

**Foreign-controlled subsidiaries and the pay-performance sensitivity  
to local accounting measures**

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## **Abstract**

Using panel data on 265 companies operating in the Netherlands, this study documents a weak link between reported accounting performance of foreign-controlled subsidiaries and managerial pay. After controlling for differences in firm size, risk and growth opportunities, managerial task complexity and other factors previously found in the literature to affect incentive systems design, we provide evidence that pay-for-accounting performance sensitivity is lower for multinationals' subsidiaries than for independent companies, and statistically insignificant in the foreign-controlled subsidiaries case. We also find that independent companies, domestically controlled subsidiaries, and foreign-controlled subsidiaries report similar average levels of variability in yearly managerial compensation, an indication that the observed differences in the pay-accounting performance sensitivity between the three groups of firms can not be attributed to differential risk tolerance between managers. These results are consistent with the hypothesis that corporate-level objectives concerning intra-group transactions and transfer prices affect the informativeness and contracting use of local measures of accounting performance.

## 1. Introduction

The purpose of this paper is to evaluate the use of local measures of reported accounting performance in rewarding managers of multinationals' subsidiaries, with a twofold motivation.

Firstly, a number of prior studies<sup>1</sup> focus on documenting the existence of a persistent difference in profitability between foreign-controlled and domestically-controlled companies. Both national tax authorities and accounting researchers take interest in a lower reported performance of foreign-controlled companies, mainly because its most invoked probable determinant is not an underlying economic rationale but tax-motivated cross-border income shifting. Accounting research is yet to provide conclusive evidence that income-shifting strategies cause this phenomenon.<sup>2</sup> This paper focuses on management control implications of “the foreign-domestic profitability puzzle”. Any systematic impact of international transfer pricing schemes on locally reported profitability would likely be reflected not only in abnormal performance of foreign-controlled subsidiaries when compared to domestically-controlled companies, but also in differences across the two types of entities in managerial incentives incentive schemes. If tax planning considerations, regardless whether aimed at compliance with or avoidance of transfer pricing regulations, drive the reported performance of foreign-controlled subsidiaries, the information properties of their accounting reports would be duly affected, and so would be the link between locally reported accounting figures and managerial pay.

Secondly, the analysis of managerial pay for locally reported accounting performance of multinationals' subsidiaries could provide a needed test for the fundamental assumption embedded in international transfer pricing regulation: arm's length principle applied in intra-group cross-border transactions is non-distortive and economically justified. The regulators assume that within large multinational as in any multidivisional firms there are incentives at work such that, in the absence of tax savings opportunities, headquarters would naturally prefer to treat subsidiaries as

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<sup>1</sup> For a review of the related literature and evidence, see Langli and Saudagaran (2004).

<sup>2</sup> The actual use of international transfer pricing as an income-shifting mechanism receives limited support in the foreign-domestic profitability studies. Moreover, the difference in profitability appears to dissipate as new control factors are introduced in regression equations. For example, Grubert (1997) concludes that more than 50 percent, and perhaps as much as 75 percent, of the foreign-domestic profitability differential can be explained by systematic differences between foreign-controlled and domestic companies. This is greater than the share attributed to measurable differences in the earlier paper by Grubert, Goodspeed and Swenson (GGS) published in 1993.

autonomous businesses and to instruct managers to conduct intra-group deals at arm's length (Durst, 2002). Whether this is indeed the case, though, it is debatable and actually very much questioned by economics-based researchers in accounting (Anctil and Dutta, 1999) and practitioners (Durst, 2002) alike. If the assumption were valid, the accounting performance would be as necessary an input into the managerial incentive system of subsidiary companies as it is into that of independent companies, where the separation between ownership and management generates agency problems. An empirical comparison of pay-earnings sensitivity between subsidiary and truly independent companies could shed some light on this issue.

The methodology employed in this study is grounded in the literature on the design of compensation contracts based on noisy performance measures, which has provided the insight that noisier and less effort-sensitive measures of performance are assigned smaller weights in incentive contracts (Banker and Datar, 1989). The formulation of the research hypotheses also draws on the international transfer pricing literature which points to the most likely source of noise in the accounting performance of foreign-controlled subsidiaries: the ability of multinational firms to adjust the reported location of their taxable income and thus manage down group-wide tax bills. Several analytical studies (Smith 2002b, Baldenius et al., 2004, Hyde and Choe, 2005) have provided important insights regarding the trade off between tax and incentive roles of transfer prices within multinational firms. However, with few exceptions (Phillips, 2003), these two roles, although closely inter-related and jointly determined have been examined empirically in isolation. To assess how informative are the earnings of foreign-controlled subsidiaries, the pay-accounting performance sensitivity of their managers is benchmarked against the same parameter estimated for independent companies and for the domestically controlled subsidiaries of multinational companies. The first benchmark provides a proxy for the expected levels of pay accounting performance sensitivity in firms that conduct their business independently, at arm's length. The second benchmark provides a proxy for the expected level of pay-accounting performance sensitivity of controlled subsidiaries least likely to engage in tax-motivated income shifting.

This study represents a contribution to two streams of literature. From incentive compensation research perspective, there is sparse evidence on performance incentive practices within firms (Pendergarst, 1999). From the empirical transfer prices literature perspective, the study bridges the gap between two branches which

are yet to intersect: the international and the domestic settings. The sizeable<sup>3</sup> international income shifting literature generally abstracts away from related incentive problems, by placing the analysis at parent level and analysing cross-sectionally various levels of effective rates of taxation. The literature on incentive implications of transfer pricing is silent on tax matters, as it restricts the analysis to transactions between domestic divisions. This study considers the two matters concomitantly, and performs a quantitative analysis of the incentive system design implications which international transfer prices have.

The research objective is addressed based on a sample of companies which function as legal entities in the Netherlands and belong to three different groups: independent companies, domestically-controlled subsidiaries, and foreign-controlled. For all companies in the sample panel<sup>4</sup> data were available on compensation of the managing board, accounting measures of performance (net income, earnings before interest and taxes, sales, returns on assets), and several other variables used to proxy and control for factors considered by prior studies in explaining differential pay to accounting performance sensitivity.

The main finding is that the pay for executives of subsidiaries belonging to multinational industrial groups is significantly less sensitive to local summary accounting performance measures than it is the pay of independent companies managers. In particular, the managers of subsidiary companies are not rewarded on bottom-line results, as it is the case of their independent companies' counterparts. The sensitivity of pay to *net income* for managers of subsidiaries, whether domestically controlled or foreign-controlled, is not statistically significant. Also, the *pay-earnings*<sup>5</sup> *sensitivity* of independent companies is twice larger than found for subsidiaries of multinational corporations, and it is not statistically significant for foreign-controlled subsidiaries.

The remainder of the paper is organized as follows. In the next section, the research hypotheses are formulated and motivated. Section 3 discusses the empirical design of the study. Section 4 presents the results, while Section 5 discusses robustness tests and sensitivity analyses. Conclusions are presented in Section 6.

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<sup>3</sup> More recent examples of research concerning income shifting between different tax jurisdictions are: Beatty and Harris (2001), Collins et al. (1998), Harris (1993), Jacob (1996), Klassen et al. (1993), Mills and Newberry (2004), Newberry and Dhaliwal (2001), and Rego (1999, 2003).

<sup>4</sup> For the period 1995 to 2003.

<sup>5</sup> Earnings is measured as reported EBIT (earnings before interest and taxes), a measure of operating profitability, independent of the firm's financing structure.

## **2. Related literature and motivation of research hypotheses**

### **2.1. Agency literature and determinants of managerial pay sensitivity to accounting measures of performance**

Although contemporaneous research criticizes the agency theory and the idea of variable compensation as the optimal outcome of the contracting problem (e.g. Bebuck and Fried, 2003), this paradigm is remains strongly supported theoretically and empirically. The theoretical underpinning of pay-for-performance remuneration is to be found in the works of Jensen and Meckling (1976), Holmstrom (1979), and Grossman and Hart (1983). Once the theoretical apparatus for principal-agent models was set up, empirical research has begun to assess to what extent contracts reflect agency concerns. Murphy (1985), Jensen and Murphy (1990), and Kaplan (1992) started by asking whether compensation changes with measures of performance. As the estimated levels of pay-for-performance could not be measured against any benchmark, the research in agency theory has moved away from analysing determinants of levels to addressing questions about how sensitivity varies with relevant parameters (Prendergast, 1999). For example, it became of interest whether the size of the relationship between pay and performance depends on the noisiness of the measures (Lambert and Larker, 1987, Sloan, 1992, Bushman et al, 1996, Ittner et al, 1996, Aggarwal and Samwick, 2003), on the marginal return to effort (Murphy, 1985), or on the risk tolerance of the agents (Aggarwal and Samwick, 1998, Moers and Peek, 2000). These factors are notoriously difficult to observe and proxy for, which may account for some of the theory-inconsistent results<sup>6</sup>.

In particular, the use of accounting measures in executive compensation has received considerable<sup>7</sup> attention in the accounting literature, mostly in conjunction with and relative to market performance measures. The agency theory predicts that management compensation is linked to measures of performance that are informative about the managerial effort (Holmstrom, 1979). Accounting-based proxies measure effort of top management team with error, thus impose risk on them. The greater the error, the greater also the resulting risk and of course the differential pay which needs

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<sup>6</sup>For example Brown (1990), Garen (1994), Bushman et al (1996).

<sup>7</sup> See for example, Murphy (1985), Barro and Barro (1990), Gibbons and Murphy (1990), Lambert and Larker (1987) and Sloan (1993).

to be imposed. Risk imposed on the manager being evaluated can be reduced by choosing a performance measure containing less error, or by reducing the sensitivity of pay to the performance measure (Milgrom and Roberts, 1992).

Multiple measures are useful for contracting purposes when they provide additional information about managerial effort. Thus, contracts written on accounting performance exist only to the extent that these measures provide information about managerial action. Analytical studies in accounting show that the incentive weights that performance measure will receive in a contract depend on measure specific characteristics, e.g. precision and sensitivity to agent's effort (Banker and Datar, 1989). The ideal measure, which is the one that would receive greatest weight in compensation contracts, has two relevant characteristics. The first characteristic is precision, which means it reflects *only* managers' contribution to the firm value, thus being purged of noise and any factors beyond agent's control. Secondly, the measure is sensitive to agents' effort, which means that it reflects completely the contribution the agent has made. When several measures are available for contracting, the structure of incentives depends on the relative signal to noise ratios of those performance measures. Banker and Datar theoretical prediction is empirically well documented at CEO-company level (e.g. Sloan, 1993) for accounting versus market measures of performance, and at division managers-division level (e.g. Keating, 1997) for company-wide versus divisional accounting performance.

As mentioned before, the focus in accounting literature has been mainly on testing predictions related to the impact of measures characteristics on pay-performance sensitivity. Still, executive pay depends not only on performance, and its characteristics, but also on company size (Murphy, 1985, Schaefer, 1998), governance mechanisms in place (Core et al, 1999, Ke et al, 1999), growth opportunities (Lewellen et al, 1987), factors that must be considered in empirical studies which estimate differential pay-for-performance sensitivity across firms.

Prior studies of incentive systems design at subunit levels, whether business units or divisions, have shown that accounting-based performance metrics are used in evaluating and rewarding subunit managers. Keating (1997) indicates that division accounting metrics (e.g. division earnings) are usually most important in evaluating and rewarding division managers. For Dutch multinationals, Abernethy et al (2004) show that divisional summary measures (earnings, ROI) are by far the most important

performance measures used and on average firms put 57 percent weight on this measure.

One of the objectives of this study is to compare empirically the stewardship relevance of subsidiaries accounting earnings to the stewardship relevance of independent companies' earnings. A good proxy for expected pay-performance sensitivity when the reported performance reflects arm's length pricing for all transactions is the pay-performance sensitivity of independent companies. The first null hypothesis of this study is therefore formulated as follows:

Hypothesis 1: Ceteris paribus, there are no significant differences between the pay-performance sensitivity of subsidiary companies' managers and independent companies' managers, when accounting measures of performance are considered.

Accounting performance measures are defined in this study as profitability indicators which can be observed in financial reports: earnings before interest and taxes (hereafter EBIT), sales, net income, and return on assets.

## **2.2. Transfer prices: tax and incentive roles within multinationals**

Multinationals use transfer prices both to effectively manage the company-wide tax bill and to provide incentives to subsidiary managers (Baldenius et al, 2004). International transfer price choices can not affect the accounting profitability of self-contained subsidiary operations, i.e. the profitability from strictly local operations. However, to the extent to which these organisational sub-units are engaged in cross-border transactions with the parent and/or other subsidiaries in the group, the accounting measures of performance at subsidiary level are affected by the chosen level of tax-optimal transfer prices. Often, the optimal tax transfer price and the optimal incentive transfer price do not coincide (Choe and Hyde, 2004), and neither do the optimal incentive transfer price and the arm's length price (Baldenius et al, 2004). Despite the fact that virtually all theoretical economists agree with the above statements, still disagreement remains in the literature (Smith, 2002) as to whether firms face a meaningful trade-off between tax minimization and performance evaluation, since the use of multiple transfer prices and/or double book accounting could presumably eliminate the tension between performance evaluation and taxes.

Several recent practice descriptive surveys and case studies (Springsteel, 1999, Elliot and Emmanuel, 1998, Cools et al., 2003) suggest that the two conflicting roles served by international transfer prices within multinational, solving agency conflicts and determining tax liability, are indeed being increasingly reconciled at subsidiaries level in several ways: using two sets of books, using the tax-optimal transfer price for accounting purposes while the reward system is strictly linked to non-accounting measures of performance, and using one set of transfer prices, sub-optimally, for both tax and incentive purpose. Each of these solutions has costs and benefits whose magnitudes depend on a variety of factors. Nevertheless, all the above mentioned solutions are likely to result in noisier or less controllable accounting performance metrics at foreign-controlled subsidiaries level, and as a consequence, a reduced reliance on foreign-controlled subsidiaries accounting metrics for designing managerial performance incentives.

Analytically, this issue has already received attention, though Hyde and Choe (2005) point out that the two distinct roles of transfer prices, solving agency conflicts and determining tax liability, have been examined more or less in isolation. When the trade-offs between the two conflicting roles were studied, most studies still took away some of the complexity of the issue by introducing the assumption that multinationals only use one transfer price per intra-firm transaction. That is, such studies implicitly assume that only one set of books is kept to satisfy both cost and tax requirements. Examples are: Halperin and Srinidhi, 1991; Elitzur and Mintz, 1996; Schelderup and Sorgard, 1997; Sansing, 1999; Haufler and Schelderup, 2000; Smith, 2002a).

Few recent papers model explicitly two distinct transfer prices. Baldenius et al. (2004) examine the interrelation between the preferred managerial transfer price and the arm's length price used for tax purposes. Smith (2002) analyses two methods of disentangling the tax and incentive roles: setting multiple prices and using performance measures independent of transfer prices. The result of the analysis is that tax/incentive trade-offs still exist if the firm can separate transfer prices and/or use a performance measure other than accounting profit, the reason for this being that even with imperfect enforcement of transfer-pricing rules, regulator scrutiny limits firm's flexibility. The main results in Hyde and Chow (2005) is that the tax and the incentive transfer prices are inter-related, even when they are decoupled: they are both affected in the same direction as the expected penalty for non-compliance increase and they are affected in opposite directions as the marginal cost of production increases.

The extent to which multinationals integrate tax and incentive roles of international transfer prices remains, therefore, an open question, in both in the empirical and analytical literature on the subject. The provision of direct evidence regarding the tax motivated alteration of reported profitability is toughened by the threatening nature the revelation of such information has for multinational firms. For that reason, we need to turn to indirect evidence, of the sort that can be found by analysing the stewardship relevance of foreign-controlled subsidiaries accounting performance.

Since from a tax perspective often domestically-controlled subsidiaries represent one fiscal unit together with the parent and are less likely to be set as tax saving vehicles (Hines, 2000), this study examines whether foreign-controlled subsidiaries and domestically controlled subsidiaries of multinational display differential pay-for-accounting performance sensitivities. More specifically, it raises the question whether accounting performance-based incentive pay contracts are less prevalent in foreign-controlled subsidiaries than they are in domestically controlled subsidiaries of multinationals. The question leads to the following null hypothesis:

Hypothesis 2: Ceteris paribus, there are no significant differences between the sensitivity of executives pay to accounting performance measures of foreign-controlled subsidiaries and that of domestically-controlled subsidiaries of multinational companies.

Besides the question of whether foreign-controlled subsidiaries have lower pay-accounting performance sensitivity than the domestically-controlled counterparts, another controversial matter is whether the former have *any pay for local accounting performance* at all.

Surveys and case studies (Elliot and Emmanuel, 1998, Springsteel, 1999, Fris, 2003, Cools et al, 2003) suggest that the management control function of transfer prices, their use for performance evaluation and compensation, has become less relevant in recent years, while the fiscal aspects predominate. Over the last decades, an increasingly larger part of foreign subsidiaries profit comes from non-local operations, more exactly from cross-border group-transactions. It is important, therefore, to review the dynamics of international transfer pricing regulations and the impact of their implementation on the incentive systems within multinationals. In

early 80's there was no such regulation in place anywhere in the world. The volume of cross-border intra-firm trade has since then increased dramatically to the point that about 60% of international trade takes place within firms. Thus, it is notable that three decades ago, Czechowitz, et. al (1982) reported that 89 percent of US MNEs use the same transfer price for incentive and tax purposes. More recently though, Springsteel (1999) reports that 77 percent use separate reporting system to track internal pricing information, compared with about 25 percent of large companies outside that "best practices" group. The companies that operate two sets of books include Hewlett-Packard and Microsoft. Springsteel (1999) suggests that stricter tax regulations governing multinationals – forcing the use of numbers that may not reflect internal realities – have helped popularize the use of a second managerial set of transfer pricing numbers for interdivisional purposes.

According to Fris (2003) , "In today's integrated economies and the present state of information and communication technology, *performance management in MNEs no longer takes the income distribution driven by transfer pricing as its main reference*, but has a vast number of alternative measurements. The relevance of transfer pricing for tax purposes, however, has only increased."

Elliot and Emmanuel (1998) report on an exploratory fieldwork study of 12 multinationals enterprises based in the UK, which attempts to place current practices of international transfer pricing in the organisational and fiscal context. One important observation coming out of this research is: "Systems are introduced to distinguish managerial and subsidiary performance when International Transfer Pricing adjustments may benefit group global performance but disadvantage one subsidiary." One of the conclusions of the study is: "Alternative performance indicators are employed for specific subsidiaries, and reporting for legal and taxation purposes is distinguished from evaluating subsidiary and managerial performance." Cools et al (2003) longitudinal study confirms the trend signalled previously: in the large multinational they study, due to fiscal considerations, TP policy has become centrally imposed. Concomitantly, however a BSC (balance scorecard) was introduced. As BSC focused on a large number of non-financial and controllable measures, *the weight of the imposed transfer prices on performance measurement was significantly reduced*.

On the other hand, there are several reasons which lead us to expect that executive compensation in foreign-controlled subsidiaries may not necessarily be set

to be insensitive to accounting measures of performance. First of all, as Durst (2002) points out, top management in multinationals is often reluctant to decouple completely the tax and incentive transfer prices, because this practice is perceived as borderline to illegal. Also, it is plausible that firms take into consideration that tax authorities will scrutinize and make inferences from compensation mechanisms involving transfer prices. Moreover, even where management recognizes and supports the goal of separating accounting for management control from accounting for tax compliance, and even when tax authorities have not introduced statutory requirements for conformity, some elements of the tax system preclude a complete separation between these two. Tax and reporting rules require that the cash accounts of different legal entities reflect the pricing used for tax purposes between those entities. The determination of prices for tax purposes therefore unavoidably will have some effect on such issues as intra-company loan balances and distribution policies, which are of large practical significance to a multinational group's treasury function.

Since none of the three studies cited above as pro-evidence goes beyond small scale surveys or case studies, we believe that the extent to which accounting earnings based on transfer prices have become subordinated to fiscal purposes and lost their contracting use in incentive systems is an open question which awaits empirical answer.

To answer this question, the null hypothesis is stated as follows:

Hypothesis 3: Pay for executives of foreign-controlled subsidiaries is sensitive to local accounting measures of performance.

### 3. Empirical design

#### 3.1. Regression models, tests, and variables definition

To test the first two hypotheses, the sensitivity of executive compensation to accounting earnings must be analysed conditional on the ownership status: independent versus subsidiary company and domestically-controlled subsidiary versus foreign-controlled subsidiary. Thus, the following two regression models which pool observations both cross-sectionally and temporally are initially defined:

##### Model 1:

$$\text{Compensation}_{it} = \alpha_t + \beta_1 \text{EBIT}_{it} + \beta_2 \text{EBIT}_{it} * \text{Subsidiary\_status}_i + \beta * \text{CONTROLS}_i + e_{it}$$

##### Model 2:

$$\text{Compensation}_{it} = \alpha_t + \beta_1 \text{EBIT}_{it} + \beta_2 \text{EBIT}_{it} * \text{Domestically-controlled subsidiary}_i + \beta_3 \text{EBIT}_{it} * \text{Foreign-controlled subsidiary}_i + \beta * \text{CONTROLS}_i + e_{it}$$

Where:

i	=	firm index
t	=	year index
Compensation	=	the natural log of annual cash compensation (base salaries plus bonuses) of the managing board
EBIT	=	the natural log of earnings before interest and taxes
Subsidiary_status	=	dummy variable, taking the value one if the Company is controlled by a multinational group, and takes value otherwise zero;
Domestically-controlled Subsidiary	=	dummy variable, taking the value one if the company is controlled by a Dutch multinational group, otherwise zero
Foreign-controlled Subsidiary	=	dummy variable, taking the value one if the company is controlled by a foreign multinational group, otherwise zero;
e	=	error term

Similar to prior work (Sloan, 1993, Ke et al,1999), we have specified the above models in order to estimate the implicit absolute sensitivity of cash

compensation of executives to contemporary earnings performance, as well as the differences in sensitivity parameter across categories of ownership. The intercept that varies across time is included to control for the effects of exogenous economic factors on compensation over the time period (Ke et al, 1999). *Subsidiary\_status*, Domestically-controlled subsidiary, and Foreign-controlled subsidiary are dummy variables included to capture possible differences in the level of managerial compensation between independent companies and subsidiaries, and further between foreign and domestically controlled subsidiaries of multinational firms.

EBIT is the main measure for accounting performance we use to test the hypotheses, chosen because is a summary<sup>8</sup> measure and because it is insensitive to the impact of financing structure of the firm, a variable managers may influence but have little control over. The log transformation of the EBIT figure eliminates negative earnings observations from the estimation sample. Gaver and Gaver (1998) show that the link between earnings and cash compensation is weak when earnings are negative. Matejka et al. (2005) also find pay-performance sensitivity in loss-making firms is lower than in profitable firms.

In Model 2, the interaction terms between earnings and the foreign and domestically controlled subsidiary' dummies are included as means to test the second hypothesis, namely whether the relationship between compensation and earnings performance is the same for foreign controlled subsidiaries and domestically controlled subsidiaries.

The first hypothesis under test predicts that the coefficient on the interaction term  $EBIT * Subsidiary\_status$  would not be significantly different from zero. If however, the alternative holds, we could find an significant negative coefficient on the interaction term in model 1, signalling lower pay-performance sensitivity for subsidiary companies than for independent firms.

In model 2, regardless whether hypothesis 1 is confirmed or rejected, we expect that that  $(\beta_1 + \beta_2)$  and  $(\beta_1 + \beta_3)$  are positive, meaning that, although weaker, there still exist positive sensitivities of pay to accounting earnings for subsidiary companies of MNEs, regardless whether these subsidiaries are domestically or foreign controlled.

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<sup>8</sup> According to the Hay Boardroom Guide 2002, on the "Executive remuneration in the Netherlands", bonuses are in large part linked to the achieved operating profits. The link is non-linear, though, which justifies the log specification we employed. The guide mentions, for example, that in the bull markets, like 2000, the amount of bonuses for board members does not increase in direct proportion to the sharp increase in profits, and a comparable cushion effect is also exhibited in case of falling profits.

Model 2 is mainly designed, however, to allow the testing of the second hypothesis. If  $\beta_2 > \beta_3$  and both coefficients are significantly negative, then the alternative hypothesis holds, i.e. for foreign controlled subsidiary the link between pay and accounting earnings is weaker than it is for domestically controlled subsidiaries.

As already mentioned, the first set of analyses focuses on the sensitivity of executive compensation to accounting earnings. Nevertheless, given that the second hypothesis is formulated in terms of accounting performance in general, and not earnings, it is necessary to further test the second hypothesis for several other accounting performance indicators, besides earnings: sales, net income, and return on assets. The separate analyses allow assessing the differential sensitivity of compensation to each specific measure, independent of the impact of other measures.

The general specification for the estimation equations for models 3, 4, and 5 described above is:

$$\text{Compensation}_{it} = \alpha_t + \beta_1 \text{Performance}_{it} + \beta_2 \text{Performance}_{it} * \text{Domestically-controlled subsidiary}_i + \beta_3 \text{Performance}_{it} * \text{Foreign controlled subsidiary}_i + \beta * \text{CONTROLS}_i + e_{it}$$

where performance indicator is represented by reported accounting measures:

- Sales, in model 3
- Net income, in model 4:
- ROA, in model 5

With model 6, we introduce in the same regression equation two accounting performance indicators, EBIT and Sales, concomitantly, in order to test which of the two receives the larger weight in compensation contracts and whether there is any difference in compensation package design between the three groups of firms: independent companies, domestically-controlled subsidiaries and foreign controlled subsidiaries.

All the models include several groupings of control variables, which according to prior literature have an impact on managerial pay level, and on pay-performance sensitivity.

The first group is introduced to account for firm size, risk and growth opportunities, all variables related to differences in pay level. Following Kostiuck (1989), it is necessary to account for the impact on the level of managerial

compensation of firms' size, as measured by the natural logarithm of total assets. Size, often considered a proxy for managerial ability and talent, is expected to be positively related to total compensation. A proxy for growth opportunities is also introduced because prior studies have shown that contemporaneous accounting earnings are a particularly poor measure of managerial contribution to firm's value in high growth firms. Gaver and Gaver (1995) examine the relationship between the structure of executive compensation packages and firms' investment opportunity sets. Consistent with their predictions, they find that executives of growth firms receive higher levels of compensation than their non-growth counterparts. Also, compensation has been proved to diminish when investment opportunities are present for CEO pay (Smith and Watts, 1992) and business unit managers pay (Bushman, Indjejikian, and Smith, 1995, Keating 1997). Murphy and Oyer (2003) also claim that bonuses tend to be more discretionary in companies with substantial growth or investment opportunities. The proxy used to control for the impact of this factor on total pay level is a firm specific parameter that reflects the time series mean of total assets growth rate<sup>9</sup>.

The empirical analysis takes into consideration size related differences in pay-for-performance sensitivity. Schaefer (1998) analyses the properties of pay-performance sensitivity for "teams" of executives working for the same firms and shows it to have the property of being approximately proportional to the inverse of the square root of size, however measured. We expect, therefore, a positive coefficient on the interaction term between EBIT and the inverse of the square root from total assets value, the size measure used in Schaefer (1998).

Three different control variables proxy for managerial task complexity, which is a factor expected to lead to an increase in compensation: the natural log of the number of years since the firm was founded, acquired or purchased (Firm age), the natural log of number of business sites a company has declared with the Chamber of Commerce, and the natural log of the book value of intangible fixed assets. Following Holmstrom and Milgrom (1990), and George Baker (1992), it is necessary to control for the incentive problem known as multitasking. When the managerial task is complex, and the agent is being involved in an array of activities, there are significant opportunities for reallocation of activities towards those that are rewarded in

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<sup>9</sup> See Pillote (1992) for a discussion on contextually appropriate proxies for firms' growth opportunities.

particular and away from those activities that do not bring immediate rewards. Thus, complex jobs will not typically be evaluated through explicit contracts (Prendergast, 1999, Murphy and Oyer, 2003), but basically by increased fixed compensation.

Two other controls are used as factors affecting the companies' remuneration policy (the mean labour costs and the salary per employee). These measures are designed to capture both company and industry specific factors that could account for differences in the level of compensation between firms.

To control for risk related differences in managerial pay and pay-for-performance sensitivity we introduce in the models the variable Volatility of Earnings and its interaction to EBIT, as in Aggarwal and Samwick (1999). The volatility of earnings is the time series coefficient of variation of EBIT. According to Aggarwal and Samwick (1999) estimates of the pay-performance sensitivity that do not explicitly account for the effect of variance of firm performance are biased toward zero, conclusions which hold for both CEOs of independent firms and for other highly compensated executives in large firms, responsible for various sub-units.

### **2.3.2. Sample Selection**

In order to preserve comparability in terms of reporting rules and economy-wide specific factors, the empirical analysis in this study is restricted to companies from one country: the Netherlands. The source of data is the November 2004 edition of REACH-BVD database<sup>10</sup>, from which data are retrieved on all variables of interest, including the managing board compensation.

Data considerations have imposed certain limitations on this study. Firstly, REACH-BVD database provides information on each individual members of the managing board of firms, but only reports the total compensation number, for the managing board as whole. Averaging the board compensation across team members it is not a feasible option given that some board members are in the team for only fractions of the years at times. Thus, the dependent variable in this study is the annual cash compensation (base salaries and bonuses) for the entire managing board of a company.

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<sup>10</sup> REACH stands for Review and Analysis of Companies in Holland, and it is Bureau van Dijk financial database with searching and analyzing software. REACH collects data from annual reports of legal companies in the Netherlands.

Secondly, in the Netherlands, the disclosure in annual reports of the managing boards' compensation was not mandated during the period 1999-2003, the time span of this study. Therefore, the data points on compensation are available only for companies which have voluntarily disclosed<sup>11</sup> this information. When available, the information refers to those companies incorporated in the Netherlands to which the so-called "structure regime"<sup>12</sup> applies. These are the companies subjected<sup>13</sup> to the Dutch two-tier management model, that is, such companies have a management board that performs day-to-day executive functions, and a non-executive supervisory board that advises and supervises the management board. Because of the lack of separation between boards, of managers and of non-executive directors, for those companies which do not use the two-tier management model, REACH-BVD will not report "managing board compensation"<sup>14</sup>. As of 1 January 1999, 393 companies were registered with the Chambers of Commerce in the Netherlands as "structure regime" companies, thus having a purely executive managing board. Of these, 265 are represented in the sample for this study, that is more than two third (67.4%) of the relevant population size.

For a company to be included in the sample, it was required that data be available for 5 consecutive years, over the period 1999-2003. The constraint is necessary in order to allow the computation of time-series firm-specific parameters included in the study. The figure below presents the selection procedure which led to the selection of firms in the final sample.

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<sup>11</sup> To the extent that non-disclosure of compensation data is motivated by some systematic underlying cause related to the underlying hypotheses of this research (i.e. companies which pay compensations un-related to performance because the reported performance has been manipulated will not disclose), the findings will be biased in favour of no rejection of the null hypothesis. That is, the possible bias is against the findings of this study.

<sup>12</sup> The Functioning and Future of the Structure Regime was drawn up by the Social and Economic Council (Sociaal-Economische Raad, SER) in response to requests from the Dutch government and House of Representatives for advice on the functioning and future development of legislation governing the supervision of large companies in the Netherlands. This legislation, known as the *structuurregeling* or 'structure regime', was introduced in 1971. It requires large companies to appoint a Supervisory Board (*Raad van Commissarissen*) to oversee the activities of the Board of Management (*Raad van Bestuur*). In this way, the executive and non-executive (or supervisory) functions are separated and assigned to two distinct bodies.

<sup>13</sup> Once a company attains a certain size, must adopt, according to the Dutch company law enacted in 1971, the "structured regime", however a relatively large number of foreign-controlled subsidiaries and publicly listed companies which need not comply have applied for the structured regime on a voluntary basis (Source: Jong et al, 2000).

<sup>14</sup> This variable's name in REACH-BVD is "Beloning Bestuur" (code 1281).

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**Figure 1: Sample selection procedure**

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Top 5.000 Dutch firms from trade & industry	4753
Economically active	2764
Spanning <u>all</u> 5 years of available statements, from 1999 to 2003	2651
Independent firms and ultimately owned subsidiaries of parents which are listed industrial companies, in the Netherlands and abroad	759
Compensation data reported across the period 1999 to 2003	267
Outliers <sup>15</sup>	2
<b>Final number of firms included in the sample</b>	<b>265</b>

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Thus, the sample before performing any transformations (e.g. logarithmic) of raw variables into the proxies necessary to undertake regression analysis contained 1325 firm-year observations (265 firms with 5 years of data each). Of these observations, 540 were on independent firm-years, 345 on domestically- controlled subsidiary firm-years, and 440 on foreign controlled subsidiary firm-years.

Testing the three hypotheses mentioned in the previous section necessitates a comparison across 4 groups of firms: independent companies, subsidiary companies, domestically-controlled subsidiaries, and foreign-controlled subsidiaries. Firstly, using REACH search criteria, the sample companies could be divided into two categories: independent firms and subsidiaries ultimately owned by parents who are listed industrial companies, either in the Netherlands or on a foreign stock exchange. REACH-BVD classifies as independent companies those in which no shareholder has more than 24.9% direct or total ownership. The second category was created using several search criteria. In the *BvD-Ownership Database* used in REACH, the concept of *subsidiary* makes no reference to the percentage of ownership between the parent and the daughter. In this sense, if company A is recorded as having a stake in company B with a very small, or even an unknown percentage of ownership, company B is said to be a *subsidiary* of company A. Further search allows selecting the subsidiaries that are ultimately owned, i.e. controlled directly or indirectly, through other intermediary structures, by a publicly listed company. Publicly listed domestic (Dutch) and foreign corporations represent the proxy for multinational companies category we employ for the purposes of this study. The choice is appropriate, as all

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<sup>15</sup> These two companies' reported returns on assets were smaller than four standard deviation from mean, presumably due to periods of extreme losses.

parents incorporated in the Netherlands and listed on the Amsterdam Stock Exchange report having at least 10 foreign subsidiaries, according to REACH-BVD database.

The subsidiary companies are further selected into two categories: domestically controlled subsidiaries and foreign-controlled subsidiaries. A subsidiary is considered foreign if its shareholder(s) is located outside Netherlands and owns at least 51% direct or total percentage of ownership. In the final sample there are 108 (41%) independent companies, and 157 (59%) subsidiary companies. Out of the subsidiary companies, 69 firms are controlled by Dutch publicly traded companies, and 88 companies are controlled by foreign publicly traded companies.

## 4. Results

### 4.1. Sample description

Table 1 presents key summary statistics for all firms in the sample, and separately for each of the three types of companies: independent, domestically controlled subsidiaries and foreign-controlled subsidiaries. The variables on which we report descriptive statistics concern compensation, i.e. total cash compensation of the managing board, accounting performance indicators, like EBIT, sales, net income, return on assets, and size, as revealed by the book value of firm's assets.

**Table 1. Key summary statistics**

	Mean	Median	St. dev.
<b>Panel A: All sample firm-year ( N=1325 )</b>			
Compensation	1388	700	2095
EBIT	67125	6669	581226
Sales	1734438	257584	5197611
Net income	62970	8298	189910
ROA	4.1	5.3	23.7
Assets	1535852	156558	5221631
<b>Panel B: Independent companies (N=540)</b>			
Compensation	1971	1002	2767
EBIT	104351	14185	885086
Sales	2834817	524113	7678192
Net income	75239	19003	257711
ROA	3.3	6.2	25.6
Assets	2279958	306496	6817566
<b>Panel C: Domestically-controlled subsidiaries ( N=345)</b>			
Compensation	1060	448	1461
EBIT	63795	3400	229906
Sales	1137732	144756	2406636
Net income	49174	2935	147522
ROA	3.8	5.3	30.7
Assets	1294055	55382	5050651

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**Panel D: Foreign-controlled subsidiaries ( N=440)**

Compensation	927	550	1150
EBIT	24049	5265	109733
Sales	866057	230773	1526946
Net income	42235	6687	126705
ROA	5.2	4.0	11.9
Assets	812222	167168	1980802

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## Notes:

1. All monetary variables are expressed in constant (2001) thousands euro.
  2. Compensation is the total annual cash compensation of the managing board, EBIT is the earnings before interest and taxes, Sales is the operating revenue, ROA is the return on assets, and Assets is company's total assets in reported in the annual balance sheet.
- 

The average firm-year in the sample is large, with about 1.5 billions in assets and about 1.7 billions in sales, and fairly profitable, as the mean return on assets stands at 4.1%. Concerning compensation policies with respect to reported measures of performance, it is notable that, on average, for each 100 euro of reported EBIT, the managing board gets about 2 euro of compensation<sup>16</sup>. There are differences across the three groups of firms in the average pay for reported EBIT: 1.89 euro for managers of independent companies, 1.66 for managers of domestically-controlled subsidiaries, and 3.85 euro for managers of foreign-controlled subsidiaries. This data appear to indicate that, on average, managers of foreign controlled companies are relatively better rewarded for seemingly similar firm's performance than their counterparts from domestically-controlled companies, which again raises questions about the reliability of reported performance for foreign-controlled companies already signalled in prior literature (Kinney and Lawrence, 2000, Emmanuel and Oyelere, 2002, Langli and Saudagaran, 2004).

The median (mean) annual cash compensation for the executive teams of independent companies in the sample is 1,002,000 (1,971,000) euro, almost twice as much as the 448,000 (1,060,000) euro in case of domestically controlled subsidiaries, and the 550,000 (927,000) euro in case of foreign-controlled subsidiaries. The differences are not surprising given the differences in size between these groups of companies. All three groups appear to be profitable, with mean returns on assets ranging between 3.3% and 5.2%.

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<sup>16</sup> The conclusion was derived by computing, for all sample firm-year, the ratio of the mean firm-year compensation of the managing board to the mean firm-year EBIT (both reported in thousands of euro), and them multiplying the result by 100.

## **4.2. Regression analyses results**

Table 2 presents Pearson correlation coefficients among compensation, several measures of accounting performance, and control variables for the sample of firm-years used in the regression analyses.

We find strong evidence of a correlation between executive team compensation and several measures of accounting performance: EBIT, sales, and net income. The correlation between compensation and ROA is statistically insignificant though. All four accounting performance indicators, EBIT, sales, net income, and ROA, are highly cross-correlated (again, except for ROA which is correlated at only 10% level of significance). The correlation table confirms that it is necessary to examine separately the sensitivity of compensation to each specific accounting measure of performance, independent of the other measures. Since all these accounting performance measures are highly correlated, estimating the weights each of them is given in the compensation contracts would be quite difficult. For illustration, only in model 6 we include two performance measures simultaneously in the model to assess whether one of the relationships is still statistically significant.

All variables which enter as interaction terms are, prior to estimation, median-centred, in order to mitigate collinearity problem and to allow direct interpretations of the main effects in later analyses (Aiken and West, 1991).

**Table 2**

**Spearman correlations among regression variables**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Compensation	1.00														
2 Earnings	0.651**	1.00													
3 Sales	0.656**	0.834**	1.00												
4 Net income	0.641**	0.813**	0.795**	1.00											
5 ROA	0.010	0.141**	0.162**	0.175*	1.00										
6 Firm size	0.675**	0.875**	0.903**	0.860**	0.089**	1.00									
7 Earnings volatility	-0.065*	-0.11**	-0.056*	-0.14**	0.64*	-0.131**	1.00								
8 Growth opportunities	0.100**	0.059	-0.045	0.064*	-0.066**	0.021	0.041	1.00							
9 Establishments	0.485**	0.540**	0.517**	0.529**	-0.016	0.559**	-0.152**	0.031	1.00						
10 Firm age	0.175*	0.188**	0.167**	0.189**	0.016	0.165**	0.013	-0.09**	0.211**	1.00					
11 Intangibles	0.461**	0.468**	0.473**	0.388**	-0.063*	0.518**	-0.077**	0.162*	0.390**	-0.02	1.00				
12 Salary per employee	0.018	-0.009	-0.19**	0.011	-0.052	-0.026	-0.032	0.039	-0.19**	0.032	-0.09*	1.00			
13 Labour cost(average)	0.005	-0.008	-0.21**	0.001	-0.097*	-0.064*	-0.041	0.014	-0.18**	0.030	-0.11*	0.91**	1.00		
14 Inv. of sq. root of assets	-0.56**	-0.75**	-0.80**	-0.73**	-0.254**	-0.817*	0.039	0.002	-0.46**	-0.11**	-0.36*	0.00	0.13	1.00	
15 Sales growth	-0.13**	-0.052	-0.010**	-0.053	-0.052	-0.106**	0.031	0.619**	-0.15**	-0.18**	0.028	0.00	0.00	0.14	1.00

\*, \*\* denote two-tailed significance at 5 percent, and 1 percent level, respectively. **Compensation** is the natural log of total cash compensation of the managing board. **Sales** is the natural log of the operating revenue, **Net income** is the natural log of net income, and **ROA** is the return on assets. **Earnings** is the natural log of the earnings before interest and taxes. **Firm size** is the natural log of company's total assets. **Earnings volatility** is the firm-specific five-year (1999-2003) coefficient of variation of EBIT. **Establishments** is the number of business premises declared by the company to the Dutch Chamber of Commerce. **Intangibles** is the natural log of the intangible fixed assets in the company's balance sheet. **Firm age** is the natural log of the number of years the company existed until 1999. **Salary per employee** is the average salary paid by company in a certain year. **Labour cost (average)** is the mean total compensation paid by firms to employees over the period 1999-2003. **Growth opportunities** is the average growth in assets over the five-year period 1999-2003. **Sales Growth** is the average growth in sales over the five-year period 1999-2003.



Table 3 presents results of estimating the link between executive pay and accounting earnings conditional on the ownership status of the company, while controlling for several possibly confounding factors. The error terms in the simple OLS model fail White's (1980) specification test. Therefore, reported p-values are based on White-consistent t-values<sup>17</sup>.

Key descriptive statistics were reported in Table 1 about raw, un-transformed variables regarding the 1325 firm-years observations in the sample, but the empirical analyses based on the specified regression models requires the use of transformed variable. The logarithm function is not defined for negative values. Its application is therefore responsible for the loss of observations: only 1044 observations out of the 1325 available firm-year are used to estimate the models. The log transformation of EBIT renders unusable the loss firm-years (about 21% of the initial sample), proportionally distributed across the three categories of firms.

The adjusted R-squares from the two regressions indicate that the estimating equations explain about 68% of the variation in executive teams compensations. The yearly dummies are all but one (year 2003) significantly different from zero, positive and increasing between 1999 and 2002, a result which is consistent with other empirical observations and prior studies. For instance, Gregg et al. (1993) shows that managerial compensation increases over time, notwithstanding periods of bad economic performance. Thus, the yearly dummies appear to pick up the same effect for Dutch data as has been documented earlier for British context.

With respect to our main hypothesis of interest in this study, we remark that the coefficient on earnings is positive and significant at 1% level in both models, thus confirming that the compensation of the managing board in independent companies is determined by explicit earnings-based contracts. As expected, compensation is increasing in size, managerial task complexity, and firm-specific level of remuneration policy. Also, pay-performance sensitivity is decreasing, as predicted by agency models, in the volatility of the performance measure used, as evidenced by the negative and significant (at 1% level) coefficient on the interaction term between earnings and earnings volatility. On the other hand, unlike in Schaefer (1998) pay-for-performance sensitivity does not have the property of being proportional to the

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<sup>17</sup> Reported significances are based on one-tailed t-statistics tests, since the sign of associations is unambiguously hypothesized.

inverse of the square root of size. The coefficient on the interaction term between earnings and the inverse of square root of assets is not statistically significant.

The most important results are those related to the hypotheses of interest in this study. In model 1, the coefficient on subsidiary status is positive and significant, whereas the coefficient on the interaction term between EBIT and earnings is negative and significant. From model 1 estimation results, it appears that while subsidiaries managers are not offered lower compensation than that of their counterparts from independent companies (but in fact larger), however their pay is less related to the realized earnings. That is, we reject the first hypothesis that executives' pay is equally sensitive to earnings performance for subsidiary companies as it is for independent companies. In fact, the pay of subsidiaries managers is significantly (at 1 percent level) less sensitive to earnings than the pay of independent companies managers.

From estimates of model 2 in Table 3, it is noticeable that the diminished stewardship relevance holds true for both domestically controlled and foreign controlled subsidiaries, as the interaction coefficients between the respective dummy and the median-centred measure of earnings are negative (-0.070, and -0.146, respectively) and significantly different from zero at 5 percent, and 1 percent, respectively, levels of confidence. The estimated negative elasticity of pay to earnings is almost twice as large for foreign-controlled than for domestically controlled subsidiaries. Thus, we can reject the second hypothesis, as far as EBIT measure is concerned, as well: foreign-controlled subsidiaries' earnings have lower stewardship relevance than domestically-controlled subsidiaries earnings.

**Table 3 : Ordinary least squares coefficients**

<b>Dependent variable: Compensation</b>	Model 1	Model 2
<b>Tests of the hypotheses</b>		
Earnings	0.142***	0.159**
Subsidiary status * Earnings	-0.091***	
Domestically controlled subsidiary * Earnings		-0.070**
Foreign controlled subsidiary * Earnings		-0.146***
<b>Control variables</b>		
Intercept	1.580**	1.634**
<b>Fixed effects</b>		
Year 2000	0.109*	0.108*
Year 2001	0.183**	0.179**
Year 2002	0.240***	0.235***
Year 2003	0.010	0.013
<b>Ownership Status</b>		
Subsidiary status	0.838*	
Domestically Controlled subsidiary		0.060
Foreign Controlled subsidiary		0.087
<b>Firm size, risk and growth opportunities</b>		
Firm size	0.307***	0.289***
Earnings volatility	0.119***	0.118***
Growth opportunities	-0.001	-0.001
<b>Managerial task complexity</b>		
Establishments	0.004**	0.006**
Firm age	-0.004	-0.007
Intangibles	0.023***	0.026***
<b>Compensation policy</b>		
Salary per employee	0.009***	0.009***
Labor cost (mean)	-0.0062***	-0.0067***
<b>Pay-for-performance sensitivity effects</b>		
Earnings x The inverse of square root of assets	0.119	0.062
Earnings * Earnings volatility	-0.032**	-0.010**
<b>Model statistics</b>		
N	1044	1044
F-statistic	124.943	114.742
Adjusted R <sup>2</sup>	68.1	68.5

\*, \*\*, and \*\*\*, denote significance at 10 percent, 5 percent, and 1 percent level, respectively. **Compensation** is the natural log of total compensation of the managing board. **Earnings** is the natural log of EBIT, **Subsidiary Status** is a dummy variable taking value 1 if the company is controlled by another company, and otherwise taking value zero. **Domestically controlled subsidiary** is a dummy taking value 1 if the parent company is Dutch, and zero otherwise. **Foreign controlled subsidiary** is a dummy which takes value 1 if the parent company is non-Dutch, and zero otherwise. **Year 2000**, **Year 2001**, **Year 2002**, and **Year 2003**, are dummy variables that takes value 1 if the observation refers to year 2000,2001, 2002, and 2003, respectively, and zero otherwise. **Firm size** is the natural log of company's total assets. **Earnings volatility** is the firm-specific five-year (1999-2003) coefficient of variation of EBIT. The coefficient of variation is defined as standard deviation divided by mean, multiplied by 100. **Growth opportunities** is the average growth in assets over the five-year period 1999-2003. **Number of establishments** is the number of business premises declared by the company to the Dutch Chamber of Commerce. **Firm age** is the natural log of the number of years the company existed until 1999. **Intangibles** is the natural log of the intangible fixed assets, **Salary per employee** is the average salary paid by company in a certain year, and **Labour cost (mean)** is the mean total compensation paid by firms to employees over the period 1999-2003.

The results reported in Table 4 confirm that such differences in sensitivity between these two categories of subsidiaries persist for other measures of reported accounting performance like sales (-0.051 versus -0.184 estimated decrease in elasticity for domestic versus foreign controlled subsidiaries), and net income (-0.100 versus -0.123 decrease in elasticity for domestic versus foreign controlled subsidiaries). When the measure of accounting performance is the return on assets indicator, the coefficient on the interaction terms are not significantly different from zero for any of the two categories of subsidiary companies (see estimated Model 5). This fact, interpreted in conjunction with the very small positive coefficient on ROA in model 5 (0.137, significant at 10% confidence level), leads to the likely conclusion that in fact for none of the two types of subsidiaries this measure of performance is used in contracting with the managing board. However, in order to accept this result, which is equivalent to rejecting the third hypothesis in this study, for foreign-controlled subsidiary and the ROA performance measure, with any degree of confidence, we need to perform coefficient restrictions Wald test.

Table 5 reports the results of coefficients restrictions Wald tests, for several hypotheses that formalize the hypothesis 3 implications, and are tabulated for each of the estimation models used.. No tests needed be performed for coefficients in model 5, with main regressor ROA, because in that equation the interaction coefficients are not significantly different from zero.

The results can be summarized as follows. Firstly, pay-EBIT performance sensitivity for managers of domestically controlled subsidiaries is positive while pay-EBIT sensitivity for manager of foreign-controlled subsidiaries is statistically insignificant. The Pay-Sales performance sensitivity for managers of domestically controlled and foreign-controlled subsidiaries are both positive and significant, but the link is stronger for domestically controlled companies. Pay-net income and pay-ROA sensitivity for managers of subsidiaries, domestically controlled or foreign-controlled, are not significantly different from zero. In conclusion, with respect to the third hypothesis of this study, the finding is that for foreign-controlled subsidiaries' managers, pay is basically not related with any summary measure of reported accounting performance, and it is only weakly related to subsidiaries' sales.

**Table 4**

<b>Regression equations:</b> <i>Dependent variable is Managerial Compensation</i>				
Explanatory Variables	Model 3	Model 4	Model 5	Model
Intercept	0.932***	1.218***	1.967***	0.917***
<b>Year control variables</b>				
Year 2000	0.117**	0.124**	1.568	0.127**
Year 2001	0.129**	0.241***	-0.430	0.160**
Year 2002	0.137**	0.249***	-0.118	0.177***
Year 2003	0.044	0.740	-0.333	-0.006
<b>Accounting performance proxies</b>				
Sales	0.281***			0.332***
Net income		0.167***		
Return on assets			0.137*	
Earnings				0.033
<b>Interaction terms</b>				
Domestically controlled subs*Sales	-0.051*			-0.074
Foreign controlled subs*Sales	-0.184***			-0.263***
Domestically controlled subs*Net Income		-0.100***		
Foreign controlled subs*Net Income		-0.123***		
Domestically controlled subs*ROA			-0.110	
Foreign controlled subs*ROA			-0.096	
Domestically controlled subs* Earnings				-0.014
Foreign controlled subs*Earnings				-0.073
<b>Firm characteristics</b>				
Firm size	0.154***	0.198***	0.229***	0.060
Establishments	0.040***	0.095***	0.093***	0.079***
Intangibles	0.029***	0.028***	0.229***	0.028***
Firm age	0.011	0.000	0.440	-0.015
Salary per employee	0.005***	0.004***	0.002***	0.001***
Growth opportunities	0.001	-0.001	0.021	0.000
<b>Model statistics&amp; tests</b>				
N	1195	980	1026	986
F-statistic	140.776	143.353	44.055	125.016
Adjusted R <sup>2</sup>	66.5	68.5	37.0	70.5

\*, \*\*, and \*\*\*, denote significance at 10 percent, 5 percent, and 1 percent level, respectively. **Managerial Compensation** is the natural log of total compensation of the managing board. **Sales** is the natural log of the operating revenue, **Net income** is the natural log of net income, and **ROA** is the return on assets. **Earnings** is the natural log of the earnings before interest and taxes. **Domestically controlled subsidiary** is a dummy taking value 1 if the parent company is Dutch, and otherwise takes value zero. **Foreign controlled subsidiary** is a dummy which takes value 1 if the parent company is non-Dutch, and otherwise takes value zero. **Year 2000**, **Year 2001**, **Year 2002**, and **Year 2003**, are dummy variables that takes value 1 if the observation refers to year 2000, 2001, 2002, and 2003, respectively, and which take value zero otherwise. **Firm size** is the natural log of company's total assets. **Establishments** is the number of business premises declared by the company to the Dutch Chamber of Commerce. **Intangibles** is the natural log of the book value of intangible fixed assets. **Firm age** is the natural log of the number of years the company existed until 1999. **Salary per employee** is the average salary paid by company in a certain year. **Growth opportunities** is the average growth in assets over the five-year period 1999-2003.

**Table 5**

<b>Hypotheses testing: Wald coefficient restrictions tests</b>			
<b>Model</b>	<b>Null hypotheses</b>	<b>Test-value</b>	<b>P-value</b>
	<b>Alternative hypotheses</b>		
Model 2 <b>EBIT</b>	$\beta_1 + \beta_2 = 0$ rejected	F-statistic: 10.53	0.000***
	$\beta_1 + \beta_2 > 0$ accepted	Chi-square: 86.05	0.000***
	$\beta_1 + \beta_3 = 0$ accepted	F-statistic: -1.52	0.251
	$\beta_1 + \beta_3 > 0$ rejected	Chi-square: 4.32	0.362
	$\beta_2 = \beta_3$ rejected	F-statistic: 4.55	0.040**
	$\beta_2 > \beta_3$ accepted	Chi-square: 14.72	0.031**
Model 3 <b>Sales</b>	$\beta_1 + \beta_2 = 0$ rejected	F-statistic: 12.47	0.000***
	$\beta_1 + \beta_2 > 0$ accepted	Chi-square: 63.69	0.000***
	$\beta_1 + \beta_3 = 0$ rejected	F-statistic: 19.3	0.000***
	$\beta_1 + \beta_3 > 0$ accepted	Chi-square: 64.78	0.000***
	$\beta_2 = \beta_3$ rejected	F-statistic: 16.55	0.005**
	$\beta_2 > \beta_3$ accepted	Chi-square: 69.03	0.004**
Model 4 <b>Net income</b>	$\beta_1 + \beta_2 = 0$ accepted	F-statistic: -4.25	0.622
	$\beta_1 + \beta_2 > 0$ rejected	Chi-square: 10.23	0.589
	$\beta_1 + \beta_3 = 0$ accepted	F-statistic: -15.61	0.745
	$\beta_1 + \beta_3 > 0$ rejected	Chi-square: 3.26	0.899
	$\beta_2 = \beta_3$ accepted	F-statistic: -2.47	0.873
	$\beta_2 > \beta_3$ rejected	Chi-square: 1.55	0.921

## 2.5. Sensitivity analyses and robustness tests

The previously reported analyses were subjected to a series of robustness checks. The first battery concerns estimation methods.

Given the design of this study, which required time-series firm data, the sample consists of multiple observations for each firm unlikely to be independent. All models (1 to 6) could be re-estimated using fixed and random effects, assuming there are other omitted company-specific variables that may be important in determining compensation. However, results using the fixed effects model suggest the absence of omitted company specific variables that would confuse the analysis. The results on the coefficients of interest remained similar to those reported for the weighted regression estimation. Additionally, a Hausman test reveals that in almost all specifications the consistency criterion<sup>18</sup> for using the random-effect approach is violated. Thus, the random effect model should not be used. The results of estimating models from 1 to 6 using fixed effects are qualitatively unchanged, eliminating the possibility that the weighted least square results reported in previous section are biased due to dependent observations.

Ely (1991) suggests that differences in the relation between compensation and accounting-based firm performance can be attributed to differences in firms' production environments. To control for this effect, industry dummies (based on the relevant one digit industry code) were introduced as control variables. The main results of the study remain unaffected.

Secondly, we investigate the sensitivity of the reported results to various specifications of the dependent and explanatory variables or various alternative proxies designed to capture the underlying concept. We re-estimated the models 1-5 using the raw compensation rather than the logarithm of the cash compensation as a dependent variable in the regression equations. Such specification failed to explain managerial remuneration, even after trimming the explanatory variables to make sure that all extreme performance observations were removed and in particular all negative performance observations were left out of the estimation.

In the reported estimation, the impact of size on pay-for-performance sensitivity was accounting for, as in Schaefer (1998), by interacting the performance measures with the inverse of square root of size. The effect was not statistically significant.

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<sup>18</sup> Firms' specific unobserved heterogeneity must be uncorrelated with explanatory variables in the model (Baltagi, 2001).

According to Murphy (1998), and Hartzel and Starks (2002) pay-for-performance sensitivity is negatively related to size, i.e. smaller firms have higher incentive rates than do larger firms. Re-estimating the models with an interaction between performance indicators and size proxied by natural logarithm of total book value of firms' assets yields a significant negative coefficient ( $p < 0.05$ , 1-tailed). The main results of this paper are robust to the new specification. Also, two other proxies were employed for firm size and managerial task complexity: the natural log of the total number of employees and the natural log of the number of affiliated companies, respectively. The effects, both in terms of size of impact and direction, are the same as the effects that resulted using natural log of assets and the number of establishments.

Finally, the empirical models used in this study to estimate pay-performance sensitivity, though in line with prior empirical literature, could still lead to unwarranted inferences due to not taking into account the effect of managerial risk aversion on pay performance sensitivity (Banker and Datar, 1989, Bushman and Indjejikian, 1993, Moers and Peek, 2005). The threat is potentially serious because it can be argued that managers of independent companies may definitely differ along this dimension from managers of organisational sub-units (i.e. subsidiary companies), as the former self-select for and are offered more entrepreneurial (riskier) types of jobs than the latter. In order to assess the sensitivity to our results to this unobservable parameter, we run the Kolmogorov-Smirnov test to identify whether there exist significant differences in location and shape of distribution between the two groups of companies, independent and subsidiaries. The test is applied to a series of variables which, according to Moers and Peek (2005), are related to managerial risk aversion. The relevant variables are proxied by time-series firm-specific indicators: variation in compensation, volatility of EBIT, operating revenue and returns on assets, and growth indicators (the average increase in assets, revenues and investment in fixed assets over time). We proxy for risky pay and performance volatility by computing firm-specific five-year coefficients of variation of Compensation, EBIT, Operating Revenue, and ROA. For each company in the sample, we use the 5 years of data (1999-2003), and compute the ratio of the standard deviation divided by the mean, multiplied by 100. The coefficient of variation is sometimes called the relative standard deviation. This summary statistic scales the standard deviation of a measurement by the magnitude of the values being measured. Thus, the coefficient of variation provides a measure of relative variation and is scale-free.

Table 6 presents descriptive data about the firms-specific indicators of variability in pay, accounting performance volatility and growth. Descriptives of these indicators are given separately for independent and subsidiaries companies, as well as results of two-sample tests for differences in location and shape of the variables' distributions across groups. The location statistics reveal that independent and subsidiaries companies' managers get similar incentive pay rates, since in both groups the mean coefficient of variation in compensation is about 35%. Thus, both categories of managers appear to average similar risk-tolerance levels. The tests results for differences in the volatility of accounting measures of performance or growth opportunities across categories reinforce the conclusion that the findings reported previously are not the result of unaccounted for risk tolerance characteristics of the managerial teams.

**Table 6. Sensitivity tests related to managerial risk-aversion differences between independent and subsidiary firms**

Variable	Independent firms	Subsidiary firms	Test statistic and significance
	Mean (Std. Dev.)		Kolmogorov Smirnov Z test
Variation in Compensation	34.02 (26.15)	36.72 (31.84)	0.850*
Variation in EBIT	35.17 (247.87)	61.02 (315.18)	0.789*
Variation in Sales	24.62 (23.32)	19.70 (15.67)	1.077*
Variation in ROA	0.76 (375.04)	3.87 (463.88)	0.974*
Assets growth rate	14.80 (24.08)	11.70 (25.28)	1.081*
Sales growth rate	12.26 (22.68)	13.00 (22.53)	0.854*
Investment rate (mean)	26.14 (26.09)	26.50 (26.34)	0.871*

\* signifies that the Kolmogorov-Smirnov Z test statistics indicates no significant differences in location and shape of distribution between the two groups of companies: independent and subsidiaries. First 4 measures in the table represent coefficients of variation. That is, the standard deviation divided by the mean, and multiplied by 100. For each company in the sample, we use the 5 years of data (1999-2003) **Variation in Compensation** is the proxy for risky pay and is the firm-specific five-year coefficient of variation in the managing board cash compensation. **Variation in EBIT**, **Variation in Sales**, and **Variation in ROA** proxy for volatility of earnings, revenue and return on assets, respectively. The last three measures represent firms-specific averages across 5 years of yearly rates. **Assets growth rate** is the average of changes in total assets to previous year assets. **Sales growth rate** is the mean yearly percentage of sales growth. **Investment rate** is the average of the yearly percentage change in fixed assets.

## **6. Discussion and concluding remarks**

International transfer pricing regulation is grounded on the assumption that, from a managerial perspective, multinationals have an incentive to use arm's length prices to be able to judge the real performance of their different subunits and reward the managers accordingly. Thus, regulators require that subsidiaries located in foreign countries be treated by parents and other group members as independent businesses or un-controlled entities. Economic theorists and practitioners question the validity of the tax authorities' assumptions, as well as the effectiveness of the regulation.

This study provides empirical evidence that, all other things being equal, the reported accounting performance of foreign-controlled subsidiaries has significantly lower stewardship relevance than that of independent companies or domestically controlled subsidiaries. The pay of managers of group-controlled entities is not, on average, less variable or risky than the pay for the managers of independent companies. The significant difference is the following: for independent company's managers the variable compensation is tied to accounting performance, whereas for subsidiaries' managers is most likely dependent on other (non-accounting) measures of managerial performance.

These findings are consistent with the hypothesis that strategic choices regarding intra-group transactions and international transfer prices, regardless whether aimed at income shifting or simply reflecting company-wide profit maximisation choices, reduce the informativeness of accounting performance measures of foreign subsidiaries and negatively affect their contracting use.

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