Reconsidering the participative budgeting–performance relation: A meta-analysis regarding the impact of level of analysis, sample selection, measurement, and industry influences

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ABSTRACT

The relationship of participative budgeting with performance presents a much debated but still unsettled issue in management accounting research. In this paper, meta-analysis is used to explore, whether methodological concerns, such as the level of analysis, sample selection, and variations in the measurement of performance, and theoretical concerns, such as industry differences, help explain observed inconsistencies in prior results. In line with theoretical predictions, the overall participative budgeting–performance relation is positive and significant. Moreover, this relation and the positive, significant ones of participative budgeting with departmental, budgetary, and managerial performance generalize across settings. In addition, for the relation with managerial performance, moderating influences of objective versus subjective and relative versus absolute self-rating measures of performance as well as private versus public sector samples emerge, which thus are important boundary conditions for future theory development. In contrast to theoretical predictions, the relation of participative budgeting with organizational performance is heterogeneous and does not generalize across settings.

1. Introduction

Whether participative budgeting is positively related to performance, is a debated but still unsettled issue (e.g. Agbejule & Saarikoski, 2006; Chong, Eggleton, & Leong, 2005b; Jermias & Yigit, 2013; Leach-López, Stammerjohan, & McNair, 2007; Parker & Kyj, 2006), which is disconcerting, because understanding this relationship is highly important. First, participative budgeting continues to be an important element of budgetary control, although it currently is criticised by researchers and practitioners alike. Several criticisms of budgetary control, such as that setting budget goals is time-consuming, expensive, and subject to considerable manipulations (e.g. Hansen, Otley, & Van der Stede, 2003; Sivabalan, Booth, Malmi, & Brown, 2009), are directly linked to the defining elements of participative budgeting, managers' involvement in, and

influence on, the setting of their units' budgets (e.g. Shields & Shields, 1998). Apparently, many companies are aware of these problems, but instead of going beyond budgeting (e.g. Boumistrov & Kaarbøe, 2013), the majority rather adapt their budgeting systems (Dugdale & Lyne, 2010; Libby & Lindsay, 2010; de With & Dijkman, 2008). That is, for these firms, budgets add value, because they are clearly associated with strategy implementation, updated more frequently and in line with firms' requirements, and, overall, their use (e.g. for performance evaluation) is more flexible than the criticisms suggest (Libby & Lindsay, 2010). In this context, participative budgeting is of on-going or even increasing importance as an element of budgeting (Dugdale & Lyne, 2010; Shastri & Stout, 2008) and incentive (Anderson, Dekker, & Sedatole, 2010; de With & Dijkman, 2008) systems. For example, Libby and Lindsay (2010, p. 60) report that to change their budgeting systems some firms planned to 'incorporate a bottom-up orientation and gather more information from front-line managers'.

Second, performance likely is the essential outcome in management (Hamann, Schiemann, Bellora, & Guenther, 2013; Miller, Washburn, & Glick, 2013), organizational behaviour (O'Neill, Goffin, & Gellatly, 2012; Viswesvaran, Schmidt, & Ones, 2002, 2005), and budgeting (Briers & Hirst, 1990; Hartmann, 2000) research in general and in participative budgeting research in particular (Greenberg, Greenberg, & Nouri, 1994; Shields & Shields, 1998). Despite the many criticisms, research into the participative budgeting–performance relation thus is timely and important, as recent theoretical (Heinle, Ross, & Saouma, 2014) and empirical (Jarrar & Smith, 2014; Jermias & Yigit, 2013; Kramer & Hartmann, 2014; Lau & Roopnarain, 2014; Macinati & Rizzo, 2014) studies show.

But apart from criticisms of participative budgeting practices, researchers also criticise the current state of the related research (e.g. Hansen et al., 2003). For example, despite strong economic and psychological arguments in support of a positive participative budgeting–performance relation (Covaleski, Evans, Luft, & Shields, 2003; Shields & Shields, 1998), findings of survey studies at different levels of analysis conflict. Positive, non-significant and sometimes even negative relations are reported for managerial (Kenis, 1979; Lau & Lim, 2002b; Lau, Low, & Eggleton, 1995), departmental (Jermias & Setiawan, 2008; Merchant, 1984; Swieringa & Moncur, 1972), and organizational performance (Jarrar & Smith, 2014; Shields & Young, 1993).

Instead of solving these inconsistencies, the results of prior meta-analyses also diverge. On the one hand, Greenberg et al. (1994), who summarize correlations across different levels of analysis, find a significant positive mean correlation that generalizes across settings. On the other hand, Derfuss (2009) only integrates individual-level studies of private sector organizations and finds positive mean correlations of participative budgeting with budgetary and managerial performance, of which the former generalizes across studies, whereas the latter is marked by significant between-study heterogeneity. This variation is partially explained by single-versus multi-source measurements of performance, but not by random versus non-random sampling or industry differences. The discrepancies between these two meta-analyses suggest several methodological and theoretical influences that no study into the participative budgeting–performance relation has covered systematically. Moreover, further potential influences are not covered by both studies, but also might inflate the between-study variation of correlations.

First, neither Greenberg et al. (1994) nor Derfuss (2009) compare all different levels of analysis of the performance variable (organizational, departmental, budgetary, or managerial). But between-level discrepancies in the strength of the participative budgeting–performance relation might help explain systematic between-study variation of correlations (Ostroff & Harrison, 1999).

Second, Derfuss (2009) finds no significant difference between random and non-random samples, although their statistical properties differ (Birnberg, Shields, & Young, 1990). Yet, as Ostroff and Harrison (1999) point out, this might be due to omitting the difference between correlations from multi- and single-organization samples, because only the former allow estimating the population correlation, whereas the latter yield estimates of within-organization correlations. Considering random versus non-random and single-versus multi-organization sampling together though, might explain Derfuss' (2009) failure to detect a moderating influence.

Third, in contrast to Greenberg et al. (1994), Derfuss (2009) finds systematic variation between single- and multi-source datasets: The correlations of participative budgeting with subjective (self-rating) measures of managerial performance are stronger than those with objective (superiors' ratings or quantitative) measures, either because these measures capture different dimensions of performance (Bommer, Johnson, Rich, Podsakoff, & MacKenzie, 1995; Van der Stede, Young, & Chen, 2005), or because any difference between the correlations pertaining to these measures results from common method effects (Greenberg et al., 1994; Wagner and Gooding, 1987b). However, which of these reasons actually drives this discrepancy still is an open question.

Fourth, neither Derfuss (2009) nor Greenberg et al. (1994) cover two further likely sources of variation in the participative budgeting–performance relation: In line with Kihn's (2010) review, correlations pertaining to self-rating instruments that measure performance relative to a standard, such as peer performance, might differ from correlations that are estimated from measures requesting absolute self-ratings, because unmeasured influences, such as industry effects, might impact the latter more strongly than the former (Govindarajan, 1986; Kihn, 2010). The use of single- versus multi-item instruments for measuring performance also might cause variation, because single-item scales might not adequately capture the multi-dimensional nature of performance (e.g. Bergkvist & Rossiter, 2007; Gardner, Cummings, Dunham, & Pierce, 1998).

Finally, Greenberg et al. (1994) and Derfuss (2009) do not include public sector studies. But public and private sector organizations differ due to political influences (Hoque & Hopper, 1994) and differences in reward structures (ter

Bogt, 2003). Besides, although Derfuss (2009) finds no significant influence, manufacturing firms differ from service organizations (Rust & Chung, 2006; Zeithaml, Parasuraman, & Berry, 1985), which might lead to distinct designs and uses of budgeting (Lowry, 1990; Marginson, 1999). Therefore, industry differences also might explain between-study variation.

To assess these influences, this study applies similar meta-analysis methods as Derfuss (2009) and Greenberg et al. (1994). The Hunter and Schmidt (2004) meta-analysis procedure, which is applied in this study, corrects for statistical artefacts, such as sampling and measurement errors, to estimate closely the analysed variables' construct-level relation. Thereby it also distinguishes artefact-induced variance from systematic between-study differences (Hunter & Schmidt, 2004). In the latter case, methodological (e.g. variable measurement) and theoretical (e.g. industry differences) moderator variables might cause this variation. Meta-analysis allows direct comparisons of the respective groups of correlations and rigorous statistical tests of their difference.

Accordingly, the paper's first aim is to meta-analytically summarize existing correlations to estimate the overall participative budgeting–performance relationship. Next, separate analyses of the organizational, departmental, budgetary, and managerial levels of analysis assess at which levels the participative budgeting–performance relation is theory consistent and generalizes across settings. Finally, the study explores influences of sample selection procedures, the measurement of the performance construct, and industry influences to further explain non-artefactual variation.

This study makes several contributions to participative budgeting and management accounting research, in line with the aims and strengths of meta-analysis (see Aguinis, Pierce, Bosco, Dalton, & Dalton, 2011; Geyskens, Krishnan, Steenkamp, & Cunha, 2009; Hunter & Schmidt, 2004). First, it summarizes published research through to the end of 2014 and thus updates existing meta-analyses (Derfuss, 2009; Greenberg et al., 1994) and extant reviews of participative budgeting (Shields & Shields, 1998) and performance (Kihn, 2010) research. Moreover, by estimating construct-level relations closely, it offers further insights into whether the participative budgeting–performance relation is theory consistent across studies and levels of analysis. Understanding this relation is important, because despite criticisms of participative budgeting practices and research (e.g. Hansen et al., 2003; Sivabalan et al., 2009), participation still constitutes an important element of budgetary control systems (e.g. Libby & Lindsay, 2010).

Second, this paper replicates and extends the meta-analytic results of Derfuss (2009) and Greenberg et al. (1994). According to recent calls in the accounting (Dyckman & Zeff, 2014; Salterio, 2014) and budgeting (Byrne & Damon, 2008; Otley & Pollanen, 2000) literature, replication is an important and timely issue. Reassessing research literature meta-analytically is as important as any form of replication (see Lindsay, 1995), because no single meta-analysis can solve important questions, but only might provoke further theory development and research (Aguinis et al., 2011; Bobko & Roth, 2008). Previous results thus must be explored again, to investigate with larger datasets their continuing validity (Hunter & Schmidt, 2004). Moreover, important moderating influences on the participative budgeting–performance relation have not been studied systematically, such as differences between levels of analysis or public and private sector organizations. This is possible with the present meta-analysis though, because sufficient correlations now are available.

Third, by statistically comparing the respective groups of correlations, meta-analysis assesses whether the proposed moderating influences are substantial and thus represent important boundary conditions for the theoretical advancement of participative budgeting–performance research (see Malmi & Granlund, 2009). Even finding that some possible moderating influence is non-significant offers an important contribution, because this result helps rule out potential reasons for conflicts in the participative budgeting–performance relation.[1] In the next section, the theoretical background is described and research hypotheses are developed. The research method, results, conclusions, limitations, and suggestions for future research are described in the remaining sections.

2. Theoretical background and hypothesis development

2.1. Theoretical relationship

Argyris (1952) observes that autocratic budget setting may induce negative behavioural consequences and proposes participation as a remedy that might positively influence performance. The ensuing studies define participative budgeting as managers' involvement in, and influence on, the setting of their units' budgets (Brownell, 1982b; Shields & Shields, 1998). But performance is not uniformly defined. Instead, it is measured at different levels of analysis, as managerial, budgetary, departmental, or organizational performance.[2] Managerial performance usually is defined in relation to the fulfilment of important managerial tasks (e.g. Mahoney, Jerdee, & Carroll, 1963) and thus 'refers to scalable actions, behavior and outcomes that employees engage in or bring about that are linked with and contribute to organizational goals' (Viswesvaran & Ones,

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[1] Sample selection and measurement differences represent broader issues that are not limited to the participative budgeting–performance relation. Therefore, these differences also might be addressed in methodological papers that cover the entire body of management accounting research, such as Kihn (2010). However, such papers would have to either discuss these differences or test them across a plethora of different management accounting construct–performance relations. In this regard, this study offers an important step in meta-analytic management accounting research into differences in sample selection and measurement of the performance construct and thereby complements the theoretical exposition in Kihn (2010).

[2] The level of analysis of a variable describes the 'level at which the variation of interest occurs' (Luft & Shields, 2003, p. 175).

2000, p. 216). Budgetary performance measures the frequency of attainment of managers' budget goals (Kenis, 1979) and is a part of managerial performance (Briers & Hirst, 1990). The degree of attainment of departmental or organizational goals signifies departmental or organizational performance, such that both are a function of effectiveness and efficiency (Venkatraman & Ramanujam, 1986, 1987).

Agency and psychological theory both suggest that participative budgeting influences performance positively. According to agency theory, the principal delegates a task to an effort-averse and opportunistic agent, who possesses superior knowledge necessary for task completion, which then depends on the agent's effort and environmental influences. The latter also might distort performance measures, such that supervision is costly and the principal may not (fully) observe and control the agent's actions. Therefore, the agent might opportunistically exploit existing information asymmetry (Böckem & Schiller, 2009; Holmström, 1979; Kirby, Reichelstein, Sen, & Paik, 1991). To mitigate these problems, budget-based contracts may be used that align the agent's with the principal's goals, by attaching bonuses to budget achievement (Demski & Feltham, 1978; Murphy, 2001; Sprinkle, Williamson, & Upton, 2008). As a part of these contracts, participative budgeting allows the agent to reveal some of his private information and might lead to gains for both parties: First, incorporating this information into the budget yields more realistic budget goals and helps allocate resources efficiently, such that expected performance increases and risk-sharing improves. Second, due to the budget-based contract, this budget then induces higher effort from the agent. By combining both effects, participative budgeting increases performance (Heinle et al., 2014; Kirby et al., 1991; Shields & Young, 1993).[3]

According to psychological theory, participative budgeting has a positive effect on performance via motivational and cognitive mechanisms (Birnberg, Luft, & Shields, 2007; Shields & Shields, 1998). Due to the motivational mechanism, participative budgeting increases 'a subordinate's trust, sense of control, and ego-involvement with the organization, which then jointly cause less resistance to change and more acceptance of, and commitment to, the budget decisions, in turn causing improved performance' (Shields & Shields, 1998, p. 59). Due to the cognitive mechanism, participative budgeting is a process of superior-subordinate information exchange that results in a better understanding of the situation and the tasks to be completed as well as in better decision outcomes, such as budgets, which in turn leads to higher performance (Chenhall & Brownell, 1988; Kren, 1992; Parker & Kyj, 2006).

In summary, both agency and psychological theory do not propose a direct relationship between participative budgeting and performance. Instead, the relation is described as being contingent on and mediated by other variables (Covaleski et al., 2003; Shields & Shields, 1998). But *ceteris paribus*, both theories support a positive participative budgeting–performance correlation.

H1.   Participative budgeting is positively correlated with performance.

2.2. Level of analysis

Although theory suggests a positive participative budgeting–performance relation, this relation's strength is not expected to be invariant across studies (see Cortina, 2003; Luft & Shields, 2003). Instead, Ostroff and Harrison (1999) indicate that it is important to examine correlations at different levels of analysis, because the relationships will diverge, if different processes are operating at each level. But no existing meta-analysis has compared participative budgeting–performance correlations at different levels of analysis, although evidence is available at the organizational, departmental, budgetary, and managerial level.

Specifically, it is expected that the correlations of participative budgeting with budgetary and managerial performance are stronger than those with departmental and organizational performance. Tymon, Stout, and Shaw (1998; also see Mahoney et al., 1963) indicate that control systems use influences departmental or organizational performance indirectly via individual-level outcomes, such as managerial performance. Due to this indirect effect, the correlations of participative budgeting with departmental and organizational performance might be less strong than those with budgetary or managerial performance. Moreover, compared with managerial performance, uncontrollable influences, such as market competition, might more strongly affect departmental and organizational performance, because companies use difficult but highly attainable budget goals for evaluating and rewarding managers' performance. Such targets shield managers from negative external influences and compensation risks and help mitigate fairness concerns (Bol, Keune, Matsumura, & Shin, 2010; Indjejikian & Matějka, 2006; Merchant & Manzoni, 1989; Murphy, 2001; Sprinkle et al., 2008). To the extent that participative budgeting is mobilised to set these targets, its relation with budgetary and managerial performance is expected to be stronger than its correlations with departmental or organizational performance.

H2.   The participative budgeting–performance correlations are stronger for budgetary and managerial than for organizational and departmental performance.

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[3]   A related concern is that agents bias their information to attain slack budgets (Böckem & Schiller, 2009; Dunk, 1990; Heinle et al., 2014; Murphy, 2001). However, slack also might influence performance positively. For example, slack might be allowed explicitly to help managers cope with uncertainty (Merchant & Manzoni, 1989) or allocate appropriately their attention to (non-)financial goals (Davila & Wouters, 2005). Slack also might reward for higher effort (Schatzberg & Stevens, 2008). Besides, budget systems might correct for slack over time (Anderson et al., 2010).

2.3. Sample selection

The way samples are selected also is a possible moderating variable (Birnberg et al., 1990; Van der Stede et al., 2005). For example, Lau et al. (1995) sample respondents randomly from numerous organizations, but fail to replicate results of Brownell and Hirst (1986), which use a non-random single-organization sample. However, Derfuss (2009) finds no moderating influence of random versus non-random sampling on the participative budgeting–managerial performance relation. But the difference between random and non-random samples is closely related to the difference between multi- and single-organization samples (Ostroff & Harrison, 1999). The former focus on the entire population of individuals in different settings and thus allow drawing conclusions about population-level relations, whereas single-organization samples only yield estimates of within-organization correlations that may not be generalized to an entire population. Considering both influences together though, might help explain between-study variation in participative budgeting–performance correlations. For example, Dunk (1989) suggests that his results may differ from studies that used single-organization samples (e.g. Brownell, 1982a), because he used a random multi-organization sample.

On the one hand, random samples are drawn in a way that every element in the population has the same probability of being selected. Thus, representativeness, external validity, and the ensuing generalizability of results to the entire population are strong arguments in favour of random sampling (Birnberg et al., 1990). Taking the distinction between single- and multi-organization samples into account (Ostroff & Harrison, 1999), best estimates of population correlations are expected to result from random samples of subjects from different organizations. On the other hand, although non-random sampling might hamper the generalizability of findings and diminish their external validity (Lindsay, 1995), using well specified models in a variety of well-known and carefully selected settings helps understand the processes of interest (Otley & Pollanen, 2000). Such carefully selected non-random samples thus likely help control for unmeasured influences that might otherwise introduce additional variation into the results (see Chenhall & Moers, 2007). However, especially single-organization samples do not yield estimates of population but of within-organization correlations, such that a meta-analytic combination of these correlations cannot be interpreted as an estimate of the population correlation (Ostroff & Harrison, 1999). Hence, different correlations are expected to result from meta-analyses combining random multi-, non-random single-, or non-random multi-organization samples.

H3.　The correlations of participative budgeting with organizational, departmental, budgetary, and managerial performance differ between random multi-, non-random single-, and non-random multi-organization samples.

2.4. Measurement of performance

Apart from studies' level of analysis and sample selection procedures, between-study variation might be due to authors' use of different methods for measuring participative budgeting and performance. But for participative budgeting, measurement differences likely are less important, because measures vary between levels of analysis rather than within each level. Organizational and departmental level studies frequently use the instruments developed by Milani (1975) or Swieringa and Moncur (1972, 1975) or adaptations thereof (Hassel & Cunningham, 1993; Shields & Young, 1993), whereas most individual-level studies also use Milani's (1975) instrument or modify it (Kren, 1992; Shields, Deng, & Kato, 2000). Moreover, all of these instruments measure managers' involvement in and influence on budget setting. Hence, measurement differences for participative budgeting are not further explored in this study.[4] But for performance, the measurement instruments differ in important ways, most importantly concerning the measures' source. Specifically, the literature discusses self-ratings (e.g. Mahoney et al., 1963), superiors' ratings (e.g. Mia, 1988), and (non-)financial performance measures (e.g. Milani, 1975) concerning their dimensionality and validity.

First, regarding dimensionality, many studies acknowledge the multi-dimensional nature of performance (e.g. Briers & Hirst, 1990; Van der Stede et al., 2005). But differences emerge, if the degree of overlap of different instruments with performance at the construct-level is considered. (Bommer et al., 1995; also see Shields et al., 2000) note that objective measures, such as (non-)financial performance measures, only provide information on the measurable part of subordinates' performance, which is addressed by the respective measure. Furthermore, superiors cannot fully observe subordinates' work, such that their ratings only cover observable aspects of performance (Dunk, 1993). Superiors' ratings also are known to be subject to biases, such as leniency (i.e., the provision of better ratings than warranted) and centrality (i.e., the avoidance of extreme ratings, e.g. to accommodate fairness concerns). Such biases further reduce the aspects of subordinates' performance that superiors' ratings capture (Moers, 2005; Viswesvaran et al., 2002, 2005). In contrast, self-ratings likely cover all facets that a manager regards as important and thus should be able to validly capture his managerial or his department's performance (Dunk, 1993; Van der Stede et al., 2005).

Second, regarding measurement validity, bias in self-ratings, such as socially desirable responding, is a matter of concern, especially in cases of low performance (Greenberg et al., 1994; Mia, 1989; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

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[4] Moreover, no subgroups of sufficient size (i.e. of three or more correlations, see Dalton et al., 2003) could be formed for analyzing whether the measurement of participative budgeting has any influence at the individual level of analysis, because only two correlations are available for modifications of Swieringa and Moncur's (1975) instrument.

Therefore, the validity of self-ratings of performance is questioned and objective criteria, such as (non-)financial measures or superior's ratings, are recommended instead (Birnberg et al., 1990; Mia, 1988). But due to a lack of a convincing proof, Brownell and Dunk (1991) doubt that objective measures are the only valid measures of performance and that self-rating measures necessarily are biased and invalid. Supporting this argument, Lance, Teachout, and Donnelly (1992) show that while different measurement methods cause method-specific factors, these factors correlate substantially with known antecedents of performance, such as training grades or job experience. Measurement effects thus are at least partially due to distinct dimensions of performance that are captured by different measures. Besides, (non-)financial measures of performance are usually output-focused, whereas self-ratings also might take into account the input side of performance, such as managerial effort (Van der Stede et al., 2005; Venkatraman & Ramanujam, 1986).

Due to these reasons, the results of studies using different measures of performance are expected to differ. At least two studies (Greenberg et al., 1994; Venkatraman & Ramanujam, 1987) do not find significant differences pertaining to subjective versus objective measures of performance, whereas some meta-analyses attest to these differences (Bommer et al., 1995; Henard & Szymanski, 2001; Heneman, 1986; Viswesvaran, Schmidt, & Ones, 2005). Especially, Wagner and Gooding (1987a, 1987b) and Derfuss (2009) find stronger participation–performance correlations for self-rating than for objective measures of performance. Therefore, drawing on the breadth-of-construct argument, self-rating measures might better reflect performance than (non-)financial measures or superior's ratings, such that using the former results in higher participative budgeting–performance correlations. Drawing on the validity concerns, the same pattern of results is expected to emerge, because self-rating measures then would be inflated by common method variance.

H4. The correlations of participative budgeting with organizational, departmental, budgetary, and managerial performance are stronger for self-rating than for objective measures of performance.

As Kihn (2010) points out, outcomes also may differ between studies that use absolute and relative self-ratings of performance. On the one hand, many studies use absolute self-ratings, such as bad versus good or low versus high performance (e.g. Brownell, 1982a; Wong-On-Wing, Guo, & Lui, 2010). On the other hand, authors ask for relative assessments, such as performance (well) below (above) average (e.g. Chalos & Poon, 2001; Chong et al., 2005b) or relative to peers or standards (Shields et al., 2000). To overcome potential drawbacks of absolute measures, relative measures are endorsed, because they help control for the absence of common performance standards across subjects' organizations (Kihn, 2010) or external influences, such as industry effects (Govindarajan, 1986). Moreover, relative measures might reduce potential common method biases, insofar as they vary the response scale format and thus psychologically separate responses (Podsakoff et al., 2003). Therefore, because absolute measures might incorporate variance into the participative budgeting–performance relation that is due to unmeasured variables, lower correlations are expected for relative compared with absolute self-rating measures of performance.

H5. The correlations of participative budgeting with organizational, departmental, budgetary, and managerial performance are stronger for absolute than for relative self-rating measures of performance.

A third distinction concerns the difference between single-item performance self-ratings (e.g. Chenhall & Brownell, 1988) and multi-item self-rating instruments (e.g. Mahoney et al., 1963). In light of current recommendations, these measures are not necessarily complementary and thus might yield different participative budgeting–performance correlations. But no meta-analysis has tested this distinction empirically.

Specifically, single-item measures should only be used, (1) if a construct is reasonably clear, such that it can be imagined easily and uniformly by respondents, and (2) if a construct is unidimensional (Bergkvist & Rossiter, 2007; Wanous & Hudy, 2001). Regarding the first condition, studies usually select respondents who have several years of experience in their positions (e.g. Brownell, 1982c; Parker & Kyj, 2006) and thus might possess relatively clear knowledge about their performance, even if they are not forced to rate it on several dimensions. Yet, whether this expectation translates into valid responses, because respondents really possess sufficient insight to solve this task, remains unclear (Kwok & Sharp, 1998). Vis-à-vis the second condition, performance is unambiguously described as multi-dimensional (e.g. Miller et al., 2013; Van der Stede et al., 2005) and, from a measurement theory perspective, thus should not be measured by a single item, because multi-item measures might better capture the different dimensions (Henard & Szymanski, 2001; Kwok & Sharp, 1998).

So far, no meta-analysis of the participative budgeting–performance relation has compared single-item with multi-item measures of performance. But research has explored this difference for several different constructs. For attention at work and job satisfaction, single-item instruments apparently correlate significantly with their respective multi-item counterparts (Gardner et al., 1998; Wanous, Reichers, & Hudy, 1997). However, these correlations between single- and multi-item measures are not perfect, such that both types of measures probably are not fully complementary. Moreover, several meta-analyses find stronger predictor–outcome correlations for multi-item than for single-item measures of the same constructs (e.g. Henard & Szymanski, 2001; Van Vaerenbergh, Orsingher, Vermeir, & Larivière, 2014; Warren & Landis, 2007). Because single-item measures also are not well suited to capture all aspects of performance (Briers & Hirst, 1990; Kwok & Sharp, 1998; Miller et al., 2013; Van der Stede et al., 2005), single-item measures of performance are expected to yield smaller correlations with participative budgeting than multi-item measures.

H6. The correlations of participative budgeting with organizational, departmental, budgetary, and managerial performance are stronger for multi-item than for single-item measures of performance.

2.5. Industry influences

Apart from measurement influences, several authors are apprehensive of the impact of industry differences on budgeting (e.g. Lowry, 1990; Shields, 1998). On the one hand, differences between private and public sector organizations might help explain between-study variation in participative budgeting–performance correlations for several reasons: First, the influence of political demands is usually strong in the public sector, insofar as organizations in that sector often are supposed to support political goals, which then also translate into budget goals. Managers' input thus might be less important and, in consequence, their performance less strongly influenced by their budgetary participation (Hoque & Hopper, 1994). Second, information sharing and reward structures differ between these sectors, because managers are held accountable by different stakeholders, such as top managers versus politicians, and a broader set of non-financial performance criteria apply in the public sector (ter Bogt, 2003; Jermias & Setiawan, 2008). But if the importance of budgets as performance standards decreases, the participative budgeting–performance relation might be less strong, too. Third, distinct attitudes and professional socializations of organizations' members cause dissimilar preferences regarding the design and use of budget systems. For example, professional members of an organization, such as medical staff in hospitals, might prefer budgets to be deemphasized as performance standards, such that their performance might be less related to their budgetary participation (Abernethy & Stoelwinder, 1995). Because of these influences, in public sector organizations, 'the benefits of participation might not be fully realized' (Jermias & Setiawan, 2008, p. 270), such that participative budgeting–performance correlations are expected to be smaller in public than in private sector organizations.

H7. The correlations of participative budgeting with organizational, departmental, budgetary, and managerial performance are stronger for private than for public sector organizations.

On the other hand, manufacturing and service industries reportedly differ (Edvardsson, Gustafsson, & Roos, 2005; Lowry, 1990). Empirical evidence underscores this difference, insofar as Lau and Tan (1998) using data gathered in financial service organizations fail to replicate Brownell and Dunk's (1991) results, which are based on data collected from manufacturing companies. Service providers' core offering is a service that entails a performance or deed. Manufacturing and service firms therefore differ regarding the tangibility of their offerings and the degree of customer co-production (Edvardsson et al., 2005; Zeithaml et al., 1985). First, it is impossible to inventory or display services, because they are more intangible than manufactured goods. Second, in comparison with manufactured products, a higher degree of customer co-production characterizes services, such that consumers must provide necessary inputs and thereby participate in service production. For relatively intangible offerings that also demand a comparatively high degree of co-production, budgeting apparently is important for organizational learning, rather than performance measurement and incentive provision, because under these circumstances, service firms cannot anticipate outcomes precisely enough to support evaluation or rewards (Lowry, 1990; Marginson, 1999; Modell, 1996). Yet, participative budgeting is an important means of information exchange (Chenhall & Brownell, 1988; Kren, 1992), such that the intensity of its use might be higher in service than in manufacturing companies (Lowry, 1990). Insofar as participative budgeting also is an important component of incentive contracts (e.g. Anderson et al., 2010), a lower emphasis on budgets for evaluating performance might decrease the salience of participative budgeting as a determinant of performance in service industries. Therefore, the participative budgeting–performance relation might be stronger in manufacturing than in service industries.

H8. The correlations of participative budgeting with organizational, departmental, budgetary, and managerial performance are stronger for manufacturing than for services industries.

2.6. Journal quality

The quality of the included studies constitutes an important issue in the meta-analytic literature, insofar as lower quality studies might yield significantly different results than carefully designed and executed studies (Aguinis et al., 2011; Geyskens et al., 2009). As a first control for this problem, this study only covers peer-reviewed articles, because the peer-review process should help weed out serious flaws that might otherwise threaten the conclusions' validity (Aguinis et al., 2011). However, because the rigor of review processes may vary, differences still might be possible in the quality of studies from quality as compared to other journals (Geyskens et al., 2009). Yet, a basic meta-analytic principle is to use as many studies as possible, such that any errors made by authors of lower-quality studies will cancel each other out in the process of aggregation (Hay, Knechel, & Wong, 2006). But to control for possible differences in quality, this study contrasts the results of studies from quality and other journals.

3. Method

3.1. Identification of relevant studies

A thorough literature search gathered as complete a sample of studies as was possible: First, the *Business Source Complete*, *EconLit*, *JSTOR*®, *PsycINFO*, *Scopus*®, and *Thomson Reuters*^TM *Web of Knowledge* electronic databases as well as the *Emerald|Insight*, *Inderscience*, *Sage Journals Online*, *ScienceDirect*®, *SpringerLink*, and *Wiley Online Library* homepages were searched,

using combinations of appropriate key words, such as *participation*, *participative*, *budget*, *budgeting*, *performance*, *productivity*, *effectiveness*, and *efficiency*. These databases were selected because they cover all accounting journals that are regarded as influential (e.g. Brown & Huefner, 1994; Locke & Lowe, 2008) and also contain journals likely to publish appropriate papers.[5] Second, relevant review papers were perused for appropriate citations (Birnberg et al., 1990; Bonache, Maurice, & Moris, 2010; Briers & Hirst, 1990; Chenhall, 2003; Covaleski et al., 2003; Derfuss, 2009, 2015; Dunk, 2001; Greenberg et al., 1994; Hartmann, 2000; Luft & Shields, 2003; Shields & Shields, 1998). Third, additional studies were identified from the reference sections of all selected articles.

Study selection adhered to the following criteria: First, studies must have been published in an academic journal or book series by the end of 2014. Second, they must explicitly refer to participative budgeting. Different from Greenberg et al. (1994), the sample does not include participative goal setting or decision making literature, because reactions to participation might differ for different types of goals (Brownell, 1982b; Hofstede, 1967). Third, according to Bobko and Roth (2008), a meta-analytic dataset should closely match the research question. Therefore, because the present study is concerned with the relationship of participative budgeting and performance at different levels of analysis in organizational settings, the studies must be based on survey research (see Bommer et al., 1995; Viswesvaran et al., 2002). Experiments are excluded, because (1) the experimental budgeting literature usually uses student subjects (e.g. Byrne & Damon, 2008) and (2) the tasks regularly do not reflect actual managerial tasks (Kren & Liao, 1988; Sprinkle et al., 2008). Fourth, although participative budgeting is defined as involvement and influence in budget setting, studies that only measure managers' influence in budget setting were included (e.g. Jermias & Setiawan, 2008), because managers who can influence budgeting decisions of necessity also are involved in budgeting. Studies that only measure involvement were excluded (e.g. Goodwin & Bloore, 2002; Virameteekul, Jones, & Chansarkar, 1995), because involved managers are not inevitably also influential. In addition, several studies did not appear in the analysis, because they do not report correlation coefficients or statistics that could be transformed into correlations using formulas provided in the literature (Glass, McGaw, & Smith, 1981; Peterson & Brown, 2005), such as standardized regression coefficients.[6] Although Frucot and Shearon (1991) do not report the participative budgeting–managerial performance correlation, it could be included, because it is reported in Greenberg et al. (1994, p. 129, Table 2).

Meta-analysis requires statistically independent samples (Cheung & Chan, 2004). While the statistical independence of different samples used in one study can be assumed if the samples come from different national backgrounds (e.g. Leach-López et al., 2007), undetected duplicate studies might threaten statistical independence. To detect such studies, the heuristic proposed by Wood (2008) was followed. Correlations were considered only once, if they recurred in several publications based on one dataset (e.g. Nouri, Blau, & Shahid, 1995; Nouri & Parker, 1998).[7] If a study contained conceptual replications, in the form of either sub-scales of one variable (e.g. Hassel & Cunningham, 1993, 1996) or repeated measures of a construct (e.g. Brownell, 1983[8]) composite correlations and their respective reliability coefficients were computed (Hunter & Schmidt, 2004). However, if this was impossible, the correlations were averaged and the respective sample size adjusted to account for the degree of interdependence (Cheung & Chan, 2004, 2008); the adjusted sample sizes reported in Table 1 then were used in all analyses.

Outliers may increase the variance and alter the mean of a distribution of correlations, which would cause erroneous conclusions (Huffcutt & Arthur, 1995). To detect any outliers, Huffcutt and Arthur's (1995) sample-adjusted meta-analytic deviance (SAMD) statistic was calculated and plotted in a scree plot (see Fig. 1). Outliers are those studies that deviate from the line approximated by the statistic's values. Following Huffcutt and Arthur (1995), this approach was applied to the overall participative budgeting–performance meta-analysis, such that all studies were screened and the minimum recommended number of 20 correlations also was maintained (Beal, Corey, & Dunlap, 2002). Though Fig. 1 indicates that several outliers might be present, following Hunter and Schmidt (2004), only the three most severe outliers (Lau et al., 1995, $r = -0.390$, $n = 112$; Jermias & Setiawan, 2008, $r = -0.193$, $n = 204$; Scott & Tiessen, 1999, $r = -0.130$, $n = 248$) were deleted, because studies simply might surface in the outlier analysis due to their large samples (Hunter & Schmidt, 2004).

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[5] Examples include: (1) *Business Source Complete*: *Abacus*; *The Accounting Review*; *Accounting and Business Research*; *Behavioral Research in Accounting*; *Journal of Accounting Research*; *Journal of Management Accounting Research*; (2) *Emerald|Insight*: *Accounting, Auditing and Accountability Journal*; *Advances in Accounting Behavioral Research*; *Advances in Management Accounting*; (3) *ScienceDirect®*: *Accounting, Organizations and Society*; *Advances in Accounting*; *The British Accounting Review*; *Management Accounting Research*.

[6] The following studies were excluded: Aranya (1990); Breaux, Finn, and Jones (2011); Brownell (1985); Brownell and Hirst (1986); Chong (2002); Dunk (1989, 1990); Dunk and Lysons (1997); Etemadi, Dilami, Bazaz, and Parameswaran (2009); Hirst (1987); Iriyadi and Gurd (1998); Kenis (1979); Lau and Ng (2003); Leung and Chan (2001); Maiga (2005); Murwaningsari (2008); Orpen (1992); Otley and Pollanen (2000); Williams, Macintosh, and Moore (1990). An e-mail request, asking for the missing correlations, was sent to the authors of the most recent of these articles, outlined the purpose of the request but prompted disappointing results. Not all authors replied, and those who did mostly stated that it would be impossible to retrieve their datasets.

[7] The following studies were identified as using the same datasets: (1) Brownell (1982a, 1982c, 1983); (2) Brownell and Dunk (1991), Dunk (1993, 1995a, 1995b); (3) Chong and Bateman (2000), Chong and Chong (2002a, 2002b); (4) Chong, Eggleton, and Leong (2005a, 2005b, 2006); (5) Cunningham and Hassel (2008); Hassel and Cunningham (1993, 1996, 2004); (6) Eker (2008, 2009); (7) Lau and Lim (2002a, 2002b); (8) Lau et al. (1995, 1997); (9) Leach-López et al. (2007), Leach-López, Stammerjohan, and Rigsby (2008); (10) Merchant (1981, 1984), Brownell and Merchant (1990); (11) Nouri et al. (1995), Nouri and Parker (1998); (12) Quirin, Donnelly, and O'Bryan (2000), Quirin, O'Bryan, and Donnelly (2004).

[8] Brownell (1983) represents a complicated case, because he reports the participative budgeting–performance correlations only for high/low consideration and high/low initiating structure leadership styles. Thus, the correlations were averaged across these sub-samples for Milani's (1975) and Hofstede's (1967) measures of participation, before calculating the composite correlations.

Table 1

Composite correlations with sample sizes adjusted according to Cheung and Chan (2004, 2008).

Study	Link[a]	r_i	p_i	n_i	$n*_i$
Macintosh and Williams (1992)	Participative budgeting–departmental performance	0.263	2	127	127
Milani (1975)	Participative budgeting–managerial performance	0.159	12	81	140
Tsamenyi and Mills (2002)	Participative budgeting–managerial performance	0.1708	2	89	90

[a] r_i: composite correlation of study i; p_i: the number of interdependent correlations in study i; n_i: original sample size of study i; $n*_i$: sample size of study i adjusted for interdependence.
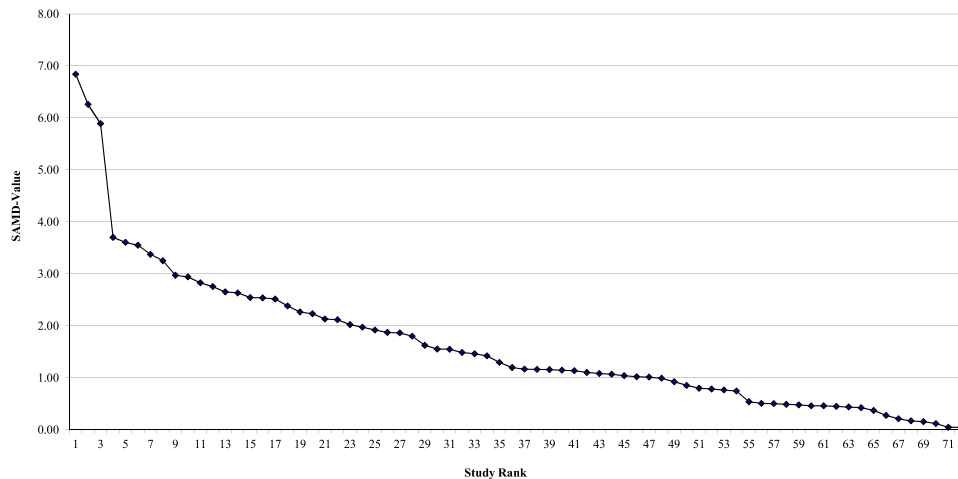

Fig. 1. Plot of outlier analysis for the participative budgeting–overall performance relation. SAMD-Values are the absolute values computed with Huffcutt and Arthur's (1995) sample-adjusted meta-analytic deviance (SAMD) statistic for each study considered for the meta-analysis. Study ranks result from ranking the studies' respective absolute SAMD-Values.

All in all, 69 independent samples that were used in 87 papers were included in the final dataset. These samples yielded 6 participative budgeting–organizational performance, 6 participative budgeting–departmental performance, 6 participative budgeting–budgetary performance, and 56 participative budgeting–managerial performance correlations.

3.2. Coding of relevant studies

Coding the 69 samples focused on several sample and design characteristics.[9] Apart from coding sample sizes, correlations, and reliabilities, categories were established for all moderator variables. If any important information was not reported in a study, the variable was coded as missing.

3.2.1. Level of analysis

The coding of the measure of performance as organizational, departmental, budgetary, or managerial performance relied on information from the studies' methods sections. Two ambiguous studies were classified as follows: First, Merchant (1981, 1984) measures departmental performance of 170 manufacturing department managers in 19 organizations. For his 1981 study, he aggregates these measures for each organization. But this measure was not classified as a measure of organizational performance, because the aggregation of several assessments of the performance of manufacturing departments does not adequately proxy for organizational performance. Second, although Milani (1975) develops his hypothesis with reference to foremen performance, in his analyses, he uses performance measures (Performance (PER) % and Hours to Base Ratio (HTB)), which the studied firm uses as measures of managerial and foremen section (i.e., departmental) performance. However, he reports that '[…] the PER % was used by the foreman's superior as a measure of the *foreman's* performance relative to the rest of the foremen in his department […]' and '[…] the relative position of the section HTB (i.e., the *foreman's* HTB) was the emphasized relationship […]' (p. 280, italics added). Milani's (1975) measures thus were classified as measures of managerial performance.

3.2.2. Sample selection

Following Ostroff and Harrison (1999), the correlations were coded as coming from (1) random multi-, (2) non-random multi-, or (3) single-organization samples.

3.2.3. Measurement of performance

The measures of managerial performance were coded as follows: First, (1) self-ratings were distinguished from (2) objective measures, such as (non-)financial performance measures or superior's ratings. Second, self-rating measures were either (1) absolute or (2) relative measures. The former use scale anchors such as 'performance is barely satisfactory' or 'performance is extremely good' (Chenhall & Brownell, 1988, p. 228), whereas the latter demand a comparison of a manager's performance to peer performance or performance standards (e.g. Govindarajan, 1986; Shields et al., 2000). Third, (1) single-item and (2) multi-item self-rating measures were assigned to separate groups.

3.2.4. Industry

Industry codes were (1) private, public (including non-profit organizations), or mixed and (2) manufacturing, services, or mixed.

3.2.5. Journal quality

Two proxies were coded as (1) quality and (2) other journals: For the first proxy, all journals included in the *Thomson Reuters*[TM] *Master Journal List* as well as the *American Accounting Association*'s journals (e.g. *Behavioral Research in Accounting, Journal of International Accounting Research*, and *Journal of Management Accounting Research*) were considered as quality journals, because the latter frequently are classified as high quality (Brown & Huefner, 1994; Locke & Lowe, 2008). As a second proxy, this study relied on a similar distinction as Hay et al. (2006) and categorized *Accounting, Organizations and Society, Behavioral Research in Accounting, Contemporary Accounting Research, Journal of Accounting Research, Journal of International Accounting Research, Journal of Management Accounting Research, Management Accounting Research*, and *The Accounting Review* as quality journals.[10]

3.3. Meta-analytic procedures

This study applies artefact distribution meta-analysis procedures developed by Hunter and Schmidt (2004) to integrate correlations and to correct for sampling and measurement error. This method was selected, first, for reasons of comparison with related studies that use the same approach (Bommer et al., 1995; Derfuss, 2009, 2015; Greenberg et al., 1994; Wagner & Gooding, 1987a, 1987b; Viswesvaran et al., 2002, 2005). Second, meta-analysis methods fall into two broad classes, fixed- and random-effects models. Because heterogeneous relations are expected based on prior evidence (Greenberg et al., 1994; Shields & Shields, 1998; Derfuss, 2009), a random-effects procedure is more appropriate than fixed-effects procedures, because for heterogeneous relations, it yields less biased and more accurate estimates (e.g. Schmidt, Oh, & Hayes, 2009). Artefact distribution meta-analysis first calculates the weighted mean correlation (r) across all k studies and corrects for sampling error, weighting the correlations with studies' sample sizes (n). The observed variance between the correlation coefficients, corrected for sampling error, and the resulting standard deviation (SD_r) then are computed. Finally, the method corrects r and SD_r for measurement error to calculate the mean corrected correlation (ρ) and the corresponding standard deviation (SD_ρ) (Hunter & Schmidt, 2004). The meta-analyses are implemented using the Comprehensive Meta Analysis program, Version 1.0.23 (Borenstein & Rothstein, 1999).

Because not all studies provide reliability data, such as Cronbach's (1951) alpha, the calculations of ρ and SD_ρ rely on the mean of the reliability distributions for the respective variables given in Table 2. If no reliability estimates were reported, but the inter-correlations among items of a scale were given (e.g. for managerial performance, Brownell, 1982a), reliability co-efficients were computed with the Spearman-Brown formula (Hunter & Schmidt, 2004). Estimating the reliability of single-item measures of performance is impossible, but these measures are not error free. To mitigate this concern, the reliability coefficients of all multi-item measures of performance were used in all analyses that only involve single-item measures, because they provide the best possible estimate of the single-item measures' reliability.

To assess whether the included studies estimate a common population correlation, two tests of homogeneity were used: According to the 75% rule (Hunter & Schmidt, 2004; Koslowsky & Sagie, 1994), if more than 25% of the variance cannot be attributed to artefacts, moderating variables exert some influence. In addition, 95% credibility intervals (CrI) that refer to a parameter's observed distribution are constructed around the ρ, using SD_ρ. If credibility intervals are large or include zero, moderator variables might be influencing the respective relation. If wide intervals exclude zero, a finding can be generalized regarding the direction of the effect (Cortina, 2003; Whitener, 1990). However, caution is necessary when applying these procedures, because simulation studies regularly reveal high Type I error rates and low power for meta-analyses that include few studies of small average sample size (e.g. Aguinis, Sturman, & Pierce, 2008; Sagie & Koslowsky, 1993). Together though, these procedures seem to guarantee relatively secure conclusions about homogeneity (Cortina, 2003; Sagie & Koslowsky, 1993). For ρ to estimate a homogeneous relation, 75% or more of the observed variance therefore must be attributable to statistical artefacts, and the credibility interval must be narrow and exclude zero unless ρ is very small (Geyskens et al., 2009).

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[10] Hay et al. (2006) include *Auditing: A Journal of Practice and Theory, Contemporary Accounting Research, Journal of Accounting and Economics, Journal of Accounting Research*, and *The Accounting Review* as high quality. No studies published in the *Journal of Accounting and Economics* appear in the current analysis.

Table 2
Reliability distributions.

Variable and reference	No.[a]	Mean α[b]	SD α
Participative budgeting	74	0.831[c]	0.108
Milani (1975)	58	0.851	0.071
Kren (1992), Milani (1975), reduced scale	3	0.830	0.072
Hassel and Cunningham (1993)	3	0.636[c]	0.309
Shields and Young (1993)	3	0.867	0.047
Swieringa and Moncur (1975)	5	0.687[c]	0.161
Vroom and Mann (1960)	2	0.861	0.084
Managerial performance	34	0.817[c]	0.126
Heath and Brown (2007)	1	0.910	
Mahoney et al. (1963)	31	0.811[c]	0.130
Shields et al. (2000)	1	0.830	
Sugioko (2010)	1	0.873	
Budgetary performance, Lau and Ng (2003)	1	0.845	
Departmental performance	2	0.780	0.240
Organizational performance	5	0.790	0.104
Duh, Chen, and Chow (2006)	1	0.915	
Hosen, Hui, Suliman, and Rahman (2011)	1	0.700	
Jarrar and Smith (2014)	1	0.780	
Kung, Huang, and Cheng (2013)	1	0.876	
Shields and Young (1993)	1	0.680	

[a] Number of studies reporting reliability coefficients for the respective variables in the studies included in the meta-analyses.
[b] Mean and standard deviation (SD) of the respective distribution of reliability coefficients.
[c] Partially computed with the help of the Spearman-Brown formula.

To determine the significance of the ρ, 95% confidence intervals (CI) were constructed, using the standard error of the ρ (SE_ρ) calculated with a formula for artefact distribution−corrected correlations (Hunter & Schmidt, 2004). However, because k is the relevant sample size for computing SE_ρ, the confidence intervals might have low power. Therefore, they should be interpreted only as approximate, especially if k is small (Schmidt et al., 2009).

Hunter and Schmidt (2004) recommend using hierarchical moderator analyses to assess the moderating variables sequentially. The sample is split into subgroups that parallel the first moderator variable's categories and meta-analyses then are performed on each subgroup. Only if a sizeable portion of variance remains unexplained should a subgroup be submitted to further analysis. A moderating influence can be assumed to exist, if (1) the subgroup ρ differ substantially and (2) the corrected variance averages lower across the subgroups than in the overall analysis. To test for subgroup differences, confidence intervals around the difference (CIdiff) of the subgroup ρ were used (Hunter & Schmidt, 2000), together with a Šidák correction to adjust α to an overall level of 0.05 for comparisons of multiple categories (Abdi, 2007). The caveat regarding a small k also applies to these confidence intervals.

Because it is exclusively based on published research, the present meta-analysis might be affected by publication bias. To address this issue methodologically, a fail-safe n (n_{fs}) was computed, which displays the number of missing studies with null findings needed for reducing the estimated ρ to a critical level (Hunter & Schmidt, 2004). Because Cohen (1988) expects many small (i.e., $r = 0.100$) correlations in the social sciences, the critical value was set to 0.040, because this value cannot be rounded to a small effect size.

4. Results

4.1. Tests of the overall relation and the journal quality influence

Table 3, Panel A, reports the meta-analysis of the overall participative budgeting−performance relation. Consistent with H1, the mean correlation is positive ($\rho = 0.304$, $k = 69$) and significant. However, as the percentage of unaccounted for variance (63.906%), the relatively high standard deviation ($SD_\rho = 0.149$), and the wide credibility interval (95% CrI: 0.012, 0.596) show, the relation is marked by significant non-artefactual between-study variance, such that it is just in line with economic and psychological theory. Moreover, an analysis of the hypothesized moderator variables is warranted.

Before assessing these effects, journal quality was analysed, to rule out its possible influence. Table 3, Panel B, presents the corresponding results. For the first proxy, the difference between quality ($\rho = 0.301$, $SD_\rho = 0.120$, $k = 35$) and the other journals ($\rho = 0.305$, $SD_\rho = 0.168$, $k = 34$) is not significant (95% CIdiff (1)−(2): −0.092, 0.084). Similarly, for the second proxy, the difference between quality ($\rho = 0.286$, $SD_\rho = 0.119$, $k = 28$) and the other journals ($\rho = 0.314$, $SD_\rho = 0.163$, $k = 41$) is insignificant (95% CIdiff (3)−(4): −0.115, 0.059). The respective subgroup standard deviations do not average considerably lower across the relevant subgroups than in the overall analysis, such that journal quality does not exert a significant moderating influence and does not present an important explanation of the between-study variation in correlations.

Table 3
Mean correlations between participative budgeting and performance for different levels of analysis.

	k^a	N	r	SD_r	ρ	SD_ρ	95% CI		95% CrI		% Var. unacc.	n_{fs}	$SE\rho$	95% CIdiff		
							Lower	Upper	Lower	Upper				Comp.	Lower	Upper
Panel A: Overall relation																
Overall performance	69	7872	0.248	0.154	0.304	0.149	0.259	0.349	0.012	0.596	63.906	455	0.023			
Panel B: Journal quality																
(1) Proxy 1: Quality journals	35	3454	0.246	0.140	0.301	0.120	0.244	0.358	0.066	0.536	50.264	228	0.029	(1)–(2)	−0.092	0.084
(2) Proxy 1: Other journals	34	4418	0.249	0.164	0.305	0.168	0.237	0.373	−0.024	0.634	71.698	225	0.034			
(3) Proxy 2: Quality journals	28	2899	0.234	0.138	0.286	0.119	0.224	0.348	0.053	0.519	50.797	172	0.032	(3)–(4)	−0.115	0.059
(4) Proxy 2: Other journals	41	4973	0.256	0.162	0.314	0.163	0.253	0.375	−0.005	0.633	69.172	281	0.031			
Panel C: Level of analysis																
(1) Organizational performance	6	1002	0.131	0.103	0.160	0.082	0.059	0.261	−0.001	0.321	43.916	18	0.051	(1)–(2)	−0.231	0.153
(2) Departmental performance	6	600	0.159	0.102	0.199	0.026	0.097	0.301	0.148	0.250	4.280	24	0.052	(1)–(3)	−0.152	0.188
(3) Budget Performance	6	411	0.120	0.081	0.142	0.000	0.065	0.219	0.142	0.142	0.000	15	0.039	(1)–(4)	−0.331	−0.031
(4) Managerial performance	56	6246	0.281	0.153	0.341	0.147	0.292	0.390	0.053	0.629	63.693	421	0.025	(2)–(3)	−0.114	0.228
														(2)–(4)	−0.294	0.010
														(3)–(4)	−0.321	−0.077

  ^{a} *k*: number of correlation coefficients per relation; *N*: total sample size across *k* samples; *r*: weighted mean observed correlation; SD_r: standard deviation of *r*; ρ: estimated weighted mean correlation corrected for artefacts; SD_ρ: standard deviation for the estimated ρ; 95% CI: lower and upper bounds of the confidence interval of the ρ; 95% CrI: lower and upper bounds of the credibility interval for each meta-analysis distribution; % Var. unacc.: percentage of unexplained variance in correlations; n_{fs}: fail-safe *n*; SE_ρ: standard error for the estimated ρ; 95% CIdiff: lower and upper bounds of the confidence interval of the difference between compared (comp.) sub-group ρ.

4.2. Tests of moderator hypotheses

4.2.1. Hypothesis 2: level of analysis

H2 states that participative budgeting is more strongly related with budgetary and managerial than with departmental and organizational performance. The corresponding results are reported in Table 3, Panel C. A positive and significant but heterogeneous (95% CrI: −0.001, 0.321) relation emerges for organizational performance ($\rho = 0.160$, $SD_\rho = 0.082$, $k = 6$), whereas for departmental ($\rho = 0.199$, $SD_\rho = 0.026$, $k = 6$) and budgetary ($\rho = 0.142$, $SD_\rho = 0.000$, $k = 6$) performance, the relations are positive, homogeneous, and significant. The relation with managerial performance ($\rho = 0.341$, $SD_\rho = 0.147$, $k = 56$) also is positive and significant, varies considerably across studies (63.693% of unaccounted for variance), and the positive effect generalizes across settings, as indicated by the credibility interval (95% CrI: 0.053, 0.629). The four subgroup standard deviations average considerably lower across subgroups than in the overall analysis. Moreover, the confidence intervals around the differences between the four subgroup ρ show that the relation of participative budgeting with managerial performance is significantly stronger than its relations with organizational (95% CIdiff (1)–(4): −0.331, −0.031) and budgetary (95% CIdiff (3)–(4): −0.321, −0.077) performance, whereas the difference between the relations of participative budgeting with departmental and managerial performance is just non-significant (95% CIdiff (2)–(4): −0.294, 0.010). The relations of participative budgeting with organizational, departmental, or budgetary performance do not differ significantly. H2 thus is partially supported for managerial but not for budgetary performance.

H3 to H8 refer to the different levels of performance, but no additional tests are possible or necessary for budgetary, departmental, and organizational performance, because of the homogeneous results for departmental and budgetary performance and insufficient correlations for organizational performance (see Dalton, Daily, Certo, & Roengpitya, 2003). Tables 4 and 5 report the findings of the moderator analyses for managerial performance.

4.2.2. Hypothesis 3: sample selection

H3 states that the participative budgeting–performance correlations differ between non-random single- ($\rho = 0.386$, $SD_\rho = 0.154$, $k = 15$), non-random multi- ($\rho = 0.318$, $SD_\rho = 0.169$, $k = 25$), and random multi-organization ($\rho = 0.334$, $SD_\rho = 0.081$, $k = 14$) samples (see Table 4, Panel B). But H3 is not supported, because the subgroups do not differ significantly, as indicated by the confidence intervals around the respective differences that all include zero. Compared with the overall analysis ($SD_\rho = 0.147$; see Table 4, Panel A), the subgroup standard deviations also do not average considerably lower across subgroups.

4.2.3. Hypotheses 4, 5, and 6: measurement of performance

H4 states that participative budgeting–managerial performance correlations are stronger for self-rating than for objective measures of performance. Supporting H4, the findings show that the correlations are stronger for self-rating ($\rho = 0.352$, $SD_\rho = 0.146$, $k = 52$) than for objective ($\rho = 0.179$, $k = 4$) measures of performance (see Table 4, Panel C). The latter subgroup also is relatively homogeneous, as its standard deviation ($SD_\rho = 0.054$), the percentage of unaccounted for variance (22.178%), and the credibility interval (95% CrI: 0.073, 0.285) indicate. Moreover, the subgroup standard deviations average lower than in the overall managerial performance analysis and the subgroup difference is significant (95% CIdiff (1)–(2): −0.298, −0.048).

Whether the difference between objective and self-rating measures of managerial performance is driven by a difference in the measured facets of performance or by common method effects is illuminated by an additional comparison of the objective

Table 4
Moderator analyses for correlations between participative budgeting and managerial performance.

	k^a	N	r	SD_r	ρ	SD_ρ	95% CI Lower	95% CI Upper	95% CrI Lower	95% CrI Upper	% Var. unacc.	n_{fs}	$SE\rho$	95% CIdiff Comp.	95% CIdiff Lower	95% CIdiff Upper
Panel A: Managerial performance																
Managerial performance	56	6246	0.281	0.153	0.341	0.147	0.292	0.390	0.053	0.629	63.693	421	0.025			
Panel B: Sample selection																
(1) Non-random single company	15	1726	0.318	0.157	0.386	0.154	0.290	0.482	0.084	0.688	66.795	130	0.049	(1)–(2)	−0.085	0.221
(2) Non-random multiple companies	25	2818	0.262	0.169	0.318	0.169	0.238	0.398	−0.013	0.649	70.085	174	0.041	(1)–(3)	−0.095	0.199
(3) Random multiple companies	14	1563	0.275	0.114	0.334	0.081	0.261	0.407	0.175	0.493	34.528	103	0.037	(2)–(3)	−0.148	0.116
Panel C: Measurement of Performance																
(1) Objective measures	4	433	0.165	0.107	0.179	0.054	0.065	0.293	0.073	0.285	22.178	14	0.058	(1)–(2)	−0.298	−0.048
(2) Self-rating measures	52	5813	0.289	0.153	0.352	0.146	0.301	0.403	0.066	0.638	63.614	406	0.026			
(3) Relative self-rating based on (2)	26	2920	0.264	0.142	0.321	0.130	0.255	0.387	0.066	0.576	57.782	183	0.034	(3)–(4)	−0.268	−0.024
(4) Absolute self-rating, based on (2)	11	1093	0.386	0.143	0.467	0.128	0.365	0.569	0.216	0.718	56.571	117	0.052			
(5) Single-item self-rating, based on (2)	4	244	0.289	0.175	0.348	0.150	0.141	0.555	0.054	0.642	51.767	31	0.105	(5)–(6)	−0.217	0.209
(6) Multi-item self-rating, based on (2)	48	5569	0.289	0.152	0.352	0.146	0.300	0.404	0.066	0.638	64.316	374	0.027			
Panel D: Industry differences, based on Panel C (2)																
(1) Public administration and services	5	547	0.442	0.077	0.535	0.000	0.453	0.617	0.535	0.535	0.000	62	0.042	(1)–(2)	0.114	0.318
(2) Private organizations	37	3781	0.261	0.153	0.319	0.143	0.259	0.379	0.039	0.599	60.161	258	0.031	(1)–(3)	0.071	0.339
(3) Private manufacturing, based on (2)	23	2362	0.273	0.149	0.330	0.137	0.256	0.404	0.061	0.599	58.796	167	0.038	(1)–(4)	0.057	0.419
(4) Private services, based on (2)	6	658	0.245	0.128	0.297	0.104	0.173	0.421	0.093	0.501	46.538	39	0.063	(3)–(4)	−0.143	0.209

[a] *k*: number of correlation coefficients per relation; *N*: total sample size across *k* samples; *r*: weighted mean observed correlation; SD_r: standard deviation of *r*; ρ: estimated weighted mean correlation corrected for artefacts; SD_ρ: standard deviation for the estimated ρ; 95% CI: lower and upper bounds of the confidence interval of the ρ; 95% CrI: lower and upper bounds of the credibility interval for each meta-analysis distribution; % Var. unacc.: percentage of unexplained variance in correlations; n_{fs}: fail-safe *n*; SE_ρ: standard error for the estimated ρ; 95% CIdiff: lower and upper bounds of the confidence interval of the difference between compared (comp.) sub-group ρ.

and self-rating measures subgroups with the findings for organizational, departmental, and budgetary performance. The results in Table 5 show that the subgroup ρ for self-rating measures of managerial performance is significantly stronger than the subgroup ρ for organizational (95% CIdiff: −0.329, −0.055), departmental (95% CIdiff: −0.292, −0.014), and budgetary performance (95% CIdiff: −0.322, −0.098), whereas the respective differences for the objective measures subgroup ρ are non-significant. Because many measures of organizational (e.g. Jarrar & Smith, 2014), departmental (e.g. Dunk, 1995a, 1995b), and budgetary (e.g. Wentzel, 2002) performance also demand self-ratings, common method bias also should inflate the corresponding correlations. But the non-significant difference between the organizational, departmental, and budgetary performance subgroups, which comprise single- and multi-source correlations, and the objective managerial performance measures subgroup shows that it is unlikely that common method bias is the only cause of the difference between objective and self-rating measures of managerial performance. Instead, these groups of measures likely capture different facets of managerial performance, such that self-ratings might cover all facets that a manager regards as important, whereas objective measures only cover the measurable or externally observable facets (see Dunk, 1993; Van der Stede et al., 2005).

H5 states that the participative budgeting–managerial performance correlations are stronger for absolute ($\rho = 0.467$, $SD_\rho = 0.128$, $k = 11$) than for relative ($\rho = 0.321$, $SD_\rho = 0.130$, $k = 26$) self-rating measures of performance (see Table 4, Panel C). Supporting H5, the subgroups differ significantly (95% CIdiff (3)–(4): −0.268, −0.024) and their standard deviations' average is lower than the standard deviation of the overall analysis of the self-rating measures of performance ($SD_\rho = 0.146$; see Table 4, Panel C).

H6 states that the participative budgeting–managerial performance correlations are stronger for multi-item ($\rho = 0.352$, $SD_\rho = 0.146$, $k = 48$) than for single-item ($\rho = 0.348$, $SD_\rho = 0.150$, $k = 4$) self-rating measures of performance. But this difference is non-significant (95% CIdiff (5)–(6): −0.217, 0.209) and the subgroup standard deviations' average is almost identical to the standard deviation of the overall analysis of the self-rating measures of performance ($SD_\rho = 0.146$; see Table 4, Panel C), such that H6 is not supported.

Table 5
Significance of differences between objective and self-rating measurements of managerial performance and the other levels of analysis.

Comparison	95% CIdiff[a] Managerial performance: Objective Lower	Objective Upper	Self-rating Lower	Self-rating Upper
Organizational performance	−0.204	0.166	−0.329	−0.055
Departmental performance	−0.166	0.206	−0.292	−0.014
Budgetary performance	−0.204	0.130	−0.322	−0.098

[a] 95% CIdiff: lower and upper bounds of the confidence interval of the respective differences between subgroup ρ reported in Tables 3 and 4.

4.2.4. Hypotheses 7 and 8: industry influences

H7 states that the participative budgeting—managerial performance correlations are stronger for private than for public sector organizations. Yet, in contrast to this prediction (see Table 4, Panel D), the mean correlation of the public sector ($\rho = 0.535$, $SD_\rho = 0.000$, $k = 5$) subgroup is significantly stronger than its private sector ($\rho = 0.319$, $SD_\rho = 0.143$, $k = 37$) counterpart, as shown by the confidence interval around the difference in the subgroup ρ (95% CIdiff (1)–(2): 0.114, 0.318) and a lower subgroup average standard deviation compared with the standard deviation of the overall analysis of the self-rating measures of performance ($SD_\rho = 0.146$; see Table 4, Panel C). H7 thus is not supported, although the participative budgeting—managerial performance relation is moderated by the distinction between the private and public sectors.

Finally, H8 states that the mean correlation is stronger for manufacturing than for service industries. The results in Table 4, Panel D, show that the correlations for private manufacturing ($\rho = 0.330$, $SD_\rho = 0.137$, $k = 23$) and private service ($\rho = 0.297$, $SD_\rho = 0.104$, $k = 6$) organizations do not differ significantly (95% CIdiff (3)–(4): −0.143, 0.209), such that H8 is not supported. Both subgroup ρ are significantly smaller than the public sector subgroup ρ though, which lends further support to the difference between the private and public sectors (95% CIdiff (1)–(3): 0.071, 0.339; 95% CIdiff (1)–(4): 0.057, 0.419).

5. Discussion and conclusion

Using meta-analysis, this paper sets out to shed further light on the participative budgeting—performance relation and thus offers additional insights into this debated but still unsettled area of research. Meta-analysis is used to estimate the mean participative budgeting—performance correlation and to explore, whether methodological (e.g. level of analysis, sample selection, measurement of performance) and theoretical concerns (e.g. industry differences) help explain observed conflicts in prior studies' results and thus are important for advancing participative budgeting research theoretically (see Malmi & Granlund, 2009). The study thereby updates, replicates, and extends the meta-analyses of Greenberg et al. (1994) and Derfuss (2009). Such replications and extensions are as important as any form of replication, because no single meta-analysis can solve important questions, but only might provoke further theory development and research (e.g. Bobko & Roth, 2008). Although participative budgeting practices and research recently are criticised (e.g. Hansen et al., 2003), the continuing importance of participation as an important and value-adding element of budgetary control (e.g. Libby & Lindsay, 2010) means that the meta-analytic findings offer key implications, significant challenges, and open questions to resolve.

Partially replicating the core finding of Greenberg et al. (1994), the overall relation of participative budgeting with performance is positive and significant. But in contrast to Greenberg et al. (1994), this study unveils that the overall relation is marked by substantial, non-artefactual heterogeneity. Because the lower bound of the credibility interval is positive (albeit marginally) (95% CrI: 0.012, 0.596), it is in line with economic and psychological theory. Moreover, moderators clearly influence this relation. For four moderator variables, the analyses yield significant results, which increase our understanding of the between-study variation of the participative budgeting—performance correlations and thus represent important boundary conditions for the theoretical development of related research.

First, studies' level of analysis is an important concern in participative budgeting—performance research, such that correlations pertaining to different levels of analysis cannot be compared directly. Moreover, the small samples of correlations for organizational ($k = 6$) and departmental ($k = 6$) performance underscore Kihn's (2010, p. 473) observation that 'analysis of organizational level performance outcomes has been quite scant in management accounting research'. These findings also are in line with similar examples of between-level differences provided by Ostroff and Harrison (1999). Specifically, the significant participative budgeting—performance relations at the departmental, budgetary, and managerial levels of analysis are consistent with economic and psychological theory, positive, and generalize across settings, though for managerial performance, only the direction of the effect generalizes, not its strength. Rather than by substantial between-study differences, some of the conflicts that earlier research deplores thus seem to be driven by artefact influences (i.e. sampling and measurement error), which are corrected for in the meta-analysis. These findings also replicate similar results reported in Derfuss (2009), but also extend them, regarding the relation with departmental performance. However, although significant, the positive organizational-level relation does not generalize, because the associated credibility interval includes zero. But for this relation no moderator analyses are possible, because due to the small sample, no subgroups could be formed, such that further analyses into this relation will only be possible if more research becomes available.

Additionally, compared with the results for organizational, departmental, and budgetary performance, the participative budgeting—managerial performance relation is stronger. The motivational and informational effects of participation thus are strongest at the managerial level, whereas organizational, departmental, and budgetary performance might be influenced more strongly by other variables suggested by agency and psychological theory, such as environmental uncertainty, information asymmetry, or budget-based incentives (Covaleski et al., 2003; Shields & Shields, 1998). This result also corroborates findings of Merchant and Manzoni (1989; also see Bol et al., 2010), insofar as companies seem to use participative budgeting to set the hard but attainable budgets that shield managers' individual performance and incentives from negative external influences. Furthermore, reinforcing findings of Bommer et al. (1995) and Viswesvaran et al. (2005), managerial performance is a broader construct than managers' economic performance, which, for example, their budgetary performance captures.

Second, replicating the findings of Derfuss (2009), self-rating measures of managerial performance yield stronger correlations with participative budgeting than objective measures, such that the distinction between these groups of measures is an important moderator. But no study has clarified whether this difference results from common method biases (e.g. Nouri et al., 1995) or the fact that self-rating measures better capture the multiple dimensions of performance (e.g. Dunk, 1993). The

present findings indicate that the mean correlation for self-rating measures of managerial performance is significantly stronger than the mean correlations for organizational, departmental, budgetary, *and* objectively measured managerial performance, which do not differ significantly. Because many studies also use self-rating measures of organizational (e.g. Jarrar & Smith, 2014), departmental (e.g. Merchant, 1984), and budgetary (e.g. Wentzel, 2002) performance, common method effects should bias the corresponding correlations, too. The non-significant differences between correlations pertaining to objectively measured managerial performance and correlations that comprise single- and multi-source correlations at the other levels of analysis thus suggest that different aspects of performance are captured by objective and subjective assessments of managerial performance (Bommer et al., 1995; Dunk, 1993). Moreover, studies show that different measurement sources capture different facets of performance (Lance et al., 1992), supervisor's ratings frequently are biased (Moers, 2005), and (non-)financial measures only capture a fraction of performance and might be contaminated by typographical and other errors (Bommer et al., 1995; Shields et al., 2000). Therefore, the use of objective measures might attenuate participative budgeting–managerial performance correlations. In summary, although common method biases cannot be ruled out completely, single-source estimates of the participative budgeting–managerial performance correlation are not invalid. At a minimum, researchers should carefully consider the implications of their measurement choices.

Third, extending Derfuss (2009) and Greenberg et al. (1994), absolute self-rating measures of managerial performance yield stronger correlations than relative self-rating measures, such that the distinction between these groups of measures also partially explains variation in the participative budgeting–managerial performance correlations. Because relative ratings help control for confounding influences, such as context effects (Govindarajan, 1986), differences in performance standards across organizations or business units (Kihn, 2010), or common method biases (Podsakoff et al., 2003), they indeed seem to be preferable from a theoretical point of view and thus should be used in future studies.

Fourth, also extending Derfuss (2009) and Greenberg et al. (1994), but contrary to expectations, the participative budgeting–managerial performance relation is stronger in public than in private sector organizations. The influences that might stand in the way of realizing the benefits of participative budgeting in public sector organizations thus do not diminish its individual-level usefulness. Instead, the political demands, particular information and reward structures, and differing professional socializations (e.g. Abernethy & Stoelwinder, 1995; ter Bogt, 2003; Hoque & Hopper, 1994) probably increase managers' need for reliable information on organizational goals and the appropriate means for their achievement, which participative budgeting might satisfy. From a motivation theory perspective, participation helps managers internalize goals and perceive the budgeting process as fair, such that even relatively small amounts of participative budgeting might help mitigate the negative influences, such as political demands. In summary, while more studies are needed to better understand the causal mechanisms, differences between private and public sector organizations are an important consideration for on-going developments of participative budgeting theory.

However, for three moderating variables proposed in this study, the results are non-significant, which suggests that these influences do not moderate the participative budgeting–performance relation. These findings also contribute to participative budgeting research, because they indicate influences that are discussed as potential problems, but apparently are less important than previously thought.

First, reinforcing Derfuss' (2009) corresponding finding, whether respondents are either selected at random from multiple firms or non-randomly from multiple or single organizations exerts no significant moderating influence. For participative budgeting research, this distinction thus appears less important than previously suggested (e.g. Birnberg et al., 1990; Ostroff & Harrison, 1999), probably because of within-organization variation in individual perceptions of participative budgeting or performance, such as due to differences in respondents personality (Derfuss, 2009).

Second, extending Derfuss (2009) and Greenberg et al. (1994), the distinction between single- and multi-item self-rating measures of performance does not appear to moderate the participative budgeting–managerial performance relation, which might be explained by the relative high average experience of the surveyed managers (e.g. Agbejule & Saarikoski, 2006; Parker & Kyj, 2006). Experienced managers may know the context and dimensions of their performance well, such that they can assess single-item measures as validly as multi-item measures. The small dataset for the single-item measures ($k = 4$) suggests that more studies would be necessary to firmly establish this finding, even more so, because it deviates from extant meta-analytic results (e.g. Henard & Szymanski, 2001; Van Vaerenbergh et al., 2014; Warren & Landis, 2007). However, because multi-item measures better reflect the multi-dimensional nature of managerial performance (Kwok & Sharp, 1998; Wanous et al., 1997), they generally are preferable and thus should be used in all future studies.

Finally, replicating Derfuss (2009), but contrary to expectation, the participative budgeting–managerial performance relation is not significantly stronger in private manufacturing than in private service organizations. Yet, Derfuss (2015) finds that participative budgeting is related to task uncertainty in service but not in manufacturing firms. Besides, service firms' offerings usually vary in their degree of co-production and intangibility (Modell, 1996), whereas manufacturing organizations increase the degree of customization of their products and the related services (Bouwens & Abernethy, 2000; Eggert, Hogreve, Ulaga, & Muenkhoff, 2014). Because service and manufacturing firms thus apparently internalize the challenges of their respective industries and devise appropriate coping strategies (Bouwens & Abernethy, 2000; Eggert et al., 2014; Zeithaml et al., 1985), the benefits of participative budgeting can be realized in both industries. Yet again, the small dataset for service organizations ($k = 6$) suggests that additional studies are necessary to substantiate this finding as well as to further explore the causal mechanisms that drive this similarity in results.

As is any empirical research, this study is subject to several limitations. First, some of the analyses are based on few studies and thus do not provide definitive conclusions. Because meta-analysis mirrors the status quo of a literature, only additional

empirical research may remedy this shortcoming. But until such studies become available, the present meta-analysis provides accurate estimates (Hunter & Schmidt, 2004). Second, range variation in the measurement of the variables might be an issue. However, it is questionable, whether all such variation is truly artefactual. Instead, it might mirror performance differences or differing degrees of participative budgeting (see Guzzo, Jackson, & Katzell, 1987). Supporting this argument, Chow, Shields, and Wu (1999), for example, find culture-driven variations in the implementation of and preferences for participative budgeting. Third, not all between-study variation was explained, such that additional moderator variables appear influential, or else the correlations and their variation might be inflated by influences originally due to antecedent, moderating, or intervening variables that are discussed in extant literature (Chenhall & Moers, 2007; Shields & Shields, 1998).

Despite these limitations, the present analyses provide important insights into the participative budgeting–performance relation at different levels of analysis. But some open questions remain that additional studies might address usefully. First, because only few correlations are available, the need for future research is most acute for the relations of participative budgeting with organizational, departmental, and budgetary performance. Second, to substantiate and extend the present findings, more research is indispensable in private service and public sector organizations. More studies from all sectors also would allow a more fine-grained distinction between industries.

Acknowledgements

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