Costing system design and honesty in managerial reporting: An experimental examination of multi-agent budget and capacity reporting

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We would like to thank participants at the ENEAR Conference (Maastricht, 2019), the GMARS (Michigan, 2019), the FEB Research Day (Ghent, 2019), the Research Day in Accounting (Hasselt, 2019), the EAA 34th Doctoral Colloquium in Accounting (Varese, 2018), and brownbag seminars at Ghent University for useful comments and suggestions. We are also grateful for the helpful feedback on earlier drafts of this paper provided by Charlotte Antoons, Werner Bruggeman, Patricia Everaert, Maggie Geuens, Katlijn Haesebrouck, Christoph Hörner, Victor Maas, Karen Sedatole, and Ivo Tafkov. We thank the editor Ranjani Krishnan and two anonymous reviewers for their very helpful and constructive comments as well as their deep engagement with our work during the entire review process.

Funding: this research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declarations of interest: none.

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ABSTRACT

Time-Driven Activity-Based Costing (TDABC) systems use time inputs and distinguish between the cost of resource usage and the cost of unused capacity to provide accurate cost information. Importantly, TDABC produces aggregate signals of unused capacity at the department level, which offers the potential for superiors to assess misreporting or slack creation during budgeting without knowing which subordinates contributed to the slack. In a multi-agent participative budgeting experiment, we examine the impact of two capacity reporting conditions against a condition where capacity reporting is absent. When superiors receive an aggregate signal of unused capacity and subordinates have no discretion over cost allocation input parameters, misreporting of cost budgets decreases compared to when capacity reporting is absent. However, the benefits of capacity reporting on misreporting largely vanish when subordinates have discretion over the inputs allowing them to hide their unused capacity. When discretion is absent, subordinates anticipate peers to reduce misreporting to avoid the superior's rejection of their aggregate proposal. Yet, discretion over the inputs changes subordinates' anticipation in that they expect others to misreport and hide unused capacity to appear honest. Costing system designers should thus be aware that giving employees discretion over time inputs can offset the decision-making benefits of TDABC.

Keywords: capacity reporting, discretion, honesty, peer behavior, rejection authority, time-driven activity-based costing

1. Introduction

This study examines how more accurate costing systems for performance measurement and control can undermine their benefits of improved decision making. One such costing system is time-driven activity-based costing (TDABC), which uses time inputs and explicitly reports the cost of unused capacity. The cost of unused capacity is a period expense (Bettinghaus, Debruine, & Sopariwala, 2012; Buchheit, 2003; Cooper & Kaplan, 1988, 1992; Kaplan & Atkinson, 1998) representing the difference between the cost of resource spending and the cost of resource usage (Kaplan, 1994). Only the cost of resource usage is allocated to cost objects. Compared to historical costing systems, which allocate the total amount of resources spent to cost objects, reporting the cost of unused capacity offers many decision-making advantages, including a more accurate reflection of resource consumption and awareness of lost opportunities or unnecessary investments due to idle capacity. In addition, it offers vital insights for performance measurement and control. When unused capacity is reported in a cost budget, top management receives crucial signals about potential cost overstatements and the amount of slack created by departments (Balakrishnan, Labro, & Sivaramakrishnan, 2012a, 2012b; Buchheit, 2003; Cooper & Kaplan, 1992; Everaert, Bruggeman, Sarens, Anderson, & Levant, 2008).

Although costing and budgeting are thus clearly linked (Arya, Fellingham, Glover, & Sivaramakrishnan, 2000; Atkinson, Kaplan, Matsumura, & Young, 2020; Covaleski, Evans, Luft, & Shields, 2003; Davila & Wouters, 2005), surprisingly, prior research has largely overlooked their interdependence. In this study, we explicitly explore this link by examining how specific costing system design choices related to capacity reporting impact managerial reporting behavior (i.e., honesty) in participative budgeting settings where subordinate managers have incentives to misreport private cost information (see Brown, Evans, & Moser, 2009). In a multi-agent

participative budgeting experiment, we examine the impact of two capacity reporting conditions that provide an aggregate signal of unused capacity at the department level (e.g., Atkinson et al., 2020) against a condition where capacity reporting is absent. One capacity reporting condition restricts subordinates' discretion over cost allocation input parameters, while the other allows for such discretion. Such discretion is often present in TDABC when firms rely on subordinates' knowledge and estimates of time inputs (e.g., Kaplan & Anderson, 2004, 2007a). Other firms rely on automatic time tracking, offering no discretion to subordinates. Appendix 1 shows examples of these costing systems.

We use an adapted version of a budget reporting experiment (e.g., Evans, Hannan, Krishnan, & Moser, 2001; Hannan, Rankin, & Towry, 2006) in a multi-agent setting (e.g., Boster, Majerczyk, & Tian, 2018; Brunner & Ostermaier, 2019; Cannon & Thornock, 2019; Fisher, Maines, Peffer, & Sprinkle, 2002; Guo, Libby, Liu, & Tian, 2020; Hannan, Rankin, & Towry, 2010). Two subordinates receive private information about true costs, which they can misreport. Superiors receive the aggregate budget report of their span of control over which they have final budget authority, reflecting the negotiation process between subordinates and superiors in how budgets are set (Fisher, Frederickson, & Peffer, 2006; Rankin, Schwartz, & Young, 2008). Through their rejection authority, superiors can enforce norms (Bicchieri, 2006; Hannan et al., 2010). We use aggregate reports to ensure information asymmetry between subordinates and superiors and to ensure external validity related to capacity reporting.[1] We predict that capacity reporting without discretion over cost allocation input parameters decreases misreporting, relative to the condition without capacity reporting, as it offers superiors an aggregate signal about cost overstatements at a

[1] Unused capacity is often reported as an aggregate signal at the department level or division level without revealing who exactly has contributed to the slack. Firms avoid collecting information locally since gathering detailed information on aggregate numbers is often costly (Maas, Van Rinsum, & Towry, 2012).

department. However, we expect the benefits of capacity reporting to disappear, and misreporting to increase, when discretion over cost allocation input parameters is present. We attribute these differences to subordinates' anticipation of how their peers and superiors act under various costing system designs, which may shape the social norms and preferences for honest behavior.

When capacity reporting is present, top management receives an aggregate signal of unused capacity, which they can use to assess some level of dishonesty. Yet, multiple managers contribute to unused capacity in a department and the aggregate nature of the cost report makes it hard for superiors to verify who is responsible for it. Nevertheless, because superiors receive this signal, subordinates may feel more accountable and, therefore, misreport less to avoid rejection of the total budget. We argue that this opportunity also leads to subordinates anticipating that their peers will misreport less (Bicchieri & Xiao, 2009; Cialdini, Kallgren, & Reno, 1991; Innes & Mitra, 2013). Hence, we expect that capacity reporting activates a social norm of honesty (Bicchieri, 2006), resulting in less misreporting when capacity reporting is present compared to when it is absent.

In contrast to a capacity reporting setting without discretion, subordinates with discretion over cost allocation input parameters may use their discretion to conceal unused capacity costs, allowing them to appear honest. In particular, subordinates may perceive capacity reporting as a monitoring tool, because showing underutilization of available capacity makes them "look bad" (Brausch & Taylor, 1997, p. 4). Subordinates may thus feel pressure to overstate input parameters such that cost reports incorrectly show almost full capacity utilization (cf. Defourny, Hoozée, Daisne, & Lievens, 2023, p. 15-16), leading to biased cost information (Mishra & Vaysman, 2001; Sprinkle, 2003; Zimmerman, 2017). By doing so, subordinates can appear honest to their superiors, potentially avoiding budget rejection. Anticipating that their peers will also use their discretion to misreport and appear honest, subordinates morally disengage from their dysfunctional behavior (Bandura, 1999). Hence, we expect that discretion over cost allocation input parameters in a

capacity reporting setting reduces expectations of honest behavior and triggers impression management. Overall, our two hypotheses jointly predict that capacity reporting decreases misreporting only when subordinates do not have discretion over cost allocation input parameters. Our empirical results offer support for our predictions. Path analyses further confirm that effects are driven by the anticipation of both peer reporting behavior and superior rejection behavior.

Our study makes a threefold contribution to prior accounting research. First, we add to the literature on honesty in managerial reporting by examining the impact of costing system design choices on budget slack in a multi-agent setting. Our novel insight into the link between costing and budgeting extends Brink, Coats, and Rankin (2017), who introduced costing system design in a budgeting setting. While they focused on how superiors strategically use the costing system to deceive subordinates to elicit more truthful budget proposals, we unravel how capacity reporting influences the honesty of subordinates. We also extend Rankin et al. (2008) who suggest that honesty preferences may disappear when superiors have rejection opportunities. We provide evidence that even when superiors have final budget authority, subordinates' honesty preferences may still arise (as suggested by Douthit & Stevens, 2015), depending on how costing systems are designed. Capacity reporting might induce such honesty preferences, but only when subordinates cannot bias cost allocation input parameters.

Second, we offer a contribution to the costing literature. While capacity reporting is useful for decision-making purposes (Balakrishnan et al., 2012a, 2012b; Buchheit, 2003, 2004; Cooper & Kaplan, 1992; Everaert et al., 2008), our results show that capacity reporting can also reduce subordinates' misreporting. Yet, we also warn of an important unintended effect of capacity reporting (Buchheit, 2003; Buchheit & Richardson, 2001). In particular, subordinates may perceive capacity reporting as a monitoring tool and, thus, may try to manipulate reported unused capacity. This finding adds to calls in accounting research to study the interdependence of the decision-

facilitating and the decision-influencing or control role of accounting information (Demski & Feltham, 1976; Labro, 2015; Sprinkle, 2003; Sprinkle & Williamson, 2007; Zimmerman, 2017). Hence, organizations that simultaneously use a particular costing system for both roles need to be aware of their trade-offs, which may hamper the efficacy of the costing system.[2]

Third, we contribute to the growing accounting literature on social norms (e.g., Abdel-Rahim, Hales, & Stevens, 2022; Abdel-Rahim & Stevens, 2018; Cannon & Thornock, 2019; Cardinaels & Jia, 2016; Cardinaels & Yin, 2015; Deore, Gallani, & Krishnan, 2022; Douthit & Majerczyk, 2019; Douthit & Stevens, 2015; Douthit, Schwartz, Stevens, & Young, 2022; Guo et al., 2020; Hannan et al., 2010; Tayler & Bloomfield, 2011) by granting superiors rejection authority over an aggregate budget proposal in a setting where subordinates do not directly observe peer behavior. More specifically, capacity reporting represents an accounting setting that via aggregation of reports creates interdependence among peers (cf. Berg, Dickhaut, & McCabe, 1995a). We contribute to the literature by showing that such aggregation can shape social norm expectations without peers directly observing each other's behavior. We show that while capacity reporting can result in a social norm of honesty, a change in design relying on subordinates' input to allocate costs can erode this norm of honesty. When discretion is present, subordinates will anticipate that peers will use their discretion to hide unused capacity to depict a positive image towards their superior. Such tactics might be successful as superiors are sensitive to norm enforcement when they see high levels of unused capacity (Bicchieri, 2006; Douthit et al., 2022).

This study also has important practical implications for TDABC systems, which report resource usage and explicitly show the cost of unused capacity (e.g., Everaert et al., 2008; Kaplan &

[2] A solution could be the old saying that we need "different costs for different purposes" (Clark, 1923). Yet, it is very difficult for organizations to implement more than one costing system (Brierley, Cowton, & Drury, 2001; Labro, 2019). Hence, organizations have to choose which costing system design features they implement, reflecting the purpose they deem most important while being cautious about consequences of these choices.

Anderson, 2007a, 2007b). Our results imply that organizations would face less budget misreporting when time is automatically tracked in TDABC systems compared to historical costing systems without capacity reporting. However, when time equations depend on estimates of employees (e.g., Dalci, Tanis, & Kosan, 2010; Demeere, Stouthuysen, & Roodhooft, 2009; Everaert et al., 2008; Hoozée & Bruggeman, 2010; Keel, Savage, Rafiq, & Mazzocato, 2017; Szychta, 2010), we caution that such increased discretion can lead to more misreporting and biased cost information. Next to the unintentional estimation errors that TDABC systems may cause (Cardinaels & Labro, 2008; Maussen & Hoozée, 2022; Schuhmacher & Burkert, 2022), our study thus shows that discretion can also trigger intentional estimation errors, which impedes decision making. We advise costing system designers to separate the collection of data inputs (i.e., time estimates) from revealing the cost of unused capacity in TDABC. The practice of separating the planning and reporting function and disclosing the cost of unused capacity after identifying unmodifiable inputs in TDABC systems (as applied in Defourny et al., 2023), is expected to reduce misreporting.

The remainder of the paper is structured as follows. The next section describes the basic setting and relevant literature. In section 3 we develop our hypotheses. Section 4 describes the methodology and experimental task. In section 5 we perform our analyses. Section 6 summarizes the main findings and provides fruitful avenues for future research.

2. Background and literature review

2.1. Basic setting

TDABC distinguishes between the cost of resource usage and the cost of unused capacity. Next to ensuring that unused capacity is excluded from the cost allocation to represent cost figures for decision making that better reflect true resource requirements, TDABC provides an estimate of unused capacity at an aggregate resource cost pool level, such as a department or division. Although

this aggregate signal offers superiors some insight into idle resources, it is difficult to attribute the cost of unused capacity to specific individuals who have contributed to the cost budget. Indeed, in decentralized organizations, the cost of unused capacity is usually only known at an aggregate level due to dispersed information among contributing subordinate managers, making detailed data gathering costly (Maas et al., 2012; Merchant, 1981). Typically, these different information sources are aggregated into one single total budget report over which top management (i.e., the superior) has final budget authority. Hence, our setting is framed as a participative budgeting setting between one superior (who approves or rejects the aggregate budget) and multiple subordinates providing estimates for that aggregate budget, a setting that is representative for practice.[3]

This setting is also relevant from a theory-testing perspective (Berg et al., 1995a), as it requires individuals to think about how their behavior (and behavior of others) affects the aggregate report (multi-individual behavior) without directly being able to observe actions of others. Expectations of peer behavior are established by subordinates projecting their own beliefs or desired behavior on their peers (Cannon & Thornock, 2019). Second, our setting resembles an ultimatum game as superiors can reject aggregate budgets offering them some control to enforce a norm of honesty by rejecting proposals that yield a lot of unused capacity. Thus, next to anticipation of peer behavior, subordinates also need to think about how to act in front of superiors who can reject their aggregate budget (Brink, Coats, & Rankin, 2018; Rankin et al., 2008) and adapt their reporting behavior accordingly (Hannan et al., 2010). Unique to our setting is that we focus on how costing system

[3] Most experimental studies on managerial misreporting use settings in which one superior and one subordinate interact (e.g., Abdel-Rahim et al., 2022; Abdel-Rahim & Stevens, 2018; Brink et al., 2017; Cardinaels, 2016; Douthit & Majerczyk, 2019; Douthit & Stevens, 2015; Evans et al., 2001; Haesebrouck, 2021; Rankin et al., 2008). However, in practice, multiple subordinates are involved in the budgeting process because relevant information is often dispersed among several managers within a department. Accordingly, some studies have studied managerial reporting behavior by increasing the span of control (e.g., Boster et al., 2018; Brunner & Ostermaier, 2019; Cannon & Thornock, 2019; Guo et al., 2020; Hannan et al., 2010). These studies show that in multi-agent settings, peer behavior is an important predictor of subordinates' reporting behavior when peer behavior is observable (Brunner & Ostermaier, 2019; Cardinaels & Jia, 2016; Guo et al., 2020).

design choices affect how subordinates form expectations about how both their superiors as well as their peers will behave and how this shapes their norms of honest behavior, which has not been explored before. We further extend the literature by demonstrating that social norm expectations can arise without direct observation of peer behavior.

Our setting thus allows for social norm expectations to arise, whereby we predict that capacity reporting can reduce misreporting when subordinates do not have discretion over cost allocation input parameters, but that such beneficial effect of capacity reporting largely vanishes and changes towards expectations of more misreporting when subordinates do have discretion over cost allocation input parameters. Before we develop our theory for these predictions in Section 3, we first describe other closely related studies and how we contribute to these studies.

2.2. Related studies on managerial reporting

Although honesty in managerial reporting is a well-studied topic, the literature has neglected how costing system design choices affect misreporting. An exception is Brink et al. (2017), who studied whether superiors misrepresent a signal of accuracy in an effort to elicit more truthful budget proposals from subordinates. We add to this study by examining the relation between other costing system design choices (i.e., capacity reporting) and honest reporting from a different perspective. In particular, we study the effects of capacity reporting and subordinates' discretion on honesty, whereas Brink et al. (2017) focus on superiors' discretion.

In a different setting, Abdel-Rahim et al. (2022) examined the effects of disaggregated reporting and discretion on managerial opportunism in a capital investment game. Although these variables are closely related to our variables of interest, our study differs in three important ways. First, we examine the effects related to costing system choices on managerial honesty, whereas the study of Abdel-Rahim et al. (2022) is not related to costing system design. Second, superiors in

our study receive an imperfect aggregate signal of individual rent extraction. Conversely, in Abdel-Rahim et al. (2022), disaggregated reporting precisely revealed managers' individual opportunism. Third, our participative budgeting setting induces theoretical differences compared to an investment setting. More specifically, our setting resembles an ultimatum game (see Güth, Schmittberger, & Schwarze, 1982) in which superiors have final budget authority and thus accept or reject subordinates' budget proposals (Rankin et al., 2008), whereas Abdel-Rahim et al. (2022) used a trust game (see Berg, Dickhaut, & McCabe, 1995b). This allows us to study how the anticipation of superior rejection behavior and peer reporting behavior may shape social norms of honesty that explain subordinates' reporting behavior, while Abdel-Rahim et al. (2022) rely on the activation of social norms of trust and trustworthiness to explain this behavior. Although Rankin et al. (2008) concluded that honesty preferences do not play a role when superiors have final budget authority, we follow Douthit and Stevens (2015) and argue that honesty preferences may also arise when superiors have final budget authority. However, the extent to which they arise may depend on costing system design choices, which we will discuss next.

3. Hypotheses development

When using capacity reporting in a budgeting process, the budgeted cost of unused capacity equals the difference between the total budgeted cost and the allocated cost based on the resources required. As such, the aggregate budgeted cost of unused capacity is relevant for superiors to make inferences about subordinates' opportunism (cf. Maas et al., 2012). When subordinates do not receive discretion over cost allocation input parameters, the explicit reporting of unused capacity makes misreporting (i.e., budget slack) more salient to the superior, although the superior still cannot directly infer who has misreported. Yet, if superiors are sensitive to enforcing a norm of honest reporting (Bicchieri, 2006, p. 219; Douthit et al., 2022; Hannan et al., 2010), they may use

their authority to reject budgets that report high levels of unused capacity and accept budgets that disclose low levels of unused capacity. Without a signal of unused capacity, it is harder for superiors to enforce these norms, as they do not know whether misreporting has occurred. Subordinates anticipate superiors' rejection decisions and delineate their reporting behavior to avoid a budget rejection (cf. Douthit & Stevens, 2015; Rankin et al., 2008). That is, once a signal is available to a superior, subordinates feel more accountable for the loss toward the superior and anticipate that superiors will rely more on this information to accept or reject budgets. As increased feelings of accountability lead subordinates to anticipate that their superior will more likely accept budget proposals with a low cost of unused capacity, we expect subordinates to misreport less (i.e., claim less slack) when the costing system uses capacity reporting than when it does not.

In addition, an aggregate budget creates interdependence among subordinates. Reporting a high cost of unused capacity by one individual could lead to rejection of the aggregate proposal, negatively affecting others. This interdependence makes subordinates form expectations of peer behavior. Although subordinates cannot observe peer behavior, the mere presence of peers can shape expectations (cf. Tenbrunsel, 1998) and thus influence their reporting behavior (Cannon & Thornock, 2019). That is, an individual will tend to project his or her own beliefs on peers such that s/he expects peers to behave in the same way as s/he would do (Ross, Greene, & House, 1977). This creates motivated expectations of peer behavior (Tenbrunsel, 1998), whereby subordinates anticipate that peers will also avoid putting in high slack to avoid rejection of the aggregate budget when a signal of unused capacity is present, thus expecting peers to report more honestly.

Anticipation of peer and superior behavior can affect subordinates' behavior in a social setting through the emergence of a social norm (Bicchieri, 2006).[4] In line with Bicchieri's (2006) social

[4] These social norms can be grounded on observations of peer behavior or on beliefs about what peers would do in a similar situation (Bicchieri & Xiao, 2009).

norm activation theory, we argue that a costing system with capacity reporting makes the social norm of honesty more salient for both superiors and subordinates. Indeed, superiors can be expected to enforce this norm through their rejection authority (Douthit & Stevens, 2015) and subordinates may anticipate this rejection behavior (Hannan et al., 2010). Second, the interdependence that unused capacity reporting creates between subordinates might induce them to think about how others will behave (Altenburger, 2017; Cardinaels & Jia, 2016; Cardinaels & Yin, 2015; Innes & Mitra, 2013), i.e., subordinates expect their peers to also care about the budget not being rejected. In sum, we expect that by anticipating both superior rejection behavior and peer reporting behavior, subordinates will report more honestly when capacity reporting is present than when it is absent.

Hypothesis 1. Capacity reporting (without discretion over cost allocation input parameters) decreases managerial misreporting.

We argue, however, that the positive effect of capacity reporting on subordinates' honesty vanishes when subordinates receive discretion over cost allocation input parameters. When they receive discretion, subordinates can intentionally bias inputs such that budgeted unused capacity remains hidden. By using their discretion to conceal unused capacity, subordinates now anticipate acceptance by the superior as the aggregate signal of unused capacity can be kept low (or hidden). In addition, they may also derive utility from being perceived as honest by their superiors. Hence, by using their discretion, subordinates can benefit monetarily by claiming budget slack and non-monetarily by appearing honest to their superior (Hannan et al., 2006; Hao & Houser, 2017).

Yet, whether subordinates engage in such impression management is not clear ex ante as they again need to anticipate whether their peers will engage in impression management. When others decide to give weight to honesty per se, and thus decide to not use their discretion, honesty levels might still be high even when discretion is present. As such, subordinates conform to the social

norm of honesty. However, when subordinates anticipate that their peers will use discretion as a way of appearing honest to their superior while still benefiting from slack, this may reduce behavioral expectations of honest behavior such that subordinates conform less to the norm of honest behavior (Bicchieri, 2006). That is, subordinates are likely to believe that their peers will act dishonestly and mislead the superior by manipulating inputs to conceal unused capacity and avoid rejection from the superior. As such, by relying on this anticipated peer behavior (Brunner & Ostermaier, 2019), subordinates can morally disengage from their dysfunctional behavior (Bandura, 1999) and justify their own dishonest behavior. Accordingly, we expect subordinates to misrepresent cost allocation input parameters when they have discretion and thus to increase misreporting compared to when they do not have such discretion.

Hypothesis 2. When capacity reporting is present, discretion over cost allocation input parameters increases managerial misreporting compared to the absence of such discretion.

Jointly, these two hypotheses predict that capacity reporting decreases subordinate managers' misreporting only when they do not have discretion over cost allocation input parameters. Fig. 1 graphically shows the theoretical pattern we predict.

-- Insert Fig. 1 here --

4. Methodology

4.1. Experimental design

We used z-Tree to conduct a computer-based lab experiment with a 1 × 3 between-subjects design (Fischbacher, 2007). The task is adapted from prior budget reporting experiments (e.g., Evans et al., 2001; Hannan et al., 2006) to represent a participative budgeting setting. Subordinates privately observed the true cost and made a factual assertion (budgeted cost) to their superiors, who acted as residual claimants. An overstatement of costs increased the subordinate's payoff (=

budgeted cost – true cost) but decreased the superior's payoff (= sales – budgeted cost) by the same amount (Rankin et al., 2008). To represent a setting in which multiple subordinates report to a single superior, superiors receive the aggregate budget proposal from two subordinates in their span of control. In addition to external validity (see Section 2.1.), this design choice ensured information asymmetry between superior and subordinate. Specifically, budget aggregation ensured that subordinates still had an informational advantage over their superiors and an incentive to misreport, because superiors in all three conditions could never detect who misreported. If such aggregation was absent, superiors would be able to attribute the cost of unused capacity to one subordinate's misreporting in the capacity-reporting-present conditions. Superiors in all three conditions could reject aggregate proposals (cf. Douthit & Stevens, 2015; Rankin et al., 2008). As in ultimatum games, a budget rejection resulted in zero payoffs for all parties. Note that the superiors' payoff depended on the aggregate budget proposal of their span of control. For superiors it was monetarily beneficial to accept all proposals. However, if superiors derived utility from enforcing norms, they could reject aggregate proposals that included costs that they perceived to be too high.

Subordinates and superiors communicated only through this budget proposal. Subordinates did not communicate with each other and they did not learn each other's or the aggregate budget proposal, reflecting a closed reporting environment (cf. Evans, Moser, Newman, & Stikeleather, 2016; Guo et al., 2020). This particular design choice allows us to check subordinates' anticipation of peer behavior that may affect their own reporting behavior. Moreover, since subordinates were re-matched to new superiors in every period, participants did not face any reciprocity and

reputational concerns, again enabling us to isolate anticipation of peer and superior behavior.[5] These design choices (i.e., aggregation of budget proposals and re-matching) may, however, bias against finding results for capacity reporting.

4.2. Experimental task and manipulations

Superiors elicited a budget from subordinates. All superiors and subordinates knew that the amount of resources would fall within a range of 0 to 100 in each period, with a uniform distribution of [0, 1, 2, …, 99, 100] at a cost of 2 lira per resource unit. However, only subordinates learned the true amount of resources required (in labor hours) for the budgeted period. The true amount of resources required was randomly determined upfront and the same in every session.[6] Regardless of the cost, sales for each department amounted to 200 lira in each period.

Our study has a nested experimental design. The first manipulated between-subjects factor is whether the costing system relies on resource spending (capacity reporting absent) or on resource usage (capacity reporting present). In the no-capacity-reporting (i.e., benchmark) condition, the budget only reported the cost of resource spending (= budgeted cost) and did not distinguish between the cost of resource usage and the cost of unused capacity. As such, the superior does not know whether or not misreporting has occurred. S/he can thus only rely upon the budgeted cost to accept or reject the budget proposal. In the capacity-reporting-present conditions, the budget separately reported the cost of resource usage and the cost of unused capacity (= budgeted cost –

[5] The use of independent periods potentially reduces the accountability and the need for impression management subordinates experienced compared to a multi-period setting in which subordinates and superiors are not re-matched. We made this design choice to benefit experimental control. However, in everyday life it is reasonable to expect much more substantial effects (Lerner & Tetlock, 1999).

[6] Consistent with other studies (e.g., Abdel-Rahim & Stevens, 2018; Brink et al., 2017; Cannon & Thornock, 2019; Cardinaels & Jia, 2016; Cardinaels & Yin, 2015; Douthit & Stevens, 2015; Haesebrouck, 2021; Hannan et al., 2006), we drew the true amount of resources required in each period prior to the experimental sessions to ensure that all participants would act on the same information, which facilitates comparisons across conditions. Total true cost (= true amount of resources × 2 lira) thus results from the randomly determined true amount of resources. The random set of the true amount of resources for the eight rounds was: 30, 79, 23, 67, 24, 3, 22, 60.

cost of resource usage), such that resources not required for the project appeared as unused capacity. Nested within the capacity-reporting-present conditions, we manipulated whether or not subordinates had discretion over cost allocation input parameters. When discretion is absent, the signal of unused capacity can reveal slack creation, without the superior knowing who has contributed to the slack. The superior can thus rely upon this signal to accept or reject the aggregate budget proposal. When subordinates had discretion, they could adapt the reported amount of resources required (i.e., overestimate time) and immediately saw the effect of this adapted amount on the budget proposal. By overstating the amount of resources required, the cost of resource usage (= reported amount of resources required × 2 lira) increased and the cost of unused capacity decreased in the budget proposal. Subordinates were thus able to conceal misreporting by lowering the reported cost of unused capacity. As such, the signal of unused capacity becomes unreliable for superiors to accept or reject budget proposals. However, adapting resources required did not influence profit. Appendix 1 presents numerical examples showing the implications of our manipulations.

Our manipulation checks show that most subordinates, except for six, understood the instructions. One participant in the no-capacity-reporting condition and one in the capacity-reporting-without-discretion condition did not answer correctly on the item of capacity reporting (*"In the budget report, the cost of resource usage and the cost of unused resources were distinguished"*). Four subordinates in the capacity-reporting-with-discretion condition did not confirm that they had discretion *("Besides budgeting the cost, I could also make a decision regarding resource usage"*).[7]

[7] Excluding the six subordinates who failed one of the manipulation checks from our analyses does not impact the results (qualitatively and inferentially).

4.3. Dependent variable

Following extant literature, we use average budget slack, calculated as [slack claimed/slack available[8]], as a measure of misreporting (e.g., Evans et al., 2001). This measure can range from 0 to 1, whereby 0 occurs when the subordinate behaved honestly across all rounds, and 1 if s/he always maximized self-interest and reported the maximum amount of slack. Since we have eight independent periods, our measure of average budget slack is calculated as follows:

$$Average\ budget\ slack = \frac{1}{8}\sum_{i=1}^{8}\frac{budgeted\ cost_i - true\ cost_i}{sales - true\ cost_i}$$

4.4. Participants and procedures

Ninety graduate students of a cost and management accounting course at a large university in Western Europe participated in the experiment in six sessions of 15 participants.[9] Since we worked in triads, 30 participants were randomly assigned to the role of superior and the remaining 60 participants to the role of subordinate. Participants kept their role throughout the experiment. In our sample, 36.7 percent of our participants were female and 10 percent had already worked in a context where they had freedom of decision in requesting a budget.[10] On average, participants were 23.21 years old and had 12.32 months of (part-time) work experience. Participants received a course credit for participation and a monetary payoff based on their budget proposals. Consistent with prior studies (e.g., Hannan et al., 2006, 2010), payoffs were based on one randomly chosen period at the end of the last session to avoid wealth effects. We converted lira as our experimental

[8] Note that the slack available is equal across participants and conditions since the total true cost (= true amount of resources required × 2 lira) in a specific period was the same for each participant.
[9] The ethics committee of the school from which the students were recruited granted permission to run the experiment.
[10] These participants do not impact our results as including this non-significant covariate (p = 0.999) in an ANCOVA does not impact our results (qualitatively or inferentially).

currency at an exchange rate of 10 lira = € 1.00. The average payoff to superiors amounted to € 11.23 *(S.D.* = 5.73); the average payoff to subordinates amounted to € 8.07 (*S.D.* = 3.77).

When entering the lab, participants were randomly assigned to a specific client computer that was connected to a specific role (superior or subordinate) and condition. Participants first read the instructions and participated in a practice tool to learn about the consequences of subordinates' reporting decisions. Participants then took a quiz to ensure they understood the task and the payoff structure. They had to answer all questions correctly before moving to the next stage, where they learned their role (superior or subordinate). Next, subordinates made budget reporting decisions in eight periods. We created new triads at the start of each period, using a stranger-design-matching pattern. Although subordinates could be re-matched with a particular superior up to two times, they were never in a particular triad more than once (as in Guo et al., 2020; Maas et al., 2012). Participants never learned the identity of the persons with whom they were matched.

In each period (see Appendix 2 for screen shots), subordinates observed the true cost per resource unit (which equaled 2 lira in each period), the true amount of resources required, and the total true cost (= true amount of resources required × 2 lira) at the top of their screen. In the middle of their screen, subordinates made their budget reporting decisions (factual assertions).[11] Subordinates also saw their completed individual budget proposal. At the bottom of their screen, they saw both their own and their superior's payoff based on their reporting decisions. Subordinates could revise their completed budget proposal before sending it to their superior.

All participants knew that superiors would see the aggregate budget proposal from their span of control (i.e., two subordinates). Superiors either had to accept or reject the aggregate

[11] The computer program only allowed proposals that are equal to or larger than the true cost to prevent subordinates from receiving a negative payoff resulting from understating costs (as in Brink et al., 2017; Cardinaels & Yin, 2015; Guo et al., 2020).

proposal. Once decisions were made, the superiors' and subordinates' own payoffs were shown in the next screen. The experiment ended with a post-experimental questionnaire (PEQ), which included process variables, manipulation checks, control variables, and demographics. We used the 12-item scale developed by Jonason and Webster (2010) to measure the Dark Triad of personalities of participants, since this personality trait may affect opportunistic decision making (D'Souza & Lima, 2015; Majors, 2016)[12]. We used seven-point Likert scales to measure all variables in the PEQ, except for the demographics and manipulation checks.

To check whether our random assignment to treatments was successful, we performed a χ^2 test on gender and one-way ANOVAs on variables that we expect to be similar across conditions (i.e., task understanding, age, work experience, and the Dark Triad of personalities). We do not find significant differences across conditions (all $p \geq 0.169$), except for narcissism ($p = 0.036$). Therefore, we include narcissism as a covariate in a robustness check (see Section 5.4.).

5. Results

5.1. Descriptives

Table 1 reports the descriptive statistics of the dependent variable average budget slack. In the no-capacity-reporting condition, the mean of subordinates' average budget slack amounts to 0.554. Subordinates' average budget slack is lowest in the capacity-reporting-without-discretion condition with a mean of 0.486 and highest in the capacity-reporting-with-discretion condition with a mean of 0.629. The standard deviations are similar across experimental conditions ($F_{(2, 57)} = 0.150$, $p = 0.861$). Within the capacity-reporting-present conditions, average budget slack (i.e.,

[12] The overall construct Dark Triad of personalities has a Cronbach's alpha value of 0.672, which indicates an internally consistent scale (Hair, Black, Babin, & Anderson, 2010, p. 125). This second-order construct is calculated as the average of first-order constructs (Jonason & Webster, 2010). The first-order constructs Machiavellianism, narcissism, and psychopathy use the average of the item scores and have Cronbach's alpha values of 0.651, 0.662, and 0.743.

misreporting) is higher for subordinates with (M = 0.629) than without (M = 0.486) discretion ($t_{(38)}$ = 3.533, p = 0.001). However, the reported unused capacity (untabulated) is lower for subordinates with than without discretion for all periods (all $t_{(38)} > 4.132$, all $p < 0.001$).[13] Hence, subordinates in the capacity-reporting-with-discretion condition did use their discretion. However, while they used their discretion, subordinates did not entirely hide their misreporting, since reported unused capacity is significantly different from zero in the capacity-reporting-with-discretion condition for all periods (all $t_{(19)} \geq 2.405$, all $p \leq 0.027$). On average, they hid 70.39 percent of their slack claimed (calculated as the average of slack hidden/slack claimed over eight periods).[14]

Fig. 2 reports subordinates' budget slack (i.e., dishonesty) across conditions over the eight periods. It suggests that as the experiment progresses, costing system design can shape social norms of honest behavior, which affect misreporting behavior. The figure suggests that capacity reporting without discretion increases behavioral (empirical) expectations of honest behavior, while discretion reduces these expectations. We will provide formal process evidence in Section 5.3.

-- Insert Table 1 here --

-- Insert Fig. 2 here --

5.2. Hypotheses testing

We conducted a one-way ANOVA with experimental condition as the independent variable and average budget slack as the dependent variable.[15] Panel A of Table 2 tabulates that the overall one-way ANOVA is significant ($F_{(2, 57)}$ = 6.078, p = 0.004), indicating that there are differences in average budget slack across the experimental conditions. Our overall prediction is based on two

[13] The means for the reported unused capacity across the eight periods for subordinates in the capacity-reporting-without-discretion versus capacity-reporting-with-discretion are: [59.15, 21.05, 72.95, 32.95, 74.34, 90.45, 77.05, 43.55] versus [16.15, 8.25, 22.75, 10.95, 23.80, 28.65, 24.55, 17.05].
[14] Two participants did not hide any part of their slack and four participants hid their slack entirely over eight periods.
[15] Unless stated otherwise, *p*-values are based on a two-tailed test. For directional predictions, we use one-tailed tests.

planned comparisons: we predicted (1) a decrease in average budget slack when moving from the no-capacity-reporting condition to the capacity-reporting-without-discretion condition (H1) and (2) an increase in average budget slack when moving from the capacity-reporting-without-discretion to the capacity-reporting-with-discretion condition (H2). We performed two planned comparisons to follow-up on this significant ANOVA.[16]

First, when we compare average budget slack between the no-capacity-reporting condition and the capacity-reporting-without-discretion condition, the difference in average budget slack is significant (p = 0.051, one-tailed). This supports our first hypothesis that introducing capacity reporting (without discretion) decreases misreporting compared to no capacity reporting, implying that capacity reporting can induce more honest reporting when discretion is absent. Second, we compare average budget slack between the capacity-reporting-without-discretion and capacity-reporting-with-discretion condition. Introducing discretion within capacity reporting significantly increases average budget slack (p < 0.001, one-tailed), which supports our second hypothesis. Moreover, although not predicted, a follow-up post-hoc test reveals that subordinates reported significantly higher levels of average budget slack in the capacity-reporting-with-discretion condition compared to subordinates in the no-capacity-reporting condition (p = 0.074). Offering discretion when capacity reporting is present may thus even increase misreporting compared to when capacity reporting is absent. Panel B of Table 2 tabulates these comparisons.

[16] We identified one outlier in the no-capacity-reporting condition. The absolute value of the standardized residual of this observation amounts to 2.77, which exceeds the threshold of 2.50 (Hair et al., 2010, p. 68). All other absolute standardized residual values are < 2.21. This exceptional observation has the lowest average budget slack (0.196) of the whole sample. To be conservative, we include the outlier in our analyses. Excluding this identified outlier would still support our hypotheses. First, the overall one-way ANOVA remains significant ($F_{(2, 56)}$ = 7.059, p = 0.002). Second, planned pairwise comparisons show a stronger significant difference in average budget slack between the no-capacity-reporting condition and the capacity-reporting-without-discretion condition (p = 0.015, one-tailed), while the post-hoc test shows a non-significant difference between the no-capacity-reporting condition and the capacity-reporting-with-discretion condition (p = 0.157). Third, the contrast test remains significant ($F_{(2, 56)}$ = 11.903, p = 0.001) and the residual between-cells variance remains non-significant ($F_{(2, 56)}$ = 0.921, p = 0.404). Fourth, although the (first) causal model yields similar results (cf. Section 5.3), model fit slightly goes down (χ^2 = 3.135, p = 0.209, GFI = 0.969, TLI = 0.780, CFI = 0.956, RMSEA = 0.122, SRMR = 0.059).

Since both our hypotheses jointly predict that capacity reporting decreases subordinate managers' misreporting only when they do not have discretion over cost allocation input parameters, we also performed a contrast analysis. Contrast analysis is used to statistically test whether the observed pattern of more than two means follows the predicted pattern of means based on underlying theory (e.g., Furr & Rosenthal, 2003; Levin & Neumann, 1999). The contrast weights reflect our prediction that misreporting in the capacity-reporting-without-discretion condition (-2) is lower than in the no-capacity-reporting condition (1); and lower than in the capacity-reporting-with-discretion condition (1). Panel C of Table 2 reports this contrast. To assess the contrast, we followed the procedure recommended by Guggenmos, Piercey, and Agoglia (2018).[17] First, we show visual evidence of fit. Fig. 1 presents the predicted pattern of means and Fig. 3 shows the observed pattern of means. Visually, the predicted pattern is a good fit for the observed data. Second, Panel D of Table 2 shows that the predicted contrast is significant (F = 8.841, p = 0.004) and the residual between-cells variance is non-significant (F = 1.657, p = 0.200). Third, we quantitatively evaluate the contrast variance residual (q^2), which is calculated as $1 - r^2$ where r represents the correlation between the predicted contrast and the corresponding observed cell means (Guggenmos et al., 2018, p. 238-240). We conclude that only 27.49 percent (= q^2) of the between-cells variance is not explained by the contrast. Based on the evidence above, we can conclude that we find support for our two hypotheses.

-- Insert Table 2 here --

-- Insert Fig. 3 here --

[17] Although Guggenmos et al. (2018) limit their discussion to 2 × 2 designs, they develop a procedure to test specific predicted patterns in the data, which makes the outlined procedure appropriate to assess our predicted pattern based on a 1 × 3 design.

5.3. Process evidence

Following Asay, Guggenmos, Kadous, Koonce, and Libby (2022), we provide process evidence of the underlying theory using mediation analysis. We base our theory on shaping social norms of honesty through anticipation of both peer reporting behavior and superior rejection behavior. In particular, we argue that capacity reporting makes the social norm of honesty more salient as compared to no capacity reporting, since the superior receives a signal about potential slack creation when capacity reporting is present, on which s/he may act by rejecting aggregate proposals that disclose high unused capacity. This results in anticipation of peers' honesty while also increasing the accountability subordinates experience toward the superior in fear of rejection. Both, in turn, will decrease misreporting. Our first model offers evidence on this process and selects subordinates in the no-capacity-reporting and capacity-reporting-without-discretion conditions. Next, we argue that, when capacity reporting is present, discretion compared to no discretion induces a social norm resulting in the anticipation of peers' dishonesty. Given that subordinates derive utility from appearing honest to their superior, they expect peers to use this discretion to engage in impression management by manipulating cost allocation input parameters to hide unused capacity and, thus, avoid rejection while increasing misreporting. This helps subordinates to rationalize their own misreporting. Our second model offers evidence on this process and selects subordinates in both capacity reporting conditions (i.e., with and without discretion).

We measured anticipation of peers' honesty through the PEQ question *"I think the other subordinates reported honestly."* We argued that the anticipation of superior rejection behavior is driven by experienced accountability for our first hypothesis and by impression management for our second hypothesis. We measured experienced accountability through the PEQ question *"I felt accountable for the higher cost when I would not report the true cost"* and impression management

through the PEQ question "*I manipulated my superior to give him or her the impression that I was honest"*. In each model we included the same variables, except for the independent variable. Hence, we always included experienced accountability and impression management measures to control for their respective effects. We used structural equations-based path analyses to estimate both causal models with AMOS software.[18] We used a bootstrapping procedure with 1,000 samples and a 90-percent confidence interval to assess indirect and total effects to test for mediations (Hayes, 2009; MacKinnon, Coxe, & Baraldi, 2012; Preacher & Hayes, 2004). We also calculated specific indirect effects using Gaskin's (2016) serial mediation estimand.

-- Insert Fig. 4 here --

5.3.1. Model 1: impact of capacity reporting (without discretion)

Fig. 4, Panel A reports standardized path coefficients. Overall, the model shows a good fit. In particular, the covariance matrix implied by the model does not differ from the observed covariance matrix ($\chi^2 = 1.484$, $p = 0.476$). The goodness-of-fit index (GFI), the Tucker-Lewis index (TLI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean squared residual (SRMR) also have acceptable values of respectively 0.985, 1.107, > 0.999, < 0.001, and 0.043 (Hair et al., 2010, p. 667-672).

The model confirms that both anticipation of peers' honesty and experienced accountability mediate the relation between capacity reporting and average budget slack. More specifically, capacity reporting increases the anticipated honesty levels of peers ($\beta = 0.304$, $p = 0.046$) and experienced accountability ($\beta = 0.336$, $p = 0.017$). Subsequently, both the anticipation of peers' honesty ($\beta = -0.361$, $p = 0.026$) and experienced accountability ($\beta = -0.417$, $p = 0.007$) decrease

[18] Since structural equation modeling (SEM) outperforms the regression-based approach to test these rather complex mediation models (e.g., Iacobucci, Saldanha, & Deng, 2007; Pek & Hoyle, 2016), we chose to perform SEM. As a robustness check, however, we also ran the models in PROCESS (Hayes, 2022) in SPSS. The results remain unchanged and are available in the online appendix (see Appendix A).

average budget slack. Hence, the model confirms that subordinates conform to (anticipated) peer behavior and that they adopt a more honest reporting strategy when capacity reporting is present due to the anticipation of superior rejection behavior, resulting in a higher level of experienced accountability. In addition, the model shows a negative association between anticipation of peers' honesty and experienced accountability (β = -0.541, $p < 0.001$), reducing the total (positive) effect of capacity reporting on experienced accountability (β = 0.172, p = 0.313). Capacity reporting does not have a significant direct effect on impression management (β = -0.124, p = 0.432) and impression management does not have a significant effect on average budget slack (β = 0.220, p = 0.133). The total effect of capacity reporting on average budget slack (β = -0.228, p = 0.005) is thus explained by the specific indirect paths through anticipation of peers' honesty (β = -0.031, p = 0.031) and experienced accountability (β = -0.039, p = 0.043).

5.3.2. Model 2: impact of discretion within capacity reporting

We improved model fit by deleting the (non-significant) path from anticipation of peers' honesty to average budget slack. A conventional Chi-square test indicates that the covariance matrix implied by the model is not different from the observed covariance matrix at the 5-percent significance level (χ^2 = 6.629, p = 0.085). The GFI, the TLI, the CFI, the RMSEA, and the SRMR amount to 0.941, 0.645, 0.894, 0.176, and 0.086 respectively. Although the Tucker-Lewis index and the RMSEA fall below the acceptable values, the other fit indices indicate an acceptable model fit for the data. Fig. 4, Panel B reports standardized path coefficients.

The path model confirms that the relation between discretion and average budget slack is mediated through anticipation of peers' honesty and impression management. We expected that subordinates would be likely to change their perception of how others behave when discretion is present under capacity reporting such that, in their perception, peers behave more dishonestly. They

then engage in impression management to appear honest and, thus, avoid rejection while also monetarily benefiting from dishonesty. Our results confirm that discretion has a negative effect on anticipation of peers' honesty (β = -0.474, $p < 0.001$). Subsequently, anticipation of peers' honesty is negatively associated with impression management (β = -0.408, p = 0.008). Although discretion does not have a significant direct effect on impression management (β = 0.214, p = 0.162), the indirect effect of discretion on impression management is positive and significant (β = 0.194, p = 0.016), consistent with our theory. This suggests that anticipation of peers' honesty mediates the relation between discretion and impression management. More specifically, when capacity reporting is present, subordinates tend to engage more in impression management when they receive discretion (β = 0.407, p = 0.003) compared to when they do not receive discretion. Next, impression management increases average budget slack (β = 0.389, p = 0.008). In addition, discretion has a direct (β = -0.292, p = 0.080) and indirect effect (β = 0.208, p = 0.009) through anticipation of peers' honesty (β = -0.439, p = 0.009) on experienced accountability. However, the total (negative) effect of discretion on experienced accountability is non-significant (β = -0.084, p = 0.585). Moreover, experienced accountability does not have a significant effect on average budget slack (β = -0.198, p = 0.176) and, thus, does not explain the relation between discretion and average budget slack. Hence, the total effect of discretion on average budget slack (β = 0.175, p = 0.016) is explained by the serial mediation path through anticipation of peers' honesty and impression management (β = 0.022, p = 0.018).

In sum, subordinates are concerned with having their budget proposal rejected[19] and thus anticipate superior rejection behavior. In addition, they anticipate peer behavior. The models above suggest that capacity reporting activates a social norm of honesty which lead to anticipation of more honest behavior when discretion is absent, but such anticipation may be less when discretion is present. Without discretion, capacity reporting has beneficial effects. Subordinates then believe that others will engage less in misreporting and conform to this more honest behavior. Yet, when capacity reporting with discretion is present, subordinates anticipate that peers will use their discretion for impression management, leading them to do the same. This in turn reduces behavioral (empirical) expectations of following the norm of honest behavior and thus increases misreporting.

5.4. Robustness checks with narcissism

Since participants score significantly different on the narcissism scale across conditions ($p = 0.036$), we ran an ANCOVA ($F_{(3, 56)} = 4.309$, $p = 0.008$) with average budget slack as dependent variable, experimental condition as independent variable, and narcissism as covariate. Our results are robust when including this non-significant covariate ($F_{(1, 56)} = 0.813$, $p = 0.371$). Planned comparisons for H1 ($M_{(1)} = 0.561$ versus $M_{(2)} = 0.480$, $p = 0.034$, one-tailed) and H2 ($M_{(2)} = 0.480$ versus $M_{(3)} = 0.629$, $p < 0.001$, one-tailed) remain significant. Although the post-hoc test becomes non-significant ($p_{(1) \text{ versus } (3)} = 0.105$), the contrast test remains significant ($F_{(3, 56)} = 9.624$, $p = 0.003$) and the residual between-cells variance remains non-significant ($F_{(3, 56)} = 1.101$, $p = 0.356$). The table summarizing these statistics is available in the online appendix (see Table B1).

[19] We assessed the PEQ item *"During the budgeting task I kept in mind that the superior could reject the budget"* across the three experimental conditions. The average score is significantly higher than the middle point 4 in all conditions (all $t_{(19)} > 7.764$, all $p < 0.001$) and does not differ across conditions ($F_{(2, 57)} = 0.565$, $p = 0.571$). As such, subordinates in all experimental conditions take superiors' rejection authority into account when making reporting decisions.

In addition, our results are robust for using a median split of narcissism and interacting it with the independent variable experimental condition. A two-way ANOVA ($F_{(5, 54)}$ = 2.332, p = 0.055) shows a significant main effect of experimental condition ($F_{(2, 54)}$ = 5.601, p = 0.006), a non-significant main effect of narcissism ($F_{(1, 54)}$ = 0.046, p = 0.831), and a non-significant interaction effect between experimental condition and narcissism ($F_{(2, 54)}$ = 0.037, p = 0.964). Planned comparisons for H1 ($M_{(1)}$ = 0.554 versus $M_{(2)}$ = 0.486, p = 0.052, one-tailed) and H2 ($M_{(2)}$ = 0.486 versus $M_{(3)}$ = 0.629, p < 0.001, one-tailed) as well as the post-hoc test ($p_{(1) \text{ versus } (3)}$ = 0.091) remain significant. The table reporting these statistics is available in the online appendix (see Table B2).

5.5. Additional analyses on rejection behavior

We ran some additional analyses to unravel subordinates' reporting behavior following the rejection or acceptance of a budget proposal and superiors' rejection behavior.

5.5.1. Subordinates and budget rejections

In Panel A of Table 3, we list the mean rejection rates across conditions. On average, each subordinate had 1.23 rejected budgets over eight periods. The average rejected budgets per subordinate is not different across experimental conditions ($F_{(2, 57)}$ = 0.837, p = 0.438). The average budget slack in these rejected budgets amounts to 0.579.[20]

We also analyzed whether the acceptance or rejection of a budget has an influence on budget slack in the next period. First, at the subordinate level, we calculated the average percentage change in slack after a rejection (see Panel B of Table 3). The means are not significantly different

[20] Controlling for the true cost, a logistic regression shows that higher budget slack increases the probability of budget rejection (p = 0.014). It is hard to predict differences in rejection rates across conditions because subordinates adapt reporting behavior in anticipation of superior rejection behavior. More specifically, when capacity reporting is present, subordinates engage in more honest reporting to not reveal unused capacity, leading to potentially lower rejection rates. In the condition with discretion they engage in manipulation of inputs to avoid revealing too much unused capacity. This reasoning might explain why we do not observe differences in rejection rates across conditions.

across conditions ($F_{(2, 36)}$ = 0.320, p = 0.728). The average percentage change in slack after a rejection is not significantly different from 0 ($t_{(38)}$ = 0.120, p = 0.905). We conclude that, on average, subordinates did not decrease their budget slack after experiencing a budget rejection. Second, we calculated, at the subordinate level, the average percentage change in slack after an acceptance (see Panel C of Table 3). The means are not significantly different across conditions ($F_{(2, 57)}$ = 0.766, p = 0.470). The average percentage change in slack after an acceptance is significantly different from 0 ($t_{(59)}$ = 2.062, p = 0.044). We conclude that, on average, subordinates increase their budget slack by 29.44 percent after a budget acceptance. We explain these additional findings by relying on attribution theory. Individuals tend to attribute their successes to factors that are controllable and internal to them and their failures to factors that are uncontrollable and external to them (Kelley, 1967; Miller & Ross, 1975). When the superior accepts their budget, it signals success to subordinates, which may be attributed to their own reporting behavior and may lead to more misreporting next round to discover which levels of slack the superior is still willing to accept. When experiencing a rejection, subordinates may not change their reporting behavior as they perceive rejections as a failure and most likely attribute this to the reporting behavior of the other subordinate in their triad.

-- Insert Table 3 here --

5.5.2. Superiors and budget rejections

In the no-capacity-reporting condition, the PEQ question *"As my payoff became lower, I had a tendency to reject the budget"* is positively correlated with the total numbers of rejections (r = 0.749, p = 0.013). In both capacity-reporting-present conditions this correlation is non-significant (r = -0.007, p = 0.985; r = -0.236, p = 0.511). This interesting result suggests that when capacity reporting is present, other factors than a superior's own payoff influence the superior's rejection

behavior. Prior studies have shown that individuals derive utility from enforcing social norms (De Quervain, Fischbacher, Treyer, & Schellhammer, 2004; Gintis, Bowles, Boyd, & Fehr, 2003) and that this utility increases with the perceived level of misreporting (Hannan et al., 2010). Since misreporting becomes more salient under capacity reporting, capacity reporting activates a social norm of honesty, which may affect the superior's willingness to enforce norms. Superiors can enforce norms by rejecting budgets containing (excessive) slack. However, we do not observe more budget rejections under capacity reporting, since subordinates already anticipate this rejection behavior and change their reporting behavior accordingly.

In addition, untabulated results show that the Dark Triad of personalities is negatively correlated with superiors' number of rejections (r = -0.324, p = 0.081). This correlation is mainly driven by the negative correlation between narcissism and superiors' number of rejections (r = -0.583, $p < 0.001$); the correlations with Machiavellianism and psychopathy are not significant (r = -0.130, p = 0.493; r = -0.047, p = 0.806). Using a median split, we find that more narcissistic superiors reject fewer budgets (M = 0.571) than less narcissistic superiors (M = 1.813; $t_{(28)}$ = 2.541, p = 0.017). This result suggests that individuals indeed have differential norm sensitivity (Bicchieri, 2006; Douthit et al., 2022) in that more narcissistic superiors have a lower norm sensitivity than less narcissistic superiors. Narcissists are indeed less conscientious (Jakobwitz & Egan, 2006), which might explain why they are less sensitive to norms and thus less willing to enforce them (Friehe & Schildberg-Hörisch, 2018).

6. Conclusion

In this paper, we studied the effect of capacity reporting on managerial honesty in a multi-agent participative budgeting setting where subordinates receive discretion or no discretion over cost allocation input parameters. The costing system is an important underlying mechanism of

budgeting (Davila & Wouters, 2005) as certain design choices can create or mitigate incentives to misreport cost information in the budget. Yet, the literature has largely overlooked the interdependence between costing and budgeting.

Our results suggest that improved costing system design does not always reduce budget misreporting. More specifically, subordinates may anticipate different reporting behavior of their peers and rejection behavior of their superiors, shaping a social norm that ultimately affects their reporting behavior. Consistent with our theory, we show that misreporting decreases when organizations report the cost of unused capacity. Yet, when subordinates receive discretion over cost allocation input parameters when capacity reporting is present, misreporting increases. More specifically, subordinates try to appear honest by hiding unused capacity by using their discretion over cost allocation input parameters. This intentional estimation error leads to biased cost information, which can hamper decision making.

Process tests support our underlying theory that costing system design choices influence subordinates' anticipation of peer reporting behavior as well as superior rejection behavior. First, our results reveal that capacity reporting (without discretion) increases subordinates' experienced accountability, resulting in more honest reporting to avoid budget rejection. With capacity reporting, subordinates expect their superior to act on the signal of unused capacity, which reveals some misreporting. In addition, capacity reporting leads to the anticipation that peers will also act more honestly, inciting subordinates to follow their peers' behavior and thus conform to the norm of more honest behavior. Second, when discretion is present in capacity reporting (as opposed to when it is absent), subordinates use their discretion to make an honest impression on their superior while monetarily benefiting from misreporting. They anticipate that their peers will also hide their misreporting to appear honest to the superior and, thus, avoid rejection. In sum, honesty preferences only arise under capacity reporting without discretion.

Our study offers important implications for TDABC systems, since these systems use time inputs and distinguish between the cost of resource usage and the cost of unused capacity. Our study shows that TDABC may have unintended effects for cost accuracy when it is perceived as a monitoring tool. In particular, although capacity reporting can reduce managerial misreporting, it can also cause dysfunctional behavior and increase misreporting when subordinate managers have discretion over time inputs. As such, our study warns of the impact of intentional estimation errors on calculated cost information, reducing the usefulness of TDABC for decision making. Although organizations may rely on employee estimates for time inputs (e.g., Kaplan & Anderson, 2007b), costing system designers should be aware of the behavioral side effects of this approach, as we show in our study. Hence, when automated measurement (e.g., time tracking) is too costly or inappropriate, capacity reporting may backfire and costing system designers should look for parameters that may mitigate the effects of employee discretion. For instance, by creating stronger feelings of psychological ownership over time estimates elicited from employees, organizations may reduce the likelihood of their employees behaving opportunistically. This is a first fruitful avenue for future research. Our results may also apply to other contexts where incentives to misreport exist (e.g., in the context of ESG reporting, people may want to hide certain externalities). Our results imply that when internal systems offer subordinates a way out to hide their misreporting, they anticipate others to use that option. Yet, when internal systems do not offer this possibility and are able to reveal a signal of misreporting, subordinates misrepresent less because they do not want to impose externalities on their peers.

Our additional analyses provide some interesting insights that can also be further explored in future research. Since capacity reporting makes subordinates' dishonesty more salient, superiors may use this signal when they want to enforce norms (Hannan et al., 2010). We find that narcissistic superiors reject fewer budgets and thus exhibit lower levels of norm enforcement and norm

sensitivity. Studying superiors' behavior in participative budgeting would be a relevant extension that future research may explore (e.g., Brink et al., 2018). Our results also show that subordinates in the discretion condition only partially hid their claimed slack. We believe that they exhibit this behavior to gain some credibility from superiors to avoid a rejection as hiding it fully and reporting a very high cost might even be less credible. Future research may further unravel this behavior.

Additionally, some limitations can be addressed in future research. First, we cannot speak to a setting in which subordinates also have to perform the activity for which they propose a budget (cf. Haesebrouck, 2021). Since performing a particular task or activity may influence perceived job tension, the effect of our manipulations on job tension and, subsequently, on honesty may be a fruitful area for future research. Second, budgets are typically set through a negotiation process (e.g., Fisher et al., 2006). Superiors' rejection authority is only a simplistic reflection of this process. When being confronted with their superior during negotiation, subordinates may report more honestly. Furthermore, future research could explore whether our results would be different under a hurdle contract. Third, in our experiment, unused capacity is necessarily linked to subordinates' opportunistic behavior. In reality, however, uncertainties may further explain unused capacity. Additional research could explore how such uncertainties interact with the deliberate overestimation of resource requirements and how costing system design choices may have an impact on it. Fourth, in our experiment, subordinates report their budgeted costs simultaneously with selecting their standard input time, which might not be applicable in all real-world settings. In particular, Kaplan and Anderson (2004) suggest that TDABC systems can be updated upon events (i.e., anytime there is new information). Hence, simultaneously changing the inputs when budgets are set can happen if managers feel that estimates are inappropriate (or want to adapt them to conceal excess capacity) during a budget period. However, firms might also opt to only change input parameters every quarter or annually, regardless of whether they are still appropriate or not.

Yet, if TDABC is used for performance measurement and control, we still expect that managers may overestimate the required time to underestimate unused capacity for the next budget period and, as such, create room for rent extraction upfront. However, the extent to which the timing of events (i.e., decoupling of events) has an effect on misreporting remains an empirical question that future research can address. Fifth, we studied a closed multi-agent reporting setting in which subordinates could not observe each other's reporting behavior. Future research might extend our study to an open reporting setting to further investigate the impact of costing system design choices on collusion and misreporting.

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Tables

Table 1
Descriptive statistics.

Average budget slack (%)	*n*[a]	Mean	S.D.	Minimum	Maximum
Capacity reporting absent	20	0.554	0.133	0.196	0.773
Capacity reporting without discretion	20	0.486	0.140	0.201	0.745
Capacity reporting with discretion	20	0.629	0.114	0.426	0.859
Total	60	0.556	0.140	0.196	0.859

Notes:
[a] *'n' represents the number of observations in each experimental condition.*

Table 2
Hypotheses tests.

Panel A: One-way ANOVA

Effect	SS	*F*-value	df	*p*-value[b]
Experimental condition	0.203	6.078	2	0.004***
Error	0.953		57	

Panel B: Pairwise comparisons

Mean-by-mean comparisons[a]	*t*-value	Std. error	df	*p*-value[b]
(1) versus (2) – Hypothesis test H1	1.665	0.041	57	**0.051***
(2) versus (3) – Hypothesis test H2	3.485	0.041	57	**< 0.001*****
(1) versus (3) – Post hoc test	1.821	0.041	57	0.074*

Panel C: Contrast weights

Contrast	(1)[a]	(2)[a]	(3)[a]
Contrast weights	1	-2	1

Panel D: Contrast test

Source of variation	SS	*F*-value	df	*p*-value[b]
Hypothesized contrast	0.148	8.841	57	0.004***
Residual[c]	0.055	1.657	2	0.200

Notes:
[a] (1), (2), (3) refer to the respective experimental conditions: capacity reporting absent, capacity reporting present without discretion, capacity reporting present with discretion.
*[b] p-values are reported on a two-tailed basis, except the ones in bold, who are reported on a one-tailed basis given the directional effects of the hypotheses. *, **, *** represent significance levels of 0.10, 0.05, and 0.01, respectively.*
[c] The residual sum of squares represents the between-group variance unexplained by the predicted contrast. A non-significant p-value indicates that the predicted contrast explains all of the between-group variance in the data.

Table 3
Additional analyses.

Panel A: Total rejections	n^a	Mean	S.D.	Minimum	Maximum
Capacity reporting absent	20	1.50	1.277	0	4
Capacity reporting without discretion	20	1.10	1.165	0	4
Capacity reporting with discretion	20	1.10	0.912	0	3
Total	60	1.23	1.125	0	4
Panel B: Average Δslack after rejection	n^a	Mean	S.D.	Minimum	Maximum
Capacity reporting absent	14	0.055	0.335	-0.522	0.682
Capacity reporting without discretion	11	-0.042	0.209	-0.420	0.444
Capacity reporting with discretion	14	-0.006	0.347	-0.584	0.682
Total	39	0.006	0.305	-0.584	0.682
Panel C: Average Δslack after acceptance	n^a	Mean	S.D.	Minimum	Maximum
Capacity reporting absent	20	0.076	0.156	-0.121	0.533
Capacity reporting without discretion	20	0.510	1.826	-0.025	8.248
Capacity reporting with discretion	20	0.297	0.582	-0.034	2.448
Total	60	0.294	1.106	-0.121	8.248

Notes:
[a] *'n' represents the number of observations in each experimental condition.*

Figures

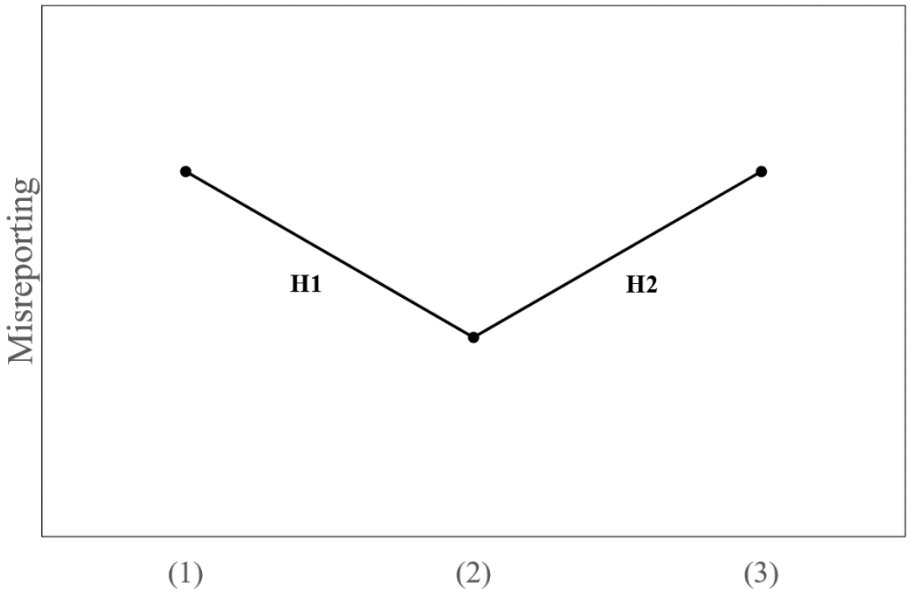


Fig. 1. Predicted pattern of misreporting across experimental conditions. [a]

Notes:
[a] *(1), (2), (3) refer to the respective experimental conditions: capacity reporting absent, capacity reporting present without discretion, capacity reporting present with discretion.*

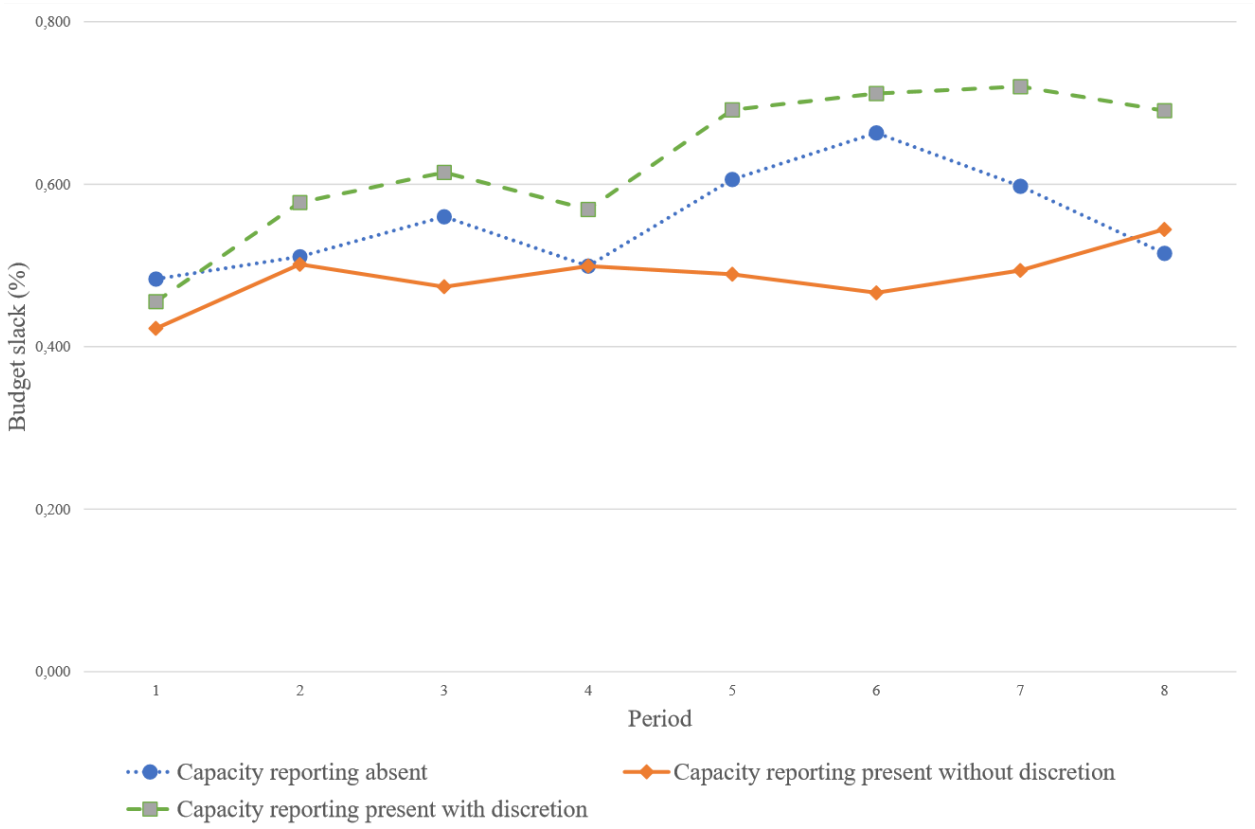


Fig. 2. Observed budget slack across conditions over 8 periods.

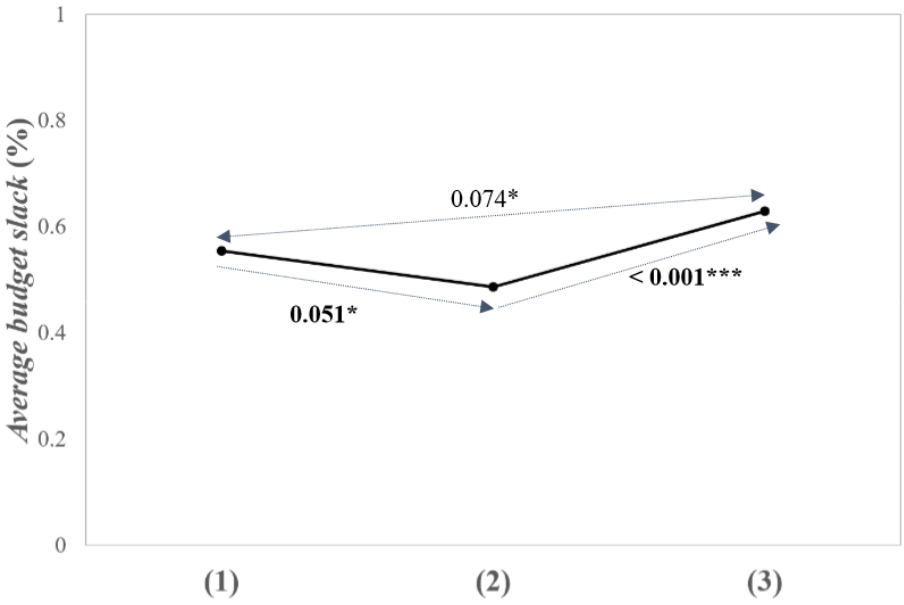


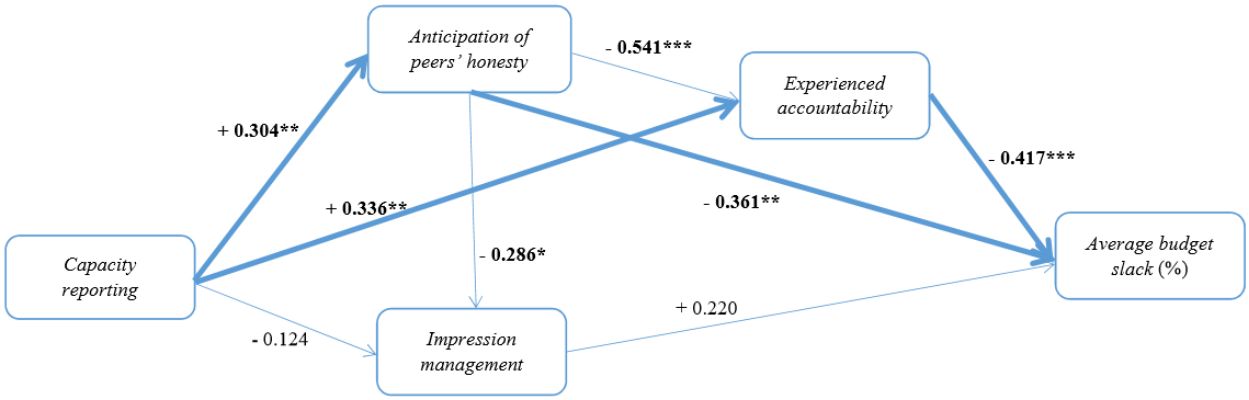
Fig. 3. Observed pattern of means. [a, b]

Notes:

[a] *(1), (2), (3) refer to the respective experimental conditions: capacity reporting absent, capacity reporting present without discretion, capacity reporting present with discretion.*

[b] *Dotted arrows and associated values represent the direction and the p-value of a mean-by-mean comparison. P-values are reported on a two-tailed basis, except the ones in bold, which are reported on a one-tailed basis given the directional effects of the hypotheses. *, **, *** represent significance levels of 0.10, 0.05, and 0.01, respectively.*

Panel A: *Capacity reporting* [a ,b, c]



Panel B: *Discretion* [a, b, d]

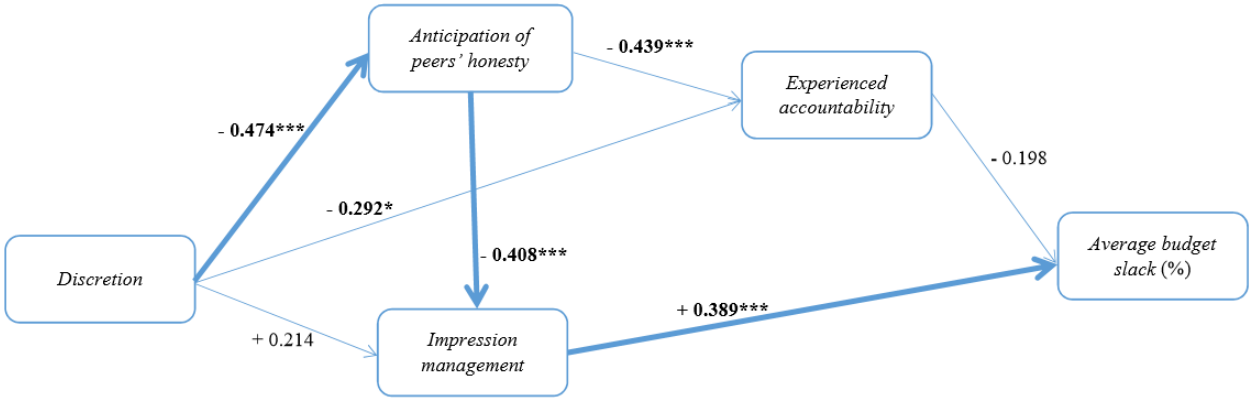


Fig. 4. Process tests.

Notes:

[a] *This figure reports standardized path coefficients resulting from structural equation modeling in AMOS.*

[b] **, **, *** represent significance levels of 0.10, 0.05, and 0.01, respectively (two-tailed).*

[c] *For this particular model, subordinates in the no-capacity-reporting condition and subordinates in the capacity-reporting-without-discretion condition are selected. Overall goodness of fit: $\chi^2 = 1.484$, $p = 0.476$ (tests the null that the model is a good fit).*

[d] *For this particular model, subordinates in both capacity-reporting-present conditions (with and without discretion) are selected. Overall goodness of fit: $\chi^2 = 6.629$, $p = 0.085$ (tests the null that the model is a good fit).*

Appendices

Appendix 1: example of how costing system design choices interact with the budgeting system

TDABC is commonly used in healthcare applications (e.g., Balakrishnan, Koehler, & Shah, 2018; Defourny et al., 2023; Demeere et al., 2009; Keel et al., 2017) as it provides insight in capacity utilization and is easily adaptable in complex and dynamic environments (Balakrishnan et al., 2012b; Kaplan & Anderson, 2004, 2007b). Hence, we chose this setting to illustrate the concept of capacity reporting through a practical example. Assume a surgical center with available operating rooms (ORs) for 100 hours at a capacity cost rate of € 200 per hour. Assume two surgeons (SA and SB) make a planning (budget) for the upcoming period. Surgeons have an incentive to overstate the number of hours that they are in surgery, because they get paid in hours. For a specific budgeting period, surgeon SA knows that s/he will need the OR for surgery for 30 hours at a true capacity cost rate of € 200 per hour. SA's total true cost thus amounts to € 6,000 (= € 200 per hour × 30 hours), but s/he reports a total cost of € 8,000 (i.e., budget slack = € 2,000 or 10 hours at a true capacity cost rate of € 200 per hour). For that same budgeting period, surgeon SB knows that s/he will need the OR for surgery for 30 hours at a true capacity cost rate of € 200 per hour. SB's total true cost thus amounts to € 6,000 (= € 200 per hour × 30 hours) and s/he reports a total cost of € 6,000 (i.e., budget slack = € 0). The true required capacity of both surgeons equals 60 hours (= 30 hours SA + 30 hours SB). The total reported cost equals € 14,000 (= € 8,000 SA + € 6,000 SB).

Historical costing systems (i.e., costing systems that do not use capacity reporting) allocate the total budgeted cost of resource spending of € 14,000 to cost objects and do not separately account for the cost of unused capacity. As such, the supervisor, who receives this aggregate budget report, does not know whether the surgeons included budget slack or not. Costing systems that use

capacity reporting, like TDABC, however, do allocate only the true required capacity cost of 60 hours to cost objects. Under standard costing, the allocated budgeted cost based on planned resource usage thus amounts to € 12,000 (= € 200 per hour × 60 hours) and the cost of planned unused or idle capacity (reported as a period expense) amounts to € 2,000 (= € 14,000 – € 12,000 = € 200 per hour × 10 hours). Although budgeted profit is the same in both cost reports (since the total budgeted cost equals € 14,000 in both cost reports), the budgeted cost allocated to cost objects differs, in that capacity reporting makes the cost of unused capacity visible. As such, the supervisor, who receives such an aggregate budget report, knows that at least one or both of the surgeons included budget slack, but does not know who did so and to what extent. The figure below demonstrates the budget reports for both costing systems.

Budget report historical costing system (capacity reporting absent)		**Budget report standard costing system (capacity reporting present)**		
Sales	€ 20,000	Sales	€ 20,000	
Cost of resource spending	€ 14,000	Cost of resource usage	€ 12,000	Total budgeted cost = € 14,000
		Cost of unused capacity	€ 2,000	
Profit	€ 6,000	Profit	€ 6,000	

An important design choice in TDABC systems that make use of capacity reporting is whether the amount of resources required (i.e., 60 hours in the example) is estimated by employees or is automatically tracked. When automatic tracking is difficult, firms often rely on employees' discretion to obtain estimates. Such discretion can give rise to incentive problems (Defourny et al., 2023; Mishra & Vaysman, 2001; Sprinkle, 2003; Zimmerman, 2017), where employees misreport required resources to avoid disclosing excess capacity.

We now illustrate the effects of this increased discretion through our example. Assume that the hours in surgery are private information for SA and SB (i.e., 30 hours for SA and 30 hours for SB). If SA wishes to overstate the cost in the budget report without slack becoming visible in the cost of unused capacity, s/he may misreport hours in surgery such that the costing system allocates

the cost of these reported required resources to cost objects. In particular, SA may report 40 hours of surgery (i.e., overstatement of 10 hours) and the costing system then estimates that 70 hours (= 40 hours SA + 30 hours SB) will be required at a true capacity cost rate of € 200. As such, the costing system estimates the budgeted cost of resource usage to be € 200 per hour × 70 hours = € 14,000 and the reported cost of planned unused capacity will equal 0. Although surgeons overstated the total budgeted cost to the same extent as when they did not have discretion, with discretion they are able to hide their slack by upwardly biasing the required time. Hence, the supervisor, who receives the budget report, again does not know whether the surgeons included budget slack. The figure below shows the budget reports for standard costing systems without and with discretion.

Budget report standard costing system without discretion		**Budget report standard costing system with discretion**		
Sales	€ 20,000	Sales	€ 20,000	
Cost of resource usage	€ 12,000	Cost of resource usage	€ 14,000	Total budgeted cost = € 14,000
Cost of unused capacity	€ 2,000	Cost of unused capacity	€ 0	
Profit	€ 6,000	Profit	€ 6,000	

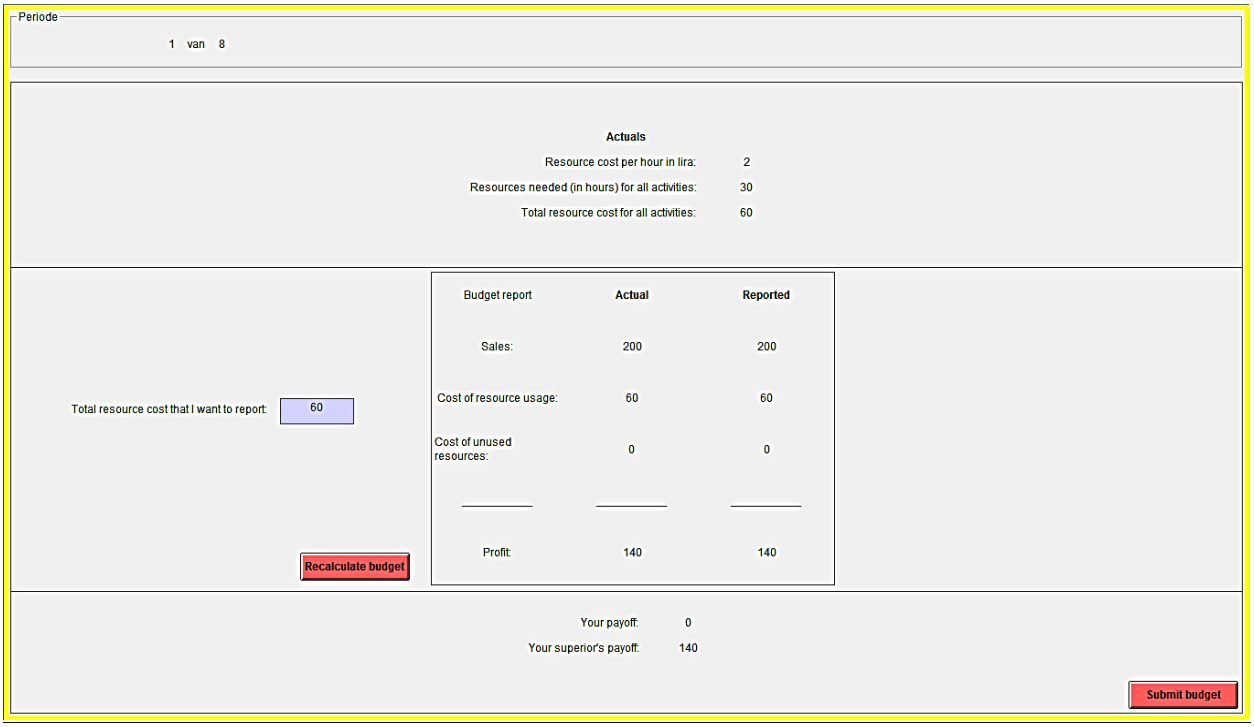
Alternatively, if SA uses his/her discretion to a lesser extent and, for example, reports that the amount of hours in surgery equals 35, some part of cost of unused capacity remains visible in the cost report (i.e., 5 hours × € 200 per hour = € 1,000), as demonstrated in the figure below.

Budget report standard costing system without discretion		**Budget report standard costing system with discretion**		
Sales	€ 20,000	Sales	€ 20,000	
Cost of resource usage	€ 12,000	Cost of resource usage	€ 13,000	Total budgeted cost = € 14,000
Cost of unused capacity	€ 2,000	Cost of unused capacity	€ 1,000	
Profit	€ 6,000	Profit	€ 6,000	

Appendix 2: screen shots reporting decisions

Capacity reporting absent

Capacity reporting present without discretion



Capacity reporting present with discretion