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How to Avoid Compensating CEO for Luck: The Case of Macroeconomic Fluctuations

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Abstract

Incentive effects of performance-based compensation schemes for management may be weakened or biased by macroeconomic influences on remuneration. These influences can be seen as reflecting luck from the CEO's perspective. In this chapter we present a model for how to avoid compensating CEO for luck by filtering out the macroeconomic influences. In the empirical section we analyze the impact of macroeconomic, industry and firm-specific factors on the compensations (salary, bonus, options, and pensions) of CEOs in 127 Swedish corporations during the period 2001-2007. We find macroeconomic influences on Swedish CEOs' compensation to be substantial. Distinguishing between favorable and unfavorable macroeconomic developments, we find compensation to be more responsive to favorable than to unfavorable developments in macroeconomic variables.

Key words: executive compensation, salary, bonus, option, pension, macroeconomic uncertainty, macroeconomic factors, performance, luck

JEL: L14, L16, M14, M21, M52

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1. Introduction

Executive compensation is under scrutiny and there are calls for regulation and "codes of conduct" with respect to levels as well as forms of compensation. Although the level of compensation in Europe remains below that in the US, the level in most European countries have increased rapidly in the new millenium. According to Fernandes et al. (2008) the difference between Europe and the US can be explained to a large extent by the larger variable component of executive compensation in the US. The higher variability in the US seems to be associated with a risk-premium. This observation implies that levels and forms of compensation are not independent.

One common view in the current debate is that CEO compensation should be linked to "sustainable" profits that presumably are the result of skill and effort. Regulation seems to be emerging in many countries stating that the reward for improved performance should not be fully realized unless the improved performance is observed for a period of 3-5 years. Increased compensation would be linked to performance surpassing some benchmark for some duration. The argument behind such proposals would be that improved performance is likely to be caused by other factors than executive skill and effort if it does not exceed a benchmark for duration of time. The other factors could be earnings management by the executives and some sort of luck.

There are a number of difficulties associated with proposals of the type discussed if they are to provide appropriate incentives for managers. The concern with earnings management can be partly resolved by linking compensation to less manageable variables and by improved accounting standards. The issue of luck is more complicated (Bertrand and Mullainathan, 2001). One problem is to define a benchmark for performance representing a minimum level that would be achieved without particular skill and effort. A second problem is to determine when and how performance above (below) the benchmark should be rewarded (penalized) for being the result of skill and effort rather than luck. More fundamentally, what changes in performance are caused by luck or bad luck in an environment characterized by a variety of shocks? Even with the benefit of hindsight this question could be hard to answer.

The contracting literature indicates that optimal incentive contracts are achieved by means of some kind of benchmarking for "normal" performance and the linking of compensation to a performance measure reflecting skill and effort with as little noise as possible.[1]

Analyzing the impact of luck on CEO compensation Bertrand and Mullainathan (2000, 2001) define luck as performance beyond CEO's control. As examples, they consider performance effects of fluctuations in oil prices in the energy sector, the impact of exchange rates in traded goods sectors and changes in performance around year to year changes in mean industry performance. Garvey and Milbourn (2006) use a market index and an industry index as proxies for stock price performance based on luck. In all cases the empirical results indicate that compensation depends strongly on luck. Garvey and Milbourn also find that executives are rewarded (penalized) more for good luck than for bad luck and that this asymmetry can be linked to corporate governance variables.

Accepting the premise from the contracting literature that lucky performance should not be rewarded there is an additional difficulty associated with the measurement of performance outside the control of management. As pointed out by Oxelheim and Wihlborg, (2003) and Gopalan, Milbourn and Song (2009) the effect on performance of external shocks beyond management's control can be influenced by management's strategic choices as well as operational decisions in response to external shocks. If so, the incentives of management to take advantage of lucky external events and to dampen the effects of unlucky external events would be removed if compensation is not related to performance effects of lucky circumstances.

The implication of this discussion is that the appropriate definition of lucky performance depends on the nature of shocks and the technological ability to adjust strategy and operations to shocks within a certain time frame. The adjustment of strategy and operations can take the form of investment in flexibility or real options in an environment characterized by high uncertainty about external shocks or adjustment may take the form of switching production and marketing efforts in response to anticipated and even current events. A restaurant business may be able to respond very quickly to lucky events by adding tables while a capital intensive firm may need years to adjust production capacity.

Lack of sustainability of performance is not a good indication of luck in all industries. Macroeconomic fluctuations may be short lived or last several years. The performance of a

[1] Milgrom and Roberts (1992) reviews the contracting literature on incentive effects of compensation schemes.

firm that can respond rapidly to macroeconomic fluctuations depends on skill and effort even in the short run. This calls for an approach that even in a shorter perspective can assess the sustainability of performance.

In this chapter we focus on the macroeconomic environment as a major source of changes in performance beyond management's control. Macroeconomic fluctuations affect almost all aspects of corporate performance but they cannot be influenced by management. However, as noted, the effect of macroeconomic fluctuations on corporate performance can be influenced by management if macroeconomic conditions can be forecast and operations can be adjusted within the period. For this reason we distinguish between anticipated and unanticipated macroeconomic conditions. Depending on firm-specific conditions, performance beyond management control may be explained either by all macroeconomic fluctuations or only by unanticipated fluctuations.

Our objective is to model the macroeconomic influence on CEO compensation and to estimate the macro economy's contribution to changes in this compensation. The empirical analysis in this study is based on Swedish companies and the period under investigation is 2001-2007. Most studies on CEO compensation are based on US firms and to some extent this choice is motivated by the easy access to detailed data for very long periods. However, our research question motivates the choice of a small open economy since a higher degree of openness may also mean higher exposure to macroeconomic factors influencing CEO compensation (Oxelheim and Randöy, 2005). Swedish firms are known to belong to the top-five league regarding financial as well as commercial internationalization (UNCTAD, 2008).

We ask how compensation for Swedish CEO's would have developed had macroeconomic influences on compensation been filtered out. Second, we distinguish between anticipated and unanticipated macroeconomic fluctuations to see how CEO compensation had developed if only unanticipated macroeconomic influences were filtered out from compensation. Third, we ask whether there is an asymmetric impact on remuneration any particular year in the sense that remuneration is particularly sensitive to favorable developments in variables affecting performance. The interest in asymmetry arises because it may reflect "skimming" of shareholders in the words of Bertrand and Mullainathan (2001) and because asymmetry affects incentives for risk management with respect to variables affecting compensation.

Compensation is typically not linked in a simple way to one well-defined performance measure. Macroeconomic effects on compensation can occur through a number of channels depending on what aspects of performance affect salaries, bonus and other forms

of CEO compensation. Therefore, we focus on the decomposition of compensation into "intrinsic" and macroeconomic components rather than of any one performance measure. Presumably, changes in compensation net of changes linked to macroeconomic factors represent compensation for changes in firms' "intrinsic" competitiveness. We control for industry factors as well.

In Oxelheim and Wihlborg (2003) the case of Electrolux was used in the context of value-based management (VBM) to illustrate how changes in performance can be decomposed into one "intrinsic" component and one component caused by macroeconomic developments. A set of domestic and foreign macroeconomic price variables (exchange rates, interest rates, price levels) were used to filter out the macroeconomic component from total changes in performance from quarter to quarter. One reason for using price variables is that they can be observed without a long lag. Therefore, they can be used in practice to decompose very recent changes in performance and, thereby, to adjust compensation.

In the empirical part of this paper macroeconomic price variables are also used as indicators of macroeconomic fluctuation. The period 2001-2007 is determined by data availability. Industry factors are also included to the extent possible in the relatively small Swedish economy. After estimating the impact of macroeconomic factors we ask how salaries and bonus would have developed for the average firm during the estimation period had they been independent of total and unanticipated macroeconomic fluctuations, respectively.

The paper is organized as follows. In Section 2, the data set for compensation in the form of salary, bonus, option awards and pension payments is described. Relevant performance variables explaining compensation are identified in Section 3. The contribution of macroeconomic factors to compensation and performance measures is estimated in Section 4 using cross-section and panel analyses. In Section 5 we decompose compensation each year into an "intrinsic" component and a component caused by macroeconomic factors distinguishing between the total impact of the macro economy and the unanticipated impact. In section 6 we test whether remuneration is asymmetric in response to macroeconomic factors, in particular. The total compensation each year is divided into symmetric and asymmetric components. Concluding comments follow in Section 7.

2. The compensation data

Our dataset covers compensation for CEOs and contains two samples: cash disbursements (salaries and bonus) from 2001-2007, and total compensations (i.e. salaries, bonus, stock option awards, and pensions) from 2004-2007. Data have been collected from annual reports

for all Swedish firms listed on the stock exchange as Large-Cap, Mid-Cap, and Small-Cap[2] firms during the period 2001-2007. The firm-specific factors are collected from DataStream, while the macroeconomic factors are obtained from EcoWin (Reuters) database.

Table 1 reports mean (in million SEK), standard deviation, as well as growth index (Index = 100 in 2001) for cash disbursement levels for the CEOs in 127 Swedish firms on the Stockholm Stock Exchange during the period 2001-2007.[3] We can see that in panel C of Table 1, the compensation levels in the form of total cash disbursements increased during this period. On average, salary plus bonus increased 58 percent. A distinction is made between salary and bonus in panels A and B. The year 2001 is excluded here because we could not separate the bonus from the salary for this year. Table 1 shows that bonus payments increased much faster than salary payments. Bonus payments increased 183 percent, while salaries increased only 30 percent. The former figure takes into account both that average bonus payments increased and that the number of firms paying bonus increased.

(Insert Table 1 Here)

In Table 2 compensation in the form of Option awards and contributions to Pensions are added. Since the option and pension data are only available from 2004, the descriptive statistics in this table refers to the period 2004-2007 (with index 100 in 2004). In Panel C we can see that compensation in the form of option awards increases by 725 percent over the period. The variation is substantial. Pension awards are stable and increase only 9 percent. Both options and pensions decreased in 2006. If we add all the components, i.e. Salary + Bonuses + Options + Pensions, we can see that the total increased 30 percent from 2004 to 2007.

(Insert Table 2 Here)

3. Explaining compensation without macroeconomic factors

[2] It is grouped according to the market capitalization of the firm. Large-Cap > 1 billion Euro; 150 mil Euro < Mid-Cap < 1 billion Euro; Small-Cap < 150 million Euro.

[3] There is no publicly available database for executive compensation as in the US but the availability of data is limited to annual reports of firms specifying compensation to CEO. As of January 2005, the implementation of IFRS improved disclosure and access to detailed compensation data.

Early US studies of executive compensation across firms focused on the relation between CEO compensation and measures of firm performance (Coughlan and Schmidt, 1985; Murphy, 1985, 1986; Jensen and Murphy, 1990; Abowd, 1990; Leonard, 1990), while other studies analyzed whether CEOs are rewarded for performance relative to a market or industry benchmark (Antle and Smith, 1986; Gibbons and Murphy, 1990; Bebchuk and Grinstein 2005). The US evidence indicates that benchmarking is not practiced much.

In this section we ask which measures of firm performance explain CEO compensation across the Swedish sample of firms. The analysis in the following sections of the impact of macroeconomic factors is similar to analysis of benchmarking but it allows macroeconomic factors to have a general as well as a firm-specific impact on CEO-compensation.

Cash compensation (salary plus bonus) is used as the main measure of CEO compensation but we also analyze whether the results are likely to generalize to a wider measure of compensation. After eliminating the missing values in the firm performance sample, our final sample contains different numbers of firms in different years. Thus, the panel is unbalanced with a maximum of 127 firms and a minimum of 109 firms during the period 2001-2007.

We begin by analyzing how the cross-section variation of cash compensation levels (salary plus bonus) for the CEOs depends on a number of firm-and industry performance measures, and we ask whether the cross section pattern is stable over the data period. The following regression is estimated in cross-section for each year, as well as pooled:

$$Log(Compensation_{i,t}) = \alpha_0 + \alpha_1 Log(Sales_{i,t}) + \alpha_2 Log(Performance_{i,t}) + \sum_{i=3}^{8} \alpha_i Industry\ dummies_i + \varepsilon_{i,t} \quad (1)$$

The firm's total sale is used as a proxy for firm size. Whether CEO compensation is more closely tied to firm size (sales) or firm profits is controversial due to a multicollinearity problem among the independent variables in the regressions (Ciscel and Carroll, 1980; Rosen, 1992). In order to minimize this problem, we focus on variables and ratios that exhibit relatively little correlation with each other. A number of performance variables were tested in equation (1) to find which one(s) explains compensation the best. The variables were return on assets, return on equity, and Tobin's Q. We found that Tobin's Q (measured as market value relative to book value) had the most explanatory power. Therefore, Tobin's Q is used as

the performance proxy from now on. Seven industry dummies are used to control for industry factors.[4]

All the variables in the regressions in this study are in logarithms. Thus, the regression coefficients are interpreted as "compensation-performance elasticities." One of the advantages of the elasticity approach is that it produces a better "fit" in terms of marginal effects. Another advantage is that the elasticity is relatively invariant to firm size while sensitivities vary monotonically with firm size (larger firms having smaller betas) (Gibbons and Murphy, 1992; Murphy 1999).

Table 3 shows the results for equation (1) for each year and for pooled data. It can be seen that the elasticity with respect to sales remains fairly constant from year to year. The elasticity with respect to Tobin's Q is also stable except for the relatively low elasticities for the years 2001 and 2002.

The only industry showing a significant difference from the average is industry 4 (health care). The compensation level in this industry has increased relatively fast.

(Insert Table 3 Here)

Table 4 shows the results for the equation (1) for the pooled data by using different compensation measures as dependent variables: 1) Salary plus Bonus, 2) Salary plus Bonus plus Options, and 3) Salary plus Bonus plus Option plus Pensions. This sample covers the period 2004-2007. We want to check whether the coefficients for the firm-specific variables depend on the scope of the compensation measure. Table 4 shows that the estimated coefficients remain very much the same when we add options and pension awards to salary plus bonus as the dependent variable. Since we have several more years of observations for salary plus bonus alone we will use this measure of compensation in the decomposition below.

(Insert Table 4 Here)

Using the sample 2001-2007 and the above firm specific factors, we estimate two random effects models with industry dummy variables in one and industry plus time dummy

[4] The industries are: 1) consumer goods, 2) information technology, 3) financials, 4) health care, 5) industrials, 6) others, 7) materials.

variables in the other[5]. The results are reported in Table 5. The results for the random effects Model 1 with industry factors is very similar to the results for pooled data in Table 3 except that the dummy for industry 6 is not significant. Thus, competitive conditions in particular industries do not seem to influence compensation much.

The time dummy variables are highly significant in the second column of Table 5. The coefficients increase each year from 2001-2007. The time pattern could be caused by macroeconomic influences and provide motivation to analyze the role of these influences.

(Insert Table 5 Here)

Are the patterns for salary and bonus different? It can be expected that the bonus component of compensation is more sensitive than the salary component to performance-variation over time and across firms. Therefore the model with industry dummies is also tested for Salary and Bonus separately. The results are shown in Table 6. There are fewer observations for Salary and Bonus separately than for the sum of these components, because all observations of zero Bonus are excluded. The Salary component is explained mainly by sales, while Tobin's Q has a strong effect on Bonus but little effect on Salary. Clearly and not surprisingly, compensation in the form of bonus is much more sensitive to performance from a shareholder perspective than salary compensation. The table also shows that the results for Salary plus Bonus are similar to the results for Bonus alone, although the coefficients for the total are generally smaller. Since the results are so similar, and since we have twice as many observations for total compensation as for Bonus alone, we focus on total compensation in the following analysis of macro-factors.

(Insert Table 6 Here)

4. CEO-compensation and macroeconomic factors

In this section we turn to an analysis of the macroeconomic influences on CEO-compensation. These influences can occur through the performance variables in equation (1) or through other variables influencing compensation. We investigate whether macroeconomic variables affect compensation independently of variation in Q and Sales, and we analyze macroeconomic

[5] The random effects model is compared to pooled linear regressions and the fixed effect model in the next section where macro variables are introduced. See footnote 7 below.

influences on Q and Sales. The total macroeconomic influence on compensation is the sum of these effects.

Macroeconomic conditions can be identified using either quantity variables like GDP, GDP growth, investments and employment, or using price variables like interest rates, inflation and exchange rates. Although the former group of variables describes macroeconomic conditions, they are typically observed with a substantial lag. Price variables, on the other hand, can be seen as easily observable signals of underlying macroeconomic shocks and developments. A shock would have a certain effect on a group of price variables as well as on GDP, employment, etc. but only the former would be observable at the time a shock occurs. Therefore, these signals can be useful tools for a firm wishing to decompose compensation and performance into "intrinsic factors" and macroeconomic factors. Another advantage of using price variables like interest rates and exchange rates in the decomposition is that they adjust rapidly to both domestic and foreign conditions affecting a firm's performance. For these reason we prefer to use only price variables as proxies for macroeconomic conditions in the following.[6] Specifically, we use exchange rates, interest rates, inflation and the market return in the stock market.

It is likely that each firm's performance is sensitive to its specific set of variables but here we employ one set to explain changes in compensation across firms and time. Thus, we obtain estimates for the macroeconomic impact on compensation for the average firm. Dummy variables for firm characteristics could have been introduced in the analysis if the data set had covered a longer time period. We restrict the use of dummies to identification of industry effects on levels of compensation. In addition, we use a dummy to identify relatively export dependent firms.

The first step in the analysis of macroeconomic influences on compensation is to determine effects of macroeconomic influences controlling for variation in the performance variables Q and Sales. The latter variables will explain only a part of changes in compensation if corporate boards use varying criteria to determine compensation. The following random effects model is estimated:

[6] An alternative formulation including GDP as well as price variables was tested. The explanatory value of this formulation including GDP was much lower than the present formulation. This result supports the idea that price variables serve as useful signals of macroeconomic conditions.

$$
\begin{aligned}
&Log(Compensation_{i,t}) = \alpha_0 + \alpha_1 Log(Sales_{i,t}) + \alpha_2 Log(Tobin's\ Q_{i,t}) \\
&+ \alpha_3 Log(1 + Anticipated\ interest\ rate_{i,t}) \\
&+ \alpha_4 Log(1 + Unticipated\ interest\ rate_{i,t}) \\
&+ \alpha_5 Log(1 + \Delta Anticipated\ exchange\ rate_{i,t}) \\
&+ \alpha_6 Log(1 + \Delta Unticipated\ exchange\ rate_{i,t}) \\
&+ \alpha_7 Log(1 + Anticipated\ \Delta CPI_{i,t}) + \alpha_8 Log(1 + Unanticipated\ \Delta CPI_{i,t}) \\
&+ \alpha_9 Log(exchange\ rate_{i,t-1}) \\
&+ \sum_{i=10}^{15} \alpha_i Industry\ dummies_i + u_i + \varepsilon_{i,t}
\end{aligned}
$$

(2a)

All variables are defined in log levels. The macro variables are the Swedish one year interest rate, the exchange rate (SEK/USD) and the Swedish consumer price index (CPI). The stock market index has been removed from the equation. It does not add explanatory value to the interest rate. Table 7 shows that the correlation between the market index and the interest rate is 0.88.

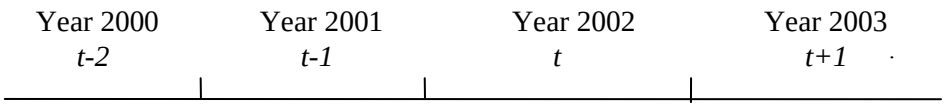
(Insert Table 7 Here)

Since compensation may be affected to different degrees by anticipated and unanticipated levels and changes in the macro-variables, we distinguish between the anticipated levels of the interest rate and the exchange rate, and the unanticipated changes in these variables from the previous year.

The anticipated exchange rate level in period *t* is further divided into the level last period and the anticipated change from last year. Thereby, the exchange rate can influence compensation in three ways; the level from the previous period, the anticipated change from previous period and the unanticipated change.

We assume that compensation is potentially influenced by inflation rather than the price level. Since Sales are in nominal values the price level is accounted for in this variable. Inflation is also divided into an anticipated and an unanticipated component.

Before discussing the results in Table 8 it is important to clarify how anticipated and unanticipated changes in the macro variables have been constructed. The following time line illustrates the average yearly observations of interest rates, exchange rates, and consumer prices. On the time line period *t* is 2002.



The expected interest rate in the next period is equal to the current interest rate. Thus, all interest rate changes from year to year are assumed to be unanticipated.

$$Anticipated\ interest\ rate_t = i_{t-1}$$

$$Unanticipated\ interest\ rate_t = i_t - i_{t-1}$$

The return on the 1-year Government bond is used as the interest rate. The expected exchange rate change over the next year is reflected in the current one-year interest rate differential (uncovered interest rate parity). Thus,

$$Anticipated\ \Delta exchangerate_t = i^{SEK}{}_{t-1} - i^{USD}{}_{t-1}$$

$$Unanticipated\ \Delta exchangerate_t = \left[(SEK/USD)_t - (SEK/USD)_{t-1}\right] - \left[i^{SEK}{}_{t-1} - i^{USD}{}_{t-1}\right]$$

The exchange rate is SEK/US Dollars. All the changes are in percent. The expected inflation over the next year is equal to the inflation last year. Thus,

$$Anticipated\ \Delta inflation_t = cpi_{t-1} - cpi_{t-2}$$

$$Unanticipated\ \Delta inflation_t = \left[cpi_t - cpi_{t-1}\right] - \left[cpi_{t-1} - cpi_{t-2}\right]$$

Estimating equation 2a we find that the unanticipated interest rate and the anticipated inflation rate, as specified above, are insignificant and, therefore, dropped. The following specification is estimated. The result is presented in Table 8, Model 1.

$$
\begin{aligned}
&Log(Compensation_{i,t}) = \alpha_0 + \alpha_1 Log(Sales_{i,t}) + \alpha_2 Log(Tobin's\ Q_{i,t}) \\
&+ \alpha_3 Log(1 + Anticipated\ interest\ rate_{i,t}) \\
&+ \alpha_4 Log(1 + \Delta Anticipated\ exchange\ rate_{i,t}) \\
&+ \alpha_5 Log(1 + \Delta Unticipated\ exchange\ rate_{i,t}) \\
&+ \alpha_6 Log(1 + Unanticipated\ \Delta CPI_{i,t}) \\
&+ \alpha_7 Log(exchange\ rate_{i,t-1}) \\
&+ \sum_{i=8}^{13} \alpha_i Industry\ dummies_i + u_i + \varepsilon_{i,t}
\end{aligned}
\qquad (2b)
$$

The correlation between the anticipated and the unanticipated exchange rate changes is -0.74 as shown in Table 7 and the estimated effect of the former is very small in Model 1. For this reason we include the total exchange rate change in Model 2 in Table 8 and the remainder of the paper.

(Insert Table 8 Here)

Sales and Tobin's Q are significant in all the models in Table 8 and their coefficients are insensitive to the specification.[7] In comparison with Tables 3 and 4 the coefficient for Tobin's Q, in particular, is substantially smaller as a result of correlation between this variable and macroeconomic factors. Thus, it seems that macroeconomic influences occur through Q and Sales, as well as through other channels. CEO compensation changes by about 2.30% for each 10% change in firm size, and it changes about 1% for each 10% change in firm performance as measured by Q. The former finding is consistent with some findings from the US markets. Bebchuk and Grinstein (2005) find in a US sample for the period 1993-2003 that a 10% change in the firm size results in a 2.14% change in CEO compensation. They also find

[7] The robustness of the random effects model, Model 4, is further tested by using two alternative specifications, i.e. pooled linear regression model or fixed effects model. The random effects exist based on the Breusch and Pagan Lagrangian Multiplier test ($\chi^2(1)$ =1049.11, Prob > χ^2 = 0.000). Furthermore, based on the Hausman test ($\chi^2(5)$ =11.57, Prob > χ^2 = 0.024), the random effects model is rejected at 5% level of significance, but it cannot be rejected at 1% level of significance. In addition, in order to detect multicollinearity among all the factors, the variance inflation factors (VIF) are estimated by using the pooled regression. The average VIF is 2.67, and the individual VIF is within the range 1.36-4.74. Therefore, multicolinearity does not seem to be a problem in the final model.

that a 10% change in performance leads to a 2.11% change in compensation. Our results before controlling for macroeconomic factors in Table 4 are consistent with these figures, but when we control for macroeconomic factors the compensation effect of a change in Tobin's Q in Table 8 is less than a third of the effect in Table 5.[8] This result indicates that Q also depends on macroeconomic factors. We return to this issue.

The anticipated (lagged) interest rate is strongly significant, negative and almost the same in the four specifications. A one percentage point increase in the interest rate leads to a five percent decline in compensation. Since we control for inflation the interest rate can be considered real.

The lagged level of the exchange rate is significant in the four models with a negative coefficient indicating that a weaker SEK is associated with a decline in compensation. The unanticipated exchange rate change during the last year has an even stronger negative effect. The coefficients for the total exchange rate change in Models 2-4 are almost the same. A one percent depreciation of the SEK leads to a 0.7 percent decline in compensation. The negative coefficient may seem surprising but it must be remembered that the coefficients include not only the direct effects of the macro-economic price variables but the also the effects of underlying shocks causing the changes in the exchange rate and the other macro variables. For example, a depreciating exchange rate is often the result of a weak macro economy with negative effects on performance and compensation.

In Model 3 the interaction between the exchange rate change and the export dummy is insignificant. Therefore only the export dummy is kept in the final Model 4.[9]

We turn now to the impact of macroeconomic factors on the performance measures, Sales and Q, which systematically affect compensation. We regress these two performance variables on the set of macroeconomic and dummy variables used in Model 4 in Table 8. In addition, Log (Tobin's Q) is an independent variable in the regression for log Sales and vice versa.

Table 9 shows that Sales has a small but significant negative effect on Q when controlling for macroeconomic factors. This result indicates that sales generally are higher than what value maximization would call for. As expected Tobin's Q does not affect Sales.

[8] Test for simultaneity between performance and compensation (not presented here) indicates that the results are not seriously affected by simultaneity.

[9] The compensation for the CEOs in the export firms is about 20% (which is $(e^{0.18}-1)*100$) higher than in the non-export firms.

The only macroeconomic variable that significantly explains Tobin's Q and Sales is the lagged level of the exchange rate. A depreciation of the SEK leads to a decline in both variables. None of the other macroeconomic variables has a significant effect on Tobin's Q but effects on Sales cannot be ruled out although the coefficients are not significant on conventional levels. An exchange rate depreciation has a positive effect on Sales while in Table 8 a depreciation affected compensation negatively. The export dummy variable is also positive and significant indicating that the sales from export oriented firms are larger than sales from other firms.

(Insert Table 9 Here)

In the next section the above estimates of macroeconomic influences on Sales, Q-values, and on compensation at constant levels of Sales and Q will be used to decompose compensation into one component explained by macroeconomic factors and one component explained by "intrinsic" factors.

5. Filtering out macroeconomic influences on compensation

How would compensation have developed if the impact on compensation of macro-economic factors would have been filtered out? Table 10a shows the impact on compensation of the total change in the macro variables for the period 2001-2007, while Table 10b displays the impact of unanticipated changes in macro variables.

In each of the tables 10a and10b column (1) shows the percent of salary plus bonus caused by macroeconomic variables each year at constant levels of Q and Sales. In 10a the column shows the effects of total changes in macroeconomic variables while in 10b the effects of unanticipated changes are presented. Columns (2) and (3) show the percent of changes in Q and Sales explained by the same variables. Column (4) presents the sum of the effects in columns (1)-(3) using the coefficients in Table 8 Model 4 as weights. Thus, column (4) shows the percent change in salary plus bonus each year explained by macroeconomic. In columns (5) and (6) we show the macroeconomic effects as percent of bonus payments only.

Macroeconomic effects are calculated based on deviations from mean levels of the macro variables during the period times the coefficients in Table 8, Model 5. The procedure for calculating macroeconomic effects on Q and Sales is the same, but the coefficients are obtained from Table 9. The mean levels of unanticipated changes are zero. The effects of changes in the exchange rate do not include effects of changes in the lagged level of the

exchange rate.

Column (4) in Table 10a reveals that the macroeconomic factors through all three channels had a large negative effect on compensation in 2001 (-11.3 percent). The macroeconomic factors had an increasingly positive effect on compensation each year through 2006 when macroeconomic factors added nearly 12 percent to compensation. In 2007 macroeconomic factors added 11 percent to compensation. The average share of compensation explained by macroeconomic factors is around three and a half percent. This small average effect is the result of our assumption that macroeconomic effects occur when the variables deviate from their mean values.

Another way to look at these figures is to calculate how compensation would have changed in a stable and average macroeconomic environment. Applying the results in Table 10a on the index figures for salary plus bonus in Table 1, the compensation adjusted for macroeconomic factors in 2001 would have been higher at index 113 (100/(1-0.113) while the compensation in 2006 would have been lower at index 135 (151/1.118). In 2007 the adjusted compensation would have been at index 143 (158/1.108). In other words, in a stable macroeconomic environment the compensation would have increased by 19 percent (from index 113 to index 135) through 2006 and then increased in 2007 to a level 27 percent above 2001. Instead we have observed a 58 percent increase in compensation.

The total macro effects in column (4) are dominated by the independent effects in column (1) although the macro effects on both Q and Sales are substantial.

The total macroeconomic effects each year as percent of bonus payments only are presented in columns (6). Since bonus is only a fraction of total compensation, increasing from 21 percent to 45 percent of salary plus bonus, the macroeconomic effects here are much larger. Table 10a shows that in 2007 macroeconomic factors contributed to compensation an amount equal to 33 percent of the bonus payments.

(Insert Table 10a, 10b Here)

The contributions of unanticipated macroeconomic effects are shown in Table 10b for the period 2001-2007. The unanticipated changes in macro variables include effects of exchange rate changes and inflation under the assumption that all exchange rate changes are unanticipated.

The contribution of unanticipated macroeconomic factors to compensation is smaller than the total effects in the previous table. The time pattern is also very different. Table 10b

Column (4) shows that the largest positive impact of unanticipated macro factors on compensation occurred in 2003 (+10.8 percent). The lowest effect occurred in the year 2001 (-3.5 percent). Clearly, it would make a substantial difference whether compensation levels would be adjusted for total macroeconomic influences or only unanticipated influences.

The unanticipated macroeconomic effects on compensation are quite large relative to bonus payments some years as shown in column (6). In 2003 the compensation due to unanticipated macroeconomic effects amounted to 63 percent of the bonus payments.

6. Asymmetric macroeconomic effects

Since the macroeconomic effects could be asymmetric, Model 4 in Table 8 is re-estimated by including interaction terms capturing up or down periods. We define one dummy variable for each of the independent variables. Thereby, we analyze whether different sources of changes in performance have different asymmetric effects on compensation. In this case there is a Q dummy, a Sales dummy, an anticipated interest rate dummy, an exchange rate change dummy and an unanticipated inflation dummy.[10] The dummy for the particular variable takes the value one when the variable is increasing relative to the previous year. The sample period is 2002-2007 since the year 2001 is lost in the creation of dummies for change. Table 11 shows the estimated parameters after dropping the change in the exchange rate. This variable and its interaction term turn out to be far from significant when asymmetries are introduced. The remaining macro factors with asymmetry dummies in Table 11 are the anticipated interest rate and unanticipated inflation.

(Insert Table 11 Here)

The F-test for joint significance of the interaction terms for the exchange rate, unanticipated inflation plus Q and sales is $\chi^2 = 8.22$ (p-value 0.0839). Thus the symmetric model is rejected at the 10% significant level. In Table 11 the interactive terms with asymmetry dummies for Sales and Q turn out to be significant and positive. The coefficients without interaction terms in Table 11 show the effects of falling values of the variables. The effect of a rising value for

[10] An alternative way to test for asymmetry is to use the same dummy for all the variables. In this case the interactive 0/1 dummy for all variables is set to one in years when the performance variable Q increases. Using this approach the interaction terms were not significant and the test for asymmetry effects of all variables on compensation did not reveal significant asymmetry. The result of this test is not shown.

each variable is obtained as the sum of the two coefficients for the variable. Thus, the coefficient for a decline in Sales is 0.211 while the coefficient for an increase is 0.215 (0.211 + 0.004). In spite of the significant coefficient this asymmetry seems to be negligible. The corresponding coefficients for Q are 0.049 and 1.04 (0.049 + 0.055) Thus, an increase in Q increases compensation twice as much as a decrease reduces compensation.

Turning to the asymmetric effects of the macroeconomic variables in addition to effects through Q and Sales, we can observe that the coefficient for the interactive asymmetry dummy for the interest rate is insignificant and negligible. The coefficient for a decline in inflation is 4.4 while the coefficient for an increase in inflation is as large as 15.8 although the large coefficient (11.5) for the interactive term is not significant.[11] We conclude that significant asymmetric effects of macroeconomic variables occur primarily through effects on Tobin's Q.

Fluctuations in Q depend primarily on fluctuations in the firms share price which in turn depends on macroeconomic factors. The asymmetry of changes in compensation to changes in Q can be explained by bonus payments being linked to firms' share prices. As noted in Tables 9 and 10 changes in bonus payments depend strongly on macroeconomic factors.

Another implication of the asymmetry result is that CEOs' incentives to manage firms' macroeconomic exposure is weakened by the likelihood that improved macroeconomic conditions lead to larger bonus payments while the "penalty" for worse macroeconomic conditions is relatively small.

7. Conclusions

The "optimal" CEO compensation contract in terms of sensitivity and asymmetry to macroeconomic factors from shareholders point of view depends on a number of firm-specific factors in addition to ability to forecast macroeconomic developments and risk-aversion of managers. Firms differ with respect to adjustability of structure, capacity and operations, and they differ in terms of their sensitivity to macroeconomic fluctuations. Thus, although macroeconomic fluctuations are beyond management's control their impact on performance may not be the result of luck alone. If management cannot do much to benefit from positive macroeconomic developments or to dampen the effects of negative developments contract theory suggest that management should not be rewarded (penalized) for performance it cannot

[11] The F-test for joint significance of the interaction terms for the anticipated interest rate and unanticipated inflation is $\chi^2 = 0.095$ with the p-value=0.6213.

influence. This argument presumes that it does not lie in the shareholders interest to induce management to reduce exposure to macroeconomic fluctuations.

No matter how the optimal incentive contract looks there is little doubt that macroeconomic fluctuations have a powerful impact on CEOs' compensation in Sweden on the average in spite of the fact that the variable part of compensation is lower than elsewhere (Fernandes et al., 2008).

Analysis of the dependence of a particular firm's performance and CEO-compensation on macroeconomic conditions requires data for performance, compensation, and relevant macroeconomic data for a substantial period. Lacking such data we were restricted to analyze macroeconomic influences on CEO compensation in 127 Swedish firms for the period 2001-2007 using the same set of macroeconomic factors for all firms. Using pooled data we identified the average impact of macroeconomic factors on Swedish firms. Industry level analysis is also constrained by an insufficient number of firms within each industry.

One set of macroeconomic variables was used in the decomposition for all firms. Thereby, the macroeconomic influences on performance in many firms could be underestimated, since the appropriate set of variables is likely to be firm-specific.

Three channels of macroeconomic influences on compensation were identified. Macroeconomic factors affect sales and Q-values, and they affect compensation through other variables that affect compensation in a less systematic way than sales and Q. The macroeconomic factors we identified as important for the aggregate performance and compensation in the Swedish firms were the exchange rate, the interest rate and the inflation rate. These macroeconomic price variables can be viewed as signals of underlying macroeconomic shocks. As such, they are easily observable and useful for decomposing performance and compensation into an "intrinsic" component and a macroeconomic component.

After estimation of the sensitivities of performance variables and compensation to the macroeconomic factors we used the coefficients in combination with macroeconomic developments each year to calculate how compensation would have developed had macroeconomic influences been filtered out each of the years 2001 through 2007. The calculations showed that in a neutral and stable macroeconomic environment compensation would have increased by 27 percent rather than by the observed 58 percent. Thus, if compensation had been based on intrinsic factors alone CEO compensation would have increased by less than half of the actual increase.

Unanticipated macroeconomic factors explain a smaller part of compensation. In 2003 and 2007 these factors increased compensation by 11 and 8 percent while in 2005 the same factors reduced compensation by almost 2 percent. As percent of bonus payments the largest effect of unanticipated factors amounting to 55 percent occurred in 2002

The analysis of asymmetric effects on compensation of positive and negative changes in performance and macroeconomic variables indicated that the effect of an increase in Q is twice as large as the effect of a decrease in Q. This result supports the findings of Garvey and Milbourn (2006) and may explain the mechanism behind their findings. Asymmetric effects of macroeconomic variables appear to take place primarily through changes in Q. The asymmetric effects of increases and decreases in sales appear to be small.

The main recommendation of this chapter for corporate remuneration policy and for regulators is to capture the "sustainable" performance worth a reward by filtering out the impact of macroeconomic factors in accordance with the approach developed above and not by waiting 3-5 years as suggested by policy-makers to see if the improved performance is still observable. In the latter case luck in one way or the other will still be present.

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Table 1 Compensation Levels: Salary and Bonus

This table displays mean, standard deviation for compensation levels (salary and bonus) *(Million SEK)*, as well as the growth index for the CEOs in 127 Swedish firms during the period 2001-2007.

	Year 2001	**Year 2002**	**Year 2003**	**Year 2004**	**Year 2005**	**Year 2006**	**Year 2007**
Panel A: Salary							
Mean	-	3.263	3.579	3.582	3.764	3.975	4.270
Std.	-	2.462	3.112	2.683	2.812	3.051	3.290
Index	-	100	110	110	115	121	130
Panel B: Bonus							
Mean	-	0.684	0.822	1.306	1.774	1.944	1.932
Std.	-	1.553	1.672	2.205	2.868	2.941	3.128
Index	-	100	120	191	259	284	283
Panel C: Salary + Bonus							
Mean	3.918	3.948	4.327	4.804	5.450	5.918	6.202
Std.	4.059	3.658	4.082	4.318	4.934	5.388	5.586
Index	100	101	111	123	139	151	158

Table 2 Compensation Levels: Salary, Bonus, Options, and Pensions

This table displays mean, standard deviation for compensation levels (salary, bonus, options, and pensions) *(Million SEK)*, as well as the growth index for the CEOs in 127 Swedish firms during the period 2004-2007.

	Year 2004	**Year 2005**	**Year 2006**	**Year 2007**
Panel A: Salary				
Mean	3.582	3.764	3.975	4.270
Std.	2.683	2.812	3.051	3.290
Index	100	105	111	119
Panel B: Bonus				
Mean	1.306	1.774	1.944	1.932
Std.	2.205	2.868	2.941	3.128
Index	100	136	149	148
Panel C: Options				
Mean	0.094	0.432	0.272	0.782
Std.	0.456	3.036	0.882	3.292
Index	100	462	290	825
Panel D: Pensions				
Mean	1.707	2.020	1.780	1.861
Std.	2.368	2.921	3.053	2.617
Index	100	118	104	109
Panel E: Salary + Bonus				
Mean	4.804	5.450	5.919	6.202
Std.	4.318	4.934	5.388	5.586
Index	100	113	123	129
Panel F: Salary + Bonus + Options				
Mean	4.952	5.922	5.821	6.710
Std.	4.313	6.853	5.119	7.177
Index	100	120	118	136
Panel G: Salary + Bonus + Options + Pensions				
Mean	6.646	7.380	7.672	8.655
Std.	6.023	6.452	7.160	8.661
Index	100	111	115	130

Table 3 Pooled and Cross-Sectional Regressions without Macro Variables

This table reports the parameter estimations from both pooled and cross-sectional regressions from equation (1). The dependent variable is Log (Compensation). The industries are: 1) consumer goods, 2) information technology, 3) financials, 4) health care, 5) industrials, 6) others, and 7) materials. The dummy 7 is dropped in the model.

	Year 2001-2007	**Year 2001**	**Year 2002**	**Year 2003**	**Year 2004**	**Year 2005**	**Year 2006**	**Year 2007**
Log (Sales)	0.277***	0.293***	0.266***	0.235***	0.290***	0.300***	0.275***	0.285***
	(29.21)	(12.43)	(11.92)	(9.74)	(11.88)	(11.66)	(9.67)	(9.78)
Log (Tobin's Q)	0.236***	0.094	0.070	0.205***	0.286***	0.309***	0.277***	0.202***
	(7.28)	(1.17)	(0.84)	(1.98)	(2.91)	(3.29)	(2.91)	(2.20)
Industry Dummy 1	0.051	0.210	0.049	0.083	0.040	0.032	-0.036	0.094
	(0.54)	(0.86)	(0.229	(0.32)	(0.17)	(0.13)	(-0.13)	(0.33)
Industry Dummy 2	0.053	0.324	0.053	-0.047	0.060	0.072	-0.058	0.064
	(0.59)	(1.41)	(0.26)	(-0.19)	(0.26)	(0.30)	(-0.23)	(0.25)
Industry Dummy 3	0.174***	0.318	0.058	0.239	0.347	0.298	-0.052	-0.016
	(2.01)	(1.44)	(0.28)	(1.03)	(1.61)	(1.32)	(-0.20)	(-0.06)
Industry Dummy 4	0.564***	0.762***	0.552***	0.559	0.437	0.587***	0.641**	0.673***
	(4.98)	(2.65)	(2.10)	(1.78)*	(1.53)	(1.99)	(1.91)	(2.03)
Industry Dummy 5	0.125	0.265	0.091	0.090	0.094	0.035	0.156	0.229
	(1.52)	(1.26)	(0.48)	(0.41)	(0.45)	(0.16)	(0.65)	(0.94)
Industry Dummy 6	0.425***	0.425	0.324	0.342	0.312	0.482	0.544	0.554
	(3.02)	(1.21)	(0.98)	(0.90)	(0.88)	(1.30)	(1.33)	(1.35)
Constant	10.743***	10.221***	10.910***	11.372***	10.514***	10.425***	10.887***	10.787***
	(63.41)	(24.26)	(27.74)	(26.33)	(24.23)	(22.62)	(21.29)	(20.74)
Observations	846	122	127	127	127	127	111	109
Adjusted R^2	55%	60%	58%	48%	56%	54%	52%	53%

1. *t*-values are in round parentheses.
2. *, **, *** denotes significance at the 0.10, 0.05 and 0.01 level or better.

Table 4 Pooled Regression using Salary plus Bonus, or Salary plus Bonus plus Options, or Salary plus Bonus plus Options plus Pensions as Dependent Variable

This table reports the parameter estimations from three pooled models to identify compensations. The dependent variable is Log (Salary + Bonus), Log (Salary + Bonus + Options), or Log (Salary + Bonus + Options + Pensions). The industries are: 1) consumer goods, 2) information technology, 3) financials, 4) health care, 5) industrials, 6) others, and 7) materials. The industry dummy variable 7 is dropped in the models. The time period is 2004-2007.

	Log (Salary + Bonus)	**Log (Salary + Bonus + Options)**	**Log (Salary + Bonus + Options + Pensions)**
Log (Sales)	0.279***	0.287***	0.309***
	(21.63)	(21.34)	(23.43)
Log (Tobin's Q)	0.246***	0.270***	0.275***
	(5.70)	(5.99)	(6.22)
Industry Dummy 1	0.001	0.011	-0.030
	(0.01)	(0.08)	(-0.24)
Industry Dummy 2	0.057	0.060	-0.037
	(0.50)	(0.50)	(-0.32)
Industry Dummy 3	0.125	0.163	0.033
	(1.11)	(1.39)	(0.29)
Industry Dummy 4	0.629***	0.632***	0.530***
	(3.94)	(3.81)	(3.25)
Industry Dummy 5	0.127	0.138	0.027
	(1.20)	(1.25)	(0.25)
Industry Dummy 6	0.451***	0.468***	0.348**
	(2.53)	(2.52)	(1.91)
Constant	10.802***	10.682***	10.709***
	(47.16)	(44.74)	(45.72)
Observations	438	438	438
Adjusted R^2	57%	56%	61%

1. *t*-values are in round parentheses.
2. *, **, *** denotes significance at the 0.10, 0.05 and 0.01 level or better.

Table 5 Random Effects Model with Industry or Industry and Time Dummy Variables

This table reports the parameter estimations from two random effects models for the period 2001-2007. The dependent variable is Log (Compensation). In the first model the industry dummies are used, while in the second model both industry and time dummies are used. The industries are: 1) consumer goods, 2) information technology, 3) financials, 4) health care, 5) industrials, 6) others, and 7) materials. The time dummies are the years 2001-2007. The industry dummy variable 7 is dropped in the first model, while the industry dummy variable 7 and time dummy variable for the year 2001 are dropped in the second model.

	Model 1	**Model 2**
Log (Sales)	0.260***	0.233***
	(15.28)	(13.34)
Log (Tobin's Q)	0.189***	0.083***
	(6.19)	(2.55)
Industry Dummy 1	0.121	0.120
	(0.62)	(0.61)
Industry Dummy 2	-0.006	0.002
	(-0.03)	(0.01)
Industry Dummy 3	0.185	0.186
	(1.03)	(1.02)
Industry Dummy 4	0.524***	0.556**
	(2.21)	(2.30)
Industry Dummy 5	0.125	0.141
	(0.71)	(0.79)
Industry Dummy 6	0.406	0.374
	(1.31)	(1.18)
Year Dummy 2002	-	0.082***
		(2.06)
Year Dummy 2003	-	0.172***
		(4.44)
Year Dummy 2004	-	0.219***
		(5.63)
Year Dummy 2005	-	0.300***
		(7.64)
Year Dummy 2006	-	0.319***
		(7.73)
Year Dummy 2007		0.360***
		(8.87)
Constant	11.027***	11.270***
	(33.98)	(34.66)
Observations	846	846
Log likelihood-ratio test	-418.44***	-364.90***
	[0.000]	[0.000]

1. *t*-values are in round parentheses, and *p*-values are in square parentheses.
2. *, **, *** denotes significance at the 0.10, 0.05 and 0.01 level or better.

Table 6 Random Effects Model using Salary, Bonus or Salary plus Bonus as Dependent Variable

This table reports the parameter estimations from three random effects models. The dependent variable is Log (Salary), Log (Bonus), or Log (Salary plus Bonus). The industries are: 1) consumer goods, 2) information technology, 3) financials, 4) health care, 5) industrials, 6) others, and 7) materials. The industry dummy variable 7 is dropped in the models. The time period is 2002-2005. The regressions are based on the sample that firm pays bonus for the year.

	Log (Salary)	**Log (Bonus)**	**Log (Salary plus Bonus)**
Log (Sales)	0.239***	0.352***	0.286***
	(4.81)	(8.84)	(15.06)
Log (Tobin's Q)	0.005	0.623***	0.162***
	(0.14)	(6.31)	(4.40)
Industry Dummy 1	0.185	0.031	0.168
	(1.14)	(0.08)	(0.88)
Industry Dummy 2	0.115	0.322	0.242
	(0.74)	(0.88)	(1.32)
Industry Dummy 3	0.175	1.185***	0.492***
	(1.13)	(3.22)	(2.65)
Industry Dummy 4	0.690***	1.094***	0.890***
	(3.28)	(2.21)	(3.54)
Industry Dummy 5	0.093	0.386	0.190
	(0.64)	(1.13)	(1.10)
Industry Dummy 6	0.429*	0.706	0.529**
	(1.78)	(1.24)	(1.84)
Constant	11.245	7.651***	10.670***
	(38.76)	(10.77)	(31.20)
Observations	456	456	456
Log likelihood-ratio test	-117.37*** [0.000]	-622.68*** [0.000]	-157.82 *** [0.000]

1. *t*-values are in round parentheses, and *p*-values are in square parentheses.
2. *, **, *** denotes significance at the 0.10, 0.05 and 0.01 level or better.

Table 7 Correlations

This table reports the correlation coefficients of all the variables. The time period is 2001-2007.

	Log (Salary and Bonus)	**Log (Sales)**	**Log (Q)**	**Log (1+Marke return)**	**Log (1+Anti. int. rate)**	**Log (1+Unati. int. rate)**	**Log (1+Anti. Δex. rate)**	**Log (1+Unanti. Δex. rate)**	**Log (1+Anti. ΔCPI)**	**Log (1+Unanti. ΔCPI)**
Log (Salary and Bonus)	1									
Log (Sales)	0.7046	1								
Log (Tobin's Q)	0.0629	-0.1845	1							
Log (1+Market return)	0.1782	0.0425	0.2106	1						
Log (1+Anti. interest rate)	-0.1791	-0.0524	-0.2031	-0.8878	1					
Log (1+Unanti. interest rate)	0.1057	0.0489	0.0248	0.2539	-0.5223	1				
Log (1+Anti. Δexchange rate)	-0.0517	-0.0421	-0.0572	0.0361	0.2512	-0.7383	1			
Log (1+Unanti. Δexchange rate)	-0.0137	0.0252	0.0561	-0.1854	-0.1024	0.2449	-0.7339	1		
Log (1+Anti. ΔCPI)	-0.1056	-0.0429	-0.2071	-0.4207	0.6399	-0.2803	0.5952	-0.6984	1	
Log (1+Unanti. ΔCPI)	0.0091	0.0222	0.0331	-0.2990	0.0176	0.4451	-0.8655	0.6674	-0.5689	1

Table 8 Random Effects Model with Firm Specific Factors and Interest Rate, Exchange Rate and Inflation as Macroeconomic Factors

This table reports the parameter estimations from four random effects models. The dependent variable is Log (Compensation). The industry dummy variables are included in all the models but not reported her. The time period is 2001-2007.

	Model 1	**Model 2**	**Model 3**	**Model 4**
Log (Sales)	0.234***	0.234***	0.226***	0.226***
	(13.43)	(13.42)	(12.67)	(12.68)
Log (Tobin's Q)	0.072***	0.075***	0.075***	0.075***
	(2.27)	(2.37)	(2.37)	(2.37)
Log (1+Anti. interest rate)	-5.495**	-5.222**	-5.295**	-5.293**
	(-2.19)	(-2.14)	(-2.18)	(-2.17)
Log (1+Anti. Δexchange rate)	-0.009	-	-	-
	(-0.01)	-	-	-
Log (1+UnAnti. Δexchange rate)	-0.681***	-	-	-
	(-4.51)			
Log (1+Δexchange rate)	-	-0.703***	-0.660***	-0.703***
		(-4.89)	(-3.57)	(-4.89)
Log (1+Unanti. ΔCPI)	3.482	2.483**	2.508**	2.507**
	(1.34)	(1.76)	(1.77)	(1.77)
Log (Exchange rate (t-1))	-0.547***	-0.540***	-0.542***	-0.542
	(-3.18)	(-3.15)	(-3.17)	(-3.17)
Export Dummy	-	-	0.179**	0.182**
			(1.91)	(1.95)
Export Dummy × Log (1+Δexchange rate)	-	-	-0.821	
			(-0.36)	
Constant	12.776***	12.757***	12.737***	12.735**
	(27.77)	(27.83)	(27.97)	(27.97)
Observations	846	846	846	846
Log likelihood-ratio test	-366.05*** [0.000]	-366.16*** [0.000]	-364.20*** [0.000]	-364.27*** [0.000]

1. *t*-values are in round parentheses, and *p*-values are in square parentheses.
2. *, **, *** denotes significance at the 0.10, 0.05 and 0.01 level or better.

Table 9 Random Effects Model with Tobin's Q or Sales as Depended Variable and Interest Rate, Exchange Rate and Inflation as Macroeconomic Factors

This table reports the parameter estimations from two random effects models. The industry dummy variables are included in both models but not reported her. The time period is 2002-2007.

	Q Equation	**Sales Equation**
Log (Sales)	-0.031*	-
	-(1.70)	
Log (Tobin's Q)	-	-0.044
		(-1.04)
Log (1+Anti. interest rate)	-1.096	-3.725
	-(0.40)	(-1.20)
Log (1+Δexchange rate)	0.064	0.204
	(0.40)	(1.11)
Log (1+Unanti. ΔCPI)	0.405	2.316
	(0.26)	(1.28)
Log (Exchange rate (t-1))	-1.063***	-0.624***
	-(5.69)	(-2.85)
Export Dummy	0.036	1.402***
	(0.38)	(3.88)
Constant	2.967***	16.231***
	(6.31)	(19.15)
Observations	846	846
Log likelihood-ratio test	-441.32***	-722.50***
	[0.000]	[0.000]

1. *t*-values are in round parentheses, and *p*-values are in square parentheses.
2. *, **, *** denotes significance at the 0.10, 0.05 and 0.01 level or better.

Table 10a Contribution of the Anticipated and Unanticipated Macroeconomic Factors to Compensation (Interest Rate, Exchange Rate, and Inflation)

This table reports the predicted anticipated and unanticipated macro effects in different years as well as the whole period 2001-2007 using Model 4 in Table 8, and the models in Table 9. The macroeconomic factors are risk free return, exchange rate, and inflation. In the column (4) and column (6), w_1 and w_2 are the coefficients for the variables Log (Tobin's Q), and Log (Sales) in Table 8, Model 4.

Year	Macro Effects in the Compensation Equation; Salary plus Bonus, given Q and Sales	Macro Effects in the Q Equation	Macro Effects in the Sales Equation	Total Macro Effects to Salary and Bonus (1)+w_1×(2)+w_2×(3)	Macro Effects in the Compensation Equation to the Bonus Only	Total Macro Effects to the Bonus Only (5)+w_1×(2)+w_2×(3)
	(1)	(2)	(3)	(4)	(5)	(6)
2001	-11.61%	0.04%	1.30%	-11.31%	-	-
2002	1.09%	-1.38%	-4.95%	-0.13%	6.31%	5.09%
2003	7.26%	-2.40%	-8.35%	5.19%	38.88%	36.81%
2004	3.96%	-0.96%	-4.70%	2.83%	14.84%	13.70%
2005	3.11%	1.23%	4.16%	4.15%	9.72%	10.76%
2006	10.47%	3.78%	4.57%	11.78%	31.87%	33.19%
2007	9.98%	1.09%	3.46%	10.84%	32.03%	32.90%
Average	3.47%	0.20%	-0.64%	3.35%	22.28%	22.07%

Table 10b Contribution of the Unanticipated Macroeconomic Factors to Compensation (Exchange Rate, and Inflation)

This table reports the predicted unanticipated macro effects in different years as well as the whole period 2001-2007 using Model 4 in Table 8, and the Models in Table 9. The macroeconomic factors are risk free return, exchange rate, and inflation. In the columns (4) and (6), w_1 and w_2 are the coefficients estimated from Model 4 in Table 8 for the variable Log (Tobin's Q) and Log (Sales), respectively.

Year	Unanticipated Macro Effects in the Compensation Equation; Salary plus Bonus, given Q and Sales	Unanticipated Macro Effects in the Q Equation	Unanticipated Macro Effects in the Sales Equation	Total Unanticipated Macro Effects to the Salary and Bonus (1)+w_1×(2)+w_2×(3)	Unanticipated Macro Effects in the Compensation Equation to the Bonus Only	Total Unanticipated Macro Effects to the Bonus Only (5)+w_1×(2)+w_2×(3)
	(1)	(2)	(3)	(4)	(5)	(6)
2001	-4.83%	1.33%	5.56%	-3.48%	-	-
2002	4.65%	-0.62%	-2.28%	4.09%	26.85%	26.29%
2003	11.94%	-1.31%	-4.48%	10.83%	63.91%	62.80%
2004	2.67%	-1.24%	-5.69%	1.29%	9.98%	8.60%
2005	-1.82%	0.21%	0.74%	-1.64%	-5.70%	-5.51%
2006	4.15%	2.31%	-0.48%	4.22%	12.64%	12.71%
2007	7.72%	0.58%	1.77%	8.17%	24.79%	25.24%
Average	3.50%	0.18%	-0.69%	3.35%	22.08%	21.69%

Table 11 Test for the Asymmetric Macroeconomic Effects

This table reports the parameter estimations from the random effects model testing for the asymmetric macroeconomic effects. The dependent variable is Log (Compensation). The industry dummy variables are included in the model but not reported her. The time period is 2002-2007.

	Model
Log (Sales)	0.211***
	(8.64)
Log (Tobin's Q)	0.049
	(1.15)
Log (1+Anti. interest rate)	14.637
	(0.61)
Log (1+Unanti. ΔCPI)	4.366
	(1.36)
Log (Exchange rate (t-1))	-1.158
	(-1.16)
Sales Dummy × Log (Sales)	0.004*
	(1.82)
Q Dummy × Log (Tobin's Q)	0.055**
	(1.95)
Anti. Interest Rate Dummy × Log (1+Anti. interest rate)	-0.662
	(-0.22)
Unanti. Inflation Dummy × Log (1+Unanti. ΔCPI)	11.475
	(0.72)
Export Dummy	0.216**
	(1.98)
Constant	13.625***
	(9.69)
Observations	719
Wald test	-377.29*** [0.000]

1. *t*-values are in round parentheses, and *p*-values are in square parentheses.
2. *, **, *** denotes significance at the 0.10, 0.05 and 0.01 level or better.