumed that in smaller firms, employees have frequent and repeated social contacts and know each other. In addition, as outlined in Section 9.1, new market firms attract employees of similar type and quality; therefore, teams may be assumed to be homogenous, leading in turn to efficacy of social sanctions. In sum, this dynamic may have lead to the internalisation of others' welfare because workers empathise more with fellow workers than they do with faceless others. Thus, this finding suggests that, because option plans act as effective substitutes for more expensive formal monitoring mechanisms, they help to mitigate the agency problem in situations of high information asymmetry and promote a productivity growth.

> *Hypothesis 5. Firms with equity-based pay plans combined with information sharing about these plans will experience a productivity growth.*

Again in contrast to the literature, sharing information with employees about their equity-based pay plans *does not* contribute to a productivity growth. Indeed, firm information activities related to employee pay plans *do not*, by themselves, pay off for either share or option plans. This finding suggests that information sharing has no impact whatsoever on whether employees contribute more of the effort that results in higher productivity. Three possible explanations exist for this finding. First, information sharing may be important for the successful launch of an equity-pay plan – that is, to encourage employees to buy shares or options – but not important for lifting productivity. Second, even though firms may implement information-sharing activities, employee knowledge about shares and option may

[25] Calculated as $(e^{0.15}-1)*100$, see Table 13, column 10, coefficient estimate 0.15. This result has been achieved for coverage by both option plans.

in actuality be gleaned primarily from colleagues, work councils, or unions. Therefore, corporate information sharing is not critical for the success of a share plan. Third, it may be that corporate information is somehow "neutralised" by information received from elsewhere; for instance, from colleagues, work councils, unions, and/or the press. Thus, it is critical that further investigation be carried out on possible noise sources and content of corporate equity information sharing.

Hypothesis 6. Firms with a high coverage of equity-based pay plans combined with a high level of information sharing about these plans will experience a productivity growth.

Findings for this hypothesis are based on supplementary tests of whether high levels of plan coverage combined with information sharing do indeed cause productivity growth. Some evidence was found that equity information sharing, when combined with high levels of share plan coverage, has a negative impact on performance. More important, results showing that high coverage of option plans (see results for previous hypothesis) in combination with equity information sharing do not lead to higher productivity were significantly positive. The minimally negative significance of the findings for share plans and the neutral results of the productivity models for option plans again call for further studies in this field.

8.3 Key Findings: Consequences of Equity-Based Pay Complemented with HRM Activities

Hypothesis 7. Equity-based pay plans combined with innovative systems of HRM activities lead firms to experience productivity growth.

The results for this hypothesis provide no evidence that share plans or option plans combined with systems of innovative HRM activities lead to productivity growth. Moreover, in contrast to complementarity theory and other empirical research (see Section 5), this study finds no evidence for the existence of complementarities. This finding implies that companies introducing both financial participation and bundles of HRM activities promoting non-financial participation will not benefit from increased productivity. Additionally, results do not support the existence of

interaction effects between systems of innovative HRM activities and high coverage of share or option plans.

These neutral results may be attributable to at least two different problems. First, given the difficulties of measuring complementarities, it is unclear whether the results were a product of poor measures of this construct or the absence of its impact in the sample. Second, as explained earlier, innovative HRM practices are not as innovative as the name would suggest (see Section 5.1). TQM, for example, "was used as a loose descriptor for several different interrelated management techniques" (Baron & Kreps, 1999: 195), promoting new production techniques with high quality standards but also including new human resource dimensions like direct involvement of workers and direct monitoring possibility in forms such as quality circles and autonomous work groups. In fact, TQM became most fashionable in the early 1990s (see for an overview, e.g., Baron & Kreps, 1999: 195), however, most of these new production techniques date back to the 1970s or 1980s. For example, the Swedish car manufacturer Volvo introduced workgroups with a high degree of autonomy in the early 1970s (see for an overview, e.g., Schreyögg, 1996).

Even though this study has used measures for complementarities that are used in similar studies (see Section 6.4) and recent books on strategic human resources promote these practices as important features of so-called high commitment HRM – "an ensemble of HR practices that aim at getting more *from* workers by giving more *to* them" (Baron & Kreps, 1999: 189) – it might be that more recent HRM practices like some non-monetary compensation practices (Lazear, 1998) and/or work-life balance concepts (e.g., Harvard Business Review, 2000) could be useful starting points to build up new measures for complementarities.

8.4 Limitations of the Dissertation

As previously outlined, the focus of this study was adoption and consequences of equity-based pay and/or equity-based pay complemented with innovative HRM activities in Germany. Despite the stated advantages of the research setting (stock listed companies), the theoretical perspective (agency theory, institutional theory, and complementarity theory), and the method (a quantitative correlative statistical

analysis of survey and company data), the analysis is subject to a number of limitations that should be noted.

First, this type of research is often surrounded by endogeneity problems, meaning that it is not entirely clear whether (1) high-performing firms introduce equity-based pay plans or (2) equity-based pay plans lead to higher performance. Therefore, this issue must be taken into consideration when interpreting results in this field of research.

Moreover, it must be admitted that the sample suffers from a bias towards large firms (see Table 10, Section 8), raising the question of generalisability of the results to all German firms in the underlying population. That is, because the dataset experiences some problems of generalisation, the study results are probably not generalisable to the underlying population of all stock-listed German companies.

In addition, the dataset contains only firms publicly listed on the German stock exchange. Therefore, its results do not apply to privately held companies. Further, while companies have indicated the type(s) of plan(s) they have in operation and the coverage of their share and option plans, neither the terms under which shares and options are distributed (e.g., strike prices, vesting or blocking periods) nor the amount of company equity involved are known. As a result, in contrast to the literature on executive compensation, incentive measures for all employees could not be calculated. Moreover, given that companies are not required to disclose anything about employee plans, it was felt that asking for this information would place too great a demand on survey respondents. In addition, the context of when and why plans were introduced is not known, meaning that although theoretical assumptions about why firms have implemented equity-based pay plans can be offered, their real motivations are also unknown. Thus, for example, even though the financial constraints of new market firms and high-growth companies can be assumed, the real financial conditions of each firm are not known.

In addition to dataset constraints, some measurement tools may also involve limitations. For example, on the survey questionnaire, respondents from some companies (subsequently excluded from the equity information-sharing sub-sample) indicated implementing equity information-sharing mechanisms even

though they have no equity-based pay plan for either staff or executives and the questionnaire asks specifically about information sharing related to equity-based pay plans. Apparently, these respondents misunderstood the question. Therefore, the potential for such miscomprehension must be taken into consideration when interpreting the study results.

Questions on coverage of share and option plans may also be subject to some problems. Specifically, the survey asks for the percentage of employees covered by the schemes, yet some responses are no more than rough guesses. In addition, because some firms make no distinction between executive and employee coverage, their responses indicate only one percentage designating the total number of employees (including executives). This inclusion makes it impossible to derive the extent of employee coverage.

Additionally, despite the valid reasons (outlined in Section 6.4) for choosing the performance variables applied in the models, performance measurement does involve some difficulties. Primarily, as already discussed, sales or other accounting-based measures like EBIT or net income have proven especially problematic for new market firms, which generate barely any sales, EBIT, or net income in the early stage of their development. Indeed, accounting-based measures in general have been criticised for their tendency to report data for external purposes rather than accurately reporting the status quo of the business (e.g., Bromwich & Bhimani, 1989).

It might also be argued that operationalisation of Tobin's Q, a practice not yet common in the managerial discretion literature (e.g., Finkelstein & Boyd, 1998), could be problematic, because this measure is neither known nor used in related research and therefore does not represent what managerial discretion stands for. However, despite some valid critical points, the core definition of Tobin's Q captures the firms' perceived growth opportunities and risk in future streams of earnings that are the core of managerial discretion (see Section 6.4). Thus, it is here suggested that further work on the operationalisation of managerial discretion using Tobin's Q may prove extremely useful.

Another potential bone of contention is the assumption that complementary systems of human resource practices appear to matter, because the way these

systems are operationalised and built (see Section 6.4) may lead to problems of multi-collinearity. For this reason, some studies (Ichniowski, Shaw, & Prennushi, 1997; MacDuffie, 1995) decrease the number of human resource practice dimensions by using a factory analysis method, which, however, has not proven useful for this current study. Therefore, the multi-collinearity question must be taken into consideration when interpreting the results based on complementarity theory presented here.

8.5 Implications for Theory

Whereas this study does not take into consideration all factors that might explain adoption of equity-based pay and is unable to fully identify all factors that might impact firm performance, it does make several important theoretical contributions regarding both antecedents and consequences of equity-based pay.

Antecedents of Equity-Based Pay

Prior research on antecedents of equity-based pay tests predictions derived from agency theory and institutional theory. From an agency theory perspective, firms adopt equity-based pay to overcome imperfect monitoring and to align interests so as to ultimately lift corporate productivity. However, this analysis finds no support for either agency theory predictions about the implementation of these schemes or the arguments that share plans are introduced in a high-discretion environment or are adopted in firms with a high degree of internationalisation. Thus, the agency theory prediction that equity-based pay plans are adopted as a substitute mechanism for hierarchy structures implying costly monitoring in the presence of asymmetric information is not supported. Conversely, for option plans, results do support agency theory predictions for implementation of these schemes and also the arguments that option plans are introduced in environments subject to high managerial discretion and are adopted in firms with a high degree of internationalisation. Therefore, the agency theory prediction that equity-based pay plans are adopted as a substitute mechanism for hierarchy structures implying costly monitoring in the presence of asymmetric information is supported. Yet, no matter how such findings may have been impacted by the methodological limitations already outlined, these differing results for share plans and option plans

imply that agency theory may have limited predictive power with regard to the adoption of equity-based pay.

From an institutional theory perspective, firms adopt equity-based pay in response to perceived pressures from their institutional environment and thus to achieve isomorphism. For both share and option plans, this study finds strong support for institutional theory predictions of scheme implementation. Thus, the institutional theory prediction that equity-based pay is adopted due to mimicry patterns within an industry is supported, implying that institutional theory has strong predictive power with regard to the adoption of equity-based pay.

	Antecedent predictions	
	Agency theory	Institutional theory
Share plans Option plans	Rejected Confirmed	Confirmed Confirmed
Contributions to theory	Agency theory has limited predictive power for the adoption of equity-based pay	Institutional theory has strong predictive power for adoption of equity-based pay

Table 19: Antecedents Predictions – Contributions to Theory

From the perspective of agency theory, the significant positive results for institutional theory may imply that the institutional theory argument – namely, imitation of others – is part of rational decision making. This assumption would be especially true for firms implementing equity-based pay due to competitive imitation pressures. From an economic perspective, it is efficient to imitate others because it leads to a minimised risk of losing market – not doing so would disadvantage the firm relative to its competitors. Therefore, from an institutional theory perspective, it would be interesting to investigate whether early and late adopters differ in their reasons for equity-based pay implementation. Westphal, Gulati and Shorthell (1997: 366) show that early adopters customise organisational practices for efficiency reasons, "while later adopters gain legitimacy from adopting the normative form" of the same organisational practices, meaning that as organisational practices became institutionalised, reasons for adoption evolve

from customisation to conformity. Consequently, the efficiency argument of agency theory could be integrated into the institutional perspective.

Consequences of Both Equity-Based Pay and Equity-Based Pay Complemented with HRM Activities

Despite the study limitations already discussed, conclusions drawn from study results on antecedents and consequences have important implications for agency theory. First, neither the agency theory argument for adoption of share plans nor the agency theory argument for their consequences is supported, meaning that firms do not take efficiency arguments into consideration when adopting share plans. Therefore, firms target other reasons for increase in productivity when introducing share plans. Perhaps because share plans have a long history, firms tend not to think in terms of efficiency when implementing share plans but rather orient themselves to successful firms that have implemented such plans. In contrast, the agency theory argument for adoption of option plans is supported, while the agency theory argument for consequences is not supported, meaning that, despite the consequences of option plans, firms consider rational arguments when introducing them, possibly because option plans are a recent phenomenon and less familiar than share plans. Nonetheless, the results for high coverage firms and firm performance paint a different picture for share and option plans. The results for option plans suggest that high levels of company equity-based pay coverage *do* contribute to better performance. Agency theory suggests that group incentives alone have an inherent problem of shirking, which free-rider problem can only be overcome through peer pressure (see Section 4.1). However, in sum, these assumptions imply that agency theory has limited predictive power for the consequences of equity-based pay.

In addition, the results fail to confirm complementarity theory, meaning that introducing systems of HRM activities (ranging from teamwork and training to communication activities) together with share or option plans does not impact productivity. This finding implies that complementarity theory has limited predictive power for the consequences of HR systems in combination with equity-based pay plans.

	Consequence predictions	
	Agency theory	Complementarity theory
Share plans Option plans	Rejected Rejected (with the exception of high coverage for firms with option plans)	Rejected Rejected
Contributions to theory	Agency theory has limited predictive power for the consequences of equity-based	Complementarity theory has limited predictive power for the consequences of HR –systems combined with equity-based pay plans

Table 20: Consequences Predictions – Contributions to Theory

Even though the hypothesis on the link between equity-based pay and performance could not be confirmed, the results of this study are consistent with the mixed and neutral results discussed in section 4.3. Therefore, this study contributes to the literature by confirming these mixed and neutral results.

Finally, this study contributes to theory by taking a bi-theoretical approach to the investigation of equity-based pay plan adoption. The results, particularly those based on an institutional theory, suggest a need to explain antecedents and consequences using a much broader, multi-theoretical framework with more predictive power than any one theoretical paradigm can currently offer.

8.6 Implications for Management

An understanding of whether equity-based pay plans offer a real resolution to the conflict between employer and employees is central for management. As outlined, the conflict could be seen to be resolved if the interests of both employer and employee are aligned and employees' efforts enhanced. From this perspective, share plans and option plans do not help to mitigate the conflict between employer and employee. The introduction of complementary work practices, meaning a combination of equity-based pay plans with innovative HRM activities, does not

seem to be a promising way of mitigating the conflict and ultimately lifting corporate productivity.

The study results on antecedents and consequences of equity-based pay raise questions about the decision-making patterns of firms. Management should be aware that not only rational motivations but also coercive, normative, and mimetic pressures influence the decision to adopt an equity-based pay plan. Therefore, the adoption of such plans is motivated by both rational decision making and the search for legitimacy through referral to others that have implemented them. While an overgeneralised answer would be inappropriate, this study indicates that in real situations, patterns of both efficiency and imitation occur and companies should be aware of their decision-making process when adopting equity-based pay.

The results of this study also indicate a qualitative difference between pure share-based schemes and those based on stock options. Whereas option plans are apparently adopted in environments subject to managerial discretion and seem to attract employees with less risk aversion, share plans are seemingly introduced for other reasons like creating an ownership culture within the firm (which observation is in line with Conyon & Freeman, 2001) (see Section 4.1). As regards outcomes of equity-based pay, share and option plans do not impact differently: For both plans, neutral impact on productivity growth has been found. However, the high-coverage option plans may lead to productivity growth, which suggests that option plans could be beneficial in high-coverage environments and where peer-pressure may work.

The results for complementarity theory predictions show that innovative forms of human resource management can theoretically have a tremendous impact on firm performance. However, even though there may be several coherent options, only one will generally be optimal (Milgrom & Roberts, 1992). It may be that even though managers do a good job in describing different coherent strategies, they have failed to find the optimal solution (see Section 5 on the difficulties of designing a coherent system of HRM practices). Thus, future research may wish to further explore the consequences of complementary work systems (1) using other measures for innovative work practices and (2) after having reviewed the firms' procedure for introducing coherent systems of HRM practices.

The evidence presented here also suggests that to improve performance and productivity, companies need to consider four important issues: (1) which human resource practices they should introduce, (2) whether innovative human resource practices do or do not produce higher firm performance than non-innovative work practices, (3) which practices are complementary, and (4) whether the workplace that has adopted innovative work systems is receptive (in terms of productivity growth) to innovative work practices. Most important, the findings imply that, for a clear understanding of these issues to emerge, not only scholars but firms themselves must produce more comprehensive evidence on innovative HRM activities.

From an international management perspective, this study delivers useful and important findings, especially for companies coming to Germany or for foreign companies establishing a German subsidiary. The decision-making process for equity-based pay plan adoption is not an isolated, purely internal dynamic, because a firm must necessarily engage in a reciprocal exchange with its institutional environment and adopt practices in response to it. This exchange has consequences for foreign subsidiaries in Germany. Decision making may not only be influenced by the thinking of the headquarters or the subsidiary but, as suggested by Kostova and Roth (2002), may also be impacted by the German institutional context. Moreover, foreign subsidiaries may also influence their German counterparts. As regards consequences of equity-based pay, foreign subsidiaries must bear in mind that what may be a good practice at home might not be appropriate for the German setting. For example, in light of this study's findings, U.S. companies wanting to adopt share or option plans considered to be performance-enhancing measures at home should re-evaluate their decision to implement them in their overseas subsidiaries.

8.7 Suggestions for Future Research

Obviously, further research is needed to understand why and when firms adopt equity-based pay, especially as other motivations besides pure efficiency seem to drive firms to adopt equity-based pay. For instance, it might prove valuable to study how the German co-determination system and work councils shape company adoption of share and option plans for broad-based employees. Of equal interest

would be an investigation of the consequences of the German "negotiating competitiveness" (see Section 2.1 and 8.2).

This study also presents evidence that isomorphic pressure leads to the adoption of equity-based pay. Two related research problems of interest are whether early and later adopters of equity-based pay differ in their reasons for adoption and whether there indeed exists a pattern, similar to that found by institutional theoreticians (e.g., Westphal, Gulati, & Shorthell, 1997), by which early adopters implement plans for reasons of efficiency whereas later adopters do so for reasons of conformity with their institutional environment (see also Section 8.1). Also of interest would be the identification of what differentiates firms that initiate organisational change. For instance, some authors argue that the prestige or status of an organisation is essential to the initiation of change in many organisational fields (Rogers, 1995; Sherer & Kee, 2002).

It might be that compensation consultants have an impact on the adoption of option plans and facilitate plan travel from one firm to another. Therefore, it would be interesting to investigate the isomorphic nature of equity-based pay plan adoption from this point of view. Meaning, if and how compensation consultants influence equity based-pay plan adoption in German companies may constitute another valuable avenue of research, particularly as some studies (e.g., Conyon & Peck, 2002) indicate that executive compensation is heavily influenced by the presence of compensation consultants.

The field might also benefit from further research using the conceptual model of psychological ownership (Pierce, Kostova, & Dirks, 2001; Pierce, Rubenfeld, & Morgan, 1991), which suggests that under certain moderating conditions formal ownership leads to psychological ownership that can engender higher performance. Such an approach may offer valuable new insights into why and when equity-based pay plans create feelings of psychological ownership and under what conditions employee owners perform better than non-owners. It may also increase understanding of what actually characterises an ownership culture, how it impacts firm performance, and how it can be created. Such research might help to illuminate under what conditions share and option plans can foster higher employee performance.

In addition, because this study finds no evidence that the presence of high equity information sharing leads to increased performance, further research might investigate the content of information dissemination rather than its mere existence. As a corollary, research on potential noise in communication about equity-based pay plans may also prove useful.

Finally, further work may wish to explore the consequences of comparing "high participatory" workplaces with other workplace types, particularly when participation is combined with equity incentives. Such exploration might also consider the effect not simply on firm productivity but on other measures of firm performance, such as share price reactions, which may be strongly influenced by firm adoption of broad-based option plans.

8.8 Conclusions

To conclude, this study documents the growing use of equity-based incentive schemes in Germany and provides evidence on their antecedents and consequences. It also suggests a qualitative difference between share and option plans in terms of antecedents but not consequences (with the exception of high coverage of option plans and performance). As regards option plans, the findings support the agency theory propositions that option plans are adopted in response to high information asymmetry in environments subject to high managerial discretion and in response to high information asymmetry in an international environment. However, for share plans, these propositions are not supported. In addition, even though agency theory appears to have strong predictive power for the adoption of option plans, it has limited predictive power for the adoption of share plans.

In contrast, the study finds strong support overall for the institutional theory proposition that companies adopt plans in response to coercive, mimetic, or normative pressures from their industry. This finding implies the isomorphic nature of equity-based pay plan introduction. That is, firms reflect their institutional environment when adopting equity-based pay. In addition, the fact that this proposition is strongly supported for both share and option plans suggests that institutional theory has strong predictive power for the adoption of equity-based pay.

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Appendix I

Cover letter

Kapitalbeteiligung für Mitarbeiter

Sehr geehrte(r) [Personaldirektor(in)]

Kapitalbeteiligungen für breite Mitarbeiterkreise erfreuen sich in Deutschland immer grösserer Popularität. Viele Unternehmen führen Kapitalbeteiligungen für Mitarbeiter in der Überzeugung ein, dass ein direkter Zusammenhang zwischen Kapitalbeteiligungen für Mitarbeiter und Unternehmensproduktivität besteht. Darüber hinaus sind Kapitalbeteiligungen sehr beliebt, um Mitarbeiter stärker ans Unternehmen zu binden.

Ihre Meinung und Erfahrung zum Thema Kapitalbeteiligung für Mitarbeiter interessiert uns sehr, und deshalb laden wir Sie ein, an einer Umfrage der Forschungsstelle für Internationales Management (FIM) der Universität St. Gallen teilzunehmen.

Wir möchten Sie bitten, den beiliegenden Fragebogen zu beantworten oder diesen Ihrer Personalleitung zur Beantwortung zukommen zu lassen. Den ausgefüllten Bogen können Sie uns mit dem beigefügten voradressierten Umschlag zusenden. Wir würden uns sehr freuen, Ihre Antwort bis spätestens 15. März 2002 zu erhalten.

Bei unserer Umfrage handelt es sich um eine wissenschaftliche Studie. Teilnehmende Unternehmen erhalten einen Untersuchungsreport mit zentralen Ergebnissen und Schlussfolgerungen. Selbstverständlich behandeln wir alle Informationen streng vertraulich. Ausserdem werden im Untersuchungsreport keine Rückschlüsse auf einzelne Personen oder Firmen möglich sein.

Wir freuen uns, von Ihnen zu hören und bedanken uns recht herzlich für Ihre Bemühungen und Ihre wertvolle Mitarbeit.

Mit freundlichen Grüssen

Falls Sie Fragen oder Anregungen haben, wird Ihnen unsere Themenexpertin gerne Auskunft geben:

Micaëla B. Raschle Email: micaela.raschle@unisg.ch Telefon: +41 76 389 85 69

Questionnaire

Forschungsstelle
für Internationales Management

Universität St.Gallen

Kapitalbeteiligung für Mitarbeiter

Fragebogen zum Thema

Kapitalbeteiligung für Mitarbeiter

und

Unternehmensproduktivität

in Deutschland

Februar 2002

Kapitalbeteiligung für Mitarbeiter und Unternehmensproduktivität

1. <u>Aspekte zum Thema Kapitalbeteiligung für Mitarbeiter</u>

Befürworter von Modellen der Kapitalbeteiligung für Mitarbeiter gehen von einem direkten Zusammenhang zwischen Kapitalbeteiligung und Unternehmensproduktivität aus. Bitte kreuzen Sie auf der folgenden Skala die Alternative an, der Sie am ehesten zustimmen.

	Stimme ich auf jeden Fall zu	Stimme ich zu	Neutral	Stimme ich nicht zu	Stimme ich auf keinen Fall zu
Das Vorhandensein von Modellen der Kapitalbeteiligung für Mitarbeiter führt zu erhöhter Unternehmensproduktivität.	1	2	3	4	5
Kapitalbeteiligungen für Mitarbeiter sind mit zu geringen Steuervorteilen verbunden und können daher die Unternehmensproduktivität nicht beeinflussen.	1	2	3	4	5
Die Verwaltungskosten von Modellen der Kapitalbeteiligung für Mitarbeiter vermindern deren Attraktivität für Unternehmen.	1	2	3	4	5
Es wäre wünschenswert, Modelle der Kapitalbeteiligung vermehrt als Altersvorsorge für Mitarbeiter einzusetzen.	1	2	3	4	5
Gegenwärtige Modelle der Kapitalbeteiligung für Mitarbeiter funktionieren zufriedenstellend.	1	2	3	4	5
Begleitende interne Kommunikationsmaßnahmen für Modelle der Kapitalbeteiligungen führen zu erhöhter Unternehmensproduktivität.	1	2	3	4	5
Kapitalbeteiligungen für Mitarbeiter haben einen positiven Einfluss auf die Loyalität der Mitarbeiter in meinem Unternehmen.	1	2	3	4	5
Kapitalbeteiligungen für Mitarbeiter reduzieren die Fehlzeiten der Arbeitnehmer in meinem Unternehmen.	1	2	3	4	5
Kapitalbeteiligungen für Mitarbeiter haben einen positiven Einfluss auf die Dauer der Anstellung der Mitarbeiter.	1	2	3	4	5
Kapitalbeteiligungen für Mitarbeiter erhöhen die langfristige Unternehmensstabilität.	1	2	3	4	5

2. Modelle der Kapitalbeteiligung für Mitarbeiter

Bieten Sie Ihren Mitarbeitern gegenwärtig eines (oder mehrere) der folgenden Modelle der Kapitalbeteiligung am Unternehmen an oder planen Sie eines (oder mehrere) einzuführen? Bitte kreuzen Sie die entsprechenden Felder an. Falls Sie die Fragen mit „Ja“ beantworten, füllen Sie bitte die zusätzlichen Felder aus (Mehrfachnennung möglich).

	Ja	Nein	Jahr der Ein-führung	Anteil der beteiligten Führungs-kräfte (in %)	Anteil der beteiligten Belegschaft (in %)	Einführung in den nächsten 12 Monaten geplant
Aktienkaufplan mit staatlicher Förderung (nach § 19 a EstG, Vermögensbildungsgesetz)						
Aktienkaufplan mit Finanzierung über (zinsvergünstigtes) Darlehen						
Aktiensparplan (Ansparen der Mitarbeiterbeiträge über einen Zeitraum)						
Aktienoptionsplan (einmaliges Angebot)						
Aktienoptionsplan (mehrmaliges Angebot)						

3. Formen der nicht-finanziellen Mitarbeiterbeteiligung

Über welche der folgenden Human-Resource-Aktivitäten verfügt Ihr Unternehmen? Bitte kreuzen Sie die entsprechenden Felder an (Mehrfachnennung möglich). Bitte beachten Sie, dass es sich um zwei Spalten mit Felder zum Ankreuzen handelt.

	Ja	Nein		Ja	Nein
Qualitätszirkel, Lernstatt			Kommunikationsbroschüre, Newsletter		
Autonome Arbeitsgruppen			Mitarbeiterinformationsstelle (Informationen zur Finanzlage & Firmen-strategie, zum Börsenkurs)		
Total Quality Management			Mitarbeiterkontaktstelle für Feedback spezialisiert auf Kapitalbeteiligungen		
Abteilungsübergreifende Arbeitsgruppen			Einführende Informationsbroschüre über Kapitalbeteiligungen für Mitarbeiter		
Mehrtägige Schulungs-veranstaltungen, Seminare			Regelmäßige Rundschreiben, Newsletter zum Thema Kapitalbeteiligungen für Mitarbeiter		
Auf Intranet / Internet / Datenbank aufbauendes Informationssystem			Schulungsveranstaltungen, Seminare bezogen auf Kapitalbeteiligungen für Mitarbeiter		

4. Internationalisierung

Die Internationalisierung einer Firma beeinflusst oft auch ihr Vergütungssystem. Bitte beantworten Sie die folgenden Fragen, indem Sie die entsprechenden Felder ausfüllen oder ankreuzen.

In wievielen Ländern ist Ihr Unternehmen mit eigenen Tochtergesellschaften vertreten?	
In wievielen Ländern, in denen Sie mit eigenen Tochtergesellschaften vertreten sind, kommen die Mitarbeiter in den Genuss von Kapitalbeteiligungen?	

Um was für Modelle handelt es sich dabei? Bitte kreuzen Sie die entsprechende Option an.

- Global einheitliches Modell der Kapitalbeteiligung	
- Modelle der Kapitalbeteiligung, die von Land zu Land verschieden sind	
- Einheitliches Modell der Kapitalbeteiligung, das lokale Modifikationen zuläßt	

Was sind die wichtigsten Anpassungskriterien?
Bitte kreuzen Sie die entsprechenden Felder an, Mehrfachnennungen möglich.

- Lokale Gesetze und /oder Regelungen	
- Lokale Kultur	
- Entscheidung der ausländischen Tochtergesellschaft	
- Entscheidung der Muttergesellschaft	

Wie ist der prozentuale Anteil Ihrer Mitarbeiter in ausländischen Tochtergesellschaften, die von Kapitalbeteiligungen profitieren, im Verhältnis zum Anteil Ihrer Mitarbeiter in Deutschland? Bitte kreuzen Sie das entsprechende Feld an.

höher	gleich hoch	tiefer

5. Unternehmensproduktivität

Das Messen der internen Unternehmensproduktivität ist oft mit einigen Schwierigkeiten verbunden: Zum einen stellt sich die Frage, ob und wie die interne Unternehmensproduktivität gemessen werden kann und zum anderen, auf welcher Ebene diese Messung angesetzt soll. Bitte geben Sie an, ob Sie ein Maß für die interne Unternehmensproduktivität einsetzen, und auf welcher Ebene die interne Unternehmens-produktivität ermittelt wird.

	Ja	Nein	Einzel-person	Team oder Projekt	Division oder Geschäftseinheit	Ausländische Tochter-gesellschaft	Gruppe (Corporate)
Unternehmens-produktivität							

Vielen Dank für Ihre Teilnahme an dieser Studie! Bitte senden Sie uns den Fragebogen mit dem beigefügten voradressierten Umschlag bis zum **15. März 2002** zurück. Als Dankeschön für Ihre Mitarbeit werden wir Ihnen unseren abschließenden Bericht kostenlos zukommen lassen.

Falls Sie Fragen oder Anregungen haben, wird Ihnen unsere Themenexpertin gerne Auskunft geben:

Micaëla B. Raschle Email: micaela.raschle@unisg.ch Telefon: 0041 76 389 85 69

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Universität St. Gallen
Bodanstrasse 6
CH-9000 St. Gallen

Appendix II

Structure of the Responding Companies

Figure 1 shows the detailed equity plan distribution by plan type. By 2001, the companies are offering 34 employee share plans (plan 1), 24 option plans (several offers), 9 leveraged employee ownership plans (plan 2), 4 option plans (one time offer), and 3 stock saving plans[26].

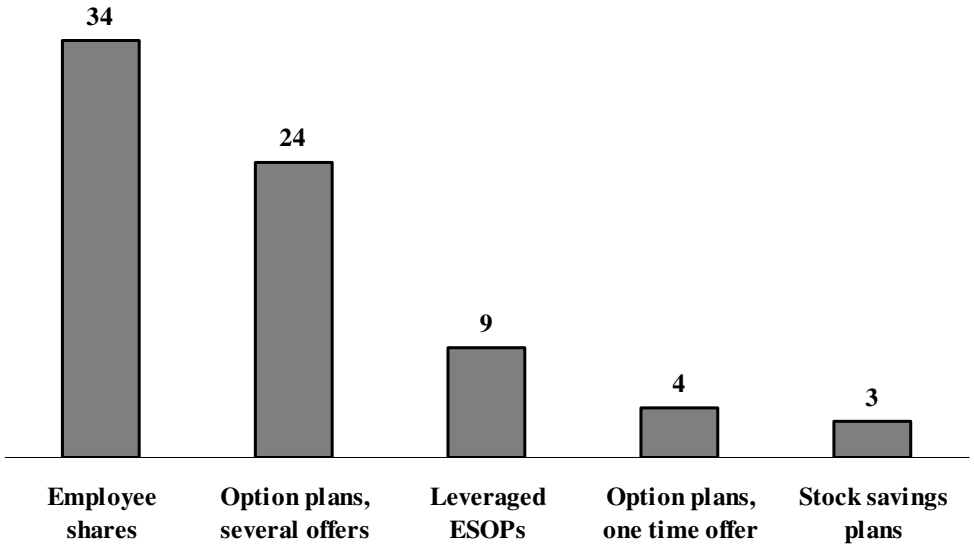

Figure 1: Detailed Equity Plan Distribution by Plan Type in 2001

[26] These numbers represent the number of share plans (employee shares, leveraged ESOPs and stock saving plans) and option plans (several offers, one time offer) over the whole data set. The plans are calculated separately, and the total number of plans does not correspond to the total number of firms (see footnote above for the calculation of the total number of firms) because some of them have more than one plan, e.g., (a) share and option plans, (b) several different share plans, or (c) two different option plans.

Figure 2 illustrates the development of equity plans from 1997 to 2001. As of 1997, only 16 out of 39 share plans have been established, but between 1997 and 2001, the number of share plans grows constantly each year. As noted previously, the legal framework for stock option grants remained unclear until 1998. Therefore, in 1997 and 1998 only a few option plans are in place. However, after the new law on control and transparency in business (Gesetz zur Kontrolle und Transparenz im Unternehmensbereich; KonTraG) comes into force, the number of option plans increases from 5 in 1998 to 13 in 1999. In the following year, the number of option plans almost doubles, from 13 in 1999 to 23 in 2000.

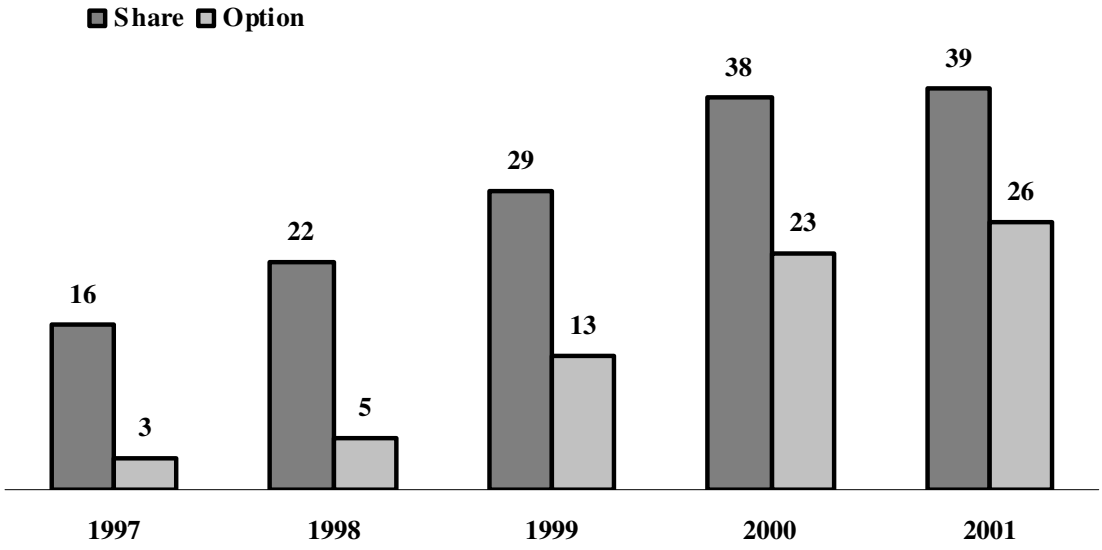

Figure 2: Equity Plan Development from 1997-2001

Figure 3 outlines the number of plans per company. In 2001, there are 45 companies with one plan, 11 companies with two plans, 1 company with three plans, and 1 company with four plans.

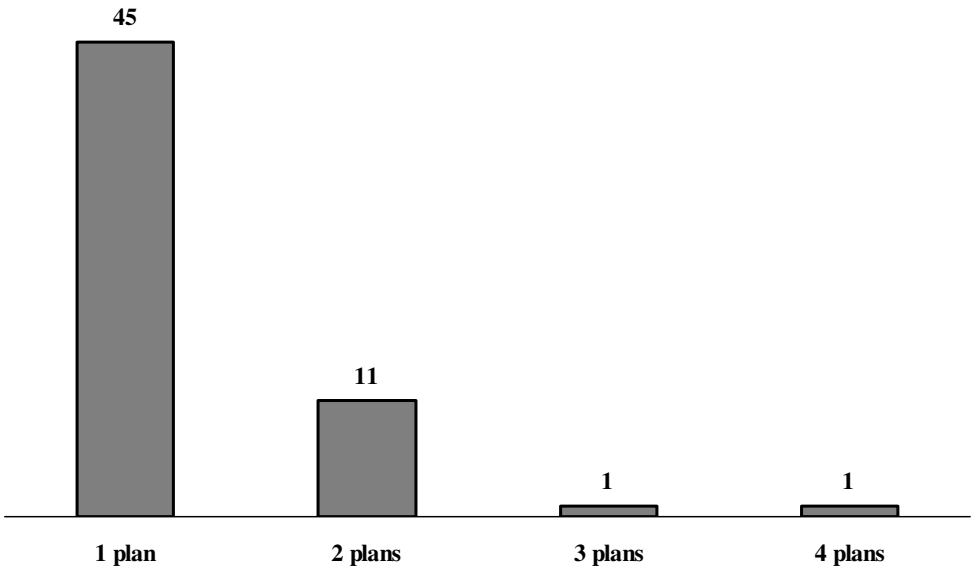

Figure 3: Number of Plans per Firm in 2001

Figure 4 presents the breakdown for companies with equity-based pay plans by major industry group. In 2001, the largest industry group represented is the manufacturing sector (48%), followed by finance/insurance/real estate (19%), services (17%), transportation/communications/electric/gas/sanitary services (7%), wholesale trade (5%), retail trade (2%), and mining (2%). The construction industry is not represented.

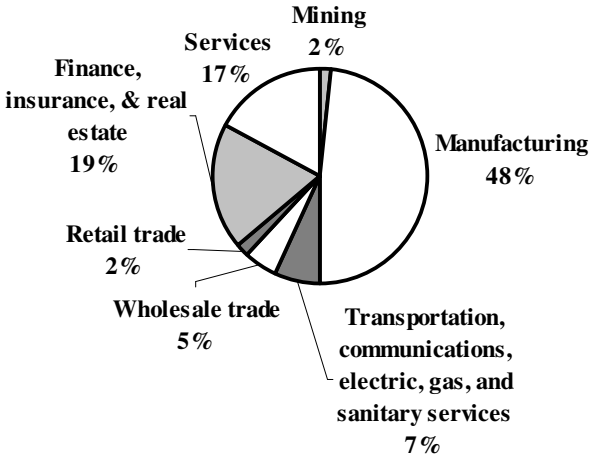

Figure 4: Equity-Pay Plan Firm by Industry Group in 2001

Figure 5 charts companies with no equity-based pay plan by major industry group. In 2001, the manufacturing industry represents the largest sector (61%), followed by finance/insurance/real estate (11%), transportation/communications/ electric/gas/sanitary services (7%), wholesale trade (5%), retail trade (5%), services (5%), construction (4%), and mining (2%).

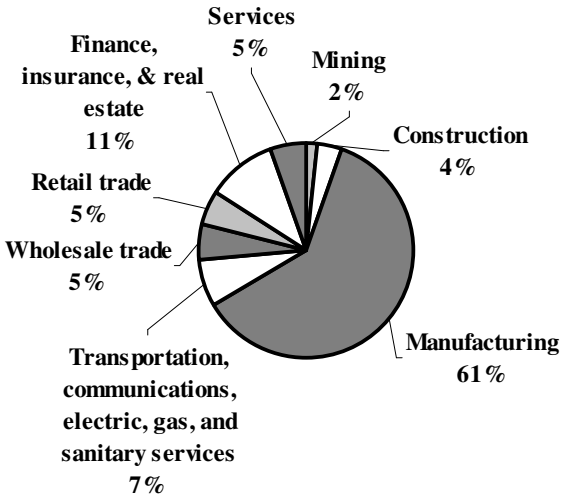

Figure 5: Non-Equity Pay Plan Firms by Industry Group in 2001

Figure 6 presents the share plan distribution by major industry groups. In 2001, the manufacturing industry represents the largest sector (53%), followed by finance/insurance/real estate (18%), transportation/communications/ electric/gas/sanitary services (10%), services (8%), wholesale trade (5%), retail trade (3%), and mining (3%).

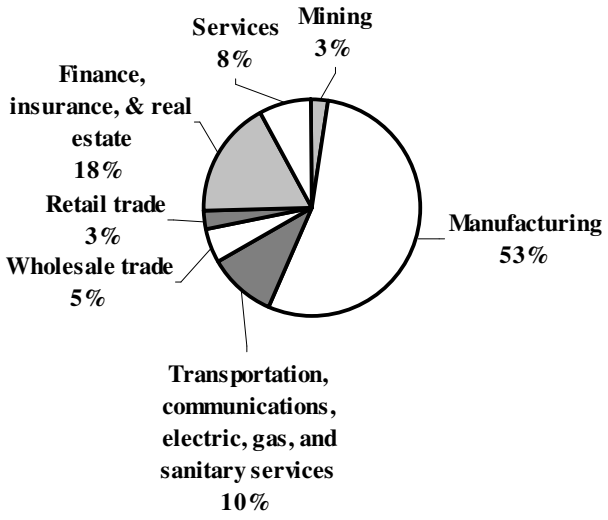

Figure 6: Share Plan Distribution by Industry Group in 2001

Figure 7 charts the option plan distribution by major industry group. For 2001, the industry breakdown of companies with option plans in place is as follows: manufacturing (38%) and services (35%) comprise the largest two sectors followed by finance/insurance/real estate (19%), transportation/communications/ electric/gas/sanitary services (4%), and wholesale trade (4%). Interestingly, a comparison of share plan companies with option plan companies reveals that companies with option schemes represent fewer industries (5 different industries) than share plan companies (7 different industries). In addition, no option plan companies in the sample represent the retail trade and mining sectors. However, implementation of option plans rather than share plans is proportionally much higher in the services sector: 35% of option plans but only 8% of the share plans. Overall, manufacturing, the largest sector represented, accounts for over half the share plans and more than one third of the option plans.

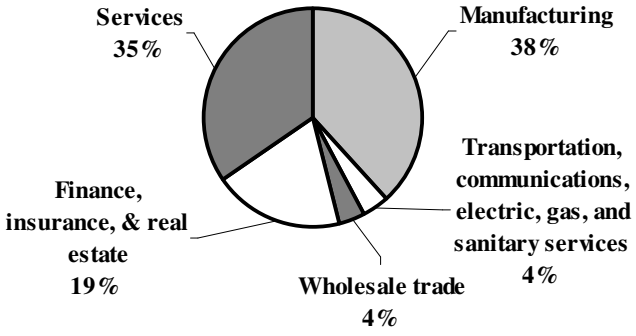

Figure 7: Option Plans by Industry Group in 2001

Figure 8 outlines the distribution of companies having both share and option plans by industry group. In contrast to the distribution of option plans, in this distribution the wholesale trade industry has no companies offering both share and option plans. Forty-three percent of companies are in manufacturing, 29% in services, 14% in finance/insurance/real estate, and 14% in the transportation/ communications/electric/gas/sanitary services industry.

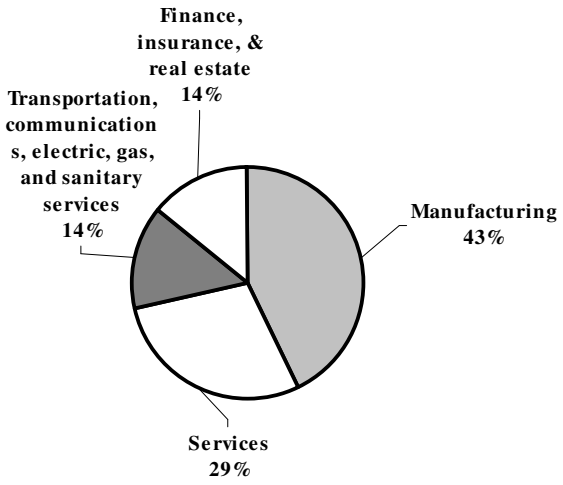

Figure 8: Distribution of Share and Option Plans by Industry Group in 2001

Figure 9 presents the breakdown of companies with equity-based pay plans by firm size. In 2001, companies with equity-based pay plans are represented in all five size classes, with the largest group (42%) having 1,000 to 9,999 employees, followed by 22% of the companies with 10,000 to 99,999 workers. The other companies are equally distributed among the remaining three size classes, with 12% companies in each class.

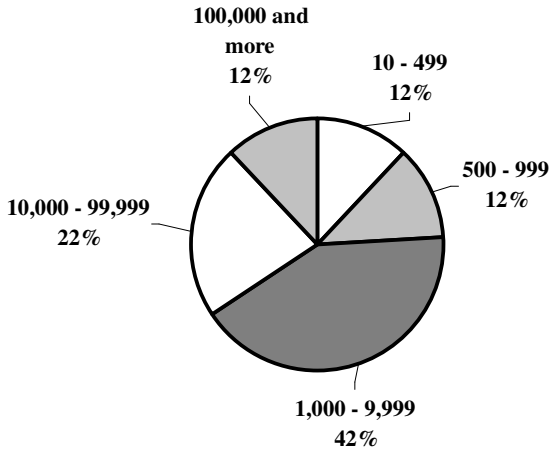

Figure 9: Distribution of Equity Pay Plan Firms by Firm Size in 2001

Figure 10 charts companies without any equity-based pay plans by firm size. In 2001, 58 % have from 1,000 to 9,999 employees, 16% have from 10 to 499 employees, 14% have from 500 to 999 employees, and 12% have 10,000 to 99,999 employees.

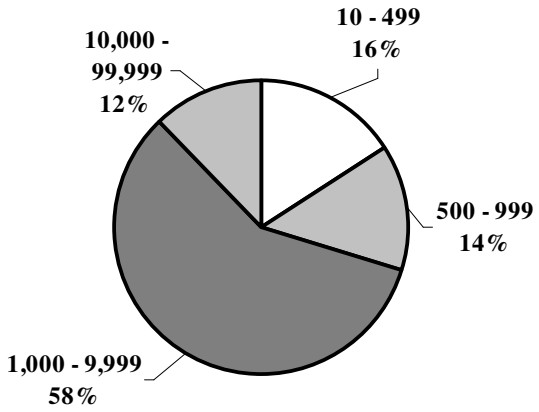

Figure 10: Distribution of Non-Equity Pay Plan Firms by Firm Size in 2001[27]

[27] The figures "10 – 499", "500 – 999", "1,000 – 9.999", "10,000 – 99,999", "100,000 and more" represent the number of employees.

Figure 11 presents share plan distribution by firm size. By 2001, 39% of all share plans have been adopted by companies with 1,000 to 9,999 employees, and 31% by companies with 10,000 to 99,999 employees. Fifteen percent of share plans have been implemented in companies with more than 100,000 employees, 10% in companies with 500 to 999 employees, and 5% in companies with 10 to 499 employees.

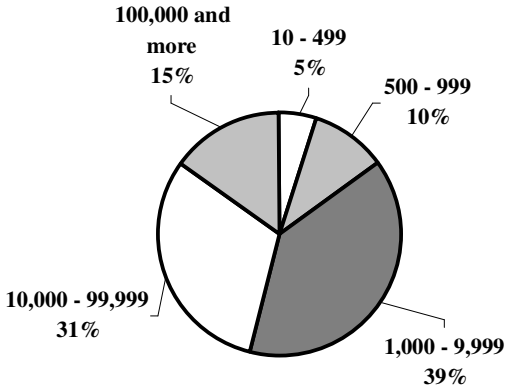

Figure 11: Distribution of Share Plans by Firm Size in 2001[28]

[28] The figures "10 – 499", "500 – 999", "1,000 – 9,999", "10,000 – 99,999", "100,000 or more" represent the number of employees.

Figure 12 shows the option plan distribution by firm size. In 2001, 42% of the option plans are offered by companies with 1,000 to 9,999 employees, 23% by companies with 10 to 499 employees, 15% by companies with 500 to 999 employees, 12% by companies with 10,000 to 99,999 employees, and 8% by companies with over 100,000 employees. Overall, option plans rather than share plans tend to be implemented by smaller companies: 38% of all option plans but only 15% of all share plans have been implemented in the two smallest size classes. In contrast, share plans tend to be implemented in large firms: only 20% of all option plans but 46% of all share plans have been implemented in the two largest firm size classes.

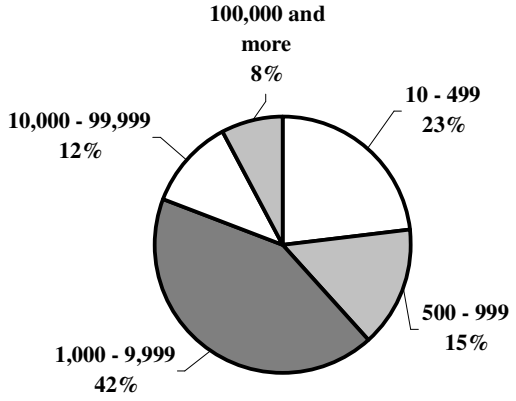

Figure 12: Distribution of Option Plans by Firm Size in 2001[29]

[29] The figures "10 – 499", "500 – 999", "1,000 – 9,999", "10,000 – 99,999", "100,000 or more" represent the number of employees.

Figure 13 presents the distribution of companies with both share and option plans by firm size. In 2001, 29% of the companies have 1,000 to 9,999 employees and another 29% companies have 10,000 to 99,999 employees. The other three firm size classes are each represented by 14% of companies.

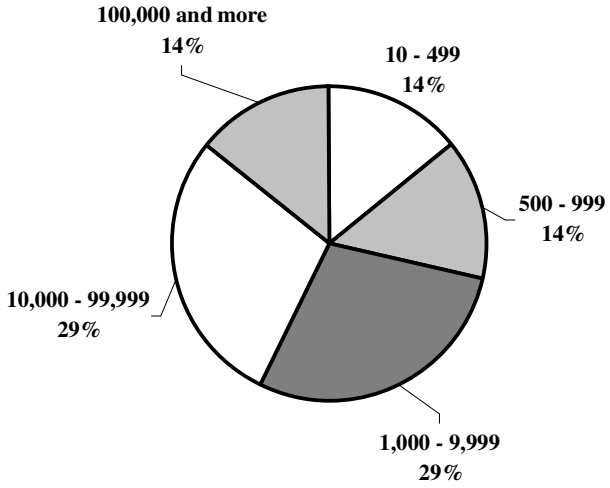

Figure 13: Distribution of Share and Option Plans by Firm Size in 2001[30]

[30] The figures "10 – 499", "500 – 999", "1,000 – 9,999", "10.,000 – 99,.999", "100,000 or more" represent the number of employees.

Questionnaire Results[31]

Company Statements[32]

Figure 14 charts the responses to the second statement. This statement argues that tax advantages of equity-based pay plans are too small to affect corporate productivity. Twenty-nine percent of company respondents agree that the tax advantages of equity-based pay plans are too small to affect corporate productivity. Thirty-five percent of the respondents are neutral, while 36% disagree. Of the total number of respondents agreeing with this statement, only about one third work for firms that have an employee share plan in operation, the only plan that offers a tax advantage. Half of the respondents confirm working without any equity schemes; the rest have equity pay plans that operate without any tax advantages.

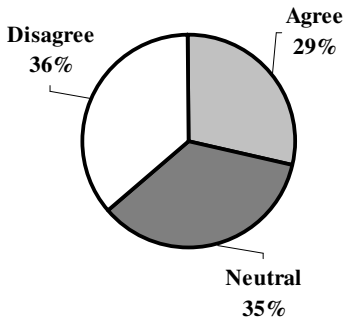

Figure 14: Tax Advantage and Firm Performance

[31] See Appendix I, Questionnaire parts 1-5.
[32] For a detailed discussion of the statements, see section 6.5 and Appendix I, Questionnaire part 1.

Figure 15 presents the responses to the third statement. Forty-two percent of respondents agree that administrative costs of equity-based pay schemes reduce their attractiveness; however, 37% disagree, while 21% are neutral. Of the companies whose respondents agree with this statement, less than half have equity-based pay plans in operation, while the majority work without any such plans. According to experts (e.g., Barthel, 1998), high administrative costs prevent companies from implementing employee share plans. In this survey, more than one third of the respondents whose companies offer employee share plans agree with this statement, while the rest disagree.

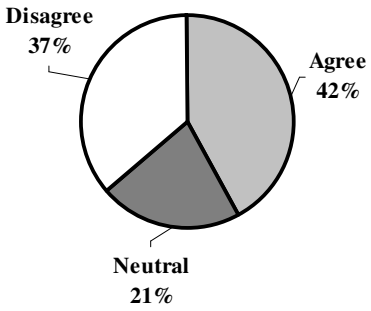

Figure 15: Administrative Costs and Attractiveness of Equity-Based Pay Plans

Figure 16 illustrates the responses to the fourth statement. Despite the scandal over the employee retirement arrangements of Enron, almost 63% of company respondents in Germany agree that it would be desirable to use equity-based pay schemes for retirement provision. About half of these respondents represent firms that have already adopted equity-based pay plans; the rest work without any equity-based employee pay plan. A minority of respondents (14%) (around half of them with equity-based pay plans and the rest without) disagree with the idea of using equity-based pay plans for retirement provision. Twenty-three percent of the company respondents (around half form firms with and half from firms without equity-based pay plans) are neutral on this statement.

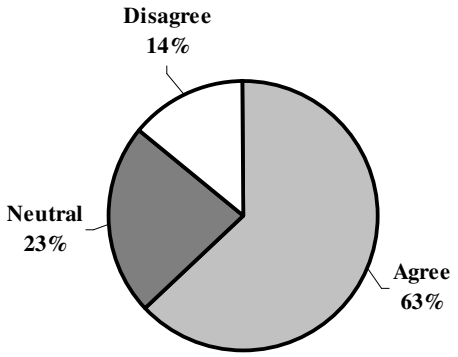

Figure 16: Equity-Based Pay Plans as Retirement Arrangements

Figure 17 presents the responses to the fifth statement. A majority of respondents (45%) agree that current equity-based pay plans are optimal; more than two thirds of these respondents represent firms that have already implemented equity-based pay plans, and the rest companies that work without any plans. Seventeen percent of the respondents disagree that current equity-based pay plans are optimal, less than two thirds from firms that work without any equity-based pay plans and the rest from firms that have already implemented equity-based pay plans. Of the 38% of respondents indicating neutrality on this statement, more than two thirds represent firms that have not implemented any equity-based pay plans, while the rest represents firms that have.

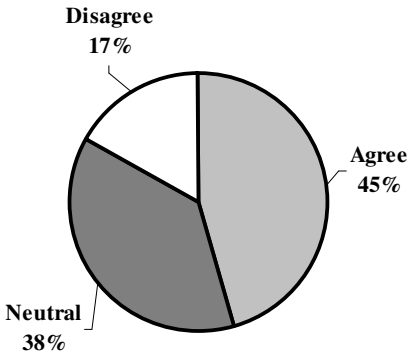

Figure 17: Current Equity-Based Pay Plans

Figure 18 presents the responses to the eighth statement. Almost half of company respondents (46%) are neutral as to whether equity-based pay plans lower absenteeism; of these, almost two thirds represent firms with equity-based pay plans in place, while the rest represent companies with no such plans. Thirty-five percent of respondents disagree with this statement, around half from firms having equity-based pay plans in place and the rest from companies with no equity-based pay plans. Nineteen percent agree that equity-based pay plans reduce employee absenteeism. Interestingly, only around one third of companies represented have already implemented equity-based pay plans; the rest work without any such plans. Also noteworthy is the fact that the majority of firms whose representatives either agree or disagree with this statement come from the manufacturing industry. Of additional interest is that around one fifth of the respondents from the finance, insurance, and real estate sector (most from firms with equity pay plans) and around 15% of respondents from the services sector (also mostly from firms with equity pay plans) disagree with this statement, while only 1 respondent from each of these two sectors agrees with it (the single firm from the finance, insurance, and real estate sector having no equity pay plan in place; that from the services sector works having already implemented equity pay).

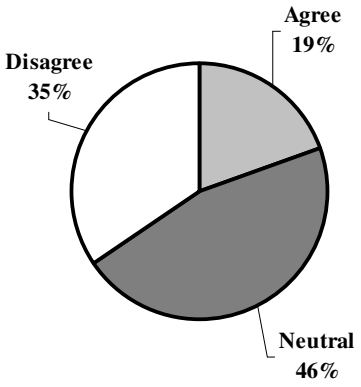

Figure 18: Equity-Based Pay Plans and Absenteeism

Figure 19 outlines the responses to the ninth statement. Sixty-five percent of respondents agree that employees who take up share and/or options are more likely to remain with their organisation. Of these respondents, around half represent companies that have already implemented equity-based pay plans (around one third of whom introduced their plans in 1997 or earlier); the rest represent companies that have no such plans. Twenty-eight percent of respondents are neutral on this statement, more than half of them from companies that have implemented equity-based pay plans (one third of whom introduced their plans in 1997 or earlier) and the rest from companies that have not. A minority of company representatives (7%) disagree with this statement, half from companies that have already implemented equity-based pay plans (most having introduced their plans in 1997 or earlier) and half from firms that have not.

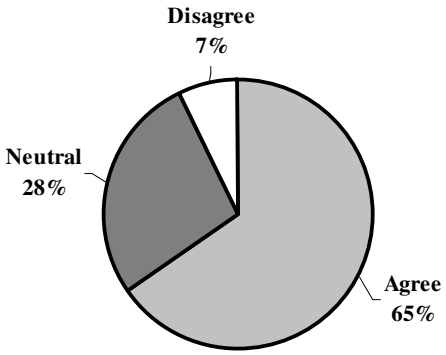

Figure 19: Employee Equity-Based Plans and Duration

Figure 20 charts the responses to the tenth statement. Sixty percent of company respondents agree that equity-based pay plans make companies more stable in the long run; around half represent companies with equity-based pay plans (more than one third of companies having introduced their plans in 1997 or earlier) and the rest companies without. Thirty-five percent of respondents are neutral on this statement, half from companies with equity-based pay plans (around half of whom introduced their plans in 1997 or earlier) and half from firms without. A minority of company respondents (5%) disagree on this statement, half from companies with equity-based pay plans (1 company that introduced its plan in 1997 or earlier) and half from companies without.

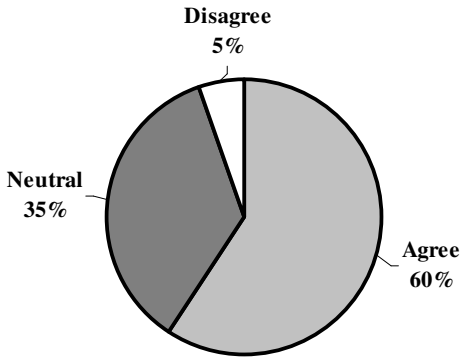

Figure 20: Equity-Based Pay Plans and Firm Long-Term Stability

HRM and Communication Activities[33]

Figure 21 presents the distribution of HR- and communication measures for all 115 sampled companies with and without equity-based pay plans. The numerals 1-12 stand for the twelve different HR- and communication activities outlined in Section 5. Sixty (52%) companies use quality circle schemes (no. 1); 50 (43%) companies use autonomous work groups (no. 2); 65 (57%) companies have implemented total quality management (no. 3); 98 (85%) companies use overlapping departmental work groups (no. 4); 101 (88%) companies offer employee training and seminars lasting several days (no. 5); 96 (83%) companies have implemented an information system for employees based on Intranet, Internet or database (no. 6); 99 (86%) companies keep employees informed through brochures and newsletters (no. 7); 74 (64%) have adopted a formal structure for information-sharing with employees – e.g., provision of data on financial status, firm and market strategy, and stock market price (no 8.); 31 (27%) companies have adopted specialised consultation and feedback channels related to equity-based pay for their employees (no. 9); 55 (48%) companies distribute specialised introductory informational brochures about equity-based pay for their employees (no. 10); 16 (14%) companies inform their employees about equity-based pay through regular specialised circulars and newsletters (no. 11); and 18 (16%) companies offer specialized training in and seminars on equity-based pay (no. 12).

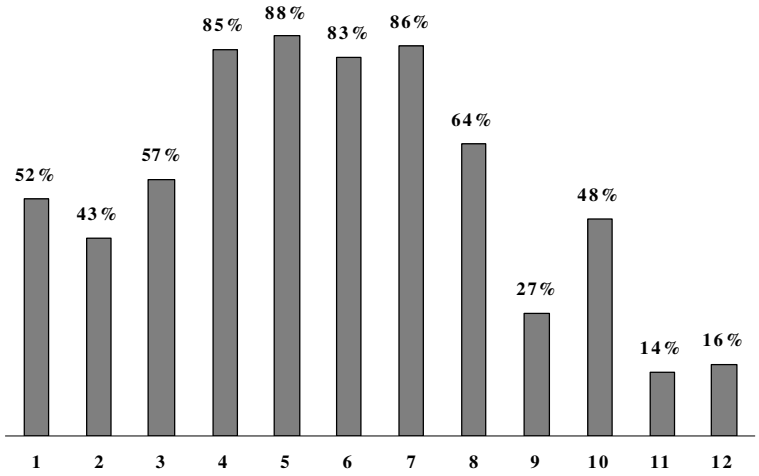

Figure 21: HRM and Communication Activities in All Firm Sampled

[33] See Appendix 1, Questionnaire part 3.

Figure 22 presents the distribution of HR- and communication measures for 58 companies with equity-based pay plans in place. Again, the numbers 1-12 stand for the twelve different HR- and communication activities. Twenty-six (45%) companies use quality circle schemes (no. 1); 25 (43%) companies use autonomous work groups (no. 2); 31 (53%) companies have implemented total quality management (no. 3); 52 (90%) companies use overlapping departmental work groups (no. 4); 53 (91%) companies offer employee training and seminars lasting several days (no. 5); 54 (93%) companies have implemented an information system for their employees based on Intranet, Internet or database (no. 6); 55 (95%) companies keep employees informed through communication brochures and newsletters (no. 7); 44 (76%) companies have adopted a formal structure for information-sharing with employees – e.g., provision of data on financial status, firm and market strategy, stock market price, (no 8.); 21 (36%) companies have adopted specialised consultation and feedback channels related to equity-based pay for their employees (no. 9); 42 (72%) companies have specialised introductory informational brochures about equity-based pay for their employees (no. 10); 8 (14%) companies inform their employees about equity-based pay through regular specialised circulars and newsletters (no. 11); and 11 (19%) companies offer specialised training in and seminars on equity-based pay (no. 12).

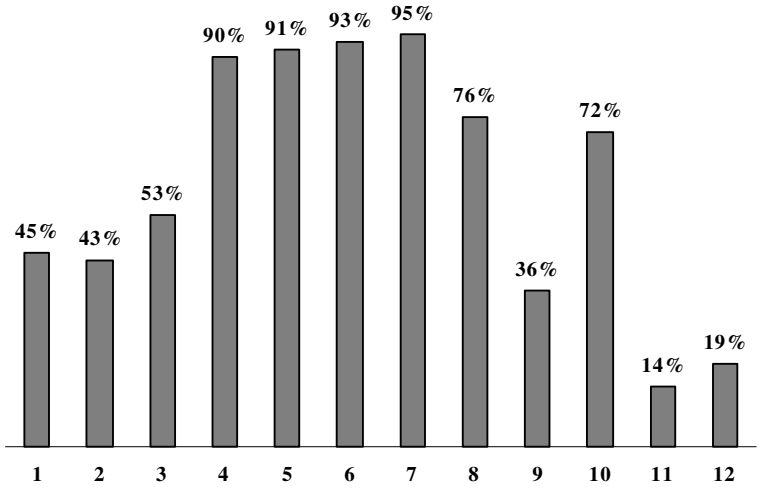

Figure 22: HRM and Communication Activities in Firms with Equity-Based Pay

Figure 23 presents the distribution of HR- and communication measures for 57 companies without any equity-based pay plans in place. The numbers 1 to 12 stand for the twelve different HR- and communication activities. Thirty-four (60% of) companies use quality circle schemes (no. 1), 25 (44%) use autonomous work groups (no. 2), 34 (60%) have total quality management in place (no. 3), 46 (81%) use overlapping departmental work groups (no. 4), 48 (84%) offer their employees training and seminars lasting several days (no. 5), 42 (74%) have implemented an information system for their employees based on Intranet, Internet, or database (no. 6), 44 (77%) inform their employees through communication brochures and newsletters (no. 7), and 30 (53%) have adopted a formal structure for information-sharing with employees; e.g., provision of data on financial status, firm and market strategy, and stock market price (no 8).

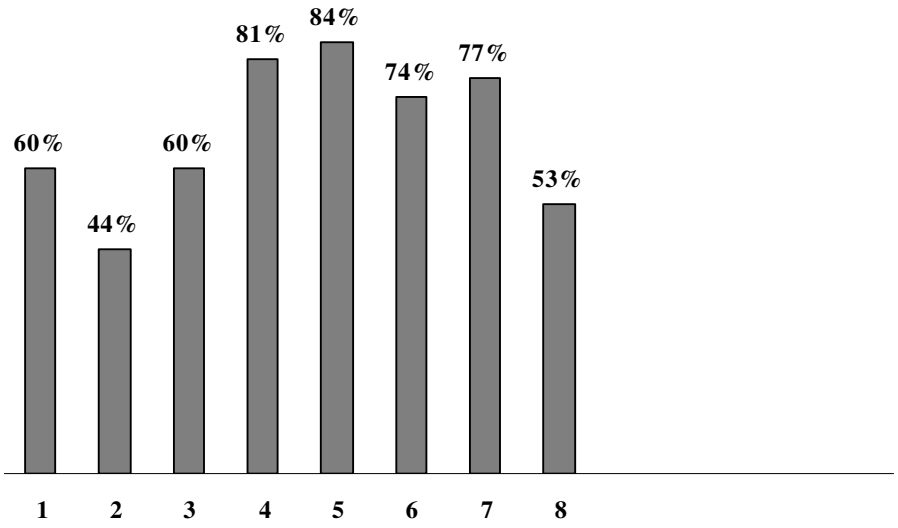

Figure 23: HRM and Communication Activities in Firms with Non-Equity Pay

Internationalisation

The first survey item on internationalisation (see Appendix 1, Questionnaire part 4) asks participating companies to indicate the number of different countries in which they operate foreign subsidiaries. 13 (12%) companies work in no other countries. Sixty-nine (62%) companies operate their own foreign subsidiaries in 1 to 20 countries (5 companies in 1 country, 10 companies in 2 different countries, and 54 companies in more than 3 countries). Eleven companies (10%) operate their own foreign subsidiaries in 21 to 40 countries (1 company in 21 countries, 2 companies in 25, 6 companies in 30, 1 company in 34, and 1 company in 37). Twelve companies (11%) operate subsidiaries in 41 to 60 different countries (1 company in 42 countries, 1 company in 43, 5 companies in 50, 2 companies in 52, 1 company in 57, and 2 companies in 60). One company (1%) carries out different operations in 70 countries, while 2 companies (2%) operate foreign subsidiaries in 81 to 100 different countries (1 company in 90 countries; 1 company in 100). Two companies (1% each) operate subsidiaries in 140 and 190 countries, respectively (see Figure 24).

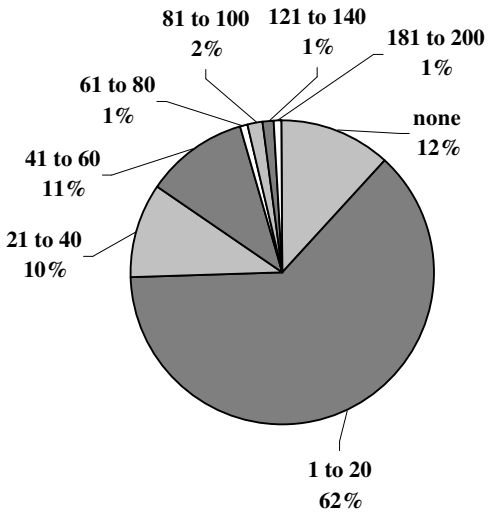

Figure 24: Number of Foreign Countries in Which Firms Operate Subsidiaries

The second item on internationalisation requests that participants indicate the number of countries in which company employees benefit from equity-based pay plans (with no distinction made between equity-based pay plans for executives and employees or between the share and option plans). Forty (40%) company respondents report offering no equity-based pay plans, while 54 (54%) report equity-based pay plans for their foreign subsidiary workers in 1 to 20 countries (10 companies in 1 country, 4 companies in 2 countries, and 40 companies in more 3 to 20 countries). Four respondents (4%) report offering plans for their foreign subsidiaries in 21 to 40 countries (2 in 22 countries, 1 company in 23, and 1 company in 28), while 2 (1% each) offer them in 42 and 79 countries, respectively (see Figure 25).

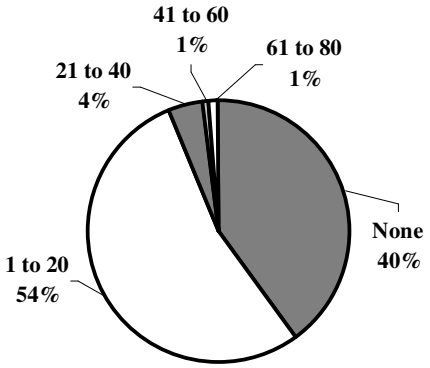

Figure 25: Number of Countries with Equity-Based Pay Plans

The third item on internationalisation asks respondents to characterise the plans implemented in their foreign subsidiaries by ticking off any of three different plan types. Their responses indicate that 35 (53%) companies have a global running plan in place, 13 (20%) companies offer plans that differ from country to country, and 18 (27%) companies have implemented a unified plan that allows for local modifications (see Figure 26).

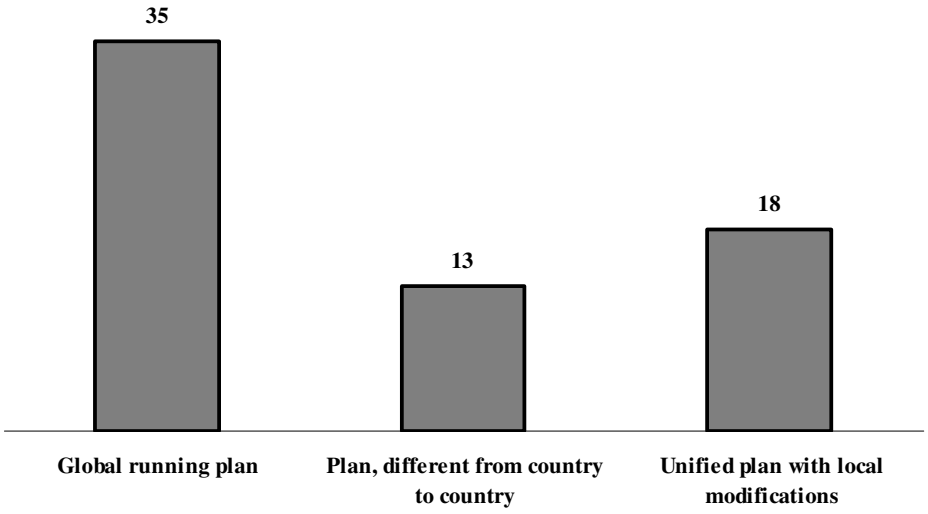

Figure 26: Plan Type Implemented in Foreign Subsidiaries

The fourth item on internationalisation asks participating companies to indicate their reason(s) to modify equity plans by selecting as many answers as appropriate from four different motivations. Twenty-nine company representatives report local laws and/or rules as reasons to modify equity pay plans, 5 point to local culture, 18 report that foreign subsidiaries decide whether or not to modify such plans, and 5 indicate that headquarters decides upon equity pay plan modification or not (see Figure 27).

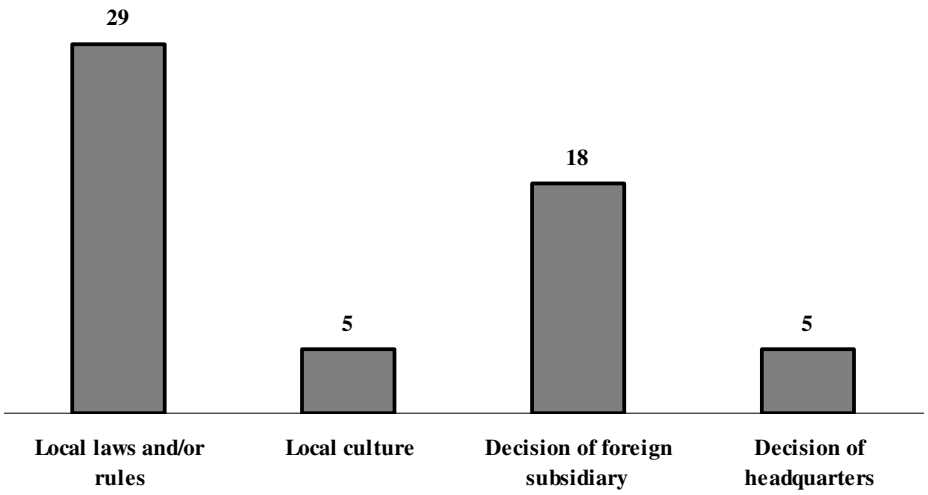

Figure 27: Reasons to Adopt Equity-Based Pay Plans in Foreign Subsidiaries

The fifth internationalisation item asks respondents whether the percentage of employees covered by schemes in foreign subsidiaries is higher than, equal to, or lower than the percentage of employees covered by equity pay plans in Germany. Eight representatives report that the percentage of employees covered in foreign subsidiaries is higher than the percentage covered in Germany, 25 that it is equal to the percentage covered in Germany, and 28 that it is lower than the percentage covered in Germany (see Figure 28).

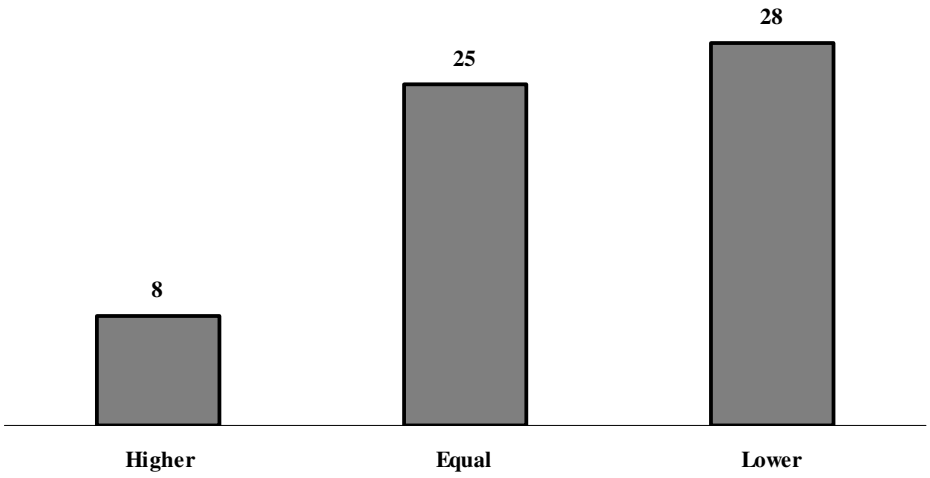

Figure 28: Level of Coverage in Foreign Subsidiaries

Productivity

In the final section of the survey (see Appendix I, Questionnaire part 5), companies are asked whether they measure internal productivity, and if so, at what unit of analysis. Twenty (19%) company representatives report not measuring internal productivity, while 88 (81%) (41 from companies with equity pay plans) admit to measuring internal productivity. Twenty respondents (10 from firms with employee equity pay plans) report that the company measures internal productivity at the individual level, 33 (15 from firms with employee equity pay plans) at the team or project level, 68 (34 from firms with employee equity pay plans) at the divisional or business unit level, 44 (4 from firms with both employee and executive equity pay plans) at the foreign subsidiary level, and 49 (22 from firms with employee equity pay plans) at a corporate level (see Figures 29 and 30).

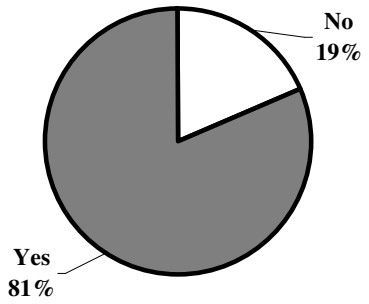

Figure 29: Productivity Measurement

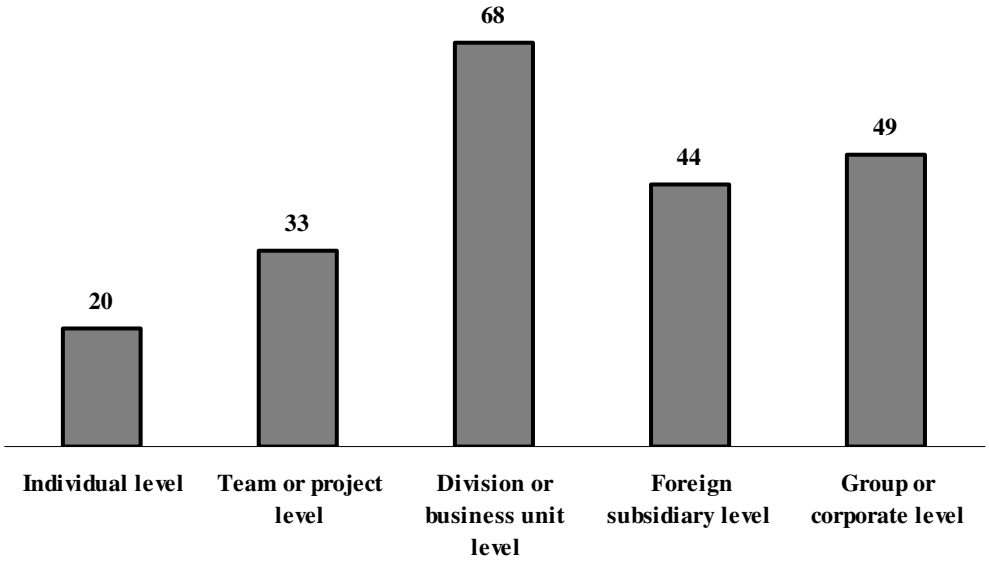

Figure 30: Level of Productivity Measurement

Curriculum Vitae

06.06.1971	Born in Uster, Switzerland

Education

2000-2004	University of St. Gallen Doctorate at the Research Institute for International Management (FIM-HSG)
1991-1997	University of Zürich Degree in Business Administration
1990	Kantonsschule des Zürcher Oberlands, Wetzikon Matura Typus B

Professional Experience

Since 2004	EXALOS AG, Zürich Marketing Manager
Since 2002	University of St. Gallen Lecturer
2001-2003	AWD AG, Zug Observer Oral Exams
2000-2003	University of St. Gallen, Research Institute for International Management (FIM-HSG) Research and Teaching Assistant
1998-2000	CWS AG, International Division, Glattbrugg Market Manager
1990-1997	Various internships with e.g. Swiss Bank Corporation and Elida Fabergé (Unilever)