Burn It or Return It?
The Effects of the Possibility to Return Budget and the Moderating Role of Uncertainty on Capital Budgeting

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Abstract

This paper uses an experiment to investigate the effects of giving subordinates the possibility to return remaining budget to the organization on capital budgeting processes. We predict and find that when subordinates face low uncertainty when submitting their budget request, the possibility to return budget increases budget requests compared to not having this possibility. Under high uncertainty, this effect is mitigated, and budget requests no longer increase. We also predict and find that subordinates return more budget under high than low uncertainty. Together, the results imply that the possibility to return budget *increases* slack consumption (i.e., project inefficiency) under low uncertainty but *decreases* it under high uncertainty. We contribute to the literature by integrating an important feature of budgeting practice into research, i.e., subordinates' possibility to return remaining budget. Our findings imply that in some situations, adopting a "use it or lose it" budgeting policy may be beneficial for organizations.

JEL codes: D91, M10, M40

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Data availability: The data and research instrument are available from the authors upon request.

I. INTRODUCTION

The question of how budgets are allocated to projects in organizations is important as it strongly affects how efficiently an organization's capital is used (Hannan, Rankin, and Towry 2006; Abdel-Rahim, Majerczyk, Stevens, and Wilhelm 2019). The better an organization can reduce slack consumption, the better it is likely able to fund value generating projects and to reduce wasteful resource spending (Baiman and Evans 1983; Harris and Raviv 1996, 1998). However, despite these concerns about wasteful resource spending, many organizations implement a "use it or lose it" budgeting policy, implying that returning remaining budget to the organization at the end of a period does not have positive consequences for a division (Taylor 2009; Khalil, Kim, and Lawarree 2019). In some settings, the consequences can even be negative as returning budget can be understood as a lack of capital need and may reduce future funding (Liebman and Mahoney 2017; Laffont and Tirole 1986; Jones 2005). This essentially forces subordinates to "burn the budget" at the end of a budgeting period by investing into lower quality activities (Mitchell 2015; Rempfer 2019; Beeby 2018). For example, Liebman and Mahoney (2017) find that IT projects started in the last week of a fiscal year are of substantially lower quality than those started earlier in a year.

Prior research on capital budgeting has taken the "use it or lose it" budgeting policy into account by forcing subordinates to fully consume project slack (e.g., Rankin, Schwartz, and Young 2008; Hannan, Rankin, and Towry 2010; Douthit and Stevens 2015). However, it is an open question whether—when given the possibility to return budget at the end of the period—subordinates will use this possibility and whether this will benefit the organization. Therefore, this paper investigates the effects of giving subordinates the possibility to return remaining budget on capital budgeting processes and their outcomes. We also investigate whether the effects of giving subordinates this possibility are moderated by subordinates' environmental uncertainty when

submitting the budget request.

Giving subordinates the possibility to return remaining budget at the end of the period is not without tension. On the one hand, it can lead subordinates to request more budget in the first place as they can return remaining budget at the end. This could create even *more* slack. On the other hand, returning budget at the end of the period can signal to the organization that the allocated budget is responsibly used and not wastefully spent which could positively affect the long-term superior-subordinate relation. We suggest that an important factor determining this tradeoff is subordinates' uncertainty about project costs when submitting the budget request.

Specifically, we develop theory to predict that when subordinate uncertainty is low, budget requests increase when subordinates have the possibility to return remaining budget at the end of a period. The reason is that subordinates shift their focus on the possibility to return budget and overestimate their potential budget return at the end of a period, which makes it easier for them to self-justify requesting higher amounts of budget in the first place. Subordinates may also exploit superiors' likely increased willingness to accept budget requests when this possibility exists. In contrast, we predict that when uncertainty is high, the possibility to return budget likely makes subordinates increase their budget requests less compared to low uncertainty. The reason is that, in combination with high uncertainty, the possibility to return budget may mitigate the effects of self-justification and foster the activation of a responsibility norm which shifts subordinates' focus on using resources more responsibly. Specifically, even though such a norm may be generally activated under high uncertainty (Abdel-Rahim et al. 2019), it is more likely to be activated in combination with the possibility to return budget as this possibility signals to the subordinate that the firm encourages responsible use of resources. We also predict that when this possibility exists, subordinates return more budget when uncertainty is high vs. low. Taken together, this implies that the possibility to return budget likely *decreases* slack consumption (i.e.,

the slack consumed after any potential budget return) and, thus, increases organizational efficiency more when uncertainty is high than when it is low. Finally, we develop a research question with regard to superiors' budget allocation decisions and the tradeoffs superiors face in making these decisions.

We investigate our predictions in an experiment based on the setting of Antle and Eppen (1985) that has regularly been used in prior capital budgeting experiments (e.g., Rankin et al. 2008; Douthit and Stevens 2015). Subordinates submit a budget request to superiors who decide about allocating the requested budget or not. The distribution of project costs and the revenues of the project are such that it is always beneficial for the superior to realize the project.

The experiment uses a 2 x 2, between subjects, design in which superior-subordinate dyads repeatedly interact for eight periods.[1] As subordinates' possibility to return unused budget is likely a continuum in practice, we capture one end of the continuum where the subordinate consumes the full amount of slack after the project is implemented (budget return absent) and compare it to a point along the continuum where the subordinate, after project implementation, can decide whether he wants to return some or all of the remaining budget to the superior (budget return present).[2] Subordinate uncertainty is also manipulated at two levels (high vs. low). When subordinate uncertainty is low, subordinates know their project costs exactly when they submit their budget request to the superior, to provide a clean test of our theory. When subordinate uncertainty is high, subordinates are still better informed about project costs than the superior but only know a *cost range* that includes actual project costs when they submit their budget request. If the superior has granted the budget, subordinates are informed about the *exact project costs* in

[1] While prior work in budgeting has analyzed the effects of competition among subordinates on capital requests (Brüggen and Luft 2011), we focus on a situation *without* competition. Competition can potentially also contribute to "use it or lose it" behavior owing to increased pressure from other units to reallocate capital.
[2] For simplicity, we will use male pronouns for the subordinate and female pronouns for the superior in the following.

this period before implementing the project. We keep superior information constant across conditions as, in all conditions, they only know the project revenue, the ex ante distribution of project costs and subordinates' uncertainty level (high or low) at the time of the budget request.

Consistent with our predictions, we find that when subordinate uncertainty is low, budget requests increase when the possibility to return budget is present compared to when it is absent. When subordinate uncertainty is high, this effect is strongly mitigated, and the possibility to return budget no longer increases budget requests. We also find that subordinates return more budget when uncertainty is high than when it is low. As a result, the possibility to return budget *decreases* slack consumption when uncertainty is high but *increases* it when it is low. We also provide evidence that superiors are more willing to allocate budget when the possibility to return budget exists, but differences in their willingness to allocate budget between high and low uncertainty are rather small. Supplemental analyses provide evidence about our underlying theory and the dynamic superior-subordinate interaction.

Our paper has several important implications for theory and practice. First, our paper integrates an important feature of budgeting processes in practice into research: the possibility to return remaining budget at the end of the period. We provide evidence that this possibility can have different effects depending on the level of uncertainty the subordinate is exposed to. While, under high subordinate uncertainty, organizations likely profit from this possibility, it may mainly lead subordinates to increase budget requests under low uncertainty, thereby potentially increasing slack consumption. Our findings thus help explain why some organizations in practice install budgeting policies that de facto imply no possibility to return budget but also suggest that other organizations may benefit from implementing this possibility.

Second, our paper sheds more light on the role of subordinate uncertainty in budgeting. With a few exceptions (e.g., Abdel-Rahim et al. 2019; Farrell, Peffer, Rotaru, and Schulz 2021),

prior experimental work in budgeting has largely ignored subordinate uncertainty at the time of budget requests and how it may interfere with budgeting policies, although it is common in practice (Drury 2013; Shields and Shields 1998). While prior experimental research on uncertainty has mainly focused on bottom-up budgeting processes (Abdel-Rahim et al. 2019; Farrell et al. 2021), we study a setting with superior budgeting authority. We provide evidence that in such strategic interactions, a responsibility norm is more likely activated under high uncertainty when the firm's budgeting policy (i.e., the possibility to return remaining budget) is linked to the potential reason for remaining budget (i.e., increased budget requests due to high uncertainty). This indicates that the effects of uncertainty may depend on whether subordinates can establish a connection between the design of budgeting processes and the presence of high uncertainty.

Finally, while prior work has assumed that subordinates consume remaining budget at the end of the period, we provide evidence that this is not always the case but that subordinates often return remaining budget, particularly when uncertainty is high. Additionally, as we find that superiors' reaction and future budget allocations can depend on such budget returns, we provide evidence on factors that can improve the long-term budgeting relationship between superiors and subordinates, which is important to understand the efficiency of budgeting in practice.

II. THEORY AND HYPOTHESES DEVELOPMENT

Setting and Background

We investigate a capital budgeting setting similar to the model of Antle and Eppen (1985) in which a subordinate has superior information about the budget necessary to realize a project generating additional revenues for a superior. The revenues and costs are such that it is always beneficial for the superior to realize the project as costs never exceed revenues. After the subordinate has submitted a capital budget request, the superior reviews the request and decides whether to allocate the requested budget to the subordinate or not. The subordinate has incentives

to overstate project costs to maximize slack consumption. In contrast, the superior has incentives that the project is realized but also that slack consumption is minimized. In this setting with final superior budget authority, we explore how subordinates' possibility to return remaining budget to the superior instead of consuming it affects the budgeting process and how this effect is moderated by subordinates' level of uncertainty about the actual project costs when they submit their budget request. The question of returning budget is likely most relevant when superiors have (at least partial) decision authority about budget allocations. This is also reflective of many cases in practice where superiors have substantial negotiation power in budgeting processes (Merchant and Van der Stede 2017; Fisher, Frederickson, and Peffer 2002; Ross 1986).

Conventional budgeting models rely on economic theory to predict that subordinates use their informational advantage over superiors to maximize slack consumption which induces inefficient resource allocations (e.g., Antle and Fellingham 1995). Likewise, economically, the possibility to return budget at the end of the period should not affect the budgeting process as subordinates would always consume the full amount of slack and never return any budget. However, prior experimental work finds that subordinates are not fully self-interested and refrain from making budget requests that maximize slack (e.g., Evans, Hannan, Krishnan, and Moser 2001; Church, Hannan, and Kuang 2012). Similarly, we use behavioral theory to predict that the possibility to return budget affects budgeting processes and their outcomes, but differently so contingent on the level of subordinate uncertainty.

Uncertainty for subordinates varies *across* and *within* organizations depending on the dynamics and complexity of the environments that they operate in (Downey, Hellriegel, and Slocum 1975). Uncertainty arises due to the limited predictability of the external environment such as, for example, the development in market demand and the actions of suppliers or competitors (e.g., Govindarajan 1986; Lorain 2010). According to managers in the finance

profession, the predictability of budgetary factors is a continuum ranging from easy to predict to very challenging to predict, depending on the industry and country a unit operates in (Libby and Lindsay 2010; Lorain 2010). For example, in a survey conducted by Lorain (2010), about a third of the respondents indicate that their unit is able to produce precise budget forecasts while the rest indicates challenges in establishing accurate plans.

Importantly, even though subordinates likely keep an informational advantage relative to superiors even when uncertainty is high, it usually reduces their ability to determine the actual budget required to realize projects in the next period at the moment of the budget request (Merchant 1985; Lukka 1988; Dunk and Nouri 1998). While early survey studies investigate perceived environmental uncertainty as an antecedent of participative budgeting (Shields and Shields 1998) and its joint effect with budgetary participation (e.g., Govindarajan 1986; Kren 1992; Maiga 2005), little is known about how uncertainty may interfere with other budgeting policies like, for example, the possibility to return remaining budget.

So far, few recent experimental papers have analyzed the effects of uncertainty on budgeting and find ambiguous results about whether uncertainty increases or decreases budget requests (e.g., Abdel-Rahim et al. 2019; Farrell et al. 2021). In contrast to the bottom-up budgeting process examined in prior studies, we use a setting with final superior budget authority (e.g., Rankin et al. 2008) and, more importantly, we focus on how uncertainty *moderates* the effects of a budgeting policy—the possibility to return budget—on budgeting processes and its outcomes without predicting a general effect of uncertainty.

Effects of the Possibility to Return Budget on Subordinates' Budget Requests

We first develop a hypothesis to predict that the possibility to return budget increases budget requests when uncertainty about project costs is low. Prior research suggests that when requesting budget, subordinates trade off honest behavior of not requesting more budget than

necessary with the benefits of consuming slack (Evans et al. 2001). When ambiguity exists as to how available information or the setting can be interpreted (Thompson and Loewenstein 1992; Babcock and Loewenstein 2004), subordinates can more easily overcome the potential disutility from dishonest, self-interested behavior by self-servingly justifying increased budget request as being compatible with moral standards (e.g., Wiltermuth 2011; Church et al. 2012). Thus, the ambiguity of a given situation likely plays an important role in capital budgeting.

When uncertainty is low, there is little ambiguity about project costs. In fact, prior research suggests there is a threshold of uncertainty below which managers tend to disregard uncertainty even if actual costs are not perfectly predictable (e.g., Lorain 2010; Dickhaut and Eggleton 1975). Thus, when uncertainty is low, it is unlikely to be relevant as self-serving justification to increase budget requests. In this case, the possibility to return budget is likely especially important because it increases ambiguity as to whether requesting more budget than necessary constitutes dishonest and self-interested behavior compared to no such possibility (Shalvi, Dana, Handraaf, and De Dreu 2011; Shalvi, Gino, Barkan, and Ayal 2015). The reason is that the possibility to return budget *separates* the initial request from the slack consumption decision and therefore (partly) shifts the final slack consumption decision towards the end of a budgeting period (i.e., when subordinates decide whether to return budget or not). Having this budget return possibility likely allows subordinates to self-justify higher budgets requests by referring to the possibility of returning remaining budget later. Consistent with this argument, research in psychology suggests that such separation may lead individuals to subconsciously overestimate the extent to which they will act ethically in the future (Tenbrunsel, Diekman, Wade-Bezoni, and Bazerman 2010; Sezer, Gino, and Bazerman 2015). Similarly, this implies that when the final decision about consuming slack shifts from the initial budget request to the budget return decision, subordinates may lean towards overestimating their potential budget return at the

end of the period which, in turn, allows them to self-servingly justify requesting higher budgets in the first place.

Second, when uncertainty is low, subordinates may also increase budget requests under the possibility to return budget because they may expect or experience superiors to more willingly accept higher budget requests in this case for two reasons: First, when subordinates have the possibility to return budget, accepting a high budget request does not imply that the potential slack included in the request is lost for superiors because subordinates could still return some of the unused budget. Thus, similar to subordinates, the possibility of budget returns can (partly) shift superiors' focus towards the end of a budgeting period. Considering the possibility of a later budget return may then affect superiors' tradeoffs when deciding about the budget allocation and, for a *given* budget request, likely increases their willingness to accept it. Second, in order to encourage subordinates to spend budgets efficiently and not wastefully consume remaining budget, superiors may try to build up a relation of mutual trust by more willingly accepting budget requests when budget returns are possible. For both arguments, expecting or experiencing such increased superior willingness to accept budget requests when budget return is possible could lead subordinates to take advantage of this increased willingness by requesting higher budgets.

The preceding discussion leads to the following hypothesis:

H1: The possibility to return budget increases subordinates' budget requests when uncertainty is low.

We now develop a hypothesis to predict that the possibility to return budget increases budget requests less under high than low uncertainty. Importantly, we focus on the *moderating* effect of uncertainty but do not predict a main effect of high uncertainty on budget requests. The reason is that high uncertainty about actual costs has the potential to both affect subordinates' self-serving justifications (Farrell et al. 2021) and activate a responsibility norm (Abdel-Rahim et al. 2019), and both forces can have different directional effects on budget requests. Thus, the

combined effect is not unambiguous. However, more importantly, we will develop theory suggesting that for both forces, the extent to which the possibility to return budget increases subordinates' budget requests is lower when uncertainty is high than when it is low.

First, high uncertainty may contribute to subordinates' self-serving justification of higher budget requests because it likely increases the need to build up slack as a risk buffer to ensure project implementation if project costs turn out to be higher than expected (Govindarajan 1986; Dunk and Nouri 1998). This increases subordinates' ambiguity related to the motives for a higher budget request even without possibility to return budget and enables them to self-servingly justify budget requests that are high but still plausible given the existing uncertainty (Schweitzer and Hsee 2002). However, if this is the case, the possibility to return budget is unlikely to strongly affect budget requests any further. The reason is that as long as budget requests stay within the plausible costs under high uncertainty, the risk buffer motive and the budget return possibility to self-justify increased budget requests are consistent with each other. However, if budget requests are increased *beyond* the level where they can be justified by uncertainty, requesting higher budgets by referring to the budget return possibility would make the two arguments inconsistent with each other. Prior work has demonstrated that self-serving biases decrease when individuals have to list counterarguments to their own reasoning (Babcock, Loewenstein, and Issacharoff 1996). This suggests that the possibility to return budget is likely less effective as a self-justification mechanism when it becomes inconsistent with the risk buffer justification. Consequently, it likely increases budget requests to a lesser extent when uncertainty is high than when it is low.

Second, prior work also suggests that situational cues and organizational factors can make norms such as honesty or responsibility more salient in budgeting settings (Douthit and Stevens 2015; Blay, Gooden, Mellon, and Stevens 2018; Abdel-Rahim et al. 2019). Such cues and factors can lead individuals to consider what is the appropriate behavior in this situation and adapt their

behavior accordingly (Bicchieri 2006). In budgeting settings, a responsibility norm likely shifts subordinates' tradeoff more towards using resources responsibly and ensuring project implementation rather than increasing slack consumption.

A cue that might activate a responsibility norm is environmental uncertainty (Abdel-Rahim et al. 2019). Specifically, the presence of high uncertainty may make subordinates consider the possible consequences of uncertainty, especially the risk that the project cannot be implemented. Not realizing the project due to uncertainty is unfavorable for both superior *and* subordinate. This likely shifts subordinates' focus on the appropriate behavior in the situation, which is the responsible use of resources to ensure project realization. While high uncertainty in general may activate a responsibility norm, we suggest that this responsibility norm is *more likely* activated under high uncertainty when a possibility to return budget exists. When uncertainty is high, the possibility to return budget likely signals to the subordinate that wasteful spending is discouraged. Instead, subordinates are encouraged to treat resources responsibly and return remaining budget arising from cost realizations lower than the budget. Thus, by linking the firm's budgeting policy about remaining budget (i.e., the possibility to return it) with the potential reason for remaining budget (i.e., increased budget requests due to high uncertainty), the possibility to return budget makes a responsibility norm particularly salient under high uncertainty and thereby facilitates conformance to the norm (Blay et al. 2018). Consequently, the possibility to return budget likely makes subordinates increase their budget requests less under high than under low uncertainty.

Finally, as described above, expecting or experiencing increased superior willingness to accept higher budget requests may lead subordinates to increase their budget requests. However, when a responsibility norm is activated, subordinates are more likely to reciprocate superiors' trust and less likely to exploit it by requesting more budget (e.g., Deore, Gallani, and Krishnan 2022). Thus, because such a norm is more likely activated under high uncertainty when a

possibility to return budget exists, the possibility to return budget likely increases subordinates' budget requests less when uncertainty is high.

All above arguments suggest that uncertainty likely mitigates the extent to which the possibility to return budget increases budget requests. We state the following hypothesis:

> *H2: The extent to which the possibility to return budget increases subordinates' budget requests is lower when uncertainty is high than when it is low.*

Effects of Uncertainty on Subordinates' Budget Returns

We next develop a hypothesis to predict that subordinates' budget returns are greater when uncertainty is high than when it is low. First, as outlined above, high environmental uncertainty can activate a responsibility norm (Abdel-Rahim et al. 2019) and particularly so when the possibility to return budget exists. This likely shifts subordinates' focus from maximizing slack consumption towards requesting budget as a risk buffer for project implementation. If this is the case, this norm likely induces subordinates to return more budget if project costs turn out to be lower than the allocated budget amount.

Second, when uncertainty is low, returning high budget amounts is more likely to be perceived by the superior as overstated budget request. That means, when a subordinate wants to *appear* responsible and trustworthy to his superior (Hannan et al. 2006; Abdel-Rahim, Hales and Stevens 2022), he likely returns less budget to her when uncertainty is low.

Finally, appearing responsible and trustworthy is also likely relevant from a more strategic standpoint as such perceptions may increase superiors' willingness to accept future budget requests. When uncertainty is high, returning larger amounts of budget may be perceived more as responsible handling of allocated resources. Thus, under high uncertainty, returning budget likely has more positive relational effects and increases superiors' willingness to accept future budget requests more than when uncertainty is low. Consequently, it is likely more beneficial for a subordinate from a strategic standpoint to return budget under high uncertainty.

All our preceding arguments suggest that subordinates likely return greater amounts of remaining budget when uncertainty is high than when it is low. Accordingly, we state H3:

H3: Subordinates' budget returns are greater when uncertainty is high than when it is low.

H1 and H3 suggest that when uncertainty is low, the possibility to return budget increases budget requests while at the same time, subordinates are unlikely to return large amounts of budget at the end of a period. Together, this implies that the possibility to return budget likely *increases* slack consumption in this case. In contrast, when uncertainty is high, H2 and H3 suggest that budget requests are unlikely to increase strongly while subordinates likely return more of the remaining budget when they have the possibility. Together, this implies that when uncertainty is high, the possibility to return budget increases slack consumption considerably less or likely even *decreases* it.

Superiors' Budget Allocation Decisions and the Possibility to Return Budget

In the following, we will discuss how subordinates' possibility to return budget can affect superiors' budget allocation decision. While, economically, superiors should always accept all budget requests in our setting, prior work shows that superiors reject budget requests when they feel unfairly treated and suspect high amounts of slack (e.g., Douthit and Stevens 2015). The possibility to return budget likely induces superiors not only to consider the slack included in the requests, but also any potential budget returns and factors influencing it. This consideration may depend on superiors' attribution of subordinates' motives to request budget.

Prior research shows that superiors often intentionally allow subordinates to build in some slack in their budget requests (e.g., Merchant and Manzoni 1989; Van der Stede 2000; Davila and Wouters 2005). This evidence suggests that, in general, superiors expect subordinates to have motives for creating slack that go beyond purely self-interested motives (Onsi 1973). If superiors expect subordinates to request higher budgets not solely due to the motive to consume slack but,

for example, due to the motive to act responsibly and ensure project implementation, superiors may expect that subordinates eventually return remaining budget if they have the possibility. To foster such behavior, superiors may try to build up a trustful relationship and be more willing to accept budget requests when subordinates have the possibility to return unused budget.

As we outlined above, we expect the possibility to return budget to increase superiors' willingness to accept budget requests as it separates employees' slack consumption decision from the budget request and may therefore shift superiors' focus towards the end of a budgeting period (i.e., the potential budget return) and the fact that not all slack included in the request is lost. Thus, considering any potential budget return at the end of the period likely increases superiors' willingness to accept a *given* budget request compared to when there is no such return possibility. It is, however, unclear whether this effect differs under high vs. low uncertainty. On the one hand, subordinates' motivation to consume slack may become more salient to superiors when uncertainty is low and, hence, superiors may more likely attribute high budget requests to this motive. In this case, superiors may expect less budget return when uncertainty is low vs. high and, consequently, the possibility to return budget could increase superiors' willingness to accept budget requests less when uncertainty is low vs. high. On the other hand, superiors may also try to build a relationship of mutual trust with the subordinate when uncertainty is low as a trustful relationship fosters cooperation and project implementation and thus is beneficial for both parties. As a consequence, superiors' willingness to accept budget requests could increase similarly when there is the possibility to return budget, irrespective of the level of uncertainty. Because it is unclear whether and, if so, to what extent environmental uncertainty affects superiors' attribution of subordinate motives, their attempts to build up a relationship of mutual trust and, ultimately, their willingness to accept budget requests, we pose the following research question:

RQ: Does the effect of the possibility to return budget on superiors' willingness to accept budget requests depend on subordinates' uncertainty?

III. METHOD

Our experiment uses a 2 x 2 x 8 (periods) full factorial design.[3] Between subjects, we manipulate subordinates' possibility to return budget to the superior at the end of each period (absent vs. present), and the uncertainty subordinates face regarding the actual project costs (low vs. high). Period is a within-subjects factor as subordinate and superior dyads interact repeatedly over eight periods. We use multiple periods in order to be able to study the dynamic relation between superior and subordinate in such budgeting processes.

Participants are randomly assigned to subordinate-superior dyads, and they remain in their assigned role and dyad over the entire experiment. In each period, subordinates can realize a project which yields a revenue of 250 for the superior. To realize the project, subordinates need to submit a budget request to superiors and the allocated budget needs to be equal or higher than the actual costs to realize the project. Actual costs are uniformly distributed on 1, 2, .., 200. Since project revenues are higher than the maximum costs, the project is always beneficial for the organization. This is common knowledge to everyone.

At beginning of each period, subordinates receive additional information about the project cost. We manipulate the level of subordinate uncertainty by varying the precision of the information that subordinates receive at this point. When uncertainty is low, subordinates receive precise information about the actual project costs of the period. Thus, they exactly know the budget necessary to realize the project when submitting their budget request. Providing precise cost information when uncertainty is low helps us keep control over the ambiguity of cost information and, thus, to provide a clean test of our theory.[4] When uncertainty is high,

[3] The experiment was approved for research ethics by the Institutional Review Board (IRB) of the university where data was collected.

[4] In fact, prior research suggests there is a threshold of uncertainty below which managers tend to disregard uncertainty even if actual costs are not perfectly predictable (e.g., Lorain 2010; Dickhaut and Eggleton 1975). Moreover, prior work also provides evidence that uncertainty has a significant impact on the behavior of individuals when it is high, but behavior does not differ significantly between *certainty* and *low uncertainty* (Rapoport, Budescu,

subordinates are only informed about a *range* of costs *including* the actual costs of the period. The distance between the highest and lowest cost in this range (i.e., the spread of the cost range) is 40. The project costs can be any whole number within this range with equal likelihood. The cost range and actual costs in this range are selected randomly at the beginning of a period.[5]

We hold superiors' information about project costs constant across conditions: In all conditions, superiors only know the ex ante distribution of project costs without receiving additional information, i.e., they only know that project costs can be any whole number between 1 and 200. Thus, they possess inferior information about the actual project costs of a period than subordinates in all conditions. They also know whether subordinates are informed about actual project costs (low uncertainty) or a cost range of 40 including actual project costs (high uncertainty) when submitting their budget request. We inform superiors about subordinates' level of uncertainty in both conditions to increase experimental control. We also treat the level of uncertainty as exogenously given without referring to any reason for why uncertainty exists.[6]

After being informed about the actual project costs (low uncertainty) or the cost range (high uncertainty), subordinates submit their budget request to the superior. Subordinates can request any amount between 1 and 200 as long as the budget request is equal to or higher than the actual project costs (low uncertainty) or the lower limit of the cost range (high uncertainty). Subordinates are also informed that the project can only be realized when the allocated budget is

Suleiman, and Weg 1992; Roch and Samuelson 1997). The choice to provide precise cost information is also in line with prior work in capital budgeting (e.g., Rankin et al. 2008; Church et al. 2012) and, thus, increases the comparability of our findings.

[5] We kept cost ranges and actual project costs constant across dyads and conditions. That means, prior to the experiment we randomly pre-determined eight cost ranges and, for each of these cost ranges, we randomly determined the project costs within the cost range. However, the exact order of these eight cost ranges and corresponding project costs over the eight period is randomly determined by the program for each dyad.

[6] In contrast to describing uncertainty in a scenario (e.g., Umanath, Ray, and Campbell 1993), our exogenous manipulation of subordinate uncertainty avoids that internal and external factors determining uncertainty may be confounded (Tymon, Stout, and Shaw 1998). Thus, superiors cannot hold subordinates responsible for (exogenous) uncertainty and vice versa. Additionally, exogenously manipulating uncertainty allows us to keep control over causality and avoids endogeneity problems potentially arising in the survey literature when linking superiors' control system choices and perceived uncertainty in an organization.

larger than or equal to the actual project costs. The superior then decides whether to accept or reject the request. When she accepts the request, the full requested budget is allocated. When she rejects the request, *no* budget is allocated and the project is not realized. The fact that superiors have final authority over budget allocation is reflective of many settings in corporate practice (Merchant and Van der Stede 2017; Fisher et al. 2002; Ross 1986).

After superiors made their budget allocation decisions, subordinates learn whether the superior accepted their request or not and, under high uncertainty, subordinates also learn the actual project costs, i.e., subordinates' uncertainty is resolved after the allocation decision. At this point, subordinates know the exact actual project costs of the current period in *all* conditions and can decide whether they want to realize the project if the allocated budget is larger than or equal to the actual costs. We implement this feature in all conditions to allow subordinates to not realize the project if they perceive the slack as too small after the actual costs are realized under uncertainty. Superiors never learned whether the project was not implemented due to the subordinate's decision or due to too high actual costs.[7] If the project is realized, any budget in excess of the actual costs (i.e., the actual slack) can be consumed by the subordinate.

We manipulate between conditions, whether subordinates can return budget to the superior at the end of each period or not. Because the possibility to return budget is a continuum in practice, we compare one end of the continuum, in which the possibility is absent, to another point on the continuum where returning budget does not have any direct consequences like, for example, a reduction in next period's budget.[8] Even though in practice, subordinates could, theoretically, always return remaining budget, budgeting practices in some organizations *de facto*

[7] In the Results section, we provide evidence that this option was used in only very few cases.
[8] In the instructions, the budget return policy was introduced as exogenously given to avoid that subordinates attribute it to the manager and interpret it as a signal of mistrust. On the post experimental questionnaire, subordinates indicated their agreement to the statement that they felt trusted by their manager (from 1 – fully disagree to 7 – fully agree). We find no differences across conditions (mean = 4.92, $p = 0.56$, two-tailed).

force subordinates to consume or "burn the budget" at the end of a budgeting period (e.g., Mitchell 2015; Rempfer 2019; Beeby 2018). This is reflected in prior analytical and experimental research assuming that slack is always fully consumed by the subordinate (e.g., Antle and Eppen 1985; Rankin et al. 2008). Likewise, in our study, in the *budget return absent* condition, all actual slack is consumed by subordinates at the end of a period, and each unit of slack consumption increases subordinates' payoff, as described below. In the *budget return present* condition, subordinates can freely decide to return some or all of the remaining budget to the superior at the end of a period. Like in the *budget return absent* condition, subordinates, in the *budget return present* condition, are first informed about the actual slack available after the project is realized. They can then decide whether and how much of the actual slack they would like to return. Subordinate's *slack consumption* is the slack remaining after returning budget to the superior. Superiors only observe the budget returned to them. In none of the conditions do they ever learn the actual amount of slack available to their subordinates, also not after any potential budget return.

Payoffs

In every period, subordinates receive a fixed salary of 20 points independent of whether the project is realized or not. Additionally, they receive a bonus of 20 points if the project is realized. The project bonus of 20 points reflects that in practice, subordinates are often rewarded for successfully realizing new projects through variable compensation. In addition, it allows subordinates to increase their payoff without need to create and consume slack (e.g., Rankin et al. 2008). If the project is realized, each unit of slack consumption increases the subordinates' payoff by 0.5 points.[9] In sum, subordinates' payoffs in each period are computed as follows:

[9] We convert slack into subordinate payoff at a rate lower than one as, in practice, subordinates can personally benefit from slack by, for example, reducing their own workload and effort (e.g., hiring more employees than necessary) (e.g., Antle and Eppen 1985) but cannot directly transfer it to their private accounts and use it freely (Church, Kuang, and Liu 2019). When budget is returned to the superior, in contrast, each unit of returned budget increases the superior payoff by one point. This reflects that firms benefit more from a unit of returned budget than subordinates, which is likely descriptive of practice as organizations can use and reinvest capital freely to generate returns.

Subordinate payoff for the period

If the project is not realized:

Subordinate's fixed salary *(20 points)*
= Subordinate's payoff for the period

If the project is realized:

Subordinate's fixed salary *(20 points)*
+ Subordinate's project bonus (*20 points*)
+ Slack consumption * 0.5
= Subordinate's payoff for the period

Where,
Budget return absent conditions:
Slack consumption = Allocated budget – project cost
Budget return present conditions:
Slack consumption = Allocated budget – project cost – returned budget

Superiors have an initial balance of 40 points at the beginning of each period. From this initial balance they have to pay subordinates' fixed salary of 20 points and the project bonus of 20 points in case the project is realized. When the project is realized, the manager receives the project revenue of 250 points less the budget allocated to the employee. In sum, superiors' payoffs in each period are computed as follows:

Superior's payoff for the period

If the project is not realized:

Initial balance *(40 points)*
– Subordinate's fixed salary *(20 points)*
= Superior's payoff for the period

If the project is realized:

Initial balance *(40 points)*
– Subordinate's fixed salary (*20 points*)
– Subordinate's project bonus (*20 points*)
+ Project revenue *(250 points)*
– Allocated capital
+ Subordinate's budget return (in *budget return present* conditions)
= Superior's payoff for the period

At the end of each period, subordinates and superiors are informed about their payoffs for this period, split up into the different components.

Participants and Procedures

Our sample consists of 148 students (74 superior-subordinate dyads) from a large European university. We collected the data remotely using o-tree software (Chen, Schonger, and Wickens 2016). Participants are on average 21 years old and 53% of them are female. There are no significant differences across conditions regarding age or gender (*p's* > 0.10). Participants' pay is the sum of points collected in all periods converted into cash at a rate of €0.02 per point. Including a show-up fee of €2, participants received an average total pay of €13.40 for approximately 30 minutes of their time. They also received course credits for their participation.

Before the session, participants give their informed consent and are then randomly matched with another participant in the same session. For each dyad, the program then randomly determines one of the four conditions and randomly assigns the role (subordinate or superior). Before the first period starts, participants learn their assigned role, read the related instructions, and complete a quiz to reinforce their understanding of the instructions. They are not allowed to continue until they have answered all questions correctly. After the eight periods of the experiment, participants complete a post-experimental questionnaire.

IV. RESULTS

Descriptive Statistics

Table 1 reports descriptive statistics on the main variables in our experiment. *Budget request* represents subordinates' requested budget and is used as our primary variable to test H1 and H2. *Deliberately included slack* is computed by subtracting the actual costs (when uncertainty is low) or the upper limit of the potential cost range (when uncertainty is high) from *budget request*. Thus, *deliberately included slack* reflects the slack that is not justifiable by any

uncertainty about actual costs. *Returned budget* is the returned budget in case the project is implemented and is used to test H3. *Slack Consumption* represents the final slack included in the realized project and is based on *budget request* less actual project costs and less *returned budget* (when budget return was possible). *Accept* reflects the superiors' budget allocation decision and is used to test our RQ. *Superior* and *subordinate payoff* reflect both parties' payoffs.

---Insert Table 1---

As reported in Table 1 and illustrated in Figure 1, when uncertainty is low, *budget request* increases strongly when subordinates have the possibility to return budget (155.13 vs. 137.91), in line with H1. When uncertainty is high, budget requests remain virtually stable when subordinates have the possibility to return budget (130.07 vs. 130.20). This result provides initial evidence in favor of H2. In line with H3, Table 1 also shows that both the frequency of a budget return (*D_BUDRET*: 0.7037 vs. 0.5315) and *returned budget* (8.09 vs. 5.83) are higher when uncertainty is high than when it is low. Thus, subordinates used the possibility to return budget in 53% of the cases when uncertainty is low and in 70% of the cases when uncertainty is high. This suggests that subordinates seem to focus more strongly on using slack as a risk buffer under high uncertainty. Likewise, *deliberately included slack* is substantially lower when uncertainty is high than when it is low. Table 1 shows that the median of *deliberately included slack* in both conditions with high uncertainty is 0, indicating that in 50% of the cases, subordinates did not report higher costs than the highest possible costs in this period.[10] As a result of subordinates' *budget request* and *returned budget*, Table 1 and Figure 2 show that, when subordinates have the possibility to return budget, *Slack consumption* increases when uncertainty is low (49.04 vs.

[10] In fact, when uncertainty is high, *deliberately included slack* is smaller than or equal to zero in 57.2% (63.9%) of the cases when the possibility to return budget is absent (present). Additionally, in 15 (12) cases under high uncertainty without (with) possibility to return budget, actual costs turned out to be higher than the allocated budget. In this case, projects could (automatically) not be implemented, reflecting that in practice, subordinates would not have sufficient budget to fund the project. When uncertainty is low, subordinates do not implement the project in five of 113 (six of 117) cases when the possibility to return budget was absent (present) even though superiors allocated the budget.

38.91) but decreases when uncertainty is high (25.16 vs. 36.49). This is in line with our expectations.

---Insert Figure 1 and Figure 2---

Finally, related to our research question about superiors' budget allocation decisions, Table 1 reports that acceptance of budget requests increases when employees can return budget both when uncertainty is low (0.7434 vs. 0.8125) and when it is high (0.7632 vs. 0.8333).

Hypotheses Tests

We test H1 and H2 jointly in a regression model reported in Table 2 (Model 1).[11] We regress *budget request* on an indicator variable *Return* (equal to 1 (0) when employee have (do not have) the possibility to return budget), an indicator variable *Uncertainty* (equal to 1 (0) when uncertainty is high (low)) and the interaction of both variables.[12] Additionally, we include *Period* to control for time effects. All regressions used in this paper cluster standard errors to control for multiple observations within subordinate or superior.

---Insert Table 2---

As reported in the table, the coefficient of *Return*, reflecting the effect of subordinates' possibility to return budget when uncertainty is low, is significantly positive (17.22, $p = 0.01$), supporting H1. Additionally, the interaction coefficient is significantly negative reflecting the reduced effect of the possibility to return budget on *budget request* when uncertainty is high (-17.09, $p = 0.05$). This result supports H2.[13]

To provide evidence that our findings on budget requests are not mainly driven by

[11] Results for our hypotheses tests are inferentially identical if we average our dependent variables over all periods and use ANOVA.

[12] While prior experimental work in the field of capital budgeting has often used the slack included in the capital request relative to the total potential slack given actual costs (e.g., Evans et al. 2001; Church et al. 2019), we do not use such relative measure because at the time of the budget request, subordinates do not know the actual cost when uncertainty is high.

[13] P-levels are one-tailed for directional expectations and two-tailed otherwise.

superior decisions, we rerun the regression controlling for the superior's allocation decision in the previous period (t-1). Specifically, *Accept t-1* is an indicator variable reflecting whether the superior accepted the budget request in the previous period (1) or not (0). Model 2 in Table 2 shows that our findings are robust and even somewhat stronger when we include *Accept t-1* (H1, *Return*: 21.64, $p < 0.01$; H2, interaction: -21.78, $p = 0.02$). This provides additional support for H1 and H2. Model 3 also shows that all results are supported when using *deliberately included slack* as the dependent variable (H1, *Return*: 17.22, $p = 0.01$; H2, interaction: -17.09, $p = 0.05$).

We test H3 by analyzing whether budget was returned more often under high uncertainty and whether *Returned budget* was larger. In Table 3, we regress *D_BUDRET* (equal to 1 (0) when budget was (was not) returned) (Model 1, Logit regression) and *Returned budget* (Model 3, Tobit regression) on *Uncertainty* and *Period*. Models 2 and 4 control for the available amount of slack (*actual slack*). The table shows subordinates return budget more often under high uncertainty (Model 1, 0.76, $p = 0.08$) and return higher amounts (Model 3: 4.52, $p = 0.07$). When controlling for the available amount of slack, both effects become even stronger (Model 2: 1.04, $p = 0.03$; Model 4: 7.86, $p < 0.01$). These results support H3.[14]

---Insert Table 3---

In Table 2 (Model 4), we also report our results for subordinates' *slack consumption*. In line with our expectations, we find that the interaction coefficient is significantly negative (-22.36, $p = 0.02$, one-tailed) indicating a less positive effect of the possibility to return budget on *slack consumption* when uncertainty is high. Consistent with our theory, we also find that the effect of possibility to return budget on *slack consumption* is positive when uncertainty is low

[14] We also re-ran Models 2 and 4 including only observations with a positive *actual slack.* Results are again in line with H3 (Model 2: 0.69, $p = 0.10$; Model 4: 6.68, $p < 0.01$).

(10.97, $p = 0.08$, one-tailed) and negative when it is high (-11.39, $p = 0.07$, one-tailed).[15]

Finally, Table 4 reports evidence on our research question on budget allocation decisions. We use a logit regression to regress *Accept* (1/0) on the indicator variables *Return* and *Uncertainty* as well as their interaction. We include *Budget request* to control for the amount of the requested budget and *Period*. Based on the regression, we then calculate the marginal effect of the possibility to return budget both when uncertainty is high and when it is low. As reported at the bottom of the table, the marginal increase in the likelihood of accepting the budget request is significant both when uncertainty is low (0.101, $p = 0.04$) and when it is high (0.078, $p = 0.09$). As indicated by the interaction term, the effect is not significantly different between high and low uncertainty (interaction term: -0.20, $p = 0.72$).[16]

---Insert Table 4---

Supplemental Analyses

Superior and Subordinate Payoffs

We first investigate superior and subordinate payoffs. We rerun the regressions used to test H1 and H2 with *superior* and *subordinate payoff* as the dependent variables. Results (untabulated) indicate that when uncertainty is low, the effect of the possibility to return budget on *superior payoff* is negative, but insignificant (-4.70, $p = 0.54$, two-tailed). When uncertainty is high, the effect of this possibility is *more* positive than when uncertainty is low (interaction term: 18.23, $p = 0.09$, two-tailed) and it generally increases *superior payoff* when uncertainty is high (13.52, $p = 0.08$, two-tailed). In contrast, *subordinate payoff* increases when subordinates have

[15] We also tested whether high uncertainty reduces the relative slack consumption (*slack consumption* relative to the actual slack after cost realization) when the possibility to return budget is present and, in line with our theory, find that this is the case (-0.18, $p < 0.01$, one-tailed).

[16] To exclude that our results are driven by idiosyncratic attitudes towards or interpretations of risk, we re-ran the analyses reported in this section including our post experimental questionnaire measure for individual risk propensity based on Hershey and Shoemaker 1985. Including this measure into our analyses does not affect our results.

the possibility to return budget when uncertainty is low (6.28, $p = 0.10$, two-tailed) but not when it is high (-0.98, $p = 0.78$, two-tailed).

Subordinates' Motivations and Norm Activation

In our development of H1, we argue that, when uncertainty is low, the possibility to return budget increases ambiguity as to whether requesting more budget than necessary represents dishonest and self-interested behavior and, therefore, allows subordinates to self-servingly justify higher budget requests. On the post experiment questionnaire, we measure subordinates' motivation to be honest by asking them whether they wanted to be honest when making their budget request (Likert scale from 1 – fully disagree to 7 – fully agree). For the conditions with low uncertainty, we then regress budget request on the motivation to be honest, the indicator variable *Return*, the interaction of both variables and period. (Untabulated) results indicate that subordinates' motivation to be honest significantly reduces budget request when the budget return possibility is absent (-13.37, $p < 0.01$, two-tailed). However, the interaction between Return and the motivation to be honest is significantly positive (12.61, $p < 0.01$, two-tailed), indicating that the motivation to be honest affects budget request less when the possibility to return budget is present.[17] Thus, despite their motivation to be honest, the possibility to return remaining budget seems to enable subordinates to submit higher budget requests, which speaks in favor of a subconscious, self-serving justification through this return option, in line with our theory.

In the development of H2, we argue under high uncertainty, a norm of responsibility may be activated such that subordinates want to use resources responsibly instead of consuming excess slack and that this is particularly the case when budget returns are possible. On the post experiment questionnaire, subordinates indicated their agreement to the statement that their

[17] We also run the regression for the conditions with subordinate uncertainty and do not find a significant interaction between *Return* and the motivation to be honest (1.26, $p < 0.78$, two-tailed). This suggests, in line with our theory, that the possibility to return budget is less effective as a self-justification mechanism with than without uncertainty.

budget request was intended to maximize the budget in excess of the actual project costs (Likert scale from 1 – fully disagree to 7 – fully agree). In line with our theory, we find that, when the possibility to return budget is present, the motivation to maximize excess budget is significantly lower when uncertainty is high than when it is low (5.06 vs. 5.78, $t_{34} = 1.53$, $p = 0.07$, one-tailed) However, this effect is less pronounced and insignificant than when the possibility to return budget is absent (5.21 vs. 5.42, $t_{36} = 0.44$, $p = 0.33$, one-tailed), supporting our theory.

Superior Attribution of Budget Requests and Reaction to Returned Budget

In our theory development, we argued that when budget can be returned and when uncertainty is high vs. low, superiors may be more likely to attribute budget requests to subordinates' motivation to hedge against uncertainty and ensure project implementation rather than to maximize excess budget and consume slack. On the post experiment questionnaire, we asked superiors whether, when making budget requests, subordinates mainly wanted to maximize excess budget or ensure project implementation (from -3 – Mainly maximize excess budget via 0 – equally maximize excess budget and ensure project implementation to 3 – Mainly ensure project implementation). We regress superiors' attribution score on uncertainty (1/0), controlling for the mean requests and mean budget returns superiors received and their acceptance decisions. We find that uncertainty shifts superiors' attribution of budget requests towards project implementation when the possibility to return budget is present (1.25, p = 0.05, two-tailed), but not when it is absent (0.03, p = 0.97, two-tailed).

Thus, under high uncertainty, superiors seem to perceive returned budget as a signal that allocated resources are carefully used and that high requests are driven by the risk buffer motive. As a consequence, returned budget likely leads to a higher willingness to allocate requested budgets in the future, particularly when the requested budget is high. This effect is likely weaker, however, when uncertainty is low as subordinates' budget requests are attributed less to the risk

buffer motive. We test this underlying theory by analyzing, in the condition with budget return possibility, superiors' budget allocation decisions in periods *following* a project implementation.

As low budget requests have a high likelihood of being accepted anyway, the effect we want to analyze is likely most relevant for high budget requests. We therefore construct an indicator variable *High_request* equal to 1 when the budget request is larger than or equal to 176 (our 75% budget request quantile) and 0 if it is lower. We regress *Accept* on *High_request*, *Returned budget (t-1)* measuring the returned budget in the previous period following project implementation, the interaction of both variables and *period*. Table 5 reports the results.

---*Insert Table 5*---

Model 1 in Table 5 shows that under high uncertainty, the coefficient of *High_request*, reflecting the effect of a high budget request when *Returned budget (t-1)* is zero, is significantly negative (-2.67, $p = 0.03$, two-tailed). Thus, when no budget is returned in the previous period, a high budget request is less likely to be accepted. Likewise, for low budget requests, the effect of returning budget in the previous period is insignificant (*Returned budget (t-1)*: -0.003, p = 0.94, two-tailed). In contrast, in line with our theory, the interaction coefficient is significantly positive (0.10, $p = 0.07$, one-tailed), indicating that superiors' reaction to high budget requests is more positive when budget was returned in the prior period. Based on this regression, we calculate the marginal effect of *Returned budget (t-1)* at the bottom of the table. The effect is insignificant when the budget request is low (-0.0003, $p = 0.94$, two-tailed) and significantly positive when the request is high (0.0216, $p = 0.05$, two-tailed). Thus, for high requests, higher returned budgets in the previous period increase superiors' willingness to accept the request. In contrast, Model 2 shows that when uncertainty is low, the effect of *High_request* continues to be negative (-1.97, $p < 0.01$, two-tailed), but the interaction is now insignificant (0.06, $p = 0.23$, one-tailed). In fact, the marginal effects at the bottom of the table show that returning budget never has a significantly

positive effect on *Accept* (low request: -0.0023, $p = 0.46$, two-tailed; high request, 0.0070, $p = 0.61$, two-tailed). Thus, under low uncertainty, returned budget does not seem to be perceived as a signal for a careful use of resources. These results support our theory.[18]

Dynamics of Superior-Subordinate Interaction

We now provide more evidence about the dynamics of the superior-subordinate interaction over the course of our experiment. Table 6 provides descriptive statistics on our key measures split up into the first and second half of the experiment. Because each dyad had the same eight *actual costs* over the course of the experiment but they were randomly drawn by the software in each period, as described in the Method section, we focus on *deliberatetly included slack* and *slack consumption* as more meaningful measures for the first/second half split-up.

---*Insert Table 6*---

Table 6 shows that related to subordinates' reporting behavior, our predicted effects are present in the first half of the experiment, but more pronounced in the second. When uncertainty is low, *deliberately included slack* increases in the first half of the experiment when budget return is present vs. absent (46.82 vs. 34.39) and this effect is less pronounced when uncertainty is high (10.79 vs. 6.49). In the second half of the experiment, the possibility of budget return increases *deliberately included slack* more when uncertainty is low (61.69 vs. 39.37) but even slightly decreases it when uncertainty is high (14.61 vs. 18.64). Similarly, the effects of the possibility to return budget on *slack consumption* are present in the first half of the experiment (low uncertainty: 38.68 vs. 34.25; high uncertainty: 23.71 vs. 26.73) but they are more pronounced in the second half of the experiment (low uncertainty: 59.58 vs. 43.23; high uncertainty: 26.50 vs. 45.67). These data suggest that our effects are partly present already in early periods but they seem to

[18] To exclude that superiors' budget allocation decisions are driven by their belief that high (low) budget requests in the prior period lead to low (high) budget requests in the current period, we also re-ran our regressions controlling for (i) the prior budget request and (ii) prior actual costs. All our findings remain unchanged.

become stronger over the course of the experiment due to the superior-subordinate dynamic.

To analyze these effects in more detail when budget return is possible, we regress *budget request* (Model 1), *deliberately included slack* (Model 2) and *slack consumption* (Model 3) on *period*, *uncertainty* and the interaction between the two variables. We adjust *period* such that the coefficient of *uncertainty* reflects the effect of high uncertainty in Period 1. Additionally, we include cost fixed effects to control for actual project costs. Table 7 reports the results.

---Insert Table 7---

Table 7 shows that when uncertainty is low, all three dependent variables increase over time as reflected by the *period* coefficients (Model 1: 6.18, $p < 0.01$; Model 2: 6.08, $p < 0.01$, Model 3: 6.59, $p < 0.01$, all p's two-tailed). In line with our theory, the results also show that already in Period 1, *budget request, deliberately included slack* and *slack consumption* are lower when uncertainty is high than when it is low (Model 1: -10.39, $p = 0.11$; Model 2: -28.54, $p = 0.01$; Model 3: -15.88, $p = 0.04$, all p's one-tailed) even though the coefficient of *budget request* is not significant at conventional levels. Additionally, as indicated by the interaction terms, all three dependent variables increase less over time when uncertainty is high (Model 1: -4.16, $p < 0.01$; Model 2: -3.72, $p = 0.01$; Model 3: -3.17, $p < 0.01$, all p's two-tailed). Again, our results indicate that our effects are already (partly) present in period 1 but the gap between uncertainty high vs. low seems to become more pronounced over time.

This does also not seem to go unnoticed by superiors: When regressing *Accept* on *budget request*, *period* and their interaction, separately for both conditions with budget return, we find (untabulated) that superiors become less willing to accept higher budget requests over time when uncertainty is low (interaction term: -0.006, $p = 0.10$, two-tailed) but not when it is high (interaction term: 0.002, $p = 0.43$, two-tailed). Thus, when uncertainty is high and budget return is possible, superiors and subordinates seem to build a more trustful relationship over time.

V. CONCLUSION

We examine the effects of giving subordinates the possibility to return remaining budget at the end of a period to the organization on the capital budgeting process and its outcomes and whether the effects are moderated by subordinates' uncertainty when submitting their budget request. We predict and find that when subordinates face low uncertainty, the possibility to return budgets increases subordinates' budget requests. However, this effect is strongly mitigated under high uncertainty. We also predict and find that when subordinates have the possibility to return budget, they do so more when uncertainty is high than when it is low. As a consequence, the possibility to return budget decreases slack consumption under high uncertainty and increases it under low uncertainty. Finally, we also provide evidence that superiors are more willing to allocate budget when subordinates have the possibility to return budget, but differences between uncertainty high vs. low are rather small and emerge partly over time.

Insights from our study contribute to the capital budgeting literature by integrating an important feature of budgeting processes in practice into research, i.e., subordinates' possibility to return remaining budget at the end of the period. By showing that the effects of giving subordinates this possibility are positive for organizations (i.e., increased efficiency of capital use) when subordinates face high uncertainty but negative (i.e., decreased efficiency of capital use) when they face low uncertainty, our paper has practical implications for organizations in designing their budgeting processes. Additionally, from a theoretical perspective, our findings may help explain why some organizations install budgeting policies that de facto imply no possibility to return budget at the end of the period. Our paper also extends prior work on the effects of uncertainty in capital budgeting (e.g., Abdel-Rahim et al. 2019; Farrell et al. 2021) by providing evidence that a subordinate responsibility norm is more likely activated under high uncertainty when the firm's budgeting policy (i.e., the possibility to return remaining budget) is

linked to the potential reason for remaining budget (i.e., increased budget requests due to high uncertainty). Thus, the effects induced by high uncertainty may (partly) depend on whether subordinates can connect the design of budgeting processes with uncertainty. Finally, while prior work has assumed that subordinates consume all remaining slack at the end of the period, we provide evidence that subordinates regularly return remaining budget to superiors, particularly when they face high uncertainty. Additionally, as we find that superiors' reaction and future budget allocations can depend on such budget returns, we provide evidence on factors that can contribute to build a trustful relationship between superior and subordinate, which is important to understand the efficiency of budgeting processes in practice.

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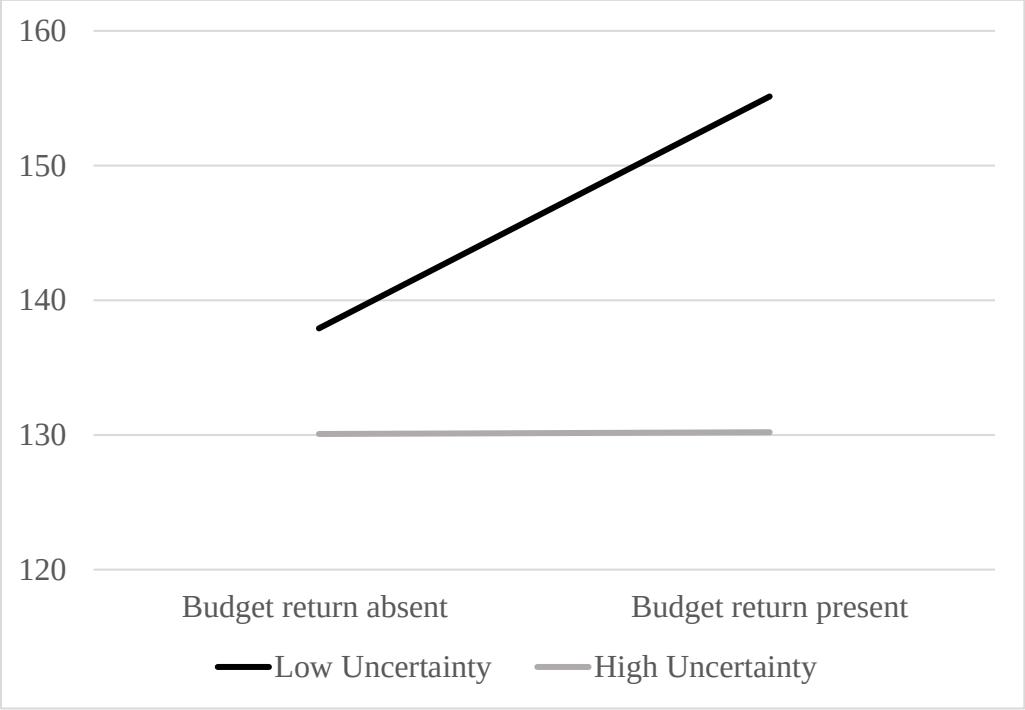
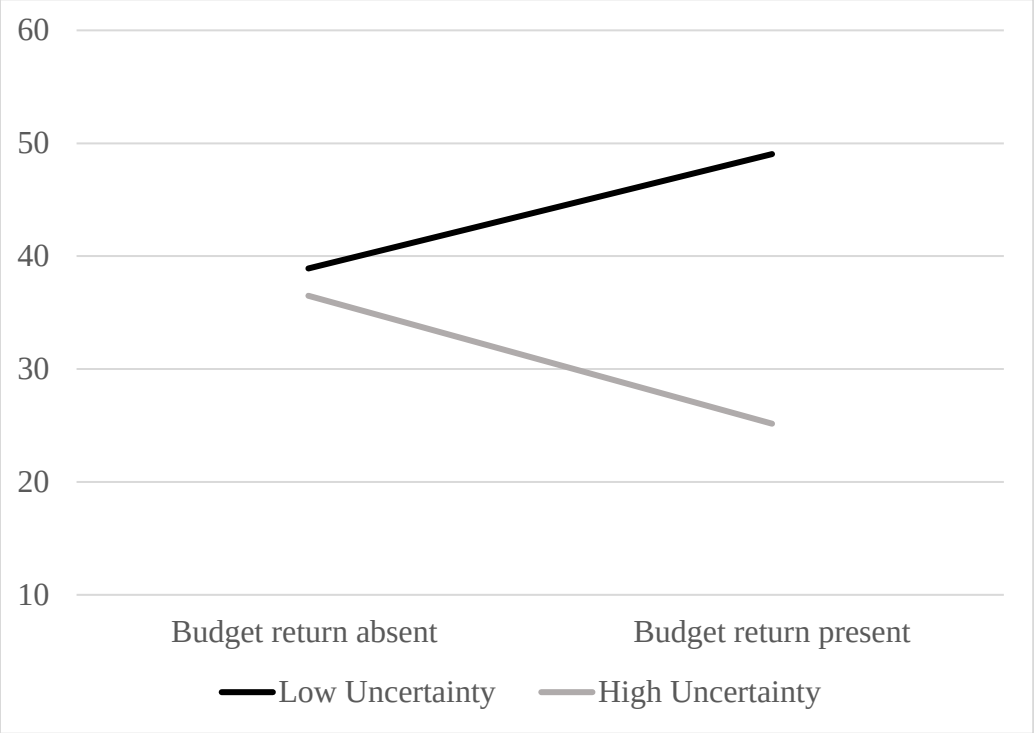
Figure 1 – Budget Requests



Notes: The figure displays mean values of subordinates' *budget requests* over all eight periods of the experiment.

Budget return absent vs. present is manipulated by giving subordinates the possibility to return remaining slack at the end of the period to the superior (budget return present) or not (budget return absent). Uncertainty high vs. low is manipulated by informing subordinates about the exact actual project cost before they submit their budget request (low uncertainty) or only about a cost range that includes actual project costs (high uncertainty).

Figure 2 –Slack Consumption



Notes: The figure displays mean values of *slack consumption* over all eight periods of the experiment. *Slack consumption* represents the final slack included in the project when it was realized and is calculated by subtracting *actual project costs* and *returned budget* (when budget return was present) from *budget request*.

Budget return absent vs. present is manipulated by giving subordinates the possibility to return remaining slack at the end of the period to the superior (budget return present) or not (budget return absent). Uncertainty high vs. low is manipulated by informing subordinates about the exact actual project cost before they submit their budget request (low uncertainty) or only about a cost range that includes actual project costs (high uncertainty).

Table 1 - Descriptive Statistics for Key Measures

Mean, Median, (Standard Deviation), *Number of Observations*

	Low Uncertainty		**High Uncertainty**	
	Budget Return Absent	**Budget Return Present**	**Budget Return Absent**	**Budget Return Present**
Budget request	137.91 148.00 (45.71) *152*	155.13 162.00 (37.52) *144*	130.07 125.00 (43.06) *152*	130.20 131.00 (45.50) *144*
Deliberately included slack	37.03 23.00 (38.26) *152*	54.26 51.00 (41.75) *144*	12.57 0.00 (37.30) *152*	12.70 0.00 (35.44) *144*
D_BUDRET (0/1)	n.a.	0.5315 1.0000 (0.5013) *111*	n.a.	0.7037 1.0000 (0.4588) *108*
Returned budget	n.a.	5.83 2.00 (8.58) *111*	n.a.	8.09 5.00 (9.13) *108*
Slack consumption	38.91 25.50 (38.96) *108*	49.04 43.00 (35.51) *111*	36.49 23.00 (35.80) *101*	25.16 18.00 (28.24) *108*
Accept (1/0)	0.7434 1.000 (0.4382) *152*	0.8125 1.000 (0.3917) *144*	0.7632 1.000 (0.4266) *152*	0.8333 1.000 (0.3740) *144*
Superior payoff	91.49 86.00 (58.60) *152*	86.79 86.50 (49.32) *144*	92.45 100.00 (60.80) *152*	105.97 106.00 (63.56) *144*

Subordinate payoff	48.03	54.32	45.41	44.43
	44.75	54.00	45.00	44.50
	(24.31)	(25.25)	(23.24)	(18.69)
	152	*144*	*152*	*144*

Notes. Every cell displays the mean, *median*, (standard deviation) and number of observations for the corresponding measure.

Budget request represents subordinates' requested budget.

Deliberately included slack is computed by subtracting the actual costs (low uncertainty) or the upper limit of the potential cost range (high uncertainty) from *budget request*. Thus, *deliberately included slack* reflects the slack subordinates deliberately include into *budget request*.

D_BUDRET (0/1) is an indicator variable equal to 1 (0) if a subordinate returned any positive amount of budget (1) or not (0).

Returned budget reflects the returned budget in case subordinates implemented the project.

Slack consumption represents the final slack included in the project when it was realized and is calculated by subtracting *actual project costs* and *returned budget* (when budget return was present) from *budget request*.

Accept reflects the superiors' budget allocation decision (1 for accept, 0 for decline).

Superior payoff and *subordinate payoff* reflect both parties' payoffs.

Table 2 - Regression Analysis of Budget Requests and Slack Consumption

Coefficient (Clustered standard error) p-level

	Budget Request	**Budget Request**	**Deliberately Included Slack**	**Slack Consumption**
	Model 1	Model 2	Model 3	Model 4
Return (1/0)	17.22	21.64	17.22	10.97
	(6.78)	(10.89)	(6.78)	(7.80)
	0.01***	<0.01***	0.01***	0.08*
Uncertainty (1/0)	-7.84	-8.92	-24.47	-2.53
	(8.04)	(8.59)	(8.04)	(8.66)
	0.33	0.30	<0.01***	0.77
Return x Uncertainty	-17.09	-21.78	-17.09	-22.36
	(10.34)	(10.89)	(10.34)	(10.88)
	0.05**	0.02**	0.05**	0.02**
Period	2.63	2.06	2.87	3.65
	(0.79)	(0.89)	(0.59)	(0.73)
	<0.01***	0.02**	<0.01***	<0.01***
Accept t-1 (1/0)		8.80		
		(5.63)		
		0.06*		
Constant	126.09	122.05	24.11	22.25
	(6.73)	(8.64)	(5.99)	(6.86)
	<0.01***	<0.01***	<0.01***	<0.01***
Simple effect Return when High Uncertainty = 1	0.13	-0.14	0.13	-11.39
	$p = 0.98$	$p = 0.99$	$p = 0.98$	$p = 0.07$*
R^2	0.07	0.10	0.21	0.11
N	592	518	592	428

Notes: The table reports results of OLS regressions using standard errors clustered at the employee level to account for multiple observations within employee. * $p \leq 0.1$; ** $p \leq 0.05$; *** $p \leq 0.01$, p-levels are one-tailed for directional expectations and two-tailed otherwise.

Return in an indicator variable equal to 1 (0) when the possibility to return budget is present (absent).

Uncertainty is an indicator variable equal to 1 (0) when uncertainty is high (low).

Period reflects the eight periods of the experiment.

Accept t-1 (1/0) reflects the superiors' budget allocation decision in the previous (t-1) period (1 for accept, 0 for decline).

Budget request represents subordinates' requested budget.

Slack consumption represents the final slack included in the project when it was realized and is calculated by subtracting *actual project costs* and *returned budget* (when budget return was present) from *budget request*.

Table 3 - Regression Analysis of Subordinates' Returned Budget

Coefficient (Clustered standard error) p-level

	D_BUDRET (0/1)	**D_BUDRET (0/1)**	**Returned Budget**	**Returned Budget**
	Model 1	Model 2	Model 3	Model 4
Uncertainty (1/0)	0.76	1.04	4.52	7.86
	(0.54)	(0.56)	(2.99)	(2.59)
	0.08*	0.03**	0.07*	<0.01***
Actual slack		0.01		0.15
		(<0.01)		(0.03)
		0.01***		<0.01***
Period	-0.07	-0.11	-0.74	-1.23
	(0.06)	(0.06)	(0.50)	(0.41)
	0.27	0.09*	0.14	<0.01***
Constant	0.41	<0.01	4.49	-1.32
	(0.44)	(0.51)	(3.36)	(3.51)
	0.35	1.00	0.18	0.71
No. of obs. lower bound (0)			84	84
Pseudo R^2	0.03	0.05	0.01	0.04
N	219	219	219	219

Notes: The table reports results of Logit (Models 1 and 2) and Tobit regressions (Models 3 and 4) using standard errors clustered at the employee level to account for multiple observations within employee. * $p \leq 0.1$; ** $p \leq 0.05$; *** $p \leq 0.01$, p-levels are one-tailed for directional expectations and two-tailed otherwise.

Uncertainty is an indicator variable equal to 1 (0) when uncertainty is high (low).

Actual slack is equal to the actual slack available to the subordinate after actual project costs are known and is calculated by subtracting actual project costs from *budget request*.

Period reflects the eight periods of the experiment.

D_BUDRET (0/1) is an indicator variable equal to 1 (0) if a subordinate returned any positive amount of budget (1) or not (0).

Returned budget reflects the returned budget in case subordinates implemented the project.

Table 4 - Regression Analysis of Superiors' Acceptance Decisions

Coefficient (Clustered standard error) p-level

	Accept (0/1)
Return (1/0)	0.70
	(0.39)
	0.04**
Uncertainty (1/0)	-0.05
	(0.38)
	0.89
Return x Uncertainty	-0.20
	(0.55)
	0.72
Budget request	-0.02
	(<0.01)
	<0.01***
Period	0.08
	(0.05)
	0.07*
Constant	3.68
	(0.63)
	<0.01***
Marginal effect of Return when Uncertainty = 0	0.101
	p = 0.04**
Marginal effect of Return when Uncertainty = 1	0.078
	p = 0.09*
R^2	0.10
N	592

Notes: The table reports results of Logit regressions using standard errors clustered at the employee level to account for multiple observations within employee. * $p \leq 0.1$; ** $p \leq 0.05$; *** $p \leq 0.01$, p-levels are one-tailed for directional expectations and two-tailed otherwise.

Return in an indicator variable equal to 1 (0) when the possibility to return budget is present (absent).

Uncertainty is an indicator variable equal to 1 (0) when uncertainty is high (low).

Budget request represents subordinates' requested budget.

Period reflects the eight periods of the experiment.

Accept reflects the superiors' budget allocation decision (1 for accept, 0 for decline).

Table 5 - Regression Analysis of Superiors' Acceptance Decisions Based on Previous Period's Returned Budget

Coefficient (Clustered standard error) p-level

	Accept (0/1) Uncertainty High	**Accept (0/1) Uncertainty Low**
	Model 1	Model 2
High_request	-2.67	-1.97
	(1.23)	(0.64)
	0.03**	<0.01***
Returned budget (t-1)	-0.003	-0.025
	(0.04)	(0.03)
	0.94	0.47
High_request x Returned budget (t-1)	0.10	0.06
	(0.07)	(0.08)
	0.07*	0.23
Period	0.18	-0.03
	(0.13)	(0.11)
	0.18	0.77
Constant	1.03	2.50
	(0.78)	(0.88)
	0.19	<0.01***
Marginal effect of Returned budget (t-1) when High_Request = 0	-0.0003	-0.0023
	$p = 0.94$	$p = 0.46$
Marginal effect of Returned budget (t-1) when High_Request = 1	0.0216	0.0070
	$p = 0.05$**	$p = 0.61$
R^2	0.07	0.11
N	94	101

Notes: The table reports results of Logit regressions using standard errors clustered at the employee level to account for multiple observations within employee. * $p \leq 0.1$; ** $p \leq 0.05$; *** $p \leq 0.01$, p-levels are one-tailed for directional expectations and two-tailed otherwise.

High_request is equal to 1 (0) when the budget request is larger than or equal to (lower than) 176.

Returned budget (t-1) reflects the returned budget in case subordinates implemented the project in the prior period t-1.

Period reflects the eight periods of the experiment.

Accept reflects the superiors' budget allocation decision (1 for accept, 0 for decline).

Table 6 - Descriptive Statistics for First and Second Half of the Experiment

Mean, (Standard Deviation)

	Low Uncertainty		High Uncertainty	
	Budget Return Absent	**Budget Return Present**	**Budget Return Absent**	**Budget Return Present**
Panel A: Periods 1-4				
Budget request	133.96 (47.53)	142.43 (43.18)	131.96 (40.53)	122.89 (46.10)
Actual costs	99.57 (53.21)	95.61 (48.40)	110.46 (45.40)	94.00 (52.35)
Deliberately included slack	34.39 (39.13)	46.82 (37.01)	6.49 (24.82)	10.79 (30.74)
Returned budget	n.a.	6.50 (8.50)	n.a.	9.33 (10.08)
Slack consumption	34.25 (39.32)	38.68 (33.54)	26.73 (24.78)	23.71 (26.80)
Accept (1/0)	0.6974 (0.4624)	0.8056 (0.3985)	0.7500 (0.4359)	0.7917 (0.4090)
Panel B: Periods 5-8				
Budget request	141.86 (43.77)	167.83 (25.36)	128.17 (45.65)	137.51 (43.89)
Actual costs	102.18 (47.14)	106.14 (51.71)	91.29 (53.01)	107.75 (47.17)
Deliberately included slack	39.37 (37.43)	61.69 (45.05)	18.64 (39.28)	14.61 (34.11)
Returned budget	n.a.	5.15 (8.68)	n.a.	6.95 (8.06)
Slack consumption	43.23 (38.47)	59.58 (40.63)	45.67 (41.93)	26.50 (29.70)
Accept (1/0)	0.7895 (0.4104)	0.8194 (0.3874)	0.7630 (0.4195)	0.8750 (0.3330)

Notes. Every cell displays the mean and (standard deviation) for the corresponding measure.

Budget request represents subordinates' requested budget.

Actual costs corresponds to the costs of implementing the project in a period.

Deliberately included slack is computed by subtracting the actual costs (low uncertainty) or the upper limit of the potential cost range (high uncertainty) from *budget request*. Thus, *deliberately included slack* reflects the slack subordinates deliberately include into *budget request*.

Returned budget reflects the returned budget in case subordinates implemented the project.

Slack consumption represents the final slack included in the project when it was realized and is calculated by subtracting *actual project costs* and *returned budget* (when budget return was present) from *budget request*.

Accept reflects the superiors' budget allocation decision (1 for accept, 0 for decline).

Table 7 - Regression Analysis of Budget Requests and Slack Consumption Over Periods when Budget Return is Possible

Coefficient (Clustered standard error) p-level

	Budget Request	**Deliberately Included Slack**	**Slack Consumption**
	Model 1	Model 2	Model 3
Uncertainty (1/0)	-10.39	-28.54	-15.88
	(8.24)	(8.31)	(8.78)
	0.11	<0.01***	0.04**
Period	6.18	6.08	6.59
	(0.76)	(0.78)	(1.05)
	<0.01***	<0.01***	<0.01***
Period x Uncertainty	-4.16	-3.72	-3.17
	(1.35)	(1.39)	(1.75)
	<0.01***	0.01***	0.08*
Constant	91.98	59.73	53.22
	(7.10)	(7.41)	(7.69)
	<0.01***	<0.01***	<0.01***
Cost fixed effects	*Included*	*Included*	*Included*
Simple effect Period when Uncertainty = 1	2.02 *p* = 0.07*	2.36 p = 0.04**	3.43 *p* = 0.02**
R^2	0.55	0.50	0.44
N	288	288	219

Notes: The table reports results of OLS regressions using standard errors clustered at the employee level to account for multiple observations within employee. The models also control for actual project costs by including fixed effects. * $p \leq 0.1$; ** $p \leq 0.05$; *** $p \leq 0.01$, p-levels are one-tailed for directional expectations and two-tailed otherwise.

Uncertainty is an indicator variable equal to 1 (0) when uncertainty is high (low).

Period reflects the eight periods of the experiment (the first period is coded as zero and the last as 7).