THE USE OF OBJECTIVE AND SUBJECTIVE MEASURES; IMPLICATIONS FOR INCENTIVE SYSTEM DESIGN

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Abstract

This study examines the question, is the use of subjective measures an *ex post* adjustment of objective measures to take into account three types of risk: target difficulty (after controlling for budget loss), shared risk (after controlling for business unit strategy) and downside risk? We examine this question using data from a sample of 522 managers and professionals in period 0 (and 434 in period 1) from a large Australasian corporation over a two year period. Period 0 is a pre shock period and period 1 is a post shock period. We find that for the overall two years that the subjective is an upward adjustment to the objective to take into account: (1) target difficulty, the spread between upper limit and lower limit of unit performance; (2) shared risk, that is organizational interdependencies; and (3) downside risk, which is the opportunity loss function that the employees faced in not meeting the maximum bonus allowed.

However, in examining the pre shock period and post shock period, the results indicate that the subjective evaluation has been used differently for each period for two type of risk (target difficulty, shared risk). (1) With regard to target difficulty for the pre shock period, the subjective makes an upward adjustment to the objective; but for the post shock, the subjective makes a downward adjustment. One plausible explanation is that during the post shock, quite a few managers and professionals were already on the maximum of the objective measures (given that there may have been gamesmanship at setting targets and upper limits for an anticipated poor economic period). Therefore, the subjective can be a downward adjustment to reflect this gamesmanship. (2) In regard to shared risk (the percentage of transfer revenues), for the pre shock period the subjective was a downward adjustment, while for the post shock period the subjective adjustment is an upward adjustment to the objective measure. This implies that for the pre shock or times of economic stability, the subjective could be used to reduce some of the free rider challenges that face incentive systems. Conversely for the post shock period, or during times of economic instability, the subjective adjustment is to encourage resource sharing and greater coordination and communication. Overall, our results indicate that the subjective measure is used as an ex post adjustment to the objective measure. This could be in response to flaws in the objective (financial) performance measures as subjective measures as this enables other factors to be taken into account.

Key words: subjective performance evaluations, objective financial measures, incentive system, EVA®, target difficulty, shared risk, downside risk.

Introduction*

Pay for performance plans play a critical role in managing performance in organisations. There is growing evidence that the use of incentive plans is growing,[1] and the trend has been to increase the amount of pay *at risk* as a percentage of total remuneration (Heneman et al., 2002b). Despite decades of research into the design and consequences of pay-for-performance plans there has been little advice that organisations could use in terms of when certain incentive system designs have been more (or less) appropriate (Heneman et al., 2002a; Heneman et al., 2002b; Merchant, 1989; Merchant et al., 2003; Miceli and Heneman, 2002).

This paper responds to calls Gibbs, Merchant and Van der Stede (2004) for more research to examine the use of subjectivity in performance evaluations as theoretical development is at an early stage. Most prior research has focused on who would use subjective evaluations (Ittner, Larcker, and Meyer, 2003). Gibbs et al. (2004) find that subjective evaluations compliment perceived weaknesses in quantitative performance measures and provide employees with some insurance against downside risk. They also find subjectivity is related to level of interdependencies between business units, the difficulty of targets and significant consequences result in not meeting these targets, and the presence of an operating loss (Gibbs et al., 2004). Gibbs et al. (2005) also argue that the subjectivity enables superiors to use other information, not available at the time the targets were set, to evaluate performance. The argument in this paper is that subjective performance evaluations are used as an adjustment (upwards or downwards) and this is consistent with what Gibbs et al. (2004, p.412) call an "*ex post* settling up".[2]

In this paper we explore whether the subjective measure is an adjustment to the objective measure to take into account risk.[3] Adjusting for risk is an important point as Baiman (1982) argues that, "Tradeoffs have to be made between the motivational properties of the reward structure and the risk that managers have to bear and highly achievable budget targets may be the outcome of such a tradeoff" (cited in Merchant and Manzoni, 1989, p.550). We know little about the tradeoffs required. Further motivation for this study is that the use of objective performance measures have dominated incentive systems (Gibbs, 2008), despite their well known limitations. While subjective evaluations are recognised as being important (e.g., incentives, promotions, job assignment), they have received little attention in the accounting and economics literatures, partly because of the scarcity of data (Gibbs, 2008, p.334).

While theoretical research has suggested various plausible reasons for the use of subjectivity in the assignment of bonuses, empirical testing of these theories are rare (Gibbs et al., 2004). The researchers have been given access to a range of performance data including subjective measures (i.e., individual performance evaluations) and objective measures (i.e., scorecard

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[1] See Baker et al. (1988), Broadbent and Cullen (2005), Heneman, Fay and Wang (2002), Heneman et al. (2002b), Holthausen, Larcker and Sloan (1995), Lawler (2000).

[2] Gibbs et al (2004) assume that the evaluators have sufficient skill to detect manipulations. Such an assumption is for the organization under study as the evaluators were senior managers who had experience in the core activities of the business

[3] Like Gray and Cannella (1997, p.518), we define risk as the extent to which there is uncertainty about outcomes.

measures) as well as the measures for targets, and key measures of transfer revenue, actual cash bonuses paid, and the opportunity loss that managers faced as a consequence of the bonus plan. Access to this type of sensitive performance data is rare.

Secondly, given the low correlation between subjective and objective measures (see Heneman, 1986; Bommer et al., 1995), there are few studies that investigate what factors drive the gap. The role of nonfinancial performance measures has also been under-researched and "has been given short shrift in both accounting and economics" (Gibbs 2008, p.333). Jensen Murphy and Wruck (2004) would go so far as to recommend that bonus plans should include a subjective component. The theoretic expectations are developed in the following section.

This paper examines an incentive system in Sensol (called this for confidentiality reasons) that involves a scorecard-type performance measurement and incentive system that includes objective and subjective measures. Half a managers' bonus is paid based on performance to pre-agreed objective measures (with 80% based on EVA®) and the other half is based on an individual managers' performance evaluation.[4] Scorecard-type incentive systems with financial and non-financial measures have also been increasing in usage following the popularity of strategic performance measurement systems like the balanced scorecard (Kaplan and Norton, 2008). However, we know little about the use of scorecard type incentive systems (Ittner et al., 2003). The use of objective (and typically financial measures) has been attractive to designers because those measures have been closely tied to the ability of an organisation to pay a bonus payment (Heneman et al., 2002b).

The next section is the hypothesis development, followed by the method section, results, discussion of results and conclusion.

Hypothesis development

The economic rationality and agency theory argument is that goal alignment between the principal and the agent is important. The underlying assumption is that business unit and individual measures should be highly correlated, congruent and reinforcing. This view is implicit in the balanced scorecard literature. Kaplan and Norton (2006) argue that scorecard measures should cascade down the organisation through to each individual's personal scorecard. The EVA® literature recommends a similar approach through the use of what they call value drivers. However, meta-analyses by Heneman (1986) and Bommer et al. (1995) that examine the associations between subjective and objective measures covering the same activities find correlations of 0.27 and 0.39 (cited in Ittner et al., 2003). The reasons for these low correlations between objective and subjective measures warrant further examination.

The adjustment to the objective measures could be upwards or downwards. Examples of upwards adjustment to the objective measures for profit centre managers are typically for bad luck (Merchant, 1989). Reasons for this include to adjust for uncontrollable factors (Merchant, 1989) or to reduce the compensation or downside risk (Gibbs et al., 2004). Good luck is seldom adjusted for, possibly because there is no pressure to do so from profit centre

[4] The high weighting on individual performance evaluations may be uncommon. Two recent papers suggest that putting a large weight of subjective evaluation on promotions decisions is surprising (Campbell, 2008, Gibbs, 2008). This paper does not investigate the weights but rather the manner in which the subjective measure adjusts the objective measure to account for risk.

managers (Merchant, 1989), or because it might be seen as increasing the pre-agreed performance standard and this can reduce trust (Gibbs et al., 2004). A recent empirical study by Woods (2008) supports this view as 93% of the adjustments to objective measures in his sample were upward adjustments, and for measures managers perceived were incomplete, unverifiable and noisy. His findings support the assertions of Jensen et al. (2004) that subjective measures can also be used to adjust the noise in good objective measures while reducing the distortion in bad objective measures.

The following discussion identifies some of the risk factors (e.g., target difficulty, shared risk, downside risk) that may be taken into account in subjective performance evaluations and may help to explain why there have been adjustments (upwards or downwards) to the objective performance measures.

Target difficulty

Setting targets too high means that they become unachievable and employees may not be motivated to try and achieve them (Merchant and Manzoni, 1989; Gibbs et al. 2004; Matejka et al., 2005). There is debate in the literature as to how to set budget targets (e.g., calculated, negotiated) and how difficult (or easy) they should to be achieved to motivate managers to increase performance. Prior studies have found budgets tend to be set to be highly achievable 80-90% of the time and that this is important for reasons other than motivating managers such as improving the predictability of results for resource planning and financial reporting (Merchant, 1989, 1990; Merchant and Manzoni, 1989; Murphy 2001). However, there has been little research examining target setting for incentive compensation (Merchant et al., 2003; Murphy, 2001). Organisations are more likely to use subjective evaluations where managers have difficult targets and there are important consequences for not meeting the targets, or they operate in a loss situation (Gibbs et al., 2004, p.434). While Gibbs et al. (2004) relate target difficulty to the use of subjectivity, there is little known about the effects of target difficulty on subjective performance evaluations.

A common way for organizations to deal with target difficulty is to provide highly achievable targets and to set minimum and maximum levels. Merchant (1990) argues that problems with setting too easy targets that will not motivate managers can be minimized by giving managers bonuses for exceeding their budget targets. A typical incentive system sets a hurdle rate below which no bonuses are paid, and then once reached the bonus increases as performance increases until the maximum performance level is reached (Jensen, 2001, p.97). Walsh (2000, p.191) argues that usually the upper target limit is outside the "business as usual" range and he estimates the chance of achieving maximum as "statistically less than 15 in 1,000". Another interesting paper by Mandel (1969) links statistical process control to estimating budgets and this analysis also examines upper and lower control limits.

There are several reasons why the spread between minimum - target - maximum is an indicator of target difficulty. Firstly, the greater the spread around the mean (typically budget target), the greater is the difficulty to achieve the upper limit (Walsh, 2000). Another reason is that the greater the spread is a surrogate measure of the greater uncertainty in operations (see Merchant, 1990). Where there is high planning uncertainty, the distance between the "highly achievable target levels and the best-guess (or even higher) target levels is much greater than when planning uncertainty is low" (Merchant, 1990, p.48). Using minimum and maximum levels reduces the risk to managers associated with missing their budget targets, and increases the chance that they will still get some bonus. The narrower spread is indicative

of a more certain planning environment. A tight bell curve is indicative of a profit probability distribution in relatively low uncertainty environment, and the bell curve with the wider spread is indicative of a more uncertain environment (Merchant, 1990).

A third reason is that while the lower limit may be reached reasonably easily, the spread may indicate a lack of precision in controlling objective or financial indicators (Merchant, 1990, p. 48). Therefore, the spread may also be a measure of (or lack of) controllability. The level of target difficulty has important implications for performance management and control systems when managers are held accountable and rewarded for factors outside of their control (Gibbs et al., 2004).

We argue that the greater the target difficulty, the greater the upwards adjustment that the subjective measures will make, ex post, to the objective measure.

A related issue is that the spread is a measure of target difficulty is where budgeted losses are controlled for in a study. Gibbs et al. (2004) argue that the use of subjectivity is relevant when a business unit is operating in a loss situation. The loss could be caused by poor managerial decision making, bad luck resulting from uncontrollable events, or trying to turn around a poorly performing unit (Gibbs et al., 2004). They also argue that most organisations are reluctant to pay formula bonuses, even when losses are being reduced. Matejka et al. (2005) find that loss-making entities tend to set targets that are very difficult to achieve. The argument here is that target difficulty must be understood in the context of whether they budgeted to make a loss or not.

Shared risk

Interdependencies between business units impact on shared risk (i.e., common risk) of employees, that is, the risk shared by the group, rather than specific to the individual (see Frederickson, 1992). Gibbs et al. (2004) argue that when the business units are interdependent that company-wide measures are often used, and this imposes increased risk on the employee due to the adverse effects from actions of other employees (Baiman and Rajan, 1995; Bommer et al., 1995). They argue that subjective evaluations can be used to insure employees against these adverse effects. Subjective evaluations may be beneficial where there are high levels of interdependence between the business units results in noisy financial measures (e.g., result of negotiated transfer pricing, the captured customer effect) and can encourage business units to cooperate, even though this may not be reflected in the financial measures (see Gibbs et al., 2004). To develop the cooperation aspect even further, the subjective measures could be seen as an upward adjustment of the objective measure to encourage cooperation. As Fisher et al. (2003, p.52) state, "Organizing production in teams also can result in benefits due to improved coordination of information, skills, effort, mutual monitoring, and improved risk sharing (Balakrishnan et al., 1998; Arya et al., 1997; Itoh, 1991; Ramakrishnan and Thakor ,1991; Alchian and Demsetz, 1972)."

Another aspect of shared risk is the perceived unfairness, where the degree of common uncertainty is inversely related to the perceived unfairness associated with a relative performance measures compensation plan (Matsumura and Shin, 2006). A further argument is mounted that the measurement errors in the sharing of revenues or costs can be a disadvantage to a group of managers (Rajan and Richelstein, 2006), and that the behavioral or subjective measures can have greater explanatory power to influence managers (Friedrickson,

1992). This would suggest that subjective measures would also be an upward adjustment because of perceived unfairness and measurement error in the objective measure.

A third issue is the free rider problem (Baker, Jensen and Murphy, 1988, p.21) where business units or managers can gain wealth by sharing in the efficiency or productivity gains of upstream or downstream units. It is therefore likely that the objective measures will improve the performance of less productive people and decreases the performance of the more productive people (Prendergast, 1999, p.41). Therefore if the subjective measures are used as an ex post adjustment, it is likely that the subjective measures will be used as a downward adjustment to reduce the effects of the free rider problem (Farnsworth and Taylor, 2006, p.316).

Therefore, literature is mixed on whether subjective measures are an upwards (e.g., cooperation, measurement error) or downwards (e.g., free rider) adjustment to objective measures with regard to shared risk.

We use strategy to control for external risk. Adopting a particular strategic mission requires a trade-off between market-share growth and maximizing short-term financial profits (Langfield-Smith, 2007, Anthony and Govindarajan, 2007). Fisher and Govindarajan (1993) state that a build strategy implies that the focus is on building market share and growth (particularly in high growth markets), often at the cost of short-term profits (e.g. where you have low market share in a high growth market). A hold strategy focuses on protecting current market share and market position (e.g., where you have a high market share in a high growth industry). A harvest strategy is where the focus is on maximizing short-term earnings and cash flows, even at the expense of market share (e.g., where you have high market share in a low growth industry). The last type of strategic mission is the divest strategy, typically in low market share or low growth industries. Eisenhardt (1985, p.144) argues that behavioural measures are also needed to reflect the strategy and nature of the business. Her view has been integrated in Anthony and Govindarajan's (2007, p.586) advice on designing budgeting systems that suggests behavioural controls (e.g., subjectivity) are more useful when adopting a build strategy and objective measures (e.g., economic, financial) when adopting a harvest strategy, and hold is in the middle of the continuum.

Downside risk

Downside risk is related to the incentive pay that is available to the manager, but not received. Gibbs et al. (2004, p.413) use the term "downside risk" and suggest that risk averse employees are more concerned with being protected against downside risk from uncontrollable factors (i.e., from bad luck), rather than good luck. Subjective evaluations provide some insurance to employees about downside risk (i.e., they will not get a bonus, or a reduced bonus) with their pay because it can adjust for problems with accounting measures (e.g., manipulations, noise, or over ambitious targets) (Gibbs et al., 2004; Rajan and Reichelstein, 2006; Farnsworth and Taylor, 2006). Gibbs et al. (2004, p.412) argued that subjective evaluations can be used to "exclude uncontrollables to reduce employee risk or to include controllables to improve incentives' sensitivity to managerial effort." In addition, Farnsworth and Taylor (2006, p.316) argue that employers can improve incentives where the free rider problem exists by linking pay to subjective evaluations of a manager's contribution to group performance. The argument here is that to reduce the financial impact to the manager of not meeting the targets, the subjective measure is an upwards (e.g., uncontrollables) or downwards (e.g., free rider) adjustment to the objective measure to reflect

the importance of downside risk. The purpose of strong performance measurement system would be to reduce compensation risk while maintaining incentives (Jensen et al., 2004). This leads to the following hypothesis:

The subjective measure is an adjustment to the objective measure, taking into account target difficulty, shared risk and downside risk.

A summary of our research hypotheses is presented in Table 1.

Insert Table 1 about here

Method

Sensol was established in the late 1980s. By 2000 it was a large Australasian organisation that had revenues of around $1 billion, and 9,000 employees. Sensol is a related diversified network business that has been successful in the mid-1990s and has used its innovations to create new businesses (e.g., consultancy). The large core business used standardised technologies and had high market share. However, the core business was now in a declining industry due to technological substitution and has become the cash cow used to fund Sensol's diversification strategy into new business areas (e.g., high-end technologies). The volume declines in Sensol's business had a large impact on its profitability because a high percentage of its costs were fixed. This resulted in a shock loss at the beginning of the study period. The time line for the study and "shock loss" is as follows:

1 April - to 31 March 00 Quarter "shock loss" 1 July 00 to 30 June 01
_____Period 0_____| |_____Period 1__

The archival performance data has been collected from Sensol, a large Australasian organisation with business units reporting to five groups. There were 12 grades of managers and 8 grades of professionals (see Stringer 2009). This paper reports of part of a broader study examining overall performance management processes over 2½ years of intense periods of observation, and over 200 interviews (Stringer, 2006). The cross sectional data set used in this paper includes **s**ubjective performance evaluation ratings for 956 managers and professionals (with 522 managers and professional for Period 0, and 434 managers and professionals for period 1) located in 11 business units. The data set also includes the objective measures for Sensol's value scorecard for Period 0 and Period 1. The complete data base includes data for Sensol's top 700 managers and professionals, but we exclude managers and professionals employed within the corporate (i.e., head office) business units, those business units for which two years of consecutive data are not available.

Sensol has a complex incentive system design. It also has a long history of giving cash bonuses to managers since the mid 1990s and over time the amount of variable pay has been increasing. The range of bonuses in the study period was between 8-25% of fixed pay, and the variable amount increases up the grades. Sensol's aim has been to set fixed pay below market rates, then providing managers meet their targets (e.g., budgets, pre-set objectives) their pay is at market rates, and managers have the opportunity to receive pay at higher than market levels if their performance is higher than expected (e.g., above budget) up to a stated maximum level (typical of many incentive systems, as noted earlier). The design of Sensol's incentive system meant that managers could receive up to four times their base amount. For a

manager who had a base amount of $10,000 who received a scorecard rating (objective measure) of 200% (maximum), and an individual rating of 200% ("outstanding") would result in a cash bonus of $40,000 (compared to $10,000 for a manager who achieves target in both subjective and objective ratings).

Objective performance measure is linked to the organizational scorecard, called a value scorecard because of the high weighting on EVA® (see Table 2). The targets are negotiated and are capped with threshold, minimum, target (budgets) and maximum.

Insert Table 2 about here

Subjective performance measure. Managers have 5-6 key objectives linked to the value scorecard (e.g., % of cost reductions, meeting project milestones) and other factors (e.g., team work, accountability). The key thing for this paper is that superiors had discretion over the choice of measures and the weighting of the measures. Sensol also used a forced distribution process to ensure the ratings (on average) were consistent across the different business units.

Model and measurement specification

In order to test what factors are associated with the difference between the objective and subjective performance measures we use the following linear regression model:

$$\underline{\text{objective} - \text{subjective} = \alpha + \beta_1 \text{target difficulty} + \beta_2 \text{shared risk} + \beta_3 \text{shared risk} + \beta_4 \text{downside risk} + \beta_5 \text{ strategy} + \beta_6 \text{ budget loss}}$$

The dependent variable is the objective measure (Business unit EVA® multiplier) minus the subjective measure (individual performance evaluation multiplier). The use of actual organizational performance data is unusual. Most prior studies have used proxies (see Gibbs et al., 2004).

Objective measure. The business unit EVA® multiplier has been used. This is a translation made from the actual Business unit EVA®. For example, when Business unit EVA® is below the minimum level set, the multiplier is 0%, 50% when the minimum is reached, when the EVA meets the budget target 100%, and 200% if the upper limit of target range is reached. The Business Unit EVA® multiplier is used, rather than the organizational-wide EVA® multiplier because this is where the managers have most influence and should be more closely associated with their individual performance evaluation (based on personal scorecards).

Subjective measure. The subjective measure is an individual's performance evaluation multiplier and also ranges from 0-200%.

Main independent variables are target difficulty, shared risk and downside risk:

Target difficulty = maximum (upper limit) – minimum (lower limit) / absolute of the budget target.

Target difficult is measured by business unit EVA® targets negotiated at the beginning of the year and includes the spread between the minimum and maximum targets and the "target"

(what is expected). Absolute budget target is used as some of the business units have budgeted losses and others have budgeted profits. An internal company memo confirms that the threshold and maximum targets are set with regard to the maturity of the business (start-up, growth, sunset), scope for improvement, degree of target difficulty, economic and competitive activity, and the need to perform.

Shared risk = % of transfer revenues.

The amount of interdependence between the business units is measured by the percentage of revenues in a business unit that involve transfer pricing from other business units as a reflection of shared risk. The percentage of transfer revenues from 2001 data has been used for both years. A prior study by Gibbs et al. (2004) has used managers perceptions of the percentage of time spent interacting with managers in other department as a proxy for interdependence.

Downside risk = target incentive times four minus the gross incentive/fixed remuneration plus target times four.

This measures the downside risk of what compensation is available to the manager but not obtained. The maximum bonus potential is four times the base amount. The higher the ratio relates to the higher opportunity loss for a manager. Gibbs et al. (2004) discussed downside risk, but did not provide a measure. Sensol's incentive system design provides that four times a managers' base amount is *at risk*, so if managers miss their targets, they have high downside risk. So we expect evaluators to make some adjustment to provide some insurance for managers when they miss their targets. The higher the ratio the greater the percentage they have missed out compared to the potential maximum bonus.

The control variables are strategy and budget loss.

Strategy. Dummy variables are used for business unit strategy (coded as 0 = build; 1 = build). This controls for external risk. The business units were categorized into Build, Hold, Harvest, Divest (see Fisher and Govindarajan, 1993) and the same categories have been used for both years.

Budget loss. The business units who have budgeted for a loss have been coded as 1 for budgeted loss, 0 otherwise. Gibbs et al. (2004, p. 418) coded Departmental Loss in the same way. Budget loss has been used, because the actual loss would have been highly correlated with the Business Unit EVA Multiplier, and it is the budget loss (not the actual loss) that is related to target difficulty.

Descriptive statistics

The descriptive statistics show a range that indicates that where the difference between the objective and subjective ratings is negative, this means that the subjective is larger than the objective measure, and pulls in ways quite different from the objective measure. Interestingly, the objective measure has a higher mean and range of values than the subjective measure across the pooled two years, as well the individual years. The higher mean for the

objective measure[5] when compared to the subjective would support the proposition that the subjective measure is not more lenient but rather has a marginally significant effect on the ratings (Bol, 2008).[6] The range of values for the objective being wider than the subjective would support prior literature that the subjective measure can result in a compression[7] when compared to the objective. However, this paper does not conclude that such a compression is evidence of bias but rather reflecting a set of adjustments that the subjective makes to mitigate the influence of risk.

Insert Table 3 about here

Correlations

The objective measure is significantly correlated with each of the risk variables: shared risk, target difficulty, and downside risk. The subjective measure, by itself, has low correlation with many of the independent variables. This would suggest that the subjective measure by itself is not driven by the risk variables. Rather, the subjective measure is an adjustment to the objective. To support this proposition, the higher and more significant correlation between the objective - subjective (difference between objective and subjective) score with the independent variables suggest that the subjective measure of performance by itself has little meaning but rather gains credence as an adjustment the objective measure.

Insert Table 4 about here

Regression results

Table 4 summarises the results for the pooled data (both periods) as well as the pre shock (period 0) and the post shock (period 1). The overall model has an adjusted R^2 of 40.9% while the pre shock adjusted R^2 is 84.1% and the post shock adjusted R^2 is 73.8%.[8] This preliminary analysis suggests that the difference between the objective and subjective is being driven by the three types of risk that are modeled: shared risk; target difficulty; and downside risk. Further analysis of the results will be undertaken, addressing each variable in turn.

Insert Table 5 about here

With regard to target difficulty, the pooled data reveals that the negative partial[9] coefficient ($p<0.01$) implies that the subjective is larger than the objective for higher levels of target

[5] When a Wilcoxon sign rank test was undertaken to compare the means of the objective and subjective measure, the pre shock period showed a marginal significance in difference ($p< 0.1$) but the post shock period showed a significant difference between the means ($p<0.01$). The pooled period showed that the subjective was significantly lower than the objective ($p< 0.05$).

[6] Other writers such as MacLeod (2003, p.216) would argue that supervisors were more likely to give lenient ratings.

[7] See Moers (2005, p.70); Prendergaast (1999, p.30); Tae Sik Ahn (2008).

[8] The high adjusted R^2 may be suggestive of endogeneity, in particular where the downside risk is highly correlated or a function of the subjective and objective. However, when the regressions were run without downside risk, the adjusted R^2 were around the 80% for period 0 (the pre shock) and 73% for the post shock suggesting that endogeneity, driven by downside risk, was not causing the high explanatory power. Therefore, downside risk remains in the model, especially when in period 0, this variable is not significant, suggesting that this independent variable is not causing any endogeneity.

[9] This partial coefficient is still significant after controlling for budget loss. While Gibbs et al. (2004) use actual loss, this paper could not use actual loss due to the high multicollinearity (where the VIF is higher than 10 for

difficulty. This pooled data is consistent for the pre shock or period 1 (negative coefficient at $p< 0.01$). However for the post shock period, the target difficulty has a positive coefficient ($p<0.01$) indicating that for higher levels of target difficulty, the subjective measure is smaller than the objective measure. This switch of signs implies that the subjective measure, being an ex post adjustment, takes into account the varying economic and competitive forces to address the effect of target difficulty. This would imply that the difference between the objective and subjective measure is not a simple consistent weighting, but contingent on understanding the complex environmental and competitive forces.

In looking at shared risk (transfer revenue), the overall model (pooled data for the two years) shows a negative significant partial coefficient ($p<0.01$), but for the pre shock period, the coefficient was positive ($p<0.01$) and then for the post shock, was negative ($p<0.01$). This would indicate that for the pre shock, the higher the transfer revenue is positively associated with the difference between the objective and subjective measures. This implies that the higher the transfer revenue, the more the subjective downwardly adjusts the objective. However for the post shock period, the negative sign suggests that the higher the transfer revenue, the subjective measure makes larger upward adjustment to the objective measure. This in turn suggests that the subjective is not a static adjustment to the objective with regard to shared risk.[10]

In examining downside risk, the overall pooled model (for both periods) finds a significant negative partial coefficient ($p<0.01$). In the pre shock period (period 0), downside risk is not significant but has a negative significant coefficient in the post shock period (period 1). This suggests that perhaps in good times, downside risk is not a significant driver to which the subjective makes adjustments to the objective. However, during the post shock period, the downside risk is a significant influence to the magnitude of the adjustment that the subjective measure makes to the objective measure.

The three types of risk seem to exhibit patterns that are different for each period, the pre shock and the post shock. The subsequent section discusses more fully some the issues that could explain the significant and intriguing way in which the three types of risk affect the way in which the subjective adjusts the objective.

Qualitative findings

The intensive and longitudinal nature of the broader study provides some explanations for the observed results. Over 200 interviews have been conducted with managers across the business units and down the levels, participant observation at meetings including a review of Sensol's incentive scheme, and extensive periods of observation over 2½ years (Stringer, 2006).

Target setting is very complex (e.g., related diversified, large number of business units, different competitive environments) and has been described by one senior manager as "more of an art than a science". Sensol operates in a dynamic environment, and across a number of different business areas. Over the course of the study it became evident that highly achievable

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the variable actual loss) but that budget loss was used and all the models (and subsequent variables) had VIF scores of less than 10.

[10] The partial coefficient for the shared risk (transfer revenue) is interpreted by controlling for business unit strategy.

targets have been agreed post shock. After the shock loss, business unit managers have been concerned that the targets were unachievable and they would never receive bonuses in the future. This resulted in the post shock targets (Period 1) being revised downward (from the earlier agreed targets). There has also been evidence of considerable gamesmanship during the target setting process. This quote from a senior business unit manager suggests that senior managers also had incentives to agree to targets that they could deliver on:

> *We felt that we were obliged at the time to put in a fairly big stretch target for us … when we sat down with [senior managers] they said well look give us your worst case scenario rather than what the full stretch is and we will accept that, so that was when our original EBIT target was revised down. When you look at the politics of it all, basically [Sensol] had just had a shocking quarter … so [senior management] decided that if they were going to put a budget in they wanted to put something in that wouldn't be – the actual result would never be any worse and they were pretty confident that would be able to proceed and the board, after that dismal quarter, was probably, you know would have been happy with anything that involved profit for the whole of [Sensol] so you know, they put in a very achievable figure in there. (M 1)*

Shared risk is also important in this network organisation as the operations of many of the business units are highly interrelated. Transfer pricing has been a significant issue since decentralization occurred in the mid-1990s. The qualitative data shows that there has been extensive evidence of intense "sibling rivalry" with the business units operating like business "silos". The dysfunctional consequences include acting in their own interests (not in the interests of the whole company), competing with each other for customers, as illustrated by this quote:

> *It's a political game I mean we have again it's a paradox to this incredibly great organisation at [Sensol] that despite itself …We have this huge distrust of ourselves. We have people who will actively go against another division of [Sensol] often to the view of our competitors or to the benefit of our competitors because we have this you know sibling rivalry in our organisation that is sometimes bizarre. (M2)*

Downside risk was also important. Managers were aware that they had high amounts of pay *at risk*, and there were a number of instances when people told "war stories" about the impact of a senior manager's decision, or year-end accounting adjustments on their cash bonuses, as these quotes explain:

> *I mean it's a significant amount of money at stake you know so for me, it's my at risk, is more than 30 percent of my salary. That's just with sort of one multiplier and so for this year there's a reasonable chance if things carry on, the multiplier could add, totally roll out to be over two, so it ends up being 60 percent of my salary again. So that does get your attention and funny enough gets your attention of your partner. (M3)*

> *End of year changes had a big effect on the incentive [payments] of one business unit. It had a very big impact on the multiplier. From a multiplier of 1 to 0.63 (I think). It was big. [amount of bonus lost] something like $10,000 for some managers. (M4)*

Discussion of results and conclusion

The regression analysis sets out to investigate what drove the difference between objective and subjective measures of performance, in particular, shared risk, target difficulty, and downside risk. For the combined two years, we find that subjective performance evaluations have been used to *adjust* (ex post) the objective measure in a (usually) upward direction to take into account the three types of risk. This supports the hypothesis that subjective evaluations are a type of an ex post adjustment that takes into consideration other factors such as the limitations of the objective measure, and are consistent with Gibbs et al. (2004). This is in contrast to prior studies that show objective measures are over-emphasised (Ittner et al., 2003; Lipe and Salterio, 2000; Moers, 2005, p.67).

However when the two periods are analyzed further, the variables of shared risk, target difficulty and downside risk showed interesting patterns. With regard to shared risk, the positive sign means that the subjective is a downward adjustment to the objective measures. One plausible explanation is that during good times, the likelihood that there were free riders who were gaining (relative to more efficient or productive business managers) and the greater the shared risk, the greater the likelihood of free riders. Therefore, during the pre shock period, the subjective measures were a downward adjustment of the objective measures to deal with the free rider problem. For the second period (the post shock), the subjective evaluation was an upward adjustment to take into account shared risk. This would suggest that coordination and risk sharing was to be encouraged in the ex post adjustment (rather than concerns of free rider) as the overall business was concerned about the rapidly changing environment and it was imperative that the business units cooperate. Such a view gains credence when we examine the quote from M2 on "sibling rivalry". During the post shock period, such intense sibling rivalry could pose severe constraints on cooperation and coordination of resources for the corporate to maintain its position in the market place.

In reviewing target difficulty, the regression results indicate that for the pre shock period, the greater the spread of the upper and lower limits around the stated target (hence the greater the target difficulty), the greater would be the upward adjustment that the subjective measure makes to the objective measure. This would in accordance with our prior expectations. However for the post shock period, the regression results indicate that the greater the target difficulty, the subjective would be a downward adjustment. Understanding this change in signs warrants a closer look at the interview quote from M1 which seems to imply that the shock loss was such a jolt that there was the likelihood of gamesmanship and the evidence for this is that the upper limit of the targets (for objective measure) had been reached by a large number of managers. [11] This is contrary to Walsh (2000) who argues that the chance of reaching maximum should statistically be very low. This would imply that for the post shock period, the objective measure has been set too easily and therefore superiors have made adjustments (in a downward manner) to take into account other factors such as budget gamesmanship that was involved. This would require an assumption that the evaluators were informed and knowledgeable, not only about the business processes and business unit strategies but also the levels of difficulty in setting the upper and lower limits. Such an assumption would not be unrealistic as the evaluators were senior managers who had worked in the corporation for several years. The finding that senior managers may agree to highly

[11] In period 0, 20.3% of managers and professionals got the maximum of 200%, while in period 1, 60.1% of the managers and professionals got the maximum of 200%.

achievable targets (post shock) to ensure predictability of results is consistent with Merchant and Manzoni (1989).

Downside risk is not significant for the pre shock period, but significant for the post shock period where the subjective measure is an upward adjustment to the objective measure. This implies that during the shock period, the importance of the loss function to the managers became an integral part of the settling up period. The qualitative data suggests that many managers have been aware of the dollar amount of cash bonus they have lost, and some could even point to transactions or events in the year that drove that opportunity cost. Therefore, one could expect that the evaluators were aware that the employees were computing what could have been lost, and such a loss function would form a part of the evaluation. We speculate that evaluators may have posed themselves the question, how much will these employees be willing to lose in cash bonuses in this post shock period? The post shock period would also be a testing time, not only for the employees but also for the evaluators. To lose key managers and professionals whose knowledge and skill were needed to see the corporation through the post shock period would have been important (a retention issue). This could explain why the downside risk is significant in the post shock period, and not in the pre shock period. Alternatively, from the perspective of the manager and professional, the amount of the bonus potential that has been lost to an individual manager could be viewed as a signal from the employer as to the intentions of the corporate evaluators for the future. Especially if the loss in the post shock was largely uncontrollable, then the opportunity cost (the downside risk) could be considered as being unfair.

In conclusion, our findings are consistent with Gibbs et al.'s (2004) argument that the use of subjective measures supports the agency theory view that the evaluators (principals) are well informed managers who know that the objective measure alone does not capture key elements of a manager's performance. This is in contrast to some studies (Ittner, Larcker and Meyer 2003; Moers, 2005) that subjective performance evaluations tend to result in biases, manipulation, and gamesmanship. Rather, we argue that the manipulation and gamesmanship that go into setting the objective measure targets and limits need to be reviewed in an ex post manner and the use of subjective measures undertaken by knowledgeable and informed evaluators is key to controlling for various types of risk.

This study has important implications for performance management and incentive system design. Subjective measures of performance, if done in an ex post adjustment by knowledgeable evaluators, can adjust the objective measures to reflect the risk that individual employees can face. However, the manner in which such adjustments occur seem to reflect the economic conditions such as pre shock or post shock. This paper supports the need for further research to understand more clearly the role of subjective measures in the adjustment process. In other words, do evaluators use heuristics that are intriguingly accurate in dealing with risk factors? Or is the relative ranking of employees and broad guidelines of ranking an effective way of ensuring that evaluators' ex post adjustments capturing the risks undertaken by employees?

There are a number of limitations with this study. The data set did not include identifiers (due to the extreme sensitivity of such performance indicators) for managers and professionals, and so we could not track an individual across the periods. The measure of target difficulty relied on the spread (difference between upper and lower limit) which could have been manipulated during the post shock period. Therefore, the spread, given the texts of

interviewed managers, was not even capturing stretch targets but rather a mechanism used by senior managers to ensure that the corporate could deliver to the now lower expectations.

There are several issues that need to be addressed in future research. The necessity of designing compensation contracts that balance incentives with efficient risk sharing (Gray and Canella, 1997; Rajan and Richelstein, 2006) and the use of subjective assessment is warranted (Jensen et al., 2004). There are several reasons to believe that the risks associated with an organization's strategy may be an important consideration in establishing the level of executive compensation (Gray et al., 1997, p. 520; Jensen et al., 2004). In addition, we need greater understanding of incentives in loss-making entities as they tend to reduce the weighting on earnings for performance evaluation purposes, the role of subjective performance evaluations needs to be better understood (Matejka et al., 2005, p.27). Further research needs to incorporate multiple methods (interviews, survey, and archival data) so that the data can be understood within the wider context.

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Target difficulty	Greater target difficulty, the greater the upwards adjustment to the objective measure
Shared risk	Mixed. Subjective measures could be an upwards (e.g., cooperation, measurement error) or downwards (e.g., free rider) adjustment
Downside risk	Mixed. Subjective measures could be an upwards (e.g., uncontrollable factors) and downwards (e.g., free rider)

Table 1 Summary of hypothesis expectations

Perspective[12]	Scorecard measures	Weighting
Financial	EVA® (70% on company performance and 30% on business unit performance)	80%
Customers	Service performance (internal service performance measure)	5%
Internal	Employee satisfaction (survey), health and safety, and other social measures	10%
Learning and Growth	Total external operating revenue	5%

Table 2 Sensol's value scorecard

[12] Kaplan and Norton's (1996) four perspectives are used here for confidentiality reasons.

Both Periods				
Variable	**Mean**	**SD**	**Actual range**	**N**
Subjective measure	1.125	.1970	0.4-1.8	956
Objective measure	1.3532	.67028	0.0-2.0	957
Objective – Subjective	.2276	.65821	-1.6-1.36	956
Target difficulty	.5272	.45003	1.4-1.79	957
Downside risk	.1543	.04113	0.06-.34	957
Transfer revenue	.284	.2298	0.0-2.84	957
Period 0 (pre shock)				
Subjective measure	1.097	.2162	.4-1.8	522
Objective measure	1.1433	.60777	.58-2.0	523
Objective - Subjective	.0448	.59446	-1.22-1.25	522
Target difficulty	.6412	.50107	.14-1.79	523
Downside risk	.1713	.03856	.10-.31	523
Transfer revenue	.265	.2274	0.0-.9	523
Period 1 (post shock)				
Subjective measure	1.159	.1653	.6-1.8	434
Objective measure	1.6062	.65520	0.00-2.0	434
Objective - Subjective	.4475	.66454	-1.6-1.36	434
Target difficulty	.3899	.33149	.15-1.79	434
Downside risk	.1338	.03423	.06-.34	434
Transfer revenue	.307	.2307	0.00-.9	434

Table 3 Descriptive Statistics

	Subjective	Objective	Objective-subjective	Shared risk	Target difficulty
Combined period					
Objective	.209**				
Objective-Subjective	-.086**	0.956**			
Shared risk	.118**	.360**	.332**		
Target difficulty	-.057	-.231**	-.219**	.208**	
Downside risk	-.187**	-.483**	-.440**	-.120**	.232**
Period 0					
Objective	.239**				
Objective-Subjective	-.119**	.936**			
Transfer revenue	.236**	.323**	.247**		
Target Difficulty	-.004	-.240**	-.244**	.083	
Downside risk	-.069	-.372**	-.364**	-.121**	.135**
Period 1					
Objective	.069				
Objective-Subjective	-.180**	.969**			
Transfer revenue	-.093	.382**	.399**		
Target Difficulty	-.040	-.009	.001	.548**	
Downside risk	-.247**	-.419**	-.351**	-.043	.103*

Table 4 Correlations

	Both periods	Period 0	Period 1
Target difficulty	-.318 (-6.473)**	-1.272 (-39.767)**	.515 (3.602)**
Downside risk	-4.611 (-10.017)**	-.430 (-1.463)	-1.897 (-3.551)**
Shared risk	-.805 (-4.806)**	1.221 (11.418)**	-.763 (-4.095)**
Budget Loss	-.746 (-12.119)**	-.095 (-2.305)*	-.929 (-14.423)**
Build	-.442 (-7.242)**	1.354 (28.522)**	-1.378 (-25.163)**
Hold	.436 (6.206)**	.615 (14.824)**	-.566 (-4.096)**
Divest	-.011 (-.094)	2.458 (27.123)**	-1.718 (-9.650)**
F Statistic	83.747 **	393.267**	175.171**
Adjusted R^2	.409	.841	.738
Number of observations	955	521	433

**p< 0.01

Table 5 Regression results

THE USE OF OBJECTIVE AND SUBJECTIVE MEASURES; IMPLICATIONS FOR INCENTIVE SYSTEM DESIGN

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Abstract

This study examines the question, is the use of subjective measures an *ex post* adjustment of objective measures to take into account three types of risk: target difficulty (after controlling for budget loss), shared risk (after controlling for business unit strategy) and downside risk? We examine this question using data from a sample of 522 managers and professionals in period 0 (and 434 in period 1) from a large Australasian corporation over a two year period. Period 0 is a pre shock period and period 1 is a post shock period. We find that for the overall two years that the subjective is an upward adjustment to the objective to take into account: (1) target difficulty, the spread between upper limit and lower limit of unit performance; (2) shared risk, that is organizational interdependencies; and (3) downside risk, which is the opportunity loss function that the employees faced in not meeting the maximum bonus allowed.

However, in examining the pre shock period and post shock period, the results indicate that the subjective evaluation has been used differently for each period for two type of risk (target difficulty, shared risk). (1) With regard to target difficulty for the pre shock period, the subjective makes an upward adjustment to the objective; but for the post shock, the subjective makes a downward adjustment. One plausible explanation is that during the post shock, quite a few managers and professionals were already on the maximum of the objective measures (given that there may have been gamesmanship at setting targets and upper limits for an anticipated poor economic period). Therefore, the subjective can be a downward adjustment to reflect this gamesmanship. (2) In regard to shared risk (the percentage of transfer revenues), for the pre shock period the subjective was a downward adjustment, while for the post shock period the subjective adjustment is an upward adjustment to the objective measure. This implies that for the pre shock or times of economic stability, the subjective could be used to reduce some of the free rider challenges that face incentive systems. Conversely for the post shock period, or during times of economic instability, the subjective adjustment is to encourage resource sharing and greater coordination and communication. Overall, our results indicate that the subjective measure is used as an ex post adjustment to the objective measure. This could be in response to flaws in the objective (financial) performance measures as subjective measures as this enables other factors to be taken into account.

Key words: subjective performance evaluations, objective financial measures, incentive system, EVA®, target difficulty, shared risk, downside risk.

Introduction*

Pay for performance plans play a critical role in managing performance in organisations. There is growing evidence that the use of incentive plans is growing,[1] and the trend has been to increase the amount of pay *at risk* as a percentage of total remuneration (Heneman et al., 2002b). Despite decades of research into the design and consequences of pay-for-performance plans there has been little advice that organisations could use in terms of when certain incentive system designs have been more (or less) appropriate (Heneman et al., 2002a; Heneman et al., 2002b; Merchant, 1989; Merchant et al., 2003; Miceli and Heneman, 2002).

This paper responds to calls Gibbs, Merchant and Van der Stede (2004) for more research to examine the use of subjectivity in performance evaluations as theoretical development is at an early stage. Most prior research has focused on who would use subjective evaluations (Ittner, Larcker, and Meyer, 2003). Gibbs et al. (2004) find that subjective evaluations compliment perceived weaknesses in quantitative performance measures and provide employees with some insurance against downside risk. They also find subjectivity is related to level of interdependencies between business units, the difficulty of targets and significant consequences result in not meeting these targets, and the presence of an operating loss (Gibbs et al., 2004). Gibbs et al. (2005) also argue that the subjectivity enables superiors to use other information, not available at the time the targets were set, to evaluate performance. The argument in this paper is that subjective performance evaluations are used as an adjustment (upwards or downwards) and this is consistent with what Gibbs et al. (2004, p.412) call an "*ex post* settling up".[2]

In this paper we explore whether the subjective measure is an adjustment to the objective measure to take into account risk.[3] Adjusting for risk is an important point as Baiman (1982) argues that, "Tradeoffs have to be made between the motivational properties of the reward structure and the risk that managers have to bear and highly achievable budget targets may be the outcome of such a tradeoff" (cited in Merchant and Manzoni, 1989, p.550). We know little about the tradeoffs required. Further motivation for this study is that the use of objective performance measures have dominated incentive systems (Gibbs, 2008), despite their well known limitations. While subjective evaluations are recognised as being important (e.g., incentives, promotions, job assignment), they have received little attention in the accounting and economics literatures, partly because of the scarcity of data (Gibbs, 2008, p.334).

While theoretical research has suggested various plausible reasons for the use of subjectivity in the assignment of bonuses, empirical testing of these theories are rare (Gibbs et al., 2004). The researchers have been given access to a range of performance data including subjective measures (i.e., individual performance evaluations) and objective measures (i.e., scorecard

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[1] See Baker et al. (1988), Broadbent and Cullen (2005), Heneman, Fay and Wang (2002), Heneman et al. (2002b), Holthausen, Larcker and Sloan (1995), Lawler (2000).

[2] Gibbs et al (2004) assume that the evaluators have sufficient skill to detect manipulations. Such an assumption is for the organization under study as the evaluators were senior managers who had experience in the core activities of the business

[3] Like Gray and Cannella (1997, p.518), we define risk as the extent to which there is uncertainty about outcomes.

measures) as well as the measures for targets, and key measures of transfer revenue, actual cash bonuses paid, and the opportunity loss that managers faced as a consequence of the bonus plan. Access to this type of sensitive performance data is rare.

Secondly, given the low correlation between subjective and objective measures (see Heneman, 1986; Bommer et al., 1995), there are few studies that investigate what factors drive the gap. The role of nonfinancial performance measures has also been under-researched and "has been given short shrift in both accounting and economics" (Gibbs 2008, p.333). Jensen Murphy and Wruck (2004) would go so far as to recommend that bonus plans should include a subjective component. The theoretic expectations are developed in the following section.

This paper examines an incentive system in Sensol (called this for confidentiality reasons) that involves a scorecard-type performance measurement and incentive system that includes objective and subjective measures. Half a managers' bonus is paid based on performance to pre-agreed objective measures (with 80% based on EVA®) and the other half is based on an individual managers' performance evaluation.[4] Scorecard-type incentive systems with financial and non-financial measures have also been increasing in usage following the popularity of strategic performance measurement systems like the balanced scorecard (Kaplan and Norton, 2008). However, we know little about the use of scorecard type incentive systems (Ittner et al., 2003). The use of objective (and typically financial measures) has been attractive to designers because those measures have been closely tied to the ability of an organisation to pay a bonus payment (Heneman et al., 2002b).

The next section is the hypothesis development, followed by the method section, results, discussion of results and conclusion.

Hypothesis development

The economic rationality and agency theory argument is that goal alignment between the principal and the agent is important. The underlying assumption is that business unit and individual measures should be highly correlated, congruent and reinforcing. This view is implicit in the balanced scorecard literature. Kaplan and Norton (2006) argue that scorecard measures should cascade down the organisation through to each individual's personal scorecard. The EVA® literature recommends a similar approach through the use of what they call value drivers. However, meta-analyses by Heneman (1986) and Bommer et al. (1995) that examine the associations between subjective and objective measures covering the same activities find correlations of 0.27 and 0.39 (cited in Ittner et al., 2003). The reasons for these low correlations between objective and subjective measures warrant further examination.

The adjustment to the objective measures could be upwards or downwards. Examples of upwards adjustment to the objective measures for profit centre managers are typically for bad luck (Merchant, 1989). Reasons for this include to adjust for uncontrollable factors (Merchant, 1989) or to reduce the compensation or downside risk (Gibbs et al., 2004). Good luck is seldom adjusted for, possibly because there is no pressure to do so from profit centre

[4] The high weighting on individual performance evaluations may be uncommon. Two recent papers suggest that putting a large weight of subjective evaluation on promotions decisions is surprising (Campbell, 2008, Gibbs, 2008). This paper does not investigate the weights but rather the manner in which the subjective measure adjusts the objective measure to account for risk.

managers (Merchant, 1989), or because it might be seen as increasing the pre-agreed performance standard and this can reduce trust (Gibbs et al., 2004). A recent empirical study by Woods (2008) supports this view as 93% of the adjustments to objective measures in his sample were upward adjustments, and for measures managers perceived were incomplete, unverifiable and noisy. His findings support the assertions of Jensen et al. (2004) that subjective measures can also be used to adjust the noise in good objective measures while reducing the distortion in bad objective measures.

The following discussion identifies some of the risk factors (e.g., target difficulty, shared risk, downside risk) that may be taken into account in subjective performance evaluations and may help to explain why there have been adjustments (upwards or downwards) to the objective performance measures.

Target difficulty

Setting targets too high means that they become unachievable and employees may not be motivated to try and achieve them (Merchant and Manzoni, 1989; Gibbs et al. 2004; Matejka et al., 2005). There is debate in the literature as to how to set budget targets (e.g., calculated, negotiated) and how difficult (or easy) they should to be achieved to motivate managers to increase performance. Prior studies have found budgets tend to be set to be highly achievable 80-90% of the time and that this is important for reasons other than motivating managers such as improving the predictability of results for resource planning and financial reporting (Merchant, 1989, 1990; Merchant and Manzoni, 1989; Murphy 2001). However, there has been little research examining target setting for incentive compensation (Merchant et al., 2003; Murphy, 2001). Organisations are more likely to use subjective evaluations where managers have difficult targets and there are important consequences for not meeting the targets, or they operate in a loss situation (Gibbs et al., 2004, p.434). While Gibbs et al. (2004) relate target difficulty to the use of subjectivity, there is little known about the effects of target difficulty on subjective performance evaluations.

A common way for organizations to deal with target difficulty is to provide highly achievable targets and to set minimum and maximum levels. Merchant (1990) argues that problems with setting too easy targets that will not motivate managers can be minimized by giving managers bonuses for exceeding their budget targets. A typical incentive system sets a hurdle rate below which no bonuses are paid, and then once reached the bonus increases as performance increases until the maximum performance level is reached (Jensen, 2001, p.97). Walsh (2000, p.191) argues that usually the upper target limit is outside the "business as usual" range and he estimates the chance of achieving maximum as "statistically less than 15 in 1,000". Another interesting paper by Mandel (1969) links statistical process control to estimating budgets and this analysis also examines upper and lower control limits.

There are several reasons why the spread between minimum - target - maximum is an indicator of target difficulty. Firstly, the greater the spread around the mean (typically budget target), the greater is the difficulty to achieve the upper limit (Walsh, 2000). Another reason is that the greater the spread is a surrogate measure of the greater uncertainty in operations (see Merchant, 1990). Where there is high planning uncertainty, the distance between the "highly achievable target levels and the best-guess (or even higher) target levels is much greater than when planning uncertainty is low" (Merchant, 1990, p.48). Using minimum and maximum levels reduces the risk to managers associated with missing their budget targets, and increases the chance that they will still get some bonus. The narrower spread is indicative

of a more certain planning environment. A tight bell curve is indicative of a profit probability distribution in relatively low uncertainty environment, and the bell curve with the wider spread is indicative of a more uncertain environment (Merchant, 1990).

A third reason is that while the lower limit may be reached reasonably easily, the spread may indicate a lack of precision in controlling objective or financial indicators (Merchant, 1990, p. 48). Therefore, the spread may also be a measure of (or lack of) controllability. The level of target difficulty has important implications for performance management and control systems when managers are held accountable and rewarded for factors outside of their control (Gibbs et al., 2004).

We argue that the greater the target difficulty, the greater the upwards adjustment that the subjective measures will make, ex post, to the objective measure.

A related issue is that the spread is a measure of target difficulty is where budgeted losses are controlled for in a study. Gibbs et al. (2004) argue that the use of subjectivity is relevant when a business unit is operating in a loss situation. The loss could be caused by poor managerial decision making, bad luck resulting from uncontrollable events, or trying to turn around a poorly performing unit (Gibbs et al., 2004). They also argue that most organisations are reluctant to pay formula bonuses, even when losses are being reduced. Matejka et al. (2005) find that loss-making entities tend to set targets that are very difficult to achieve. The argument here is that target difficulty must be understood in the context of whether they budgeted to make a loss or not.

Shared risk

Interdependencies between business units impact on shared risk (i.e., common risk) of employees, that is, the risk shared by the group, rather than specific to the individual (see Frederickson, 1992). Gibbs et al. (2004) argue that when the business units are interdependent that company-wide measures are often used, and this imposes increased risk on the employee due to the adverse effects from actions of other employees (Baiman and Rajan, 1995; Bommer et al., 1995). They argue that subjective evaluations can be used to insure employees against these adverse effects. Subjective evaluations may be beneficial where there are high levels of interdependence between the business units results in noisy financial measures (e.g., result of negotiated transfer pricing, the captured customer effect) and can encourage business units to cooperate, even though this may not be reflected in the financial measures (see Gibbs et al., 2004). To develop the cooperation aspect even further, the subjective measures could be seen as an upward adjustment of the objective measure to encourage cooperation. As Fisher et al. (2003, p.52) state, "Organizing production in teams also can result in benefits due to improved coordination of information, skills, effort, mutual monitoring, and improved risk sharing (Balakrishnan et al., 1998; Arya et al., 1997; Itoh, 1991; Ramakrishnan and Thakor ,1991; Alchian and Demsetz, 1972)."

Another aspect of shared risk is the perceived unfairness, where the degree of common uncertainty is inversely related to the perceived unfairness associated with a relative performance measures compensation plan (Matsumura and Shin, 2006). A further argument is mounted that the measurement errors in the sharing of revenues or costs can be a disadvantage to a group of managers (Rajan and Richelstein, 2006), and that the behavioral or subjective measures can have greater explanatory power to influence managers (Friedrickson,

1992). This would suggest that subjective measures would also be an upward adjustment because of perceived unfairness and measurement error in the objective measure.

A third issue is the free rider problem (Baker, Jensen and Murphy, 1988, p.21) where business units or managers can gain wealth by sharing in the efficiency or productivity gains of upstream or downstream units. It is therefore likely that the objective measures will improve the performance of less productive people and decreases the performance of the more productive people (Prendergast, 1999, p.41). Therefore if the subjective measures are used as an ex post adjustment, it is likely that the subjective measures will be used as a downward adjustment to reduce the effects of the free rider problem (Farnsworth and Taylor, 2006, p.316).

Therefore, literature is mixed on whether subjective measures are an upwards (e.g., cooperation, measurement error) or downwards (e.g., free rider) adjustment to objective measures with regard to shared risk.

We use strategy to control for external risk. Adopting a particular strategic mission requires a trade-off between market-share growth and maximizing short-term financial profits (Langfield-Smith, 2007, Anthony and Govindarajan, 2007). Fisher and Govindarajan (1993) state that a build strategy implies that the focus is on building market share and growth (particularly in high growth markets), often at the cost of short-term profits (e.g. where you have low market share in a high growth market). A hold strategy focuses on protecting current market share and market position (e.g., where you have a high market share in a high growth industry). A harvest strategy is where the focus is on maximizing short-term earnings and cash flows, even at the expense of market share (e.g., where you have high market share in a low growth industry). The last type of strategic mission is the divest strategy, typically in low market share or low growth industries. Eisenhardt (1985, p.144) argues that behavioural measures are also needed to reflect the strategy and nature of the business. Her view has been integrated in Anthony and Govindarajan's (2007, p.586) advice on designing budgeting systems that suggests behavioural controls (e.g., subjectivity) are more useful when adopting a build strategy and objective measures (e.g., economic, financial) when adopting a harvest strategy, and hold is in the middle of the continuum.

Downside risk

Downside risk is related to the incentive pay that is available to the manager, but not received. Gibbs et al. (2004, p.413) use the term "downside risk" and suggest that risk averse employees are more concerned with being protected against downside risk from uncontrollable factors (i.e., from bad luck), rather than good luck. Subjective evaluations provide some insurance to employees about downside risk (i.e., they will not get a bonus, or a reduced bonus) with their pay because it can adjust for problems with accounting measures (e.g., manipulations, noise, or over ambitious targets) (Gibbs et al., 2004; Rajan and Reichelstein, 2006; Farnsworth and Taylor, 2006). Gibbs et al. (2004, p.412) argued that subjective evaluations can be used to "exclude uncontrollables to reduce employee risk or to include controllables to improve incentives' sensitivity to managerial effort." In addition, Farnsworth and Taylor (2006, p.316) argue that employers can improve incentives where the free rider problem exists by linking pay to subjective evaluations of a manager's contribution to group performance. The argument here is that to reduce the financial impact to the manager of not meeting the targets, the subjective measure is an upwards (e.g., uncontrollables) or downwards (e.g., free rider) adjustment to the objective measure to reflect

the importance of downside risk. The purpose of strong performance measurement system would be to reduce compensation risk while maintaining incentives (Jensen et al., 2004). This leads to the following hypothesis:

The subjective measure is an adjustment to the objective measure, taking into account target difficulty, shared risk and downside risk.

A summary of our research hypotheses is presented in Table 1.

Insert Table 1 about here

Method

Sensol was established in the late 1980s. By 2000 it was a large Australasian organisation that had revenues of around $1 billion, and 9,000 employees. Sensol is a related diversified network business that has been successful in the mid-1990s and has used its innovations to create new businesses (e.g., consultancy). The large core business used standardised technologies and had high market share. However, the core business was now in a declining industry due to technological substitution and has become the cash cow used to fund Sensol's diversification strategy into new business areas (e.g., high-end technologies). The volume declines in Sensol's business had a large impact on its profitability because a high percentage of its costs were fixed. This resulted in a shock loss at the beginning of the study period. The time line for the study and "shock loss" is as follows:

1 April - to 31 March 00 Quarter "shock loss" 1 July 00 to 30 June 01
_____Period 0_____| |_____Period 1__

The archival performance data has been collected from Sensol, a large Australasian organisation with business units reporting to five groups. There were 12 grades of managers and 8 grades of professionals (see Stringer 2009). This paper reports of part of a broader study examining overall performance management processes over 2½ years of intense periods of observation, and over 200 interviews (Stringer, 2006). The cross sectional data set used in this paper includes **s**ubjective performance evaluation ratings for 956 managers and professionals (with 522 managers and professional for Period 0, and 434 managers and professionals for period 1) located in 11 business units. The data set also includes the objective measures for Sensol's value scorecard for Period 0 and Period 1. The complete data base includes data for Sensol's top 700 managers and professionals, but we exclude managers and professionals employed within the corporate (i.e., head office) business units, those business units for which two years of consecutive data are not available.

Sensol has a complex incentive system design. It also has a long history of giving cash bonuses to managers since the mid 1990s and over time the amount of variable pay has been increasing. The range of bonuses in the study period was between 8-25% of fixed pay, and the variable amount increases up the grades. Sensol's aim has been to set fixed pay below market rates, then providing managers meet their targets (e.g., budgets, pre-set objectives) their pay is at market rates, and managers have the opportunity to receive pay at higher than market levels if their performance is higher than expected (e.g., above budget) up to a stated maximum level (typical of many incentive systems, as noted earlier). The design of Sensol's incentive system meant that managers could receive up to four times their base amount. For a

manager who had a base amount of $10,000 who received a scorecard rating (objective measure) of 200% (maximum), and an individual rating of 200% ("outstanding") would result in a cash bonus of $40,000 (compared to $10,000 for a manager who achieves target in both subjective and objective ratings).

Objective performance measure is linked to the organizational scorecard, called a value scorecard because of the high weighting on EVA® (see Table 2). The targets are negotiated and are capped with threshold, minimum, target (budgets) and maximum.

Insert Table 2 about here

Subjective performance measure. Managers have 5-6 key objectives linked to the value scorecard (e.g., % of cost reductions, meeting project milestones) and other factors (e.g., team work, accountability). The key thing for this paper is that superiors had discretion over the choice of measures and the weighting of the measures. Sensol also used a forced distribution process to ensure the ratings (on average) were consistent across the different business units.

Model and measurement specification

In order to test what factors are associated with the difference between the objective and subjective performance measures we use the following linear regression model:

$$\underline{\text{objective} - \text{subjective} = \alpha + \beta_1 \text{target difficulty} + \beta_2 \text{shared risk} + \beta_3 \text{shared risk} + \beta_4 \text{downside risk} + \beta_5 \text{ strategy} + \beta_6 \text{ budget loss}}$$

The dependent variable is the objective measure (Business unit EVA® multiplier) minus the subjective measure (individual performance evaluation multiplier). The use of actual organizational performance data is unusual. Most prior studies have used proxies (see Gibbs et al., 2004).

Objective measure. The business unit EVA® multiplier has been used. This is a translation made from the actual Business unit EVA®. For example, when Business unit EVA® is below the minimum level set, the multiplier is 0%, 50% when the minimum is reached, when the EVA meets the budget target 100%, and 200% if the upper limit of target range is reached. The Business Unit EVA® multiplier is used, rather than the organizational-wide EVA® multiplier because this is where the managers have most influence and should be more closely associated with their individual performance evaluation (based on personal scorecards).

Subjective measure. The subjective measure is an individual's performance evaluation multiplier and also ranges from 0-200%.

Main independent variables are target difficulty, shared risk and downside risk:

Target difficulty = maximum (upper limit) – minimum (lower limit) / absolute of the budget target.

Target difficult is measured by business unit EVA® targets negotiated at the beginning of the year and includes the spread between the minimum and maximum targets and the "target"

(what is expected). Absolute budget target is used as some of the business units have budgeted losses and others have budgeted profits. An internal company memo confirms that the threshold and maximum targets are set with regard to the maturity of the business (start-up, growth, sunset), scope for improvement, degree of target difficulty, economic and competitive activity, and the need to perform.

Shared risk = % of transfer revenues.

The amount of interdependence between the business units is measured by the percentage of revenues in a business unit that involve transfer pricing from other business units as a reflection of shared risk. The percentage of transfer revenues from 2001 data has been used for both years. A prior study by Gibbs et al. (2004) has used managers perceptions of the percentage of time spent interacting with managers in other department as a proxy for interdependence.

Downside risk = target incentive times four minus the gross incentive/fixed remuneration plus target times four.

This measures the downside risk of what compensation is available to the manager but not obtained. The maximum bonus potential is four times the base amount. The higher the ratio relates to the higher opportunity loss for a manager. Gibbs et al. (2004) discussed downside risk, but did not provide a measure. Sensol's incentive system design provides that four times a managers' base amount is *at risk*, so if managers miss their targets, they have high downside risk. So we expect evaluators to make some adjustment to provide some insurance for managers when they miss their targets. The higher the ratio the greater the percentage they have missed out compared to the potential maximum bonus.

The control variables are strategy and budget loss.

Strategy. Dummy variables are used for business unit strategy (coded as 0 = build; 1 = build). This controls for external risk. The business units were categorized into Build, Hold, Harvest, Divest (see Fisher and Govindarajan, 1993) and the same categories have been used for both years.

Budget loss. The business units who have budgeted for a loss have been coded as 1 for budgeted loss, 0 otherwise. Gibbs et al. (2004, p. 418) coded Departmental Loss in the same way. Budget loss has been used, because the actual loss would have been highly correlated with the Business Unit EVA Multiplier, and it is the budget loss (not the actual loss) that is related to target difficulty.

Descriptive statistics

The descriptive statistics show a range that indicates that where the difference between the objective and subjective ratings is negative, this means that the subjective is larger than the objective measure, and pulls in ways quite different from the objective measure. Interestingly, the objective measure has a higher mean and range of values than the subjective measure across the pooled two years, as well the individual years. The higher mean for the

objective measure[5] when compared to the subjective would support the proposition that the subjective measure is not more lenient but rather has a marginally significant effect on the ratings (Bol, 2008).[6] The range of values for the objective being wider than the subjective would support prior literature that the subjective measure can result in a compression[7] when compared to the objective. However, this paper does not conclude that such a compression is evidence of bias but rather reflecting a set of adjustments that the subjective makes to mitigate the influence of risk.

Insert Table 3 about here

Correlations

The objective measure is significantly correlated with each of the risk variables: shared risk, target difficulty, and downside risk. The subjective measure, by itself, has low correlation with many of the independent variables. This would suggest that the subjective measure by itself is not driven by the risk variables. Rather, the subjective measure is an adjustment to the objective. To support this proposition, the higher and more significant correlation between the objective - subjective (difference between objective and subjective) score with the independent variables suggest that the subjective measure of performance by itself has little meaning but rather gains credence as an adjustment the objective measure.

Insert Table 4 about here

Regression results

Table 4 summarises the results for the pooled data (both periods) as well as the pre shock (period 0) and the post shock (period 1). The overall model has an adjusted R^2 of 40.9% while the pre shock adjusted R^2 is 84.1% and the post shock adjusted R^2 is 73.8%.[8] This preliminary analysis suggests that the difference between the objective and subjective is being driven by the three types of risk that are modeled: shared risk; target difficulty; and downside risk. Further analysis of the results will be undertaken, addressing each variable in turn.

Insert Table 5 about here

With regard to target difficulty, the pooled data reveals that the negative partial[9] coefficient ($p<0.01$) implies that the subjective is larger than the objective for higher levels of target

[5] When a Wilcoxon sign rank test was undertaken to compare the means of the objective and subjective measure, the pre shock period showed a marginal significance in difference ($p< 0.1$) but the post shock period showed a significant difference between the means ($p<0.01$). The pooled period showed that the subjective was significantly lower than the objective ($p< 0.05$).

[6] Other writers such as MacLeod (2003, p.216) would argue that supervisors were more likely to give lenient ratings.

[7] See Moers (2005, p.70); Prendergaast (1999, p.30); Tae Sik Ahn (2008).

[8] The high adjusted R^2 may be suggestive of endogeneity, in particular where the downside risk is highly correlated or a function of the subjective and objective. However, when the regressions were run without downside risk, the adjusted R^2 were around the 80% for period 0 (the pre shock) and 73% for the post shock suggesting that endogeneity, driven by downside risk, was not causing the high explanatory power. Therefore, downside risk remains in the model, especially when in period 0, this variable is not significant, suggesting that this independent variable is not causing any endogeneity.

[9] This partial coefficient is still significant after controlling for budget loss. While Gibbs et al. (2004) use actual loss, this paper could not use actual loss due to the high multicollinearity (where the VIF is higher than 10 for

difficulty. This pooled data is consistent for the pre shock or period 1 (negative coefficient at $p< 0.01$). However for the post shock period, the target difficulty has a positive coefficient ($p<0.01$) indicating that for higher levels of target difficulty, the subjective measure is smaller than the objective measure. This switch of signs implies that the subjective measure, being an ex post adjustment, takes into account the varying economic and competitive forces to address the effect of target difficulty. This would imply that the difference between the objective and subjective measure is not a simple consistent weighting, but contingent on understanding the complex environmental and competitive forces.

In looking at shared risk (transfer revenue), the overall model (pooled data for the two years) shows a negative significant partial coefficient ($p<0.01$), but for the pre shock period, the coefficient was positive ($p<0.01$) and then for the post shock, was negative ($p<0.01$). This would indicate that for the pre shock, the higher the transfer revenue is positively associated with the difference between the objective and subjective measures. This implies that the higher the transfer revenue, the more the subjective downwardly adjusts the objective. However for the post shock period, the negative sign suggests that the higher the transfer revenue, the subjective measure makes larger upward adjustment to the objective measure. This in turn suggests that the subjective is not a static adjustment to the objective with regard to shared risk.[10]

In examining downside risk, the overall pooled model (for both periods) finds a significant negative partial coefficient ($p<0.01$). In the pre shock period (period 0), downside risk is not significant but has a negative significant coefficient in the post shock period (period 1). This suggests that perhaps in good times, downside risk is not a significant driver to which the subjective makes adjustments to the objective. However, during the post shock period, the downside risk is a significant influence to the magnitude of the adjustment that the subjective measure makes to the objective measure.

The three types of risk seem to exhibit patterns that are different for each period, the pre shock and the post shock. The subsequent section discusses more fully some the issues that could explain the significant and intriguing way in which the three types of risk affect the way in which the subjective adjusts the objective.

Qualitative findings

The intensive and longitudinal nature of the broader study provides some explanations for the observed results. Over 200 interviews have been conducted with managers across the business units and down the levels, participant observation at meetings including a review of Sensol's incentive scheme, and extensive periods of observation over 2½ years (Stringer, 2006).

Target setting is very complex (e.g., related diversified, large number of business units, different competitive environments) and has been described by one senior manager as "more of an art than a science". Sensol operates in a dynamic environment, and across a number of different business areas. Over the course of the study it became evident that highly achievable

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the variable actual loss) but that budget loss was used and all the models (and subsequent variables) had VIF scores of less than 10.

[10] The partial coefficient for the shared risk (transfer revenue) is interpreted by controlling for business unit strategy.

targets have been agreed post shock. After the shock loss, business unit managers have been concerned that the targets were unachievable and they would never receive bonuses in the future. This resulted in the post shock targets (Period 1) being revised downward (from the earlier agreed targets). There has also been evidence of considerable gamesmanship during the target setting process. This quote from a senior business unit manager suggests that senior managers also had incentives to agree to targets that they could deliver on:

> *We felt that we were obliged at the time to put in a fairly big stretch target for us … when we sat down with [senior managers] they said well look give us your worst case scenario rather than what the full stretch is and we will accept that, so that was when our original EBIT target was revised down. When you look at the politics of it all, basically [Sensol] had just had a shocking quarter … so [senior management] decided that if they were going to put a budget in they wanted to put something in that wouldn't be – the actual result would never be any worse and they were pretty confident that would be able to proceed and the board, after that dismal quarter, was probably, you know would have been happy with anything that involved profit for the whole of [Sensol] so you know, they put in a very achievable figure in there. (M 1)*

Shared risk is also important in this network organisation as the operations of many of the business units are highly interrelated. Transfer pricing has been a significant issue since decentralization occurred in the mid-1990s. The qualitative data shows that there has been extensive evidence of intense "sibling rivalry" with the business units operating like business "silos". The dysfunctional consequences include acting in their own interests (not in the interests of the whole company), competing with each other for customers, as illustrated by this quote:

> *It's a political game I mean we have again it's a paradox to this incredibly great organisation at [Sensol] that despite itself …We have this huge distrust of ourselves. We have people who will actively go against another division of [Sensol] often to the view of our competitors or to the benefit of our competitors because we have this you know sibling rivalry in our organisation that is sometimes bizarre. (M2)*

Downside risk was also important. Managers were aware that they had high amounts of pay *at risk*, and there were a number of instances when people told "war stories" about the impact of a senior manager's decision, or year-end accounting adjustments on their cash bonuses, as these quotes explain:

> *I mean it's a significant amount of money at stake you know so for me, it's my at risk, is more than 30 percent of my salary. That's just with sort of one multiplier and so for this year there's a reasonable chance if things carry on, the multiplier could add, totally roll out to be over two, so it ends up being 60 percent of my salary again. So that does get your attention and funny enough gets your attention of your partner. (M3)*

> *End of year changes had a big effect on the incentive [payments] of one business unit. It had a very big impact on the multiplier. From a multiplier of 1 to 0.63 (I think). It was big. [amount of bonus lost] something like $10,000 for some managers. (M4)*

Discussion of results and conclusion

The regression analysis sets out to investigate what drove the difference between objective and subjective measures of performance, in particular, shared risk, target difficulty, and downside risk. For the combined two years, we find that subjective performance evaluations have been used to *adjust* (ex post) the objective measure in a (usually) upward direction to take into account the three types of risk. This supports the hypothesis that subjective evaluations are a type of an ex post adjustment that takes into consideration other factors such as the limitations of the objective measure, and are consistent with Gibbs et al. (2004). This is in contrast to prior studies that show objective measures are over-emphasised (Ittner et al., 2003; Lipe and Salterio, 2000; Moers, 2005, p.67).

However when the two periods are analyzed further, the variables of shared risk, target difficulty and downside risk showed interesting patterns. With regard to shared risk, the positive sign means that the subjective is a downward adjustment to the objective measures. One plausible explanation is that during good times, the likelihood that there were free riders who were gaining (relative to more efficient or productive business managers) and the greater the shared risk, the greater the likelihood of free riders. Therefore, during the pre shock period, the subjective measures were a downward adjustment of the objective measures to deal with the free rider problem. For the second period (the post shock), the subjective evaluation was an upward adjustment to take into account shared risk. This would suggest that coordination and risk sharing was to be encouraged in the ex post adjustment (rather than concerns of free rider) as the overall business was concerned about the rapidly changing environment and it was imperative that the business units cooperate. Such a view gains credence when we examine the quote from M2 on "sibling rivalry". During the post shock period, such intense sibling rivalry could pose severe constraints on cooperation and coordination of resources for the corporate to maintain its position in the market place.

In reviewing target difficulty, the regression results indicate that for the pre shock period, the greater the spread of the upper and lower limits around the stated target (hence the greater the target difficulty), the greater would be the upward adjustment that the subjective measure makes to the objective measure. This would in accordance with our prior expectations. However for the post shock period, the regression results indicate that the greater the target difficulty, the subjective would be a downward adjustment. Understanding this change in signs warrants a closer look at the interview quote from M1 which seems to imply that the shock loss was such a jolt that there was the likelihood of gamesmanship and the evidence for this is that the upper limit of the targets (for objective measure) had been reached by a large number of managers. [11] This is contrary to Walsh (2000) who argues that the chance of reaching maximum should statistically be very low. This would imply that for the post shock period, the objective measure has been set too easily and therefore superiors have made adjustments (in a downward manner) to take into account other factors such as budget gamesmanship that was involved. This would require an assumption that the evaluators were informed and knowledgeable, not only about the business processes and business unit strategies but also the levels of difficulty in setting the upper and lower limits. Such an assumption would not be unrealistic as the evaluators were senior managers who had worked in the corporation for several years. The finding that senior managers may agree to highly

[11] In period 0, 20.3% of managers and professionals got the maximum of 200%, while in period 1, 60.1% of the managers and professionals got the maximum of 200%.

achievable targets (post shock) to ensure predictability of results is consistent with Merchant and Manzoni (1989).

Downside risk is not significant for the pre shock period, but significant for the post shock period where the subjective measure is an upward adjustment to the objective measure. This implies that during the shock period, the importance of the loss function to the managers became an integral part of the settling up period. The qualitative data suggests that many managers have been aware of the dollar amount of cash bonus they have lost, and some could even point to transactions or events in the year that drove that opportunity cost. Therefore, one could expect that the evaluators were aware that the employees were computing what could have been lost, and such a loss function would form a part of the evaluation. We speculate that evaluators may have posed themselves the question, how much will these employees be willing to lose in cash bonuses in this post shock period? The post shock period would also be a testing time, not only for the employees but also for the evaluators. To lose key managers and professionals whose knowledge and skill were needed to see the corporation through the post shock period would have been important (a retention issue). This could explain why the downside risk is significant in the post shock period, and not in the pre shock period. Alternatively, from the perspective of the manager and professional, the amount of the bonus potential that has been lost to an individual manager could be viewed as a signal from the employer as to the intentions of the corporate evaluators for the future. Especially if the loss in the post shock was largely uncontrollable, then the opportunity cost (the downside risk) could be considered as being unfair.

In conclusion, our findings are consistent with Gibbs et al.'s (2004) argument that the use of subjective measures supports the agency theory view that the evaluators (principals) are well informed managers who know that the objective measure alone does not capture key elements of a manager's performance. This is in contrast to some studies (Ittner, Larcker and Meyer 2003; Moers, 2005) that subjective performance evaluations tend to result in biases, manipulation, and gamesmanship. Rather, we argue that the manipulation and gamesmanship that go into setting the objective measure targets and limits need to be reviewed in an ex post manner and the use of subjective measures undertaken by knowledgeable and informed evaluators is key to controlling for various types of risk.

This study has important implications for performance management and incentive system design. Subjective measures of performance, if done in an ex post adjustment by knowledgeable evaluators, can adjust the objective measures to reflect the risk that individual employees can face. However, the manner in which such adjustments occur seem to reflect the economic conditions such as pre shock or post shock. This paper supports the need for further research to understand more clearly the role of subjective measures in the adjustment process. In other words, do evaluators use heuristics that are intriguingly accurate in dealing with risk factors? Or is the relative ranking of employees and broad guidelines of ranking an effective way of ensuring that evaluators' ex post adjustments capturing the risks undertaken by employees?

There are a number of limitations with this study. The data set did not include identifiers (due to the extreme sensitivity of such performance indicators) for managers and professionals, and so we could not track an individual across the periods. The measure of target difficulty relied on the spread (difference between upper and lower limit) which could have been manipulated during the post shock period. Therefore, the spread, given the texts of

interviewed managers, was not even capturing stretch targets but rather a mechanism used by senior managers to ensure that the corporate could deliver to the now lower expectations.

There are several issues that need to be addressed in future research. The necessity of designing compensation contracts that balance incentives with efficient risk sharing (Gray and Canella, 1997; Rajan and Richelstein, 2006) and the use of subjective assessment is warranted (Jensen et al., 2004). There are several reasons to believe that the risks associated with an organization's strategy may be an important consideration in establishing the level of executive compensation (Gray et al., 1997, p. 520; Jensen et al., 2004). In addition, we need greater understanding of incentives in loss-making entities as they tend to reduce the weighting on earnings for performance evaluation purposes, the role of subjective performance evaluations needs to be better understood (Matejka et al., 2005, p.27). Further research needs to incorporate multiple methods (interviews, survey, and archival data) so that the data can be understood within the wider context.

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Target difficulty	Greater target difficulty, the greater the upwards adjustment to the objective measure
Shared risk	Mixed. Subjective measures could be an upwards (e.g., cooperation, measurement error) or downwards (e.g., free rider) adjustment
Downside risk	Mixed. Subjective measures could be an upwards (e.g., uncontrollable factors) and downwards (e.g., free rider)

Table 1 Summary of hypothesis expectations

Perspective[12]	Scorecard measures	Weighting
Financial	EVA® (70% on company performance and 30% on business unit performance)	80%
Customers	Service performance (internal service performance measure)	5%
Internal	Employee satisfaction (survey), health and safety, and other social measures	10%
Learning and Growth	Total external operating revenue	5%

Table 2 Sensol's value scorecard

[12] Kaplan and Norton's (1996) four perspectives are used here for confidentiality reasons.

Both Periods				
Variable	**Mean**	**SD**	**Actual range**	**N**
Subjective measure	1.125	.1970	0.4-1.8	956
Objective measure	1.3532	.67028	0.0-2.0	957
Objective – Subjective	.2276	.65821	-1.6-1.36	956
Target difficulty	.5272	.45003	1.4-1.79	957
Downside risk	.1543	.04113	0.06-.34	957
Transfer revenue	.284	.2298	0.0-2.84	957
Period 0 (pre shock)				
Subjective measure	1.097	.2162	.4-1.8	522
Objective measure	1.1433	.60777	.58-2.0	523
Objective - Subjective	.0448	.59446	-1.22-1.25	522
Target difficulty	.6412	.50107	.14-1.79	523
Downside risk	.1713	.03856	.10-.31	523
Transfer revenue	.265	.2274	0.0-.9	523
Period 1 (post shock)				
Subjective measure	1.159	.1653	.6-1.8	434
Objective measure	1.6062	.65520	0.00-2.0	434
Objective - Subjective	.4475	.66454	-1.6-1.36	434
Target difficulty	.3899	.33149	.15-1.79	434
Downside risk	.1338	.03423	.06-.34	434
Transfer revenue	.307	.2307	0.00-.9	434

Table 3 Descriptive Statistics

	Subjective	Objective	Objective-subjective	Shared risk	Target difficulty
Combined period					
Objective	.209**				
Objective-Subjective	-.086**	0.956**			
Shared risk	.118**	.360**	.332**		
Target difficulty	-.057	-.231**	-.219**	.208**	
Downside risk	-.187**	-.483**	-.440**	-.120**	.232**
Period 0					
Objective	.239**				
Objective-Subjective	-.119**	.936**			
Transfer revenue	.236**	.323**	.247**		
Target Difficulty	-.004	-.240**	-.244**	.083	
Downside risk	-.069	-.372**	-.364**	-.121**	.135**
Period 1					
Objective	.069				
Objective-Subjective	-.180**	.969**			
Transfer revenue	-.093	.382**	.399**		
Target Difficulty	-.040	-.009	.001	.548**	
Downside risk	-.247**	-.419**	-.351**	-.043	.103*

Table 4 Correlations

	Both periods	Period 0	Period 1
Target difficulty	-.318 (-6.473)**	-1.272 (-39.767)**	.515 (3.602)**
Downside risk	-4.611 (-10.017)**	-.430 (-1.463)	-1.897 (-3.551)**
Shared risk	-.805 (-4.806)**	1.221 (11.418)**	-.763 (-4.095)**
Budget Loss	-.746 (-12.119)**	-.095 (-2.305)*	-.929 (-14.423)**
Build	-.442 (-7.242)**	1.354 (28.522)**	-1.378 (-25.163)**
Hold	.436 (6.206)**	.615 (14.824)**	-.566 (-4.096)**
Divest	-.011 (-.094)	2.458 (27.123)**	-1.718 (-9.650)**
F Statistic	83.747 **	393.267**	175.171**
Adjusted R^2	.409	.841	.738
Number of observations	955	521	433

**p< 0.01

Table 5 Regression results