

# **Control Systems and the Innate Preferences of Managers**

**Jan Bouwens**

Tilburg University

CentER and Department of Accountancy

PO Box 90153, 5000 LE Tilburg, The Netherlands

[T] +31 13 466 8288, [F] +31 13 466 8001

[j.bouwens@uvt.nl](mailto:j.bouwens@uvt.nl)

**Laurence van Lent**

Tilburg University

CentER and Department of Accountancy

PO Box 90153, 5000 LE Tilburg, The Netherlands

[T] +31 13 466 8288, [F] +31 13 466 8001

[vanlent@uvt.nl](mailto:vanlent@uvt.nl)

# **Control System and the Innate Preferences of Managers**

## **Abstract**

We examine whether the innate preferences of business unit managers for producing ideas, for conforming to social norms, and for caring about precision, reliability, and efficiency influence the weight on both financial and non-financial measures of performance. We explore the association between innate preferences and performance measures in three decision contexts (annual appraisal, bonus compensation, and long-term career advancement). In addition, we examine the association between innate preferences of managers and the use of variance reporting, interactive controls, and subjective performance evaluation by their superiors. In a sample of 100 business unit managers, we find evidence consistent with the hypothesis that innate preferences are an important determinant of the design and use of control systems.

# Control Systems and the Innate Preferences of Managers

## 1. Introduction

We examine the effect of the innate preferences of business unit managers for risk avoidance and conforming to social norms on the use of performance measures and on three comprehensive control practices: (1) the use of variance reporting, (2) the use of the control system as a communication device, and (3) the use of subjective performance evaluation.

Our investigation is motivated by the increasing evidence that heterogeneity among senior managers explains variation in corporate policies unaccounted for by firm-level fundamental factors (Hambrick and Mason 1984; Bertrand and Schoar 2003; Hribar and Yang 2006; Francis, Huang, Rajgopal and Zhang 2008; Ge, Matsumoto and Zhang 2008; Malmendier and Tate 2008; Schrand and Zechman 2009). In turn, heterogeneity among managers is to a large extent rooted in personality differences (Graham, Harvey and Puri 2009).

Innate preferences are “hard-wired” into the personality of managers and we rely on a psychometrically validated instrument for measuring the preferred cognitive strategies for dealing with problems, the Kirton (1976) Adaption-Innovation Inventory, to infer these preferences. We follow the recommendation of Graham, Harvey and Puro (2009) to administer surveys and use established questions to measure respondents’ behavioral traits. Thus we address validity problems created when researchers rely on coarser broad-based proxies that use managerial actions to infer respondent preferences.

We emphasize two innate preferences: risk-avoidance and social norms, which figure prominently in those economic models that are used in the literature to explain control systems (Indjejikian 1999; Baker 2000; Sliwka 2007). Risk avoidance plays a role in explaining variation in the optimal incentive power in contracts between principals and agents. Risk avoidance relates to the use of performance measures because the latter tend to vary in how “noisy” their estimate is of the effort of the agent. More noisy measures expose managers to more risk; preferences for risk avoidance therefore affect the costs of using certain measures. Social norms are important because they can guide the behavior of managers in the absence of explicit incentives (Heinle, Hofmann and Kunz 2009) but can also interfere with the proper working of the control system (Sliwka 2007; Fischer and Huddart 2008).

We explore the effect of innate preferences of managers on the choice of whether or not a specific type of measure is used to evaluate their performance. We include a comprehensive set of financial and non-financial measures in an effort to be as precise as possible in our attribution of how preferences relate to measures. We then consider the weight placed on each performance measure in three decisions, annual appraisal, cash bonus compensation, and longer-term career advancement, to document whether the association between performance measure and innate preferences is different in each of these decisions. Although we do not have strong priors about the differences between decision contexts, we expect that innate preferences are more prominent in decisions that have longer term implications.

We collect data using a survey administrated among a sample of 105 business unit managers in the Netherlands. The survey asks well-established questions about

personality characteristics of the respondents, as well as about the performance measures used to assess the manager, other control practices (such as variance reporting), and background information about the respondents and their business unit.

Our findings provide support for the idea that the innate preferences of managers explain variation in control practices in business units. We find that risk-avoidance preferences are associated with lower use of non-financial measures, which we attribute to these measures being better at foretelling future performance and stimulating cooperation between managers who are more risk-taking. Risk avoidance is furthermore associated with a reduced use of variance reporting, a lower frequency of using the control system as a communication device between upper management and the business unit manager, and increased use of subjective performance evaluation.

We also find that preferences for social conformity increase the use of financial measures compared with non-financial measures. Specifically, the use of accounting return measures increases significantly when managers have preferences for conforming to social norms.

Overall we conclude that the importance of innate preferences for the use of control systems varies considerably. In general, we find little evidence that financial measures such as profits, costs and revenues are affected by these preferences. On the other hand, the use of non-financial measures and control practices such as variance reporting and subjective evaluation are different for managers with varying degrees of risk avoidance and social norm conformity.

## **2. Hypothesis development**

### *2.1 Do individual characteristics of managers matter in explaining corporate policy?*

A growing literature in accounting and finance considers the personality traits of managers and their effect on corporate actions. This trend follows up on a longer tradition in the management field, which has always been interested in the individual characteristics of managers (see, e.g., Hambrick and Mason 1984) and how they influence firm policy, and more recent developments in economics that models the same (see for a summary, Bolton, Brunnermeier and Veldkamp 2008).

Indeed, prior work shows that “style” differences between CEOs explain cross-sectional variation in investment policy, financing, and organizational practices (Bertrand and Schoar 2003). Several recent related studies have examined the influence of senior managers on accounting policies and show that their effect can be separated from firm-level determinants (Francis et al. 2008; Ge et al. 2008; DeJong and Ling 2009). Some of these studies also provide evidence that CEOs differ from CFOs.<sup>1</sup> These studies generally rely on panel data techniques and provide evidence of managerial fixed effects. In other cases, managerial traits are inferred from ex ante reasoning. For example, Easton, Jia and van Lent (2009) use samples of managers involved in the stock option backdating scandal or in fraud to make inferences about their preferences for honesty.

Other researchers aim at measuring managerial traits more directly and proxy for some salient characteristic. Malmendier and Tate (2008), use the overweighing of the own firm in the CEO’s investment portfolio as a measure of “overconfidence”. These authors show overconfident managers to engage more in acquisitions and, more in general, that overconfidence affects corporate investments (Malmendier and Tate 2005).

---

<sup>1</sup> Compared with CFOs, CEOs tend to be more optimistic (Graham et al. 2009) and report less solid earnings (DeJong and Ling 2009). CFOs have been shown to succumb to CEO pressure to engage in accounting manipulations (Feng, Ge, Luo and Shevlin 2009) and the incentive compensation of CFOs

Schrand and Zechman (2009) use the prevalence of the CEO's photo in the annual report as well as the difference in pay with the second-highest paid official in the company as alternative proxies and show that overconfident managers are more likely to commit financial reporting fraud. Malmendier and Tate (2008) and Hribar and Yang (2006) rely on popular press characterizations of the CEO to measure overconfidence.

In contrast to the inventive but somewhat coarse proxies used in these studies, Graham et al. (2009) administer psychometric tests of personality to a broad sample of senior managers to measure their risk aversion, optimism, time preference, and aversion to sure losses and relate these characteristics to firm policies.

Two conclusions arise from this burgeoning literature. First, heterogeneity among (senior) managers explains variation in corporate policies incremental to what is explained by fundamental firm-level factors. Second, the root cause of this heterogeneity appears to be differences in personality characteristics between managers. These conclusions come as no surprise to management accounting researchers, who have had a long tradition of considering individual characteristics (see, e.g., Chenhall 2003; Luft and Shields 2003).

The advent of economic models that incorporate insights from psychology helps to integrate this behavioral tradition in accounting with work based on economic theory, which aims to understand how firms use elements of the organizational design to align the objectives of individuals with those of the firm. The power of economic-cum-psychological models together with the thoroughly-tested psychometric measures of personality traits that suffer from far less measurement error than proxies based on

---

appear to matter more than that of CEOs with respect to earnings management (Chava and Puranandam 2009; Wang, Petroni and Jiang 2009).

publicly available information, allow us to test hypotheses about the association between managerial characteristics and the control system of the firm (Graham et al. 2009).

## *2.2 Innate preferences for risk-avoidance and conforming to social norms*

Traditional agency models analyze the tradeoff between providing incentives to risk and effort averse agents through performance dependent pay and the need to minimize the risk shifted onto these agents (Indjejikian 1999). While the practical importance of this tradeoff may be an open question (see, Prendergast 2002a), it is clear that the preferences for risk avoidance play a considerable role in understanding the response of individuals to incentives (Lambert and Larcker 1987; Garen 1994; Bushman, Indjejikian and Smith 1996; Nagar 2002), environmental uncertainty (Prendergast 2002b), and the control system (Young 1985; Kim 1992).

Recent advances in agency theory have begun to incorporate the role of social norms in contracting (Benabou and Tirole 2003; Sliwka 2007; Fischer and Huddart 2008; Mittendorf 2008). Social psychology suggests that individuals have innate preferences to conform to the behavior of peers. At the same time, the sensitivity of individuals to these norms differs (Cialdini and Trost 1998). Empirical evidence, mostly from experimental studies, shows that social norms have implication for organizational design (Hannan, Rankin and Towry 2009) and control systems (Evans, Hannan, Krishnan and Moser 2001; Coletti, Sedatole and Towry 2005; Hannan 2005; Hannan, Rankin and Towry 2006).

It is important to emphasize that the preferences for risk avoidance and for conformity to social norms are innate, i.e., they are hard-wired into the personality of

individuals (Marvin and Kuhlman 2000).<sup>2</sup> Owing to this fact, we can treat innate preferences as predetermined when examining their association with control systems.

### *2.3 The association between innate preferences and control systems*

We consider how the preferences for risk-avoidance and conformity to social norms affect the use of different types of performance measures as well as three comprehensive control practices: (1) the use of variance reporting, (2) the use of interactive controls, and (3) the use of subjective performance evaluation. Although we consider ten specific types of performance measures in our empirical tests, for the purpose of developing hypotheses, we collapse the measures into two broad categories: financial and non-financial.

#### Preferences for risk avoidance and control systems

Traditional agency models show that the optimal weight placed on a performance measure is decreasing in the degree of risk aversion of the agent (see, e.g., Holmstrom 1979; Banker and Datar 1989; Indjejikian 1999; Baker 2000). Intuitively, this happens because the more risk averse an agent is, the more he wants to be compensated in expected value for being exposed to the risk associated with a performance measure that does not capture adequately his effort (but instead is impacted on by exogenous factors). The literature on non-financial measures argues that these measures are generally more ‘controllable’ and less noisy than are financial measures (Wruck and Jensen 1994; Ittner and Larcker 1998; Ittner and Larcker 2003). This is because non-financial measures tend to be more “actionable” to business unit managers and they are less subject to exogenous

---

<sup>2</sup> There is some evidence that risk-taking (or sensation seeking behavior) is genetic (Robert and Avshalom 1998). For example, Ebstein et al. (1996) report an association between the D4 dopamine receptor (D4DR) exon III and the closely related personality trait of novelty seeking. Some authors have argued that many

events (Baker 2002; Horngren 2004; Bouwens and van Lent 2007; Raith 2008). Notwithstanding these claims, the case for the role of noise in agency models is heavily contested both in theory and empirically. Few empirical studies are able to consistently document that noise affects incentive compensation and this has motivated theorists to look for more significant factors in explaining the use of (noisy) performance measures (Feltham and Xie 1994; Prendergast 2002b; 2002a). Congruency (i.e., the extent to which a measure aligns the goals of an agent with those of the principal) has been offered a prime candidate for consideration.

Several empirical papers have documented that non-financial measures can increase the congruency of an existing set of financial measures because they are *leading* indicators of performance (Banker, Potter and Srinivasan 2000; Nagar and Rajan 2001; Smith and Wright 2004; Dikolli, Kinney Jr. and Sedatole 2007). Senior management is more likely to be concerned about receiving early signals about the potential success of a project when the manager in charge has preferences for risk-taking than when the manager is risk averse. In addition, managers with innate preferences for risk-taking are sometimes characterized in the behavioral literature as “creative loners” (Goldsmith 1994). Recent work in agency theory suggests that non-financial measures can facilitate coordination between managers (Baiman and Baldenius 2009). This feature seems especially helpful to induce cooperation among risk-taking managers who do not have innate preferences to do so (Bouwens and van Lent 2007).

---

personality traits (including the preference to conform to social norms) are likely to have a substantial genetic origin (Bouchard and Loehlin 2001).

Thus, when managers have lower preferences for risk avoidance, congruency concerns become more pronounced and firms are more likely to put higher (lower) weight on non-financial (financial) measures:

**H1a:** The innate preference of a business unit manager for risk avoidance is negatively associated with the weight on non-financial performance measures and positively associated with the weight on financial measures.

One implication of hypothesis H1a is that risk-avoidance preferences are likely to be associated with control packages that include *fewer* performance measures. This implication is again in contrast with the outcome of more traditional agency models, because these models usually conclude that risk avoidance increases the costs of using noisy measures, which in turn increases the payoff from introducing additional low-noise measures that may potentially reduce the overall noise in the control package (Feltham and Xie 1994). We predict, however, that congruency concerns motivate firms to add non-financial measures to the control system when managers are more risk-seeking and thus we believe that risk avoidance and the number of performance measures are negatively correlated:

**H1b:** The innate preference of business unit managers for risk avoidance is negatively associated with the number of performance measures used to evaluate their performance.

When dealing with managers with preferences for risk-seeking, it becomes important that senior management follows up on departures from the agreed upon plans and budgets. Indeed, by discussing why managers do not meet certain targets or by insisting on detailed explanations for unexpected results, senior management can rein in excessive risk taking that might endanger the long-term viability of the firm. In those

cases, superiors are more likely to request detailed explanations for budget variances. Risk averse agents find variance investigations particularly distasteful because their outcome is uncertain (Baiman and Demski 1980; Brownell 1983).

Senior management is also more likely to use the control system interactively when dealing with managers with preferences for risk taking (Simons 1990). The control system then becomes a communication tool to reveal their preferences to subordinates, encourage sharing of information between top management and lower level managers and allow managers to debate the underlying assumptions associated with targets and objectives (Simons 1990; Simons 1991; Abernethy and Brownell 1999; Davila 2000; Garicano 2000; Bisbe and Otley 2004; Abernethy, Bouwens and van Lent 2009a). This is especially important to ensure that risk taking managers do not cross boundaries and are kept constantly aware of what behavior is in the interest of the firm. The information sharing, on the other hand, allows senior management to monitor the actions of risk taking managers more closely and to intervene at critical times. We therefore hypothesize:

**H2:** The innate preference of a business unit manager for risk avoidance is negatively associated with the use of variance reporting.

**H3:** The innate preference of a business unit manager for risk avoidance is negatively associated with the interactive use of control systems.

Baker (2000) suggests that when the quality of objective performance measures becomes very poor, firms may abandon objective measures altogether in favor of subjective performance measurement, i.e., evaluating the manager's performance by the judgment of his superior. In Baker's model, the optimal incentive weight placed on an

objective measure moves to zero more quickly as the risk aversion of the agent increases.

We thus expect the following to hold:

**H4:** The innate preference of a business unit manager for risk avoidance is positively associated with the use of subjective performance measures.

#### Preferences for conforming to social norms and control systems

Recent agency models have analyzed how the presence of agents with a preference for conforming to social norms can affect contracting and organizational design. For example, Sliwka (2007) argues that high powered incentives can signal that senior management does not trust the prevailing social norm. This lack of trust can then crowd out the intrinsic motivation of agents. Ceding decision making authority to lower level managers, on the other hand, shows that senior management is optimistic about the social norm and this will in turn motivate “conformist” agents. Fischer and Huddart (2008) show how social norms have “multiplier” effects on the power of incentives. Social norms can both increase the working of providing incentives to agents to exert effort on some desired action as well as decrease the same. The outcome hinges on whether the social norm is present for desired (e.g., diligent effort) or undesired actions (such as manipulating the accounts).

One important takeaway from these analyses is that agents who are more sensitive to social norms are less likely to be subject to explicit incentives and other formal controls. Non-financial measures are more explicit in prescribing the kind of desired behavior senior management is looking for. For example, measures such as “customer satisfaction” or “employee absenteeism” spell out which factors in the business model should be emphasized in the decision making by local managers. Financial measures, on the other hand, leave more degrees of freedom and allow local managers to make their

own tradeoffs. The more senior managers can rely on social norms to guide these tradeoffs towards achieving company goals, the more they will put weight on financial measures of performance. Thus, we predict:

**H5:** The innate preference of a business unit manager for conforming to social norms is (positively) negatively associated with the use non-financial (financial) measures of performance.

In a much similar vein, work in behavioral economics has shown that any type of formal control can crowd out preferences for social norms (Frey 1993). Controls can actually promote opportunistic actions among agents who otherwise have a preference for reciprocity, fairness, and trust (Fehr and Gächter 2001; Fehr and Rockenbach 2003; Fehr and List 2004; Falk and Kosfeld 2006; Houser, Xiao, McCabe and Smith 2008). Much of this effect appears to be due to agents interpreting the imposition of controls as a signal of distrust (Malhotra and Murnighan 2002). As before, we expect senior management to be more reluctant to impose formal controls when agents have high preferences for conforming to social norms. This holds in particular for the use of variance reporting. By making business unit managers explain every deviation from the budget and reporting in detail about why targets have not been met, senior management might convey (at least implicitly) that they do not trust the local manager to do the very best job possible. In response, the local manager may act opportunistically (and start to game the budget system).

**H6:** The innate preference of a business unit manager for conforming to social norms is negatively associated with the use of variance reporting.

In addition, findings from work in behavioral economics suggest that agents act more opportunistically when they are facing weak or incomplete controls (Falk and

Kosfeld 2006). Some authors have argued that subjective performance measures are more useful in those circumstances when available performance measures are incomplete (Baker, Gibbons and Murphy 1994). We therefore hypothesize:

**H7:** The innate preference of a business unit manager for conforming to social norms is positively associated with the use of subjective performance evaluation.

When dealing with business unit managers who have preference for conforming to social norms, it becomes imperative that the core values of the firm are communicated clearly by upper echelons. When control systems are used interactively, senior managers personally and frequently involve themselves in the decisions of subordinates. This allows senior managers to focus attention and force dialogue and learning throughout the organization (Simons 1994). Senior management communicates the norms they value precious in the discussions with business unit managers and to the extent that the latter have a preference for conforming to these norms, using the control system interactively is going to be more effective.

**H8:** The innate preference of a business unit manager for conforming to social norms is positively associated with the interactive use of control systems.

### **3. Sample, variable measurement, and econometric issues**

#### *3.1 Sample selection*

We are interested in the relation between the innate preferences of business unit managers and the manner in which senior management assesses their performance. We randomly select a target sample from a database that contains the addresses of firms domiciled in the Netherlands. We verify that the target firms have multiple business units using information from the firm's annual report, website, or other public sources. We

then send introduction letters to the CEO of each of these firms and follow up these letters by a phone call during which we clarify the objective of the study. We attach to the introduction letter a copy of two earlier studies by the authors in a version aimed to summarize the findings for practitioners. During the phone call, we invite the CEO (or the company official we talk with) and any other interested officers of the company to attend a workshop in which the authors discuss the findings of the current project and benchmark each company's practice to the other firms in the sample. We explain that a team of students will visit the site of one of the business units of the firm to interview the manager on performance evaluation practices in the firm. This procedure yields a high response rate, 100 firms from our target sample of 135 agree to participate in the study.<sup>3</sup> We ask the CEO to nominate a "typical" business unit manager and emphasize that it is important that we do not want to speak to the most successful manager or conduct the interview in a business unit that is otherwise atypical. We then liaise with the CEO office to contact the nominated business unit manager and set up an appointment for the student team to conduct the interview.

Student teams are instructed to follow a standard interview protocol. They also receive instructions to avoid any behavior that might lead the respondents to think some answers are more acceptable and to make sure that the questionnaire is answered in full. These procedures are designed to reduce common method bias (see also below).

Table 1, Panel A presents some summary statistics about the business units included in the sample. The business units employ on average 382 people, but substantial variation in size exists (between 50 and 6700). We also find substantial variation in the

---

<sup>3</sup> This procedure is similar to the one described in Bouwens and van Lent (2007) who also report a high response rate.

importance of the business unit within the firm. In some cases, the business unit represents a negligible part of the overall company, while in other cases the unit is clearly the most important in the firm (as measured by the proportion of the unit's revenues in the total firm-wide sales or by the proportion of employees). Panel B is a frequency table of the industry distribution. Manufacturing includes 29 per cent of the sample observations, and the service sector represents about 60% of the sample (this is similar to earlier studies who have used a sample of firms from the Netherlands, (Abernethy, Bouwens and van Lent 2004; Bouwens and van Lent 2007). Panel C shows that 43 per cent of the business units have a strategy aimed at market share expansion, whereas almost the same number of units report that their strategy is to protect market share. Only 3 firms are in the process of liquidation or spin off of the business unit.

We present the characteristics of the respondents in Table 1, Panel D. The average age of the business unit managers is 45. They have been in their current job for 4.7 years on average and their longevity in the current business unit is about double that period of time (mean = 8.9 years). We find that the length of the average reporting relation between the respondent and his or her current senior manager is about 4.1 years (median = 2 years).

### *3.2 Variable measurement*

We describe the survey questions we use to construct our variables in the Appendix. All latent constructs (i.e., variables that are inferred from manifest survey questions) have been submitted to factor analysis to pre-test their measurement properties following the recommendations in Hair et al. (1998) and Chenhall (2005). These tests,

available from the authors upon request, show that our variables display good construct validity and reliability.

Practical considerations prevent us from obtaining data from more than one respondent in the firm.<sup>4</sup> This raises the potential for common rater/method bias. To further reduce potential problems of this type of bias and enhance construct validity, we undertake several procedural and statistical measures as recommended by Podsakoff et al. (2003).<sup>5</sup>

### 3.1.1 Measures of control system design and use

*Weight placed on type of performance measure.* We present respondents with a list of ten types of performance measures. We provide examples of measures that are typical for each category and ask respondents to indicate whether the measure is used to assess the respondent's performance and, if so, what weight senior management places on the measure in three different decision contexts: (1) annual performance appraisal, (2) cash bonus determination, and (3) long-term career advancement. This approach is consistent with Bouwens and van Lent (2007), who motivate their examination of these decision contexts by acknowledging that it is plausible that different performance measures are

---

<sup>4</sup> The interviews lasted between two and three hours on average. We deemed that asking for more than one manager to participate in our study would, given the time required to conduct the interviews, substantially reduce the possibility of obtaining a favorable response from top management to our request.

<sup>5</sup> Specifically, we separate the measurement of dependent and independent variables by placing the questionnaire items at maximum distance from each other and by using different response formats. We also protected respondent anonymity and reduced evaluation apprehension by assuring respondents that there are no right or wrong answers and that they should answer questions honestly. Finally, we heeded the warning in the methodological literature that some scale items are more prone to common method variance than others. For this reason, we avoided as much as possible for our key dependent and independent constructs the use of Likert-scales with similar end points and formats as these commonalities are likely to cause common method bias and anchoring effects. In addition, we conduct Harman's (1967) single factor test to provide statistical evidence on the extent to which common method variance exists in the data. If there is a substantial amount of common method variance, then either a single factor will emerge or one factor will account for the majority of covariance among the variables (see also Abernethy et al. (2004) for a similar approach). This test clearly rejects the hypothesis that common method bias is driving our results (chi-squared = 2256; df=1430, p-value<<1%).

used for different purposes (see also, Ittner and Larcker 2001). In addition, since all three contexts are concerned with the performance evaluation of managers, to some extent they can be construed as mutual validity checks.<sup>6</sup> We distinguish between financial and non-financial performance measure types. Included in the first category are profitability, accounting return, cost and sales measures. We distinguish profitability from accounting return measures because prior work has suggested that the incentive working of measures that include the asset base is substantially different from those that do not (such as firm profit) (Bouwens and van Lent 2007; Abernethy et al. 2009b). We also distinguish between cost and sales measures and between these two types and more aggregated measures of performance (e.g., profit, return-on-investment) because prior work suggest that disaggregated accounting measures are employed in firms for different reasons (Bouwens and van Lent 2007). The non-financial category comprises efficiency, quality, project, creativity, team, and personal measures. Full descriptions of these measures (including examples) are given in the Appendix. Table 2 presents summary statistics on the frequency each performance measure type is used as well as on the weight placed on each measure for annual appraisal, cash bonus determination, and career decisions. Profitability measures are used most (79% of the sample) and receive the highest weight, especially for the purpose of determining the cash bonus (mean = 0.39). In general, regardless of the decision context, financial measures of performance receive more

---

<sup>6</sup> Note that our instrument yields some other benefits that have been pointed out in prior studies. Because we ask respondents to report the *actual* weight placed on measures, we are less concerned with the possibility that we are measuring perceptions instead of harder facts. This holds in particular for the decision context of the determination of cash bonuses, in which we ask respondents to report the weight according to the bonus formula if the bonus plan is formula based. Using weights also allows respondents to report that measures have equal weight (and does not force a ranking between similar measures). Finally, as the weights have to sum to 100%, respondents base their judgment on the overall performance measure package simultaneously instead of on each measure separately (see, Abernethy et al. 2004; Bouwens and van Lent 2007; Abernethy, Bouwens and van Lent 2009b; Bouwens, Hofmann and van Lent 2009).

weight than non-financial measures. We should point out, however, that comparing the average weight across measures favors those (financial) measures that are used with highest frequency. If a respondent reports that a measure is not used, it will receive zero weight; a preponderance of measures that are used with low frequency will produce a low average weight even though individual firms (that select to use the measure) place substantial weight on it. As non-financial measures tend to be tailored to the specific circumstances of individual firms (see, e.g., Ittner, Larcker and Rajan 1997), it will rarely happen that firms use all types of non-financial measures we distinguish (whereas the majority of firms do use profit measures). In addition, we wish to draw attention to the relatively high weight placed on “personal” measures for long-term career decisions. The average weight on these measures equals that of profit measures in the same context (mean = 0.20).

*Use of the control system.* We use three different constructs to proxy for the *use* of the control systems (as opposed to the *design choice* of performance measure and their weights, (see, Abernethy et al. 2009a)). We measure the extent to which firms (1) use variance reporting, (2) use the control system interactively (Simons 1990; Abernethy and Brownell 1999), and (3) use subjective performance evaluation. We describe each of these measures in more detail below. Full descriptions of the questionnaire items are in the Appendix. Table 3, Panel A presents summary statistics on the distribution of the items in each proxy variable.

Use of variance reporting: We use an adapted version of Brownell’s (1983) “Management by Exception” instrument to measure the extent to which senior management requires business unit managers to investigate favorable and unfavorable

variances from (budget) targets. The instrument consists of six items, two of which we drop based on the factor analysis. Respondents indicate on a fully-anchored seven-point scale (1 = never; 7 = always) the frequency in which they have to investigate variances and explain these to senior management. The remaining four items are uni-dimensional and their summated scale displays good psychometric properties (Cronbach's alpha = 0.82).<sup>7</sup>

Use of interactive controls: We use the instrument developed by Abernethy and Brownell (1999) and adopted by others (e.g., Bisbe and Otley 2004; Abernethy et al. 2009a) to measure the interactive use of the control system, i.e., the extent to which performance evaluation information is exchanged between senior management and subordinates. Interactive use of controls systems provides a means of debating how to deal with changes in the environment of the firm or in operating conditions (Abernethy and Brownell 1999) and allows senior management to communicate its values and preferences in the process (Simons 1991). The instrument consists of four questions and uses a fully-anchored seven-point Likert-scale (1 = disagree very strongly; 7 = agree very strongly). Factor analyses (not tabulated) reveal that the construct is uni-dimensional and we use a summated scale (Cronbach's alpha = 0.73). High values on the summated scale indicate that the control system is used in an interactive way.

Use of subjective performance evaluation: We purpose-develop an instrument which is somewhat related to the approach taken in Govindarajan and Gupta (1985). We use five questions to understand the extent to which senior management can use their judgment when evaluating the performance of business unit managers. Specifically, the instrument

---

<sup>7</sup> Brownell (1983) suggests that firms may treat favorable and unfavorable variances differently. We do not find this in our sample.

captures whether the achievement of targets always leads to a positive performance evaluation and/or failure to do the same implies negative evaluations. Sample questions include “Performance is measured subjectively in this firm” and “Criteria to assess my performance are flexible”. We use the same Likert-scale as in the “use of interactive controls” variable. Factor analyses support the use of a summated scale, which has a Cronbach’s alpha of 0.76.

### 3.2.2 Test variables

We measure the innate preferences of business unit managers using the three subscales of Kirton’s (1976) Adaption Innovation Inventory (KAI). KAI is a measure of a basic personality dimension and it relates to the preferred cognitive strategies involved in dealing with change (Kirton 1994). KAI assumes that everyone can be placed on a continuum ranging from a preference for *doing things better*, to a preference for *doing things differently*. Those located on the former extreme are labeled “adaptors”, while the latter are “innovators”.<sup>8</sup>

We have three reasons to use KAI as a measure of innate preferences. First, current thinking in the behavioral sciences understands cognitive style to be based on individual preferences with respect to organizing and processing information, which develop around underlying personality traits that appear early in life and are stable. Indeed, KAI summarizes preferences or emotions (such as risk taking, sensation seeking, tolerance for ambiguity, and self-esteem) which are the result of personality traits and manifest themselves in preferences for problem solutions (Goldsmith 1994). As such, KAI captures exactly the kind of innate preferences we hypothesize might be important

---

<sup>8</sup> These labels do not carry any pejorative meaning. KAI refers to *style* not *ability*, and both “innovators” and “adaptors” can be effective (or not) in solving problems.

when understanding the use of performance measures and control systems in firms. Second, the construct validity and reliability of KAI has been confirmed in a considerable amount of prior work, which has applied the measure in diverse organizational settings and in different cultures (Keller and Holland 1978; Taylor 1989; Bagozzi and Foxall 1995). This prior work should reassure those concerned about measurement error and psychometric problems in our key constructs. Finally, KAI consists of three sub scales, which meaningfully map into the preferences for risk and conforming to social norms that are central to recent and more traditional agency theory work in economics. As such, KAI is amendable to empirical work that is informed by this theory.

We rely on the three sub scales that together comprise the 32-item KAI instrument: (1) sufficiency vs. proliferation of originality, (2) group conformity, and (3) efficiency. Each of these three sub scales is described in more details in what follows next. Respondents are asked to indicate how difficult it is to present themselves and for a long time a certain image of themselves to others. Answers are provided on a Likert-type scale that varies from 1 = very hard to 5 = very easy.

*Sufficiency vs. proliferation of originality.* This scale consists of 13 questions, which include items such as “Has original ideas” and “Often risks doing things differently”. Adaptors prefer the production of fewer original ideas, whereas innovators prefer to proliferate ideas. We reverse code these items, such that high (low) scores on this scale are consistent with an adaptor (innovator) innate preferences. Descriptive statistics on the sub scales are provided in Table 1, Panel D. The theoretical range of the scale is [13-65]; we find that the actual score is between 13 and 43 with an average of 30.44.

*Group conformity.* Among the 12 items that measure group conformity are “Fits readily into ‘the system’”, “conforms”, and “prefers colleagues who never ‘rock the boat’”. Innovators tend to be more willing and able to resist group pressure, whereas adaptors would value social adjustments and conventions. The actual scores on the group conformity scale (theoretical range: 12-60), vary between 22 and 60, with a mean score of 34.05.

*Efficiency.* Respondents who score high on efficiency (adaptors) tend to be concerned with precision, reliability, and efficiency. Innovators, on the other hand, do not value efficiency and score low on this scale. The scale consists of 7 items, which include the following examples: “Masters all details painstakingly”, “Is thorough”, and “Is methodological and systematic”. In the current sample, respondents score on average 22.93 on this scale (with a theoretical range of 7-35).

We test for convergent validity of the three sub scales by correlating each with the answers of the respondents to a question located elsewhere in the survey. This method is supported in prior literature (see e.g., Abernethy and Brownell 1999). The question asks to choose one of two statements to describe their management style: (1) “I am someone who ensures that existing activities within the business unit are done better” or (2) “I am someone who prefers to ensure that things within the business unit are done differently”. As the sub scale component scores faithfully reflect the overall KAI-score which places people on the adaptor-innovator continuum (Kirton 1994), these correlations are expected to be positive. Spearman correlations (not tabulated) between an indicator variable that takes the value of unity when the respondent chooses alternative (1) and zero otherwise and each of the three scales are indeed significantly positive (Sufficiency of originality:

corr. = 0.28 ( $p$ -value < 0.01); Group conformity: corr. 0.18 ( $p$ -value = 0.07); Efficiency: corr. = 0.37 ( $p$ -value < 0.01)).

### 3.2.3 Control variables

We control for features of the operating environment and the organizational design of the business units in all of our tests. We expect these variables to influence both the design and use of control systems as well as the way in which business unit managers allocate their time over specific activities (Ittner et al. 1997; Abernethy et al. 2004; Bouwens and van Lent 2007; Abernethy et al. 2009b). Panel B in Table 3 presents the summary statistics of the questionnaire items associated with each variable. All latent variables are measured on a seven point scale. Untabulated factor analyses support the use of a summated scale in all cases.<sup>9</sup> *Information asymmetry* (Cronbach's alpha = 0.77) is the extent to which the business unit manager is better informed about local conditions than his or her senior manager. The measure is based on a six item instrument described in Dunk (1993) and has been used extensively in recent managerial accounting work (Abernethy et al. 2004; Bouwens and van Lent 2007). *Percentage bonus pay* is the approximate amount of cash bonus (as a percentage of the respondent's annual salary) computed as the average earned over the most recent three years. We find substantial variation in bonus pay, ranging between 0 and 100 per cent, with an average of 19.68. We use an adapted version of Khandwalla's (1972) instrument to measure *Environmental dynamics* (Cronbach's alpha = 0.79). This construct includes six questions and captures the range of change in such matters as competitor strategies and industry buying patterns. *Expansion strategy* is an indicator variable which takes the value of unity if the business unit reports to have a strategy to increase market share, even at the expense of short-term

earnings and cash flow. We use the instrument described in Govindarajan and Gupta (1985) to measure strategy. Table 1, Panel C provides a frequency distribution of the different strategies of the business units in our sample. *Size of the business unit* is measured as the logarithm of the number of full time employees. Finally, we include a measure of *Growth opportunities* (Cronbach's alpha = 0.77) based on Abernethy et al. (2004). This instrument consists of two items asking about the growth opportunities in the industry and for the business unit specifically.

### 3.3 Econometric issues

We report two sets of main analyses. In the first set of regressions, we emphasize the weight placed on different measures of performance. The second analyses use the percentage time managers spend on specific activities as the dependent variable. In both, the dependent variable is a proportion, bounded below by zero and above by unity. We use the approach advocated in Papke and Wooldridge (1996) and estimate the regressions with a fractional dependent variable using a quasi-likelihood method in which we assume that the dependent variable follows a Bernoulli distribution (which allows some portion of the sample to be at the extreme values of zero or one), and with a logit link function (Kieschnick and McCullough 2003). Standard errors are based on a robust sandwich estimator (again following Papke and Wooldridge (1996)).<sup>10</sup>

## 4. Preferences for risk avoidance and control systems

---

<sup>9</sup> Details of the factor analyses are available from the authors upon request.

<sup>10</sup> Note that this approach assumes that all zero observations are similar, i.e., come from the same underlying distribution. Intuitively, we thus assume that respondent who report zero weight on a performance measure (or zero time spent on an activity) just happen not be using this measure currently (or for some reason do not spend time on a certain activity). There is no structural reason for these firms not to use a measure (or direct managerial attention to some activities).

In this section, we discuss the tests of hypotheses H1-H4. Table 4, Panel A presents the results of logit regressions in which the dependent variable is an indicator that takes the value of unity when a financial performance measure (i.e., profit, accounting return, costs, or revenues) is used and zero otherwise. In contrast to our expectation described in Hypothesis H1a, we find no relation between our proxy for risk-avoidance preferences (*Sufficiency of originality*) and the use of financial performance measures. In Table 4, Panels B-D, we present the results of quasi-likelihood regressions of the relation between risk avoidance preferences and the weight placed on financial performance measures in the context of annual performance evaluations, cash bonus compensation decisions, or long-term career advancement. Again, we find no evidence that the risk avoidance preferences are associated with the weight placed on financial performance measures. Hypothesis H1a also predicts a negative relation between preferences for risk avoidance and non-financial performance measures. Consistent with this prediction, we find negative associations between preferences for risk avoidance and several non-financial performance measures. In Table 5, Panel A, we find that preferences for risk avoidance have a negative effect on whether or not firms use efficiency (coeff. = -0.047,  $p$ -value = 0.06), creativity (coeff. = -0.066,  $p$ -value = 0.02), project (coeff. = -0.085,  $p$ -value < 0.01), and team measures (coeff. = -0.073,  $p$ -value = 0.02). We find some corroborating evidence when we consider the regressions that use the weight placed on non-financial measures as the dependent variable (in Table 5, Panels B-D); the strongest results are in the context of long-term career decisions. Note also that we find a significant *positive* association between *Sufficiency of originality* and the

weight placed on personal measures (coeff. = 0.040,  $p = 0.06$  for annual performance evaluation and coeff. = 0.061,  $p$ -value = 0.03 for long term career decisions).

Hypothesis H1b predicts that the number of performance measures used is negatively associated with *Sufficiency of originality*. We test this hypothesis for each of the three decision contexts by summing the number of performance measure categories that receive a positive weight (theoretical range is 0 – 10). Table 6 presents our evidence. We use Poisson regressions because our dependent variable is a count and report robust standard errors. We find strong evidence of a negative relation between risk avoidance preferences and the number of performance measures consistent with hypothesis H1b. For example, in the context of annual performance evaluation, we find a coefficient of -0.192 ( $p$ -value=0.02). These estimates do not vary much between decision contexts.

Table 7 presents Ordinary Least Squares regressions of the extent to which the business unit manager has to explain variances between target and actual performance (i.e., the use of variance reporting). Hypothesis H2 predicts a negative association between innate preferences for risk-avoidance and the use of variance reporting. Consistent with this hypothesis, we find a significant negative relation between our proxy *Sufficiency of originality* and variance reporting (coeff. = -0.269,  $p$ -value = 0.03). Hypothesis H3 predicts a negative association between innate preferences for risk-avoidance and the use of the control system for communication and debate between the respondent and his/her senior manager (“use of interactive control”). Our empirical findings support this prediction, the coefficient on *Sufficiency of originality* is negative (-0.223) and strongly significant ( $p$ -value = 0.01). We also find, consistent with hypothesis

H4, that when managers have innate preferences for risk-avoidance, companies *increase* their use of subjective performance evaluation (coeff. = 0.252,  $p$ -value = 0.04).

Together our findings on the role of innate risk avoidance preferences are as follows. The use of financial measures does not seem to depend on risk-avoidance preferences. Non-financial measures, in contrast, are used, mostly in the context of long-term career advancement decisions, in response to risk-avoidance preferences. The more risk-averse a manager, the lower the weight placed on efficiency, project, creativity, and team measures. This finding is contrary to the predictions from standard agency theory as these measures are more closely related to “inputs” and therefore less risky. They are consistent, however, with the idea that non-financial measures are leading indicators of future performance and can act as coordination devices. Both roles gain importance when the manager’s innate preferences for risk-taking are greater. We emphasize that the measures for which we find the strongest results (team, project, creativity, and efficiency) are likely to have forward looking properties (efficiency and creativity measures) or stimulate cooperation (team and project measures). Note also that personal measures often happen to include subjective assessments of performance which are more likely to be of low risk. For this reason, we postulate that the driving force for the use of personal measures is noise—these measures are used to adjust other more objective measures for personal circumstances outside the control of the manager. In addition, managers with preferences for risk-avoidance are evaluated using *fewer* measures.

In addition, the use of the control system appears to be quite different for managers with preferences for risk-avoidance; these managers are less often evaluated using variance reporting, the control system is less frequently used in an interactive

fashion and the performance of the managers is more often assessed subjectively.

## **5. Preferences for conforming to social norms and control systems**

We describe our tests of hypotheses H5-H7, which present our predictions with regard to the effect of innate preferences for conformity on control systems next. Hypothesis H5 predicts that preferences for conformity are negatively associated with the use of non-financial performance measures, but positively with financial measures. We find, however, that conformity is not significantly associated with any of the financial measures with the exception of accounting return measures (see, Table 4-Panels A-D). When managers have stronger preferences for conformity (as measured by *Group conformity*), the weight placed on accounting return measures *increases*. This finding is not sensitive to the decision context we consider (annual evaluation, cash bonus compensation, or career advancement) and significance levels vary between 1% and 5%.

We interpret these results in view of earlier evidence which suggests that the use of accounting return measures goes hand in hand with the delegation of extensive decision making power to local managers (see, Bouwens and van Lent 2007). As such, senior managers signal their optimism about the prevailing social norms by using accounting returns to evaluate business unit managers. More in general, aggregated financial measures are used in conjunction with decentralized decision making (see, e.g., Abernethy et al. 2004). Thus, while giving incentives through these measures can reduce the effectiveness of social norms, at the same time using performance metrics such as profits and accounting returns can reinforce the perception of local managers that they are entrusted with substantial decision rights.

We find little evidence that the innate preference for social conformity affects the

choice to use a specific type of non-financial performance measure (see, Table 5, Panel A). The weight placed on some non-financial measures does vary with *Group conformity*. In all cases in which the association obtains significance, we find a negative sign as predicted in hypothesis H5. The results are most consistent for creativity measures; but we also find some evidence that project measures and quality measures receive lower weight when the manager has a higher preference for conforming to social norms.

One implication of hypothesis H5 is that aggregate financial measures gain weight relative to non-financial measures. We test this implication directly in Table 8 in which we regress the summed weight on aggregated financial measures (i.e., the sum of the weights on profit, accounting return, cost and revenue measures) onto the proxies for the manager's innate preferences. Recall that our measurement of the weight placed on performance measures is such that the total weight on non-financial and financial measures sums to 100%. Thus, if we find a positive coefficient on our test variables, this should be interpreted as financial measures gaining weight *relative* to non-financial measures. The evidence is consistent with the idea that the preferences for social conformity are positively associated with the relative use of aggregated financial measures compared with non-financial measures. This evidence is strongest for the context of annual performance evaluation decisions (coeff. = 0.057,  $p$ -value < 0.01).

We also predict that agents with preferences for conforming to social norms act more opportunistically if they face weaker or incomplete controls. Subjective performance measurement is often advocated to compensate the incompleteness in objective performance evaluation. Hypothesis H7 therefore states that preferences for conforming to social norms are positively associated with the use of subjective

performance evaluation. However, we do not find evidence that preferences for social conformity affect the use of subjective measures (see Table 7, Column (3)). Neither do we find evidence that control systems are used more intensively to communicate the desired norm throughout the organization as predicted by Hypothesis H8 (Table 7, Column (2))

## **6. Additional findings**

Our empirical measure of innate preferences, the Kirton Adaption Innovation Inventory, provides three subscales although we have formulated hypotheses using only the scales for *Sufficiency of originality* and *Group Conformity*. Managers who score high on the third subscale *Efficiency* tend to care about precision, reliability, and efficiency. We summarize the findings for the innate preferences measured by *Efficiency* below.

We find some evidence that *Efficiency* preferences reduce the weight placed on profit and especially accounting return measures, mostly in the context of annual appraisal and long-term career decisions (see, Table 4, Panels B and D). We also find that innate preferences for *Efficiency* generally increase the importance of non-financial measures, most consistently (not surprisingly) with efficiency related metrics, but also with project measures. Thus, whereas we reported earlier that *Sufficiency of originality* and *Group conformity* both reduce the use of non-financial measures, those managers with innate preferences for being methodological, prudent and disciplined tend to be evaluated more on non-financial measures (Table 5, Panels A-D). This trend is also reflected in Table 6 where we report the number of measures used in different decision contexts. We find some evidence, in particular for cash bonus decisions, that *Efficiency* preferences are positively associated with the number of measures used.

There is no evidence that the use of control systems varies across managers with different innate preferences for *Efficiency* (Table 7). However, we do find that *Efficiency* reduces the weight on financial measures compared with non-financial measures, especially in annual performance evaluations (Table 8, Column 1; coeff. = -0.109,  $p$ -value < 0.01).

## **7. Discussion and conclusions**

Do innate preferences of managers affect the way firms design and use control systems? The empirical findings in this paper suggest a nuanced answer to this question. The use of financial performance measures for decisions such as annual performance appraisal, cash bonus compensation, and career advancement do not seem to vary much with differences in innate preferences. Business unit-level fundamental factors appear to explain most of the variation in the use of these measures. On the other hand, the evidence is consistent with the idea that firms choose non-financial measures at least in part with the personality characteristics of business unit managers in mind. In addition, when managers have preferences for risk taking, firms increasingly employ control practices such as variance reporting and the “interactive” use of control systems to promote communication between hierarchical levels. On the other hand, when managers prefer to avoid risk-taking, firms rely more on subjective assessments.

While we consider two salient preferences (i.e., risk avoidance and conformity to social norms) suggested by the economics literature, there is no reason to presume that other innate preferences of managers are not also important to understand control practices in firms. Such traits as sensation or arousal seeking and lying or honesty have obvious implications to those who are responsible for guiding managers to work in the

best interest of the firm. We only provide some early evidence on the effect of personality heterogeneity on control systems.

The literature is currently just starting to explore what personality traits of managers matter for explaining firm policy. The growing recognition that these questions are hard to answer using broad-based, but relatively crude proxies (Graham et al. 2009) justify a renewed interest in the methods employed by psychologists and experimental economists to measure behavioral traits. Questionnaire based research provides one way to balance the need for representative samples and detailed (personality) data on managers that is difficult to obtain using other methods.

Nevertheless, survey based data has its own set of problems. We deal with potential measurement error issues by using instruments validated in earlier work, asking for “harder data”, such as the actual weight placed on a performance measure in bonus decisions, using multiple instruments to measure the same construct and, finally, by gathering data on a wide range of organizational and respondents characteristics that allows us to control for many potentially confounding factors.

Although we explore a variety of control settings in which innate preferences can be expected to play a role, our analysis remains limited. For example, it could be that organizational design attributes such as the use of performance-based pay or employee empowerment varies with innate preferences. We leave exploring these issues for future research.

## References:

- Abernethy, M. A., J. Bouwens and L. van Lent (2004). "Determinants of control system design in divisionalized firms." The Accounting Review **79**(3): 545-70.
- Abernethy, M. A., J. Bouwens and L. van Lent (2009a). "Leadership style and control system design." Management Accounting Research **in press**.
- Abernethy, M. A., J. Bouwens and L. van Lent (2009b). The role of performance measures in the intertemporal decisions of business unit managers. Working paper, University of Melbourne and Tilburg University.
- Abernethy, M. A. and P. Brownell (1999). "The role of budgets in organizations facing strategic change: an exploratory study." Accounting, Organizations and Society **24**(3): 189-205.
- Bagozzi, R. P. and G. R. Foxall (1995). "Construct validity and generalizability of the Kirton Adaption-Innovation Inventory." European Journal of Personality **9**: 185-206.
- Baiman, S. and T. Baldenius (2009). "Non-financial performance measures as coordination devices." The Accounting Review **84**(2): 299-330.
- Baiman, S. and J. S. Demski (1980). "Economically Optimal Performance Evaluation and Control Systems." Journal of Accounting Research **18**: 184-220.
- Baker, G. (2000). "The use of performance measures in incentive contracting." American Economic Review **90**: 415-20.
- Baker, G. (2002). "Distortion and risk in optimal incentive contracting." Journal of Human Resources **37**: 724-51.
- Baker, G., R. Gibbons and K. J. Murphy (1994). "Subjective Performance Measures in Optimal Incentive Contracts." The Quarterly Journal of Economics **109**(4): 1125-56.
- Banker, R. and S. Datar (1989). "Sensitivity, precision and the linear aggregation of signals for performance evaluation." Journal of Accounting Research **27**: 21-39.
- Banker, R., G. Potter and D. Srinivasan (2000). "An empirical investigation of an incentive plan that includes nonfinancial performance measures." The Accounting Review **75**: 65-92.
- Benabou, R. and J. Tirole (2003). "Intrinsic and extrinsic motivation." Review of Economic Studies **70**(3): 489-520.
- Bertrand, M. and A. Schoar (2003). "Managing with style: the effect of managers of firm policies." Quarterly Journal of Economics **CXVIII**(4): 1169-208.
- Bisbe, J. and D. Otley (2004). "The effects of the interactive use of management control systems on product innovation." Accounting, Organizations and Society **29**(8): 709-37.
- Bolton, P., M. Brunnermeier and L. Veldkamp (2008). Economists' perspectives on leadership. Working paper, Columbia University.
- Bouchard, T. and J. Loehlin (2001). "Genes, Evolution, and Personality." Behavior Genetics **31**(3): 243-73.
- Bouwens, J., C. Hofmann and L. van Lent (2009). Aggregate and specific performance measures and intra-firm interdependencies: Theory and evidence. Working paper, Tilburg University and University of Mannheim.

- Bouwens, J. and L. van Lent (2007). "Assessing the performance of business unit managers." Journal of Accounting Research **45**(4): 667-97.
- Brownell, P. (1983). "The Motivational Impact of Management-By-Exception in a Budgetary Context." Journal of Accounting Research **21**(2): 456-72.
- Bushman, R. M., R. J. Indjejikian and A. Smith (1996). "CEO compensation: The role of individual performance evaluation." Journal of Accounting & Economics **21**(2): 161-93.
- Chava, S. and A. Puranandam (2009). "CEOs vs CFOs: incentives and corporate policies." Journal of Financial Economics **in press**.
- Chenhall, R. H. (2003). "Management control systems design within its organizational context: findings from contingency-based research and directions for the future." Accounting, Organizations and Society **28**(2-3): 127-68.
- Chenhall, R. H. (2005). "Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study." Accounting, Organizations and Society **30**(5): 395-422.
- Cialdini, R. B. and M. R. Trost (1998). Social influence: social norms, conformity, and compliance. The handbook of social psychology. D. T. Gilbert, S. T. Fiske and G. Lindzey. New York, Oxford University Press. **2**: 151-.
- Coletti, A. L., K. L. Sedatole and K. L. Towry (2005). "The effect of control systems on trust and cooperation in collaborative environments." Accounting Review **80**(2): 477-500.
- Davila, T. (2000). "An empirical study on the drivers of management control systems' design in new product development." Accounting Organizations and Society **25**(4-5): 383-409.
- DeJong, D. and Z. Ling (2009). Managers: Their effects of accruals and firm policies. Working paper, University of Iowa.
- Dikolli, S. S., W. R. Kinney Jr. and K. L. Sedatole (2007). "Measuring customer relationship value: the role of switching cost." Contemporary Accounting Research **24**(1): 93-132.
- Dunk, A. (1993). "The effects of budget emphasis and information asymmetry on the relation between budgetary participation and slack." The Accounting Review **68**(2): 400-10.
- Easton, P., Y. Jia and L. van Lent (2009). CEO characteristics and earnings attributes. Working paper, University of Notre Dame.
- Ebstein, R. P., O. Novick, R. Umansky, B. Priel, Y. Osher, D. Blaine, E. R. Bennett, L. Nemanov, M. Katz and R. H. Belmaker (1996). "Dopamine D4 receptor (D4DR) exon III polymorphism associated with the human personality trait of novelty seeking." Nature Genetics **12**(1): 78-80.
- Evans, J. H., R. L. Hannan, R. Krishnan and D. V. Moser (2001). "Honesty in managerial reporting." Accounting Review **76**(4): 537-59.
- Falk, A. and M. Kosfeld (2006). "The Hidden Costs of Control." The American Economic Review **96**: 1611-30.
- Fehr, E. and S. Gächter (2001). "Do Incentive Contracts Crowd Out Voluntary Cooperation?" SSRN eLibrary.

- Fehr, E. and J. A. List (2004). "The Hidden Costs and Returns of Incentives---Trust and Trustworthiness Among CEOs." Journal of the European Economic Association **2**(5): 743-71.
- Fehr, E. and B. Rockenbach (2003). "Detrimental effects of sanctions on human altruism." Nature **422**(6928): 137-40.
- Feltham, G. and J. Xie (1994). "Performance measure congruity and diversity in multi-task principal agent relations." The Accounting Review **69**(3): 429-53.
- Feng, M., W. Ge, S. Luo and T. Shevlin (2009). Why do CFOs become involved in material accounting manipulations? Working paper, University of Pittsburgh.
- Fischer, P. and S. Huddart (2008). "Optimal Contracting with Endogenous Social Norms." American Economic Review **98**(4): 1459-75.
- Francis, J., A. H. Huang, S. Rajgopal and A. Y. Zhang (2008). "CEO reputation and reporting quality." Contemporary Accounting Research **25**(1): in press.
- Frey, B. S. (1993). "Does monitoring increase work effort? The rivalry with trust and loyalty." Economic Inquiry **31**(4): 663-70.
- Garen, J. (1994). "Executive compensation and principal agent theory." Journal of Political Economy **102**: 1175-99.
- Garicano, L. (2000). "Hierarchies and the organization of knowledge in production." Journal of Political Economy **108**(5): 874-905.
- Ge, W., D. Matsumoto and J. L. Zhang (2008). "Do CFOs Have Styles of Their Own? An Empirical Investigation of the Effect of Individual CFOs on Financial Reporting Practices." SSRN eLibrary.
- Goldsmith, R. E. (1994). Creative style and personality theory. Adaptors and innovators. Styles of creativity and problem solving. M. Kirton. London and New York, Routledge: 34-50.
- Govindarajan, V. and A. K. Gupta (1985). "Linking control systems to business unit strategy: impact on performance." Accounting, Organizations and Society **10**(1): 51-66.
- Graham, J. R., C. R. Harvey and M. Puri (2009). Managerial attitudes and corporate actions. Working paper, Duke University and NBER.
- Hair, J. F., R. E. Anderson, R. L. Tatham and W. C. Black (1998). Multivariate data analysis. Upper Saddle River, NJ, Prentice Hall.
- Hambrick, D. C. and P. A. Mason (1984). "Upper echelons: the organization as a reflection of its top managers." Academy of Management Review **IX**(2): 193-206.
- Hannan, R. L. (2005). "The combined effect of wages and firm profit on employee effort." Accounting Review **80**(1): 167-88.
- Hannan, R. L., F. W. Rankin and K. L. Towry (2006). "The effect of information systems on honesty in managerial reporting: A behavioral perspective." Contemporary Accounting Research **23**(4): 885-918.
- Hannan, R. L., F. W. Rankin and K. L. Towry (2009). "Flattening the organization: The effect of organizational reporting structure on budgeting effectiveness." Review of Accounting Studies **forthcoming**.
- Heinle, M., C. Hofmann and A. Kunz (2009). Incentives, motivational crowding out, and the value of information. Working paper, University of Pennsylvania.
- Holmstrom, B. (1979). "Moral hazard and observability." Bell Journal of Economics **10**: 74-91.

- Horngren, C. T. (2004). "Management accounting: some comments." Journal of Management Accounting Research **16**: 207-11.
- Houser, D., E. Xiao, K. McCabe and V. Smith (2008). "When punishment fails: Research on sanctions, intentions and non-cooperation." Games and Economic Behavior **62**(2): 509-32.
- Hribar, P. and H. Yang (2006). "CEO Confidence, Management Earnings Forecasts, and Earnings Management." SSRN eLibrary.
- Indjejikian, R. J. (1999). "Performance evaluation and compensation research: an agency perspective." Accounting Horizons **13**(2): 147-57.
- Ittner, C. D. and D. F. Larcker (1998). "Innovations in performance measurement: trends and research implications." Journal of Management Accounting Research **10**: 205-38.
- Ittner, C. D. and D. F. Larcker (2001). "Assessing empirical research in managerial accounting: a value-based management perspective." Journal of Accounting & Economics **32**(1-3): 349-410.
- Ittner, C. D. and D. F. Larcker (2003). "Coming up short on nonfinancial performance measurement." Harvard Business Review **81**(11): 88-+.
- Ittner, C. D., D. F. Larcker and M. V. Rajan (1997). "The choice of performance measures in annual bonus contracts." Accounting Review **72**(2): 231-55.
- Keller, R. T. and W. E. Holland (1978). "A cross-validation of the Kirton Adaption-Innovation Inventory in three research and development organizations." Applied Psychometric Measurement **2**(4): 563-70.
- Khandwalla, P. (1972). "The effect of different types of competition on the use of management controls." Journal of Accounting Research **10**(2): 275-85.
- Kieschnick, R. and B. D. McCullough (2003). "Regression analysis of variates observed on (0,1): percentages, proportions and fractions." Statistical modelling **3**: 193-213.
- Kim, D. C. (1992). "Risk Preferences in Participative Budgeting." The Accounting Review **67**(2): 303-18.
- Kirton, M. (1976). "Adaptors and innovators: a description and measure." Journal of Applied Psychology **61**: 622-9.
- Kirton, M. (1994). A theory of cognitive style. Adaptors and innovators. Styles of creativity and problem solving. M. Kirton. London and New York, Routledge: 1-33.
- Lambert, R. A. and D. F. Larcker (1987). "An Analysis of the Use of Accounting and Market Measures of Performance in Executive-Compensation Contracts." Journal of Accounting Research **25**: 85-129.
- Luft, J. and M. Shields (2003). "Mapping management accounting research: graphics and guidelines for theory-consistent empirical research." Accounting, Organizations and Society **28**(2-3): 169-250.
- Malhotra, D. and J. K. Murnighan (2002). "The effects of contracts on interpersonal trust." Administrative Science Quarterly **47**: 534-59.
- Malmendier, U. and G. Tate (2008). "Who makes acquisitions? CEO overconfidence and the market's reaction." Journal of Financial Economics **89**(1): 20-43.
- Malmendier, U. and G. A. Tate (2005). "CEO overconfidence and corporate investment." Journal of Finance **60**(6): 2661-700.

- Marvin, Z. and D. M. Kuhlman (2000). "Personality and Risk-Taking: Common Bisocial Factors." Journal of Personality **68**(6): 999-1029.
- Mittendorf, B. (2008). "Infectious Ethics: How Upright Employees Can Ease Concerns of Tacit Collusion." Journal of Law Economics & Organization **24**(2): 356-70.
- Nagar, V. (2002). "Delegation and incentive compensation." The Accounting Review **77**(2): 379-95.
- Nagar, V. and M. V. Rajan (2001). "The revenue implications of financial and operational measures of product quality." Accounting Review **76**(4): 495-513.
- Papke, L. E. and J. M. Wooldridge (1996). "Econometric methods for fractional response variables with an application to 401(K) plan participation rates." Journal of Applied Econometrics **11**: 619-32.
- Podsakoff, P. M., S. B. MacKenzie, J. Y. Lee and N. P. Podsakoff (2003). "Common method biases in behavioral research: a critical review of the literature and recommended remedies." Journal of Applied Psychology **88**(5): 879-903.
- Prendergast, C. (2002a). "The tenuous trade-off between risk and incentives." Journal of Political Economy **110**(5): 1071-102.
- Prendergast, C. (2002b). "Uncertainty and incentives." Journal of Labor Economics **20**: 115-37.
- Raith, M. (2008). "Specific knowledge and performance measurement." RAND Journal of Economics **39**(4): 1059-79.
- Robert, P. and C. Avshalom (1998). "DNA and personality." European Journal of Personality **12**(5): 387-407.
- Schrand, C. M. and S. L. Zechman (2009). "Executive Overconfidence and the Slippery Slope to Fraud." SSRN eLibrary.
- Simons, R. (1990). "The role of management control systems in creating competitive advantage: new perspectives." Accounting, Organizations and Society **15**(1-2): 127-43.
- Simons, R. (1991). "Strategic orientation and top management attention to control systems." Strategic Management Journal **12**(1): 49-62.
- Simons, R. (1994). "How New Top Managers Use Control Systems as Levers of Strategic Renewal." Strategic Management Journal **15**(3): 169-89.
- Sliwka, D. (2007). "Trust as a signal of a social norm and the hidden costs of incentive schemes." American Economic Review **97**(3): 999-1012.
- Smith, R. E. and W. F. Wright (2004). "Determinants of customer loyalty and financial performance." Journal of Management Accounting Research **16**: 183-205.
- Taylor, W. (1989). "The Kirton Adaption-Innovation Inventory: A re-examination of the factor structure." Journal of Organizational Behavior **10**(4): 297-306.
- Wang, I. Y., K. Petroni and J. Jiang (2009). "CFOs and CEOs: Who has the most influence on earnings management." Journal of Financial Economics **in press**.
- Wruck, K. H. and M. C. Jensen (1994). "Science, specific knowledge, and total quality management." Journal of Accounting and Economics **18**: 247-87.
- Young, S. M. (1985). "Participative Budgeting: The Effects of Risk Aversion and Asymmetric Information on Budgetary Slack." Journal of Accounting Research **23**(2): 829-42.

**TABLE 1***Summary Statistics on Business Units in the Sample and on Survey Respondents*

The sample consists of 100 observations and information is collected via a questionnaire. The survey respondents are business unit managers.

**Panel A: Characteristics of the business unit**

<i>Variable</i>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Median</b>	<b>Max.</b>
Size of the unit (in number of full time employees)	382.34	834.32	50	127	6700
Relative size of the unit (in % of total firm-wide revenues)	30.84	31.99	0	20	100
Relative size of the unit (in % of total firm-wide number of employees)	26.09	29.95	0	12.5	100

**Panel B: Industry classification**

<i>Industry</i>	<b>Frequency</b>	<b>Percentage</b>	<b>Frequency</b>	<b>Cumulative Percentage</b>
Manufacturing	29		29	29
Electricity, gas and water supply	3		3	32
Construction	11		11	43
Wholesale and retail trade	14		14	57
Transport, storage and communication	13		13	70
Financial intermediation	14		14	84
Real estate	3		3	87
Public administration and defense	1		1	88
Education	1		1	89
Health and social work	11		11	100
Total	100		100	

**Panel C: Strategy of the business unit**

<i>Strategy description</i>	<b>Percentage Frequency</b>	<b>Cumulative Percentage</b>
(1) Increase market share, even at the expense of short-term earnings and cash flow	43	43
(2) Protect the business unit's market share and competitive position	38	81
(3) Maximize short term earnings and cash flow even at the expense of market share	15	96
(4) Withdrawal from the business through (slow) liquidation or sale of the unit	3	99

**Panel D: Characteristics of the respondents**

<i>Variable</i>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Median</b>	<b>Max.</b>
Tenure in current job (in years)	4.76	4.05	0	4	19
Number of years the respondent <i>expects</i> to continue in current job	4.11	4.00	0	3	25
Longevity in business unit (in years)	8.89	9.18	0	5	39
Number of years the respondent has reported to his/her current superior	4.13	4.21	0	2	20
Age	45.24	7.87	29	45	60

<i>Measures of innate preferences:</i>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Median</b>	<b>Max.</b>
Sufficiency vs. proliferation of originality	30.44	4.67	13	31	43
Group conformity	34.05	6.33	22	34	60
Efficiency	22.93	4.22	13	23	35

**TABLE 2***Summary Statistics on the Use of Performance Measures in Business Units*

The table presents summary statistics on the use of different types of measures to assess the performance of business unit managers, the weight the superior of the respondent placed on each type of measure in the annual performance review, the weight placed on each type of measure in the determination of the annual cash bonus, and the weight each measures obtains when the superior of the respondent decides about promotion or career advancements in the long-run. Data are obtained via a questionnaire among business unit managers. N = 100 for Panels A and C; N = 75 for Panel B, because we report only the weight on a type of performance measure for those companies that have an annual cash bonus plan. See for all full description of each type of measure the Appendix.

<i>Statistics</i>	<b>Profit</b>	<b>Return</b>	<b>Cost</b>	<b>Sales</b>	<b>Efficiency</b>	<b>Quality</b>	<b>Project</b>	<b>Creativity</b>	<b>Team work</b>	<b>Personal</b>
Frequency of use (%)	81	58	69	55	49	51	37	40	66	76
<b>Panel A:</b>	<u>Annual Performance Evaluation</u>									
Mean	0.24	0.12	0.11	0.09	0.06	0.06	0.04	0.03	0.07	0.12
Std. Dev.	0.23	0.17	0.12	0.15	0.08	0.09	0.07	0.07	0.09	0.15
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Median	0.20	0.05	0.10	0.00	0.00	0.00	0.00	0.00	0.05	0.10
Max.	1.00	0.91	0.50	0.70	0.30	0.40	0.40	0.30	0.40	0.90
<b>Panel B:</b>	<u>Annual Cash Bonus (N=75)</u>									
Mean	0.39	0.12	0.06	0.10	0.04	0.03	0.03	0.01	0.04	0.11
Std. Dev.	0.32	0.19	0.10	0.19	0.08	0.07	0.08	0.04	0.09	0.16
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Median	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max.	1.00	1.00	0.40	0.80	0.40	0.30	0.40	0.20	0.40	1.00
<b>Panel C:</b>	<u>Long-term Career</u>									
Mean	0.20	0.06	0.06	0.06	0.06	0.05	0.03	0.05	0.09	0.20
Std. Dev.	0.24	0.13	0.10	0.11	0.12	0.10	0.07	0.08	0.13	0.24
Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Median	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Max.	1.00	1.00	0.40	0.60	0.70	0.50	0.40	0.30	0.50	1.00

**TABLE 3***Summary Statistics for Questionnaire Items Used to Construct Control Variables*

The table presents the distribution of each questionnaire item used to construct the control variables in the study. The sample consists of 100 observations and data is collected via a questionnaire. The theoretical range for the questionnaire items associated with *Information Asymmetry*, *Growth Opportunities*, and *Environmental Dynamics* is 1-7. Full details about the survey questions are in the Appendix.

Survey Items	Mean	Std. Dev.	Min.	Median	Max.
<b><u>Growth opportunities:</u></b> Please indicate your expectations about the following:					
The growth opportunities that exists within the industry in which you compete.	4.55	1.04	2.00	5.00	7.00
The growth opportunities your unit faces.	5.08	0.99	2.00	5.00	7.00
<b><u>Environmental dynamics:</u></b> Please indicate the rate of change in each of the following six categories:					
Buying patterns and requirements of customers	4.39	1.52	1.00	5.00	7.00
Distributors' attitudes	3.86	1.41	1.00	4.00	7.00
Industry buying patterns	4.23	1.41	1.00	5.00	7.00
Competitor strategies	4.21	1.51	1.00	5.00	7.00
Technical development relevant to your unit's business	4.11	1.63	1.00	5.00	7.00
Changes in production process	3.85	1.56	1.00	4.00	7.00
<b><u>Information asymmetry:</u></b> Compared to your superior who is:					
In possession of better information regarding the activities undertaken in your unit?	5.92	1.19	1.00	6.00	7.00
More familiar with the input-output relations inherent in the internal operations of your unit?	5.73	1.32	1.00	6.00	7.00
More certain about the performance potential of your unit?	5.44	1.29	1.00	6.00	7.00
More familiar technically with the work of your unit?	5.79	1.31	1.00	6.00	7.00
Better able to assess the potential impact on your activities of factors external to your unit?	4.66	1.51	1.00	5.00	7.00
In possession of a better understanding of what can be achieved in your unit?	5.34	1.14	3.00	5.00	7.00
<b><u>Percentage bonus pay:</u></b> The approximate amount of cash bonus, stated as a percentage of the respondent's annual salary, computed as the average earned over the most recent three years.	19.68	15.95	0.00	15.00	100.00

#### **TABLE 4**

##### *Regressions of Financial Performance Measures onto Innate Preferences of Business Unit Managers and Control Variables*

The table presents regression results of different types of financial performance measures. Panel A presents Probit regressions of the use of (1) profit, (2) return, (3) cost, and (4) revenue measures. The use of each of these measures is an indicator variable that takes the value of unity if the firm reports its use in performance evaluation and zero otherwise. Panels B-D present Papke and Wooldridge (1996) regressions of the weight placed on the same four types of performance measures in annual performance evaluations (Panel B), cash bonus contracts (Panel C), and long-term career advancement decisions (Panel D). The independent variables in all panels include the three test variables: (1) sufficiency of originality, (2) group conformity, and (3) efficiency which describe the innate preferences of the respondents for producing ideas, for conforming to social norms, and for concern with precision, reliability, and efficiency, respectively. Also included are control variables for information asymmetry, environmental dynamics, growth opportunities, percentage bonus pay, and expansion strategy. All variable definitions are in the Appendix. Standard errors are in parentheses. Papke and Wooldridge (1996) regressions report robust standard errors consistent with the recommendations in that paper. \*, \*\*, \*\*\* denotes significance at the 10%, 5%, and 1% levels (one-tailed for the test variables, two-tailed for all other variables), respectively.

**Panel A:** Probit regressions of the use of financial performance measures (the dependent variable is an indicator which takes the value of unity if the firm uses the measure for performance evaluation, and zero otherwise) (N=100)

	(1)	(2)	(3)	(4)
	Profit	Return	Cost	Revenue
Sufficiency of originality	0.018 (0.036)	0.005 (0.032)	-0.040 (0.033)	0.010 (0.031)
Group conformity	0.028 (0.032)	0.064** (0.026)	-0.009 (0.026)	-0.001 (0.025)
Efficiency	-0.081 (0.056)	-0.026 (0.039)	0.018 (0.041)	-0.057 (0.038)
Information asymmetry	-0.003 (0.032)	0.055** (0.028)	0.011 (0.027)	-0.052* (0.027)
Environmental dynamics	-0.034 (0.030)	0.011 (0.023)	0.031 (0.026)	-0.009 (0.023)
Growth opportunities	0.117 (0.106)	-0.059 (0.083)	-0.189** (0.088)	0.004 (0.081)
Percentage bonus pay	0.063*** (0.021)	-0.012 (0.009)	-0.018** (0.009)	0.009 (0.008)
Expansion strategy	0.078 (0.359)	0.173 (0.281)	-0.278 (0.295)	0.350 (0.279)
Size of business unit	-0.018 (0.174)	0.213 (0.136)	-0.096 (0.133)	-0.222* (0.124)
Intercept	0.500 (2.687)	-4.029* (2.143)	3.237 (2.218)	3.941* (2.057)
Pseudo $R^2$	0.190	0.097	0.116	0.074

**Panel B:** Papke and Wooldridge (1996) regressions of the weight placed on each type of financial performance measure in the context of annual performance evaluation (N=100)

	(1) Weight on profit	(2) Weight on return	(3) Weight on cost	(4) Weight on revenue
Sufficiency of originality	-0.022 (0.030)	0.017 (0.036)	-0.013 (0.028)	0.016 (0.036)
Group conformity	0.013 (0.020)	0.084*** (0.025)	0.002 (0.024)	0.021 (0.035)
Efficiency	-0.087*** (0.029)	-0.084** (0.040)	0.027 (0.034)	-0.041 (0.062)
Information asymmetry	0.013 (0.023)	0.093*** (0.027)	0.024 (0.029)	-0.046 (0.036)
Environmental dynamics	-0.052*** (0.020)	0.020 (0.025)	0.041** (0.018)	0.005 (0.024)
Growth opportunities	0.176** (0.077)	-0.115 (0.098)	-0.173** (0.081)	-0.028 (0.094)
Percentage bonus pay	0.012* (0.007)	0.007 (0.010)	-0.023** (0.011)	-0.003 (0.010)
Expansion strategy	-0.100 (0.256)	0.141 (0.383)	-0.253 (0.292)	0.447 (0.339)
Size of business unit	0.156* (0.089)	0.115 (0.131)	0.015 (0.100)	-0.230 (0.179)
Intercept	-0.774 (2.078)	-6.802*** (2.232)	-2.309 (1.717)	0.101 (2.728)
<i>AIC</i>	100.063	73.031	69.259	68.459

**Panel C:** Papke and Wooldridge (1996) regressions of the weight placed on each type of financial performance measure in the context of cash bonus compensation (N=75)

	(1) Weight on profit	(2) Weight on return	(3) Weight on cost	(4) Weight on revenue
Sufficiency of originality	0.053* (0.035)	0.016 (0.052)	-0.046 (0.039)	0.041 (0.058)
Group conformity	0.026 (0.024)	0.084** (0.035)	-0.008 (0.045)	-0.071* (0.046)
Efficiency	-0.028 (0.040)	-0.077 (0.049)	0.120* (0.069)	0.029 (0.072)
Information asymmetry	0.022 (0.029)	0.092** (0.039)	0.032 (0.061)	-0.026 (0.042)
Environmental dynamics	-0.067** (0.030)	0.041 (0.037)	0.031 (0.040)	0.029 (0.043)
Growth opportunities	0.112 (0.100)	-0.097 (0.126)	-0.233 (0.154)	0.041 (0.145)
Percentage bonus pay	0.022 (0.014)	0.005 (0.014)	-0.021 (0.018)	-0.012 (0.014)
Expansion strategy	0.272 (0.317)	0.240 (0.523)	0.102 (0.451)	-0.088 (0.534)
Size of business unit	0.154 (0.114)	0.041 (0.154)	0.048 (0.154)	-0.384* (0.222)
Intercept	-3.867 (2.404)	-7.273*** (2.786)	-3.450 (2.485)	0.200 (4.355)
<i>AIC</i>	93.261	60.263	45.783	59.215

**Panel D:** Papke and Wooldridge (1996) regressions of the weight placed on each type of financial performance measure in the context of long-term career advancement (N=100)

	(1) Weight on profit	(2) Weight on return	(3) Weight on cost	(4) Weight on revenue
Sufficiency of originality	-0.024 (0.039)	0.026 (0.057)	-0.028 (0.029)	-0.006 (0.037)
Group conformity	0.017 (0.028)	0.151*** (0.038)	-0.042* (0.033)	-0.027 (0.046)
Efficiency	-0.047 (0.038)	-0.145*** (0.041)	0.088 (0.054)	-0.024 (0.058)
Information asymmetry	0.022 (0.031)	0.070* (0.042)	0.029 (0.035)	-0.023 (0.033)
Environmental dynamics	-0.025 (0.023)	0.047 (0.033)	0.051 (0.033)	0.002 (0.030)
Growth opportunities	0.025 (0.086)	-0.011 (0.128)	-0.267* (0.137)	0.001 (0.107)
Percentage bonus pay	0.012* (0.007)	0.019 (0.013)	-0.012 (0.013)	0.002 (0.012)
Expansion strategy	0.003 (0.287)	0.184 (0.493)	0.475 (0.450)	0.826* (0.441)
Size of business unit	0.080 (0.124)	-0.050 (0.119)	0.116 (0.144)	-0.090 (0.193)
Intercept	-1.133 (2.709)	-9.231*** (3.104)	-2.868 (1.970)	-0.477 (3.433)
<i>AIC</i>	99.126	53.017	55.116	54.570

## TABLE 5

### *Regressions of Non-Financial Performance Measures onto Innate Preferences of Business Unit Managers and Control Variables*

The table presents regression results of different types of non-financial performance measures. Panel A presents Probit regressions of the use of (1) efficiency, (2) quality, (3) project, (4) creativity, (5) team, and (6) personal measures. The use of each of these measures is an indicator variable that takes the value of unity if the firm reports its use in performance evaluation and zero otherwise. Panels B-D present Papke and Wooldridge (1996) regressions of the weight placed on the same six types of performance measures in annual performance evaluations (Panel B), cash bonus contracts (Panel C), and long-term career advancement decisions (Panel D). The independent variables in all panels include the three test variables: (1) sufficiency of originality, (2) group conformity, and (3) efficiency which describe the innate preferences of the respondents for producing ideas, for conforming to social norms, and for concern with precision, reliability, and efficiency, respectively. Also included are control variables for information asymmetry, environmental dynamics, growth opportunities, percentage bonus pay, and expansion strategy. All variable definitions are in the Appendix. Standard errors are in parentheses. Papke and Wooldridge (1996) regressions report robust standard errors consistent with the recommendations in that paper. \*, \*\*, \*\*\* denotes significance at the 10%, 5%, and 1% levels (one-tailed for the test variables, two-tailed for all other variables), respectively.

**Panel A:** Probit regressions of the use of non-financial performance measures (the dependent variable is an indicator which takes the value of unity if the firm uses the measure for performance evaluation, and zero otherwise) (N=100)

	(1) Efficiency	(2) Quality	(3) Project	(4) Creativity	(5) Team	(6) Personal
Sufficiency of originality	-0.047* (0.030)	-0.023 (0.030)	-0.085*** (0.032)	-0.066** (0.032)	-0.073** (0.035)	0.033 (0.034)
Group conformity	-0.037* (0.025)	-0.001 (0.024)	-0.007 (0.026)	-0.033* (0.025)	0.007 (0.027)	-0.008 (0.027)
Efficiency	0.065* (0.039)	0.051 (0.038)	0.036 (0.040)	0.029 (0.039)	0.043 (0.041)	0.072* (0.043)
Information asymmetry	-0.016 (0.027)	0.009 (0.026)	0.030 (0.028)	0.012 (0.027)	0.017 (0.027)	-0.016 (0.031)
Environmental dynamics	-0.000 (0.023)	0.014 (0.023)	0.004 (0.024)	-0.003 (0.023)	0.002 (0.024)	0.032 (0.025)
Growth opportunities	0.059 (0.083)	-0.084 (0.080)	0.029 (0.084)	-0.124 (0.082)	-0.110 (0.084)	0.021 (0.088)
Percentage bonus pay	-0.006 (0.009)	-0.011 (0.008)	-0.007 (0.009)	0.011 (0.009)	0.004 (0.010)	-0.003 (0.009)
Expansion strategy	-0.604** (0.284)	0.332 (0.274)	-0.315 (0.287)	0.111 (0.279)	-0.392 (0.288)	-0.337 (0.300)
Size of business unit	0.036 (0.124)	-0.038 (0.123)	0.111 (0.127)	0.140 (0.127)	0.020 (0.130)	0.005 (0.140)
Intercept	1.313 (2.021)	-0.023 (1.970)	-0.105 (2.032)	2.137 (2.030)	1.923 (2.052)	-1.921 (2.102)
Pseudo $R^2$	0.087	0.051	0.095	0.085	0.080	0.054

**Panel B:** Papke and Wooldridge (1996) regressions of the weight placed on each type of non-financial performance measure in the context of annual performance evaluation (N=100)

	(1) Weight on efficiency	(2) Weight on quality	(3) Weight on project	(4) Weight on creativity	(5) Weight on team	(6) Weight on personal
Sufficiency of originality	-0.038 (0.034)	0.006 (0.026)	-0.097*** (0.035)	-0.050 (0.042)	0.021 (0.028)	0.040* (0.025)
Group conformity	-0.028 (0.026)	0.011 (0.023)	-0.070*** (0.027)	-0.045* (0.034)	-0.025 (0.021)	-0.039* (0.030)
Efficiency	0.090** (0.043)	0.055 (0.040)	0.153*** (0.052)	0.023 (0.046)	0.057 (0.039)	0.078* (0.044)
Information asymmetry	-0.018 (0.028)	0.008 (0.027)	0.027 (0.047)	-0.036 (0.037)	-0.021 (0.025)	-0.071*** (0.022)
Environmental dynamics	-0.004 (0.029)	0.017 (0.023)	0.043 (0.033)	-0.035 (0.033)	0.034* (0.019)	0.015 (0.020)
Growth opportunities	-0.008 (0.115)	-0.184** (0.084)	0.058 (0.143)	-0.108 (0.141)	-0.032 (0.104)	0.042 (0.079)
Percentage bonus pay	-0.026 (0.017)	0.006 (0.019)	-0.033* (0.017)	0.022** (0.009)	-0.003 (0.006)	-0.002 (0.008)
Expansion strategy	-0.324 (0.303)	0.776** (0.316)	-0.132 (0.405)	0.540 (0.437)	-0.082 (0.264)	0.062 (0.260)
Size of business unit	-0.043 (0.138)	0.039 (0.151)	0.005 (0.188)	-0.009 (0.185)	-0.036 (0.124)	-0.022 (0.116)
Intercept	-1.385 (2.357)	-4.158** (1.788)	-3.814 (3.089)	1.594 (2.432)	-3.293* (1.797)	-2.060 (2.164)
<i>AIC</i>	53.137	55.908	42.453	42.987	58.685	74.769

**Panel C:** Papke and Wooldridge (1996) regressions of the weight placed on each type of non-financial performance measure in the context of cash bonus compensation (N=75)

	(1) Weight on efficiency	(2) Weight on quality	(3) Weight on project	(4) Weight on creativity	(5) Weight on team	(6) Weight on personal
Sufficiency of originality	-0.033 (0.043)	-0.110*** (0.038)	0.018 (0.053)	0.059 (0.083)	-0.019 (0.046)	-0.018 (0.039)
Group conformity	-0.019 (0.035)	-0.076** (0.037)	0.032 (0.045)	-0.096** (0.053)	-0.029 (0.040)	-0.017 (0.049)
Efficiency	0.138* (0.077)	0.191*** (0.073)	0.122** (0.058)	0.002 (0.070)	-0.012 (0.058)	0.050 (0.058)
Information asymmetry	0.058 (0.046)	0.056 (0.048)	-0.013 (0.053)	0.072 (0.105)	-0.006 (0.035)	-0.103*** (0.032)
Environmental dynamics	-0.010 (0.042)	0.001 (0.046)	0.106** (0.053)	-0.079 (0.073)	0.022 (0.032)	0.043 (0.030)
Growth opportunities	0.150 (0.188)	-0.274* (0.159)	0.275 (0.227)	-0.258 (0.179)	-0.040 (0.177)	-0.131 (0.121)
Percentage bonus pay	-0.038 (0.036)	-0.019 (0.016)	-0.014 (0.014)	0.023 (0.016)	-0.018 (0.017)	-0.014 (0.013)
Expansion strategy	-0.351 (0.494)	-0.149 (0.487)	0.268 (0.643)	1.333* (0.758)	0.289 (0.456)	0.068 (0.427)
Size of business unit	-0.125 (0.211)	-0.001 (0.185)	-0.209 (0.289)	-0.329 (0.375)	0.152 (0.235)	0.115 (0.160)
Intercept	-6.658* (3.417)	-0.984 (2.925)	-12.169*** (3.947)	-0.646 (4.669)	-1.814 (2.725)	0.856 (3.546)
<i>AIC</i>	39.113	36.375	34.818	28.223	41.613	56.021

**Panel D:** Papke and Wooldridge (1996) regressions of the weight placed on each type of non-financial performance measure in the context of long-term career advancement (N=100)

	(1) Weight on efficiency	(2) Weight on quality	(3) Weight on project	(4) Weight on creativity	(5) Weight on team	(6) Weight on personal
Sufficiency of originality	-0.068** (0.033)	-0.065** (0.033)	-0.119** (0.052)	-0.039 (0.040)	-0.005 (0.028)	0.061** (0.033)
Group conformity	-0.056** (0.029)	-0.022 (0.036)	0.007 (0.053)	-0.055** (0.030)	0.011 (0.026)	-0.029 (0.032)
Efficiency	0.091* (0.051)	-0.000 (0.073)	0.073 (0.078)	0.006 (0.042)	0.001 (0.044)	0.034 (0.045)
Information asymmetry	-0.005 (0.027)	-0.047 (0.031)	0.011 (0.060)	-0.031 (0.029)	0.030 (0.030)	-0.083*** (0.029)
Environmental dynamics	-0.040 (0.032)	-0.010 (0.041)	0.003 (0.035)	-0.035 (0.034)	-0.008 (0.028)	-0.006 (0.023)
Growth opportunities	0.109 (0.171)	-0.107 (0.147)	0.234 (0.248)	-0.090 (0.141)	-0.028 (0.089)	0.073 (0.084)
Percentage bonus pay	-0.028 (0.020)	0.011 (0.016)	-0.014 (0.012)	0.025*** (0.009)	-0.007 (0.008)	0.006 (0.008)
Expansion strategy	-0.305 (0.548)	0.596 (0.417)	0.717 (0.456)	0.647 (0.403)	-0.321 (0.307)	0.057 (0.282)
Size of business unit	0.001 (0.179)	0.221 (0.175)	-0.594 (0.386)	0.065 (0.189)	0.021 (0.144)	0.010 (0.124)
Intercept	-0.425 (2.635)	1.031 (2.104)	-2.154 (4.342)	1.456 (2.496)	-2.944 (1.990)	-1.091 (2.189)
<i>AIC</i>	54.495	52.770	38.377	47.985	68.386	95.592

**TABLE 6***Poisson Regressions of the Number of Performance Measures onto Innate Preferences of Business Unit Managers and Control Variables*

The table presents Poisson regressions of the count of the performance measure categories that receive positive weight. We present the estimation results for three different decision contexts: annual performance evaluation (Column 1), cash bonus compensation (Column 2), and long-term career advancement (Column 3). The independent variables in all columns include the three test variables: (1) sufficiency of originality, (2) group conformity, and (3) efficiency which describe the innate preferences of the respondents for producing ideas, for conforming to social norms, and for concern with precision, reliability, and efficiency, respectively. Also included are control variables for information asymmetry, environmental dynamics, growth opportunities, percentage bonus pay, and expansion strategy. All variable definitions are in the Appendix. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significance at the 10%, 5%, and 1% levels (one-tailed for the test variables, two-tailed for all other variables), respectively. N=100.

**Panel A: Summary statistics on the number of performance measures used**

<i>Variable</i>	Mean	Std. Dev.	Minimum	Median	Maximum
# of measures in:					
Annual performance evaluation	4.88	2.15	0	5	10
Cash bonus compensation	2.93	2.18	0	3	10
Long-term career advancement	3.71	2.35	0	4	10

**Panel B: Poisson regression of the number of performance measures**

	(1) Annual performance evaluation	(2) Cash bonus compensation	(3) Longer-term career advancement
Sufficiency of originality	-0.019** (0.009)	-0.027** (0.015)	-0.025* (0.017)
Group conformity	-0.000 (0.007)	-0.007 (0.010)	-0.009 (0.010)
Efficiency	0.017 (0.012)	0.046** (0.019)	0.030 (0.018)
Information asymmetry	-0.002 (0.007)	0.016 (0.014)	0.001 (0.011)
Environmental dynamics	-0.000 (0.008)	0.015 (0.011)	-0.013 (0.010)
Growth opportunities	-0.004 (0.026)	-0.064 (0.046)	-0.078* (0.042)
Percentage bonus pay	-0.000 (0.003)	0.006 (0.005)	0.004 (0.003)
Expansion strategy	-0.017 (0.094)	0.136 (0.130)	0.301** (0.127)
Size of business unit	0.016 (0.034)	0.151** (0.067)	0.028 (0.070)
Intercept	1.805*** (0.690)	-0.190 (1.145)	2.358** (1.001)
Wald statistic	18.38	27.83	12.52
<i>p</i> -value	0.03	0.00	0.18
Pseudo $R^2$	0.019	0.072	0.044

### **TABLE 7**

#### *Regressions of the Use of Control Systems onto Innate Preferences of Business Unit Manager and Control Variables*

The table presents Ordinary Least Squares regressions of (1) the extent to which the business unit manager has to explain variances, i.e., differences between target and actual performance (“use of variance reporting”), (2) the extent to which the control system is used for communication and debate between the respondent and his/her senior manager (“use of interactive controls”), and (3) the extent to which senior management evaluates the business unit manager in a subjective manner (“use of subjective performance evaluation”). The independent variables include the three test variables: (1) sufficiency of originality, (2) group conformity, and (3) efficiency which describe the innate preferences of the respondents for producing ideas, for conforming to social norms, and for concern with precision, reliability, and efficiency, respectively. Also included are control variables for information asymmetry, environmental dynamics, growth opportunities, percentage bonus pay, and expansion strategy. All variable definitions are in the Appendix. Standard errors are in parentheses. \*, \*\*, \*\*\* denotes significance at the 10%, 5%, and 1% levels (one-tailed for the test variables, two-tailed for all other variables), respectively. N=100.

	(1) Use of variance reporting	(2) Use of interactive controls	(3) Use of subjective performance evaluation
Sufficiency of originality	-0.269** (0.141)	-0.223** (0.095)	0.252** (0.141)
Group conformity	0.078 (0.114)	0.025 (0.077)	0.138 (0.114)
Efficiency	-0.127 (0.179)	-0.040 (0.122)	0.117 (0.180)
Information asymmetry	0.025 (0.123)	-0.210** (0.084)	-0.022 (0.124)
Environmental dynamics	0.173 (0.107)	0.129* (0.073)	-0.060 (0.107)
Growth opportunities	-0.221 (0.380)	0.056 (0.258)	0.217 (0.381)
Percentage bonus pay	-0.001 (0.039)	0.041 (0.027)	0.024 (0.039)
Expansion strategy	2.916** (1.297)	1.906** (0.880)	-1.784 (1.303)
Size of business unit	-0.637 (0.582)	-0.367 (0.395)	-0.014 (0.584)
Intercept	23.682** (9.373)	30.022*** (6.361)	3.137 (9.415)
adj. $R^2$	0.088	0.163	0.012

## TABLE 8

### *Regressions of the Relative Weight on Aggregated Financial Measures vis-à-vis Non-Financial Measures onto Innate Preferences of Business Unit Managers and Control Variables*

The table presents Papke and Wooldridge (1996) regressions of the combined weight on financial measures (i.e., the sum of the weight placed on profit, accounting return, cost and revenue measures). We present the estimation results for three different decision contexts: annual performance evaluation (Column 1), cash bonus compensation (Column 2), and long-term career advancement (Column 3). The independent variables in all columns include the three test variables: (1) sufficiency of originality, (2) group conformity, and (3) efficiency which describe the innate preferences of the respondents for producing ideas, for conforming to social norms, and for concern with precision, reliability, and efficiency, respectively. Also included are control variables for information asymmetry, environmental dynamics, growth opportunities, percentage bonus pay, and expansion strategy. All variable definitions are in the Appendix. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significance at the 10%, 5%, and 1% levels (one-tailed for the test variables, two-tailed for all other variables), respectively.

Dependent variable is total weight on financial measures	(1) <i>Annual performance evaluation</i>	(2) <i>Cash bonus compensation</i>	(3) <i>Long-term career advancement</i>
Sufficiency of originality	-0.005 (0.025)	0.007 (0.035)	-0.017 (0.035)
Group conformity	0.057*** (0.021)	0.038* (0.026)	0.032 (0.027)
Efficiency	-0.109*** (0.032)	-0.044 (0.041)	-0.053 (0.035)
Information asymmetry	0.037* (0.020)	0.022 (0.026)	0.034 (0.027)
Environmental dynamics	-0.013 (0.017)	-0.018 (0.025)	0.006 (0.022)
Growth opportunities	0.013 (0.070)	0.181** (0.084)	-0.040 (0.076)
Percentage bonus pay	0.005 (0.006)	0.048*** (0.017)	0.014* (0.008)
Expansion strategy	0.062 (0.241)	0.108 (0.297)	0.341 (0.294)
Size of business unit	0.124 (0.086)	0.182 (0.121)	0.055 (0.114)
Intercept	-0.789 (1.728)	-3.837 (2.597)	-1.368 (2.224)
<i>N</i>	100	100	100
<i>AIC</i>	941.691	1000.876	952.310

## Appendix

### Dependent variables:

#### **Use of and Weight placed on different performance measures**

Below are 10 broad categories of performance measures. Please read this list carefully. The examples are for illustrative purposes only and we recognize that not all the performance measures used to assess your performance are listed here. Below we use these broad categories to ask you questions concerning their importance and use.

1. Profitability measures: Business unit profit; profit margin; firm-level profit
2. Return measures: Return-on-sales; return-on-assets; cash flow return-on-investment
3. Cost measures: Unit cost of a product; cost budget of a department; average variable costs
4. Sales measures: Sales growth in a region; actual sales compared to budget; ratings of sales effectiveness
5. Efficiency measures: Lead-time; % waste reduction; productivity growth; input-output ratios
6. Quality measures: % on time completion; % warranty returns; % inspection failures; score on customer satisfaction surveys
7. Project measures: Project failure rate; subjective assessment of project success; success rate with product introduction and or process change
8. Creativity measures: Ratings of innovativeness of the department; ratings of creativity; number of patents filed
9. Team work measures: Ratings of cooperativeness with others; subjective assessment of team contribution; assessment of interpersonal behavior
10. Personal measures: Subjective assessment of achievement on personal targets; managerial development progress reports; scores on 360 degree reviews; subjective assessment of leadership or coaching skills; employee satisfaction survey scores

Please indicate for each measure:

- Whether or not the measure is used to assess your performance
- How much weight your superior gives to each measure when she or he evaluates your annual performance. Note that the sum of the weights to all 10 measure categories together should equal 100%.
- How much weight your superior gives to each measure when she or he determines your annual cash bonus. Note that the sum of the weights to all 10 measure categories together should equal 100%.
- How much weight your superior gives to each measure when she or he decides on your promotion or other career advancements in the longer run. Note that the sum of the weights to all 10 measure categories together should equal 100%.

#### **Use of variance reporting**

Respondents answer on a fully anchored 7-point Likert scale (1 = never, 7 = always).

Please indicate the frequency with which each of the following occur:

1. I am required to trace the cause of unfavorable variances from targets to groups or individuals within my business unit.
2. I am required to trace the cause of favorable variances from targets to groups or individuals within my business unit.
3. I am required to submit an explanation in writing about causes of large unfavorable variances from targets.
4. I am required to submit an explanation in writing about causes of large favorable variances from targets.

### **Use of interactive controls**

Respondents answer on a fully anchored 7-point Likert scale (1 = very strongly disagree, 7 = very strongly agree).

Please indicate to what extent you agree with the following statements:

1. My superior often uses performance evaluation information as a means of questioning and debating the ongoing decisions and actions of business unit managers.
2. The use of performance evaluation information is continuous – it demands regular and frequent attention from managers at all levels.
3. There is a lot of interaction between top management and business unit managers in the performance evaluation process.
4. My superior uses performance evaluation information to discuss with his peers and subordinates changes occurring in the firm.

### **Use of subjective performance evaluation**

Respondents answer on a fully anchored 7-point Likert scale (1 = very strongly disagree, 7 = very strongly agree).

Please indicate to what extent you agree with the following statements:

1. Standards used to assess my performance are flexible.
2. My performance is assessed without reference to formal predetermined targets.
3. Performance is measured subjectively in this firm.
4. Performance is subjectively assessed by my superior.
5. Target achievement is the most important determinant of my performance assessment.

Test variables:

**Sufficiency of originality, Group conformity, and Efficiency** are defined as subscales of the Kirton Adaption-Innovation Inventory Instrument that is reproduced in full below. Measurement is on a fully anchored 5-point Likert scale (1 = very hard, 5 = very easy).

Please indicate how difficult it is to present yourself consistently and for a long time to others as someone who:

1. Conforms
2. Will always think of something new when stuck
3. Enjoys detailed work
4. Would sooner create than improve
5. Is prudent when dealing with authority
6. Never acts without proper authority
7. Never seeks to bend or break the rules
8. Likes bosses and work patterns which are consistent
9. Holds back ideas until obviously needed
10. Has fresh perspectives on old problems
11. Likes to vary set routines at a moment's notice
12. Prefers change to occur gradually
13. Is thorough
14. Is a steady plodder
15. Copes with several new ideas at the same time
16. Is consistent
17. Can stand out in disagreement against the group
18. Is stimulating
19. Readily agrees with the team at work
20. Has original ideas
21. Masters all details painstakingly
22. Proliferates ideas
23. Prefers to work on one problem at the time
24. Is methodological and systematic
25. Often risks doing things differently
26. Works without deviation in prescribed order
27. Imposes strict order on matters within own control
28. Likes the protection of precise instructions
29. Fits readily into 'the system'
30. Needs stimulation of frequent change
31. Prefers colleagues who never 'rock the boat'
32. Is predictable

#### Control variables

#### **Growth opportunities:**

Respondents answer on a fully anchored 7-point Likert scale (1 = extreme decline, 7 = extreme growth).

Please indicate your expectations about the following:

1. The growth opportunities that exists within the industry in which you compete.
2. The growth opportunities your unit faces.

**Environmental dynamics:**

Respondents answer on a fully anchored 7-point Likert scale (1 = highly stable, infrequent change, 7 = highly volatile, frequent change).

Please indicate the rate of change in each of the following six categories:

1. Buying patterns and requirements of customers
2. Distributors' attitudes
3. Industry buying patterns
4. Competitor strategies
5. Technical development relevant to your unit's business
6. Changes in production process

**Information asymmetry:**

Respondents answer on a 7-point Likert scale (1 = my superior, 4 = my superior and I equally, 7 = I).

Compared to your superior who is:

1. In possession of better information regarding the activities undertaken in your unit?
2. More familiar with the input-output relations inherent in the internal operations of your unit?
3. More certain about the performance potential of your unit?
4. More familiar technically with the work of your unit?
5. Better able to assess the potential impact on your activities of factors external to your unit?
6. In possession of a better understanding of what can be achieved in your unit?

**Percentage bonus pay:**

Please indicate the approximate amount of cash bonus, stated as a percentage of the respondent's annual salary, computed as the average earned over the most recent three years.

**Expansion strategy:**

Which of the following statements best describes the strategy top management has chosen with regard to your business unit?

1. Increase market share, even at the expense of short-term earnings and cash flow
2. Protect the business unit's market share and competitive position
3. Maximize short term earnings and cash flow even at the expense of market share
4. Withdrawal from the business through (slow) liquidation or sale of the unit