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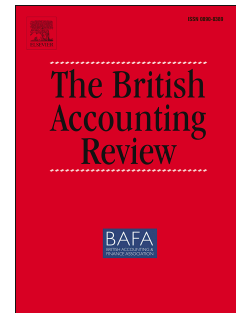
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A study of the linkages between Rolling Budget Forms, Uncertainty and Strategy

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A Study of the Linkages between Rolling Budget Forms, Uncertainty and Strategy

Abstract

Addressing the dearth of studies on rolling budgets, we investigate how the importance of rolling budgets for various planning, control and evaluation reasons relate to a business unit's strategy and uncertainty, and report on the variation in these responses when partitioned into quarterly and monthly rolling budget types. We use a survey instrument with responses from 182 rolling budget firms in our investigation. Our findings reveal consistencies as well as deviations between our sub-samples (quarterly and monthly rolling budgets), and the total rolling budget sample. We report that the way rolling budgets relate to uncertainty and strategy in organisations are substantively different for monthly and quarterly rolling budget types, and vary across planning, control and evaluation budget reasons. Our findings show a greater sensitivity between monthly rolling budgets and uncertainty/strategy, and virtually nil relations between quarterly rolling budgets and uncertainty/strategy. We posit that monthly rolling budgets are used in a manner more traditionally associated to rolling budgets in prior studies, while quarterly rolling budgets might be used relatively more symbolically or in response to external pressures such as earnings forecast requirements, and are less sensitive to establish organisational antecedents such as uncertainty/strategy.

Rolling budgets have been used extensively in practice. Many accounting texts adopt a prescriptive view with rolling budgets considering them useful in addressing the budgetary challenges faced by firms operating in turbulent environments (Hansen, et al, 2003). But academic research on their applications as well as other management accounting mechanisms remain sparse (Sivabalan et al 2009) and calls continue to be made for research on how management accounting aligns to industry practice (Tucker and Lawson, 2016). Investigations of the relationships between organisational characteristics and rolling budget design, motivation and use remain particularly rare (Haka and Krishnan, 2005). Yet there is considerable growth of this form of budgeting in organisations, and its demarcation into two dominant forms (quarterly and monthly) as identified in practitioner studies (Lynn and Madison, 2004; Hansen, 2011; Sivabalan, et al 2009). Rolling budgets are also argued to tackle management information needs that annual budgets struggle to address, such as for planning (Hansen and Van der Stede, 2004) and as such, can be counterpoints to traditional annual budgets. Some practitioner writings (Bogsnes, 2016; Morlidge & Player, 2010) and academic publications (Hansen, et al, 2003; Wallander, 1999) have argued for rolling budgets to replace the annual budget. However, in practice, evidence exists that most organisations use the rolling budget alongside the annual budget (Sivabalan, et al, 2009), and not in place of it. The underlying implications of this have not been investigated, though such research can aid in making more transparent the basis for existing gaps between practice and prescription (Tucker and Lowe, 2014; Tucker and Parker, 2014). How might rolling budgets exist in organisations, and relate to common organisational antecedents like uncertainty and strategy, if they do not replace the annual budget?

Contingency theory research has long advocated for common relationships between environmental/organisational variables and management accounting practices, as well as the consequent effects of such fit/misfit on firm performance (Chapman, 1997; Chenhall, 2003; Tucker, et al 2009; Langfield-Smith 1997). However, mixed findings are reported in established, mature streams of contingency research within management accounting – such as traditional budgeting (Hartmann, 2000) or activity based costing (Brown et al., 2004). We explore how organisations' different motivations for operationalising rolling budgets relates to these antecedent factors. Such research is relevant to assess the

Early budgeting studies more generally argued for the greater relevance of traditional financial controls such as annual budgets in uncertain environments, and cost focused strategies (Gordon and Narayanan (1984); Otley (1980), Govindarajan and Gupta, 1985; Brownell and Dunk, 1991). However, more recent research has advocated for the continued relevance of annual budgets in turbulent environments (Johansson and Siverbo, 2014; Frow, et al, 2010; Marginson et al, 2005), without necessarily being aligned to cost focused strategies (Sivabalan, et al, 2009). To what extent might rolling budgets, a more advanced form of budgeting, relate to these antecedent variables? Prior investigations indicate alignment with a deductive approach that builds upon established relationships budget use/emphasis and the two most common antecedents studied in contingency based budget research to date – uncertainty and strategy (Hartmann, 2000; Luft and Shields, 2003). Additionally, rolling budgets reveal tensions in their relationship to uncertainty and strategy that introduces a theoretical challenge to the construction of hypotheses that are subsequently tested. An example of this tension between inter-relationships is explained using a simple illustration. On the one hand, rolling budgets are very useful in high uncertainty environments, as numbers are updated over sub-annual periods , thus maintaining their relevance (Hansen, 2011). However, by doing so, rolling budget information might not gauge performance as effectively, as numbers constantly change – making rolling budget targets difficult to follow. This remains a common criticism in extant research of rolling budgets (Haka and Krishnan, 2005). The very little research to date in this space has tended to side with the arguments that the negative effects of shifting numbers outweigh the positive effect of relevant numbers. Yet, an investigation of these relationships can indicate a range of novel links not previously revealed in the literature.

We undertake our investigation by identifying the planning, control and evaluation motivations for firms to conduct rolling budgets, as pointed to by a stream of prior budgeting studies (Hansen and Van der Stede, 2004; Sivabalan, et al, 2009). We link these motivations to commonly studied antecedent variables in contingency research, and further segment these rolling budget motivations to more specific forms (monthly and quarterly rolling budgets). We consider this segmentation as important, as the practice of budgeting on

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a monthly basis (12 times a year) is substantively more onerous than quarterly (4 times a year), and could be done for very different reasons. As such, quarterly forecasts are often the basis for external reporting, which may have little management control significance internally, while monthly forecasts might be conducted for more operational reasons and this potentially impacts their fit to different environments. For example, Neely, et al (2003) found that Volvo favoured quarterly forecast reporting (in line with market expectations), but monthly internal reporting. To what extent is there a greater sensitivity of monthly reporting to internal management objectives?

We find considerable differences in the results for monthly rolling budget (MRB) users and quarterly rolling budget (QRB) users. We also find directional differences that oppose those more normally observed for the dominant annual budget research stream in the literature (Amato, 2015; Hansen et al., 2003; Hope and Fraser, 2003; Hartmann and Maas, 2011; Van der Stede, 2000; Wolf, 2014). We contribute to the accounting literature by regarding the rolling budget at a level beyond its existence. We re-invigorate studies concerning motivations (*reasons*) for control system use as introduced by Hansen (2011) and Hansen and Van der Stede (2004) in relation to annual budgets and rolling budgets, but specifically identify responses relating to the importance of using rolling budgets themselves for a range planning, control and performance evaluation reasons in organisations. While rolling budget (RB) studies are sparse, the few studies that focus on RB applications expectedly focus on its existence and *use* (Ekholm and Wallin, 2011, Hansen, 2011; Hansen and Van der Stede, 2004). We consider the *importance* of these RB's for a range of different reasons to organisations, consistent with Hansen and Van der Stede's (2004) study focusing primarily on annual budgets, in order to better understand why organisations mobilise RB's. The focus on importance also aligns with the development of theory around the motivations (*why*) for rolling budget use in organisations, consistent with well accepted theory definitions in social science literatures (Covaleski et al., 2003; Dubin 1978; Whetten 1980).

Overall, we empirically evidence the need for rolling budgets to be segmented into MRBs and QRBS in order to better understand the motivations for their application in organisations, a perspective that has not been seeded in extant budgeting studies.

Building on Hansen (2011), we also contribute to budgeting studies by demarcating these rolling budget periods into planning, control and evaluation reasons, and evidence that MRBs show far greater sensitivity to uncertainty and strategy antecedent variables than QRBs. These findings extend the preliminary practitioner claims from Neely et al (2003) that QRBs are primarily conducted for external reporting (e.g. quarterly earnings forecasts). This causes QRBs to hold lower alignment with management accounting centric decision making explanations offered in prior research (Gordon and Narayanan, 1984; Langfield-Smith, 1997). MRBs, by contrast, operationally align more to the internal management accounting practices of business units, thereby supporting internal decision making through the provision of updated rolling budget numbers. This perspective has not been put forward in accounting research to date.

We also find that MRBs align to organisational antecedents in a manner more consistent with more recent budgeting studies (Frow et al., 2010; Johansson and Siverbo, 2014) by lending support for the role of rolling budgets in higher uncertainty environments for planning and control. This of its own is unsurprising and consistent with Haka and Krishnan (2005). However, we go further, highlighting a positive relationship between MRBs and uncertainty not only for planning and control (as highlighted in Hansen, et al, (2003) and Haka and Krishnan (2005)) but also for performance evaluation, specifically staff evaluation. We conjecture that this key departure owes to the application of more relevant and accurate numbers outweighing the adverse effect of “shifting the goalposts”. Consequently, when uncertainty increases, organisations more importantly consider RBs when reflecting on the performance of staff. Other possibilities are likely. For example, organisations might use RBs to evaluate staff, but not let it affect their compensation. The positive effect of these subtle differences in relation to rolling budgets for performance evaluation reasons have not been put forward in extant research. Our findings cumulatively expand the relevance of rolling budget reasons beyond traditional budgeting studies (Gordon and Narayanan, 1984; Lau et al 1995), and emphasise the more consistent role of MRBs in aligning to extant MA antecedents, relative to QRBs.

The remainder of the paper is structured as follows. We review key studies relating to traditional annual budgets, rolling budgets, their relation to uncertainty and strategy antecedents, as well as a review of a range of reasons to budget. We proceed to construct three hypotheses, explain our research method, report

our findings and discuss their contribution to extant literature. Finally, we present our conclusions, limitations and suggestions for future research.

2. Literature Review and Hypothesis Development

We begin by defining rolling budgets and rolling forecasts, then introduce our choice of budget reasons based on prior budget literatures (Hansen and Van der Stede, 2004; Sivabalan et al, 2009). We subsequently explain the two dominant rolling budget periods (monthly/quarterly) and discuss why they might reveal different characteristics, and explain how these might manifest in relation to the uncertainty and strategy antecedents respectively.

Rolling budgets and rolling forecasts defined

Rolling forecasts are the prediction of key values that may or may not be budget related for a period of time into the future, while rolling budgets specifically link these updates to the budget, per the Hansen (2011) definition below:

“A rolling forecast is a forecast that maintains a constant forward-looking time horizon, usually between 12 and 18 months. Rolling budgets are a variant where the budget is periodically updated to maintain a constant forward looking time horizon.” p.301

Consistent with the budgeting focus of our study (as opposed to any forecast), we refer to rolling budgets. Prior budgeting studies have similarly used the term “rolling budget”, when linking the rolling activity to budgeting (Libby and Lindsay, 2010). While studies in traditional budgeting have numbered in the hundreds over the past six decades (Argyris, 1952; Hartmann, 2000; Luft and Shields, 2003), studies on rolling budgets are few. Studies that focus on rolling budgets generally do so at a descriptive (albeit important) level, categorising the nature of firms conducting rolling budgets and the period for which rolling budgets are constructed (Sivabalan et al., 2009; Libby and Lindsay, 2010), or its usage preferences next to other management accounting innovations such as beyond budgeting or activity based budgeting (Hansen, 2011). Furthermore, studies of rolling budgets within management accounting research have dominantly focused on the use of rolling budgets as part of a broader Beyond Budgeting offering in organisations

(Hansen and Van der Stede, 2004; Libby and Lindsay, 2010; Ostergren and Stensaker, 2012). Given its significant application in organisations, and its apparent use in organisations continuing to apply traditional budgeting (Sivabalan et al., 2009; Lorain, 2010), rolling budgets require a more focused investigation that is independent of Beyond Budgeting practices.

Budget reasons

Organisations may conduct rolling budgets for a plethora of reasons. Indeed, three papers specifically investigating the reasons to budget concept formed the basis for our selection of the budget reasons. First, we draw inspiration from Hansen and Van der Stede (2004), who study two operational reasons for budgeting (operational planning and performance evaluation). Sivabalan et al. (2009) expanded upon these two categories of budget reasons by identifying sub-categories of reasons within planning and evaluation, while also introducing a “control” category, incorporating managerial learning from budgets to control organisations intra-period. From these, we select five planning reasons (Coordinate Resources, Formulate Action Plans, Manage Production Capacity, Encourage Innovative Behaviour, Determining Selling Price), two control reasons (Control Costs and Board of Director Monitoring) and two evaluation reasons (Staff Evaluation and Business Unit Evaluation). We use these nine reasons as the basis for studying our rationale for the application of rolling budgets in organisations. We further these stream of studies by investigating how the importance of rolling budgets for a range of reasons specifically relate to the budget reasons identified in Sivabalan et al. (2009), originally inspired by Hansen and Van der Stede (2004). Both these prior studies applied those reasons to annual budgets alone. While a detailed explanation of these budget reasons is provided in Sivabalan et al. (2009), we briefly summarise the attributes of each below, in explaining their relevance to the practice of rolling budgets.

As stated, organisations might conduct rolling budgets for planning, control or evaluation purposes (Merchant and Van der Stede, 2007). From a planning perspective, organisations consider it important that budgets are used for *coordinating resources* at the planning stage (Covaleski, et al 2006; Covaleski et al 2003), and aid in the *formulation of action plans* (Covaleski and Dirsmith, 1983). Budgets might also be used in order to better facilitate the *determination of selling prices* (Langfield-Smith, 2006; Noreen and

Soderstrom, 1994) or aid an organisation's *management of production capacity* (Merchant and Van der Stede, 2007). Finally, budgets can *enable innovative behaviour* seeking in organisations by emphasising areas where funds should be spent or restricting the allotment of funds to areas that the firm wants less innovation in the medium term (Marginson, et al, 2005; Heidenberger, et al, 2003).

From a controlling perspective, budgets are often touted as important in aiding organisations to *control costs* (Govindarajan and Fisher, 1990; Lau, et al, 1995). They also aid the *Board of Directors as a monitoring device* in organisations (Sivabalan, et al 2009; Baysinger and Butler, 1985). Finally, budgets aid organisations from an evaluation perspective, facilitating *staff evaluation* (Hopwood, 1972; Otley, 1978) as well as *business unit evaluation* (Govindarajan and Gupta, 1985; Hansen and Van der Stede, 2004; Sivabalan, et al, 2009). Together, the above nine reasons cover the range of rationales we consider relevant to the justification of rolling budgets in organisations.

The few studies currently investigating budgeting for different reasons align the use of budgets for operational planning against the use of budgets for performance evaluation (Hansen and Van der Stede, 2004). Advanced budgeting techniques (such as rolling budgets) should align to the use of budgets for planning and control (Sivabalan, 2011), and less so for performance evaluation (Haka and Krishnan, 2005). Simultaneously, advanced budgeting techniques focusing on financial prediction are argued to be less suited to manage cost focused strategies in more turbulent environments (Hansen and Van der Stede, 2004), if used for performance evaluation. However, organisations might use rolling budgets for a more collective, business unit level evaluation, as opposed to staff evaluation (Sivabalan, et al, 2009), even under conditions of turbulence. The introduction of the business unit style of evaluation confounds our expectations of relationships between budget and uncertainty, as the budget emphasis on individual staff (per Otley, 1980 and Hopwood, 1972) is less relevant. Hence, productive comparisons of actual-budget performance at a business unit level, even in times of uncertainty, provide useful information to organisations.

Rolling budget periods – monthly versus quarterly

Broadly, might we expect uniformity in the relationships between the different rolling budget reasons discussed above for monthly rolling budgeters as opposed to quarterly rolling budgeters? On one level, we

might expect a measure of convergence. Notwithstanding the different RB frequencies (monthly vs quarterly), RBs used for the same budget reasons should broadly show similar relationships with common firm antecedents. The arguments relating to RB use in uncertain environments should broadly trend in the same direction, whether monthly or quarterly, but perhaps at different levels of sensitivity.

Rational arguments for divergence may also exist for some budget reasons versus others. For example, organisations that use rolling budgets for control purposes might consider the use of monthly annual budgets as more aligned to their broader strategic objectives, especially if not pursuing differentiator or focused strategies as they are more cost conscious. Quarterly RB firms might not have the capacity or capability to monitor and update numbers in tight budgetary environments, hence choose to conduct rolling budget updates less frequently (quarterly versus monthly). They consequently show weaker or no relationship with firm antecedents.

We put forward that organisations conducting monthly rolling budgets are likely to regard rolling budgets with more intensity than organisations conducting rolling budgets quarterly. Completing the rolling budget monthly is a significantly more onerous commitment, characterising the greater importance attached by such organisations to the rolling budget process than for quarterly rolling budgets. This should translate into a greater importance placed on rolling budgets when used on a monthly basis, as opposed to quarterly basis, for the range of budget reasons.

H₁: Budget reasons are regarded with greater importance in monthly rolling budget organisations than quarterly rolling budget organisations.

Having constructed a general hypothesis for the relative relationship importance of the two rolling budget period types (monthly vs. quarterly) as it relates to our budget reasons, we proceed to consider relationships between monthly and quarterly rolling budgets, and their relation to the uncertainty and strategy antecedents across the nine different budget reasons.

Rolling budgets periods and uncertainty

A popular definition of uncertainty in the literature is the difference between the information set available to a manager and the total information set available in an environment (Galbraith, 1973).

Theoretically, the literature posits arguments dominantly around uncertainty to justify the use of more frequent rolling budgets, conducted over sub-annual periods (Hartmann, 2000). This is echoed by arguments from the practitioner press where Lamoreaux (2011) surmises that budgets are updated more frequently in uncertain environments. Earlier accounting studies mobilising contingency theory similarly argued for the relevance of accounting information systems in more stable environments characterised by lower perceived environmental uncertainty (PEU) (Gordon and Narayanan, 1984). By virtue of being a more procedural information system (Ginzberg, 1980), accounting was less suited to unstable environments. When the fit between the information system and uncertainty was absent, managers were more likely to engage in dysfunctional behaviours (Hirst, 1981). Indeed, a majority of contingency studies in the 1980's and 1990's theorised and found relationships generally arguing for an inverse relation between the use of accounting and uncertainty (or the absence of stability) (Hartmann, 2000).

More recent budgeting studies in the last 15 years have started to argue the reverse – that accounting systems remain relevant and beneficial in more unstable environments. Marginson and Ogden (2005) emphasised the value of flexibility in budgeting systems and their value in aiding the management of ambiguity in organisations, having *positive* impacts on managerial behaviours. Johansson and Siverbo (2014) argued for the possible alignment of tighter budgetary control in public sector institutions experiencing budget turbulence (often arising from external instability). Frow et al. (2010) clarify the role of budgets in more flexible environments characterised by higher uncertainty, yet still adhering to and pursuing financial targets.

Given this tension in the literature, how might uncertainty relate to the use of an advanced management accounting technique like rolling budgets? We contend that there exists departures in the way it is applied when considering the two dominant rolling budget forms (MRB and QRB), when used for different reasons (planning, control and evaluation). Traditionally, practitioner studies and the few academic studies in this space evidence that rolling budgets are more aligned to higher uncertainty environments. However, firms might see the cost of reporting across shorter periods as excessive, though their uncertainty

is higher. Similarly, firms with lower levels of uncertainty might yet conduct rolling budgets more frequently, owing to the higher likelihood of its accuracy and/or top management direction mandating its use. Further, the prior experiences of managers in other business units might drive its introduction. It is thus important to better understand how uncertainty relates to the different reasons for conducting rolling budgets. The related budgeting literatures in this space provide mixed evidence (Gupta and Govindarajan, 1984; Johansson and Siverbo, 2014) raising the need for research to shed light on this phenomena.

The rationales for RB can also impact the decision to conduct monthly or quarterly RB's, impacting relationships with uncertainty. For example, firms that need updated selling prices (planning) in order to trade might use monthly RB's notwithstanding their level of uncertainty. This importance might not be perceived as much in quarterly RB users, who do not perceive the same urgency. Firms that use budgets for quarterly reporting might do so for reasons related to market/investor expectations (Neely, et al, 2003), as opposed to the management of operations in a high uncertainty environment, as relating to a management accounting decision making context.

Further to hypothesis 1, we overarchingly posit that firms undertaking monthly rolling budgets will consider the budget reasons as more important as the budget is being used three times more intensely than for quarterly rolling budgets. Consequently, firms experiencing higher levels of uncertainty should consider the rolling budget as more important for the full set of reasons, relating to the planning, control and evaluation perspective.

This leads to the following hypothesis:

H₂: Uncertainty is positively related to the importance of budget reasons for monthly rolling budget organisations.

What about quarterly rolling budget firms? We do not expect relationships between budget reasons and uncertainty to be as strong for quarterly rolling budgets. This is because firms conducting quarterly rolling budgets arguably face less uncertainty than their monthly rolling budget counterparts, and the sensitivity of their budget reasons to uncertainty will therefore be lower. Furthermore, firms using quarterly rolling budgets often do so in response to external reporting requirements, such as market based quarterly earnings forecasts or creditor information requirements (Lim, 2001). Therefore, even if uncertainty drives forecasting, it's importance might be affected by such external reporting requirements.

Multiple and different strategy typologies have been deployed in accounting research. The range of strategies explored in management accounting studies is exhaustive, and outside the scope of this paper¹. Consistent with Chenhall and Langfield-Smith (1998), we limit the focus of our strategy discussion to our selected strategy typology. Generally, strategies that emphasise cost control are posited to use financial controls more intensively (Chenhall and Langfield-Smith, 1998; Govindarajan, 1984), while strategies emphasising differentiation, uniqueness and customisation show less alignment to the application of accounting information (Shank and Govindarajan, 1993). When costs require tighter control and margins remain low as a percentage of sales, minor deviations in expenditures yield strong profit variances (Simons, 1990). Consequently, accounting assumes a more important role for purposes of managing the maintenance of smaller margins.

As explained in Edwards, et al (2000), financial stability has the potential to modify the relationship between budgeting and strategy in a firm. Why is this? Accounting information has the potential to legitimate strategy by emphasising efficiency and accountability as it relates to an organisation's strategy (Covaleski and Dirsmith, 1988). As strategies change, so must accounting information in order to align to and make work a said strategy (Hansen, et al 2003). As outlined in Hansen, et al. (2003), "... effective organisations adjust their management control systems, including budgetary control, to fit their strategy". .

Differentiation related strategy typologies focusing on uniqueness and customisation have been explored in management accounting studies (Chenhall, 2003; Langfield-Smith, 1997; Shank and Govindarajan, 1993). Quality based strategies where firms seek to differentiate themselves from competitors appear to do the reverse to cost focused strategies (Daniel and Reitsperger, 1991). In such strategies, the traditional narrative has been that costs are relatively less important, and the focus on quality or other non-financial drivers of competitive advantage such as customer service often weighs over cost control (Chenhall, 1997), as product margins are high and cost overruns impact profits relatively less than

¹ For a thorough review of the range of strategies studied in management accounting research, review studies concerning the link between strategy and controls are recommended (Langfield-Smith, 1997; Langfield-Smith, 2006). Similarly, studies reviewing contingency work in management accounting are recommended (Chenhall, 2003), as well as review studies of traditional budget based studies on the Reliance on Accounting Performance Measures (Hartmann, 2000);

might be the case for more cost focused strategies (Langfield-Smith, 1997). From this perspective, firms adopting a quality based uniqueness or customisation strategy arguably focuses less on costs, and therefore considers the implementation of an annual budget as less effective. However, in relation to rolling budgets, we pursue a line of reasoning counter to this stream of budgeting research, dominantly based on annual budgets. We contend that such firms might still use a rolling budget to plan their resource allocations across different business units, as all business units need to know how much they have been allocated for expenditure management purposes. Or, the budget may be used to evaluate staff, independent of their controlling of operations. There therefore exists a tension in how the strategy – rolling budget relation should manifest. Additionally, we argue that that rolling budget behaviours for monthly rolling budgets must be demarcated from quarterly rolling budgets as the intensity of their application and motivations may not be identical.

As previously stated for H₁, we expect the importance of budget reasons for monthly rolling budgets to be higher than for quarterly rolling budgets. When a uniqueness and customisation strategy is applied by an organisation conducting monthly rolling budgets, we posit that the rolling budget information frequently updates organisations on the impact of their strategic choices, and therefore factored into decision making. Consequently, monthly rolling budget organisations that are expected to *ex ante* regard rolling budgets with greater importance (as they are conducted more frequently) will be more sensitive to the strategic effects of their decisions, and subsequently impound rolling budget information more concerted, as their perceived strategic importance increases (for the full range of budget reasons). This leads us to the following hypothesis:

H3: The intensity of application of a uniqueness/customisation strategy is positively related to the importance of budget reasons for monthly rolling budget organisations.

Importantly, we do not suggest that the positive relation between the more intense application of a uniqueness customisation strategy implies an inverse relation for cost leadership organisations. We instead

posit that cost leader firms consider cost control as central to their strategic aim, so we do not expect variation between the importance of budget reasons and their cost leader strategy variable – cost leaders will always consider financial controls as important, even those using budget reasons with less significance. The linear relationship between cost leader strategy intensity and budget reasons importance is therefore less apparent.

Similarly, we expect weaker/nil relationships for the importance of budget reasons and strategy, for quarterly rolling budget firms. By virtue of using the rolling budget less intensely relative to monthly rolling budget organisations, quarterly rolling budget organisations will not exhibit the same intensity of relationship to strategic choice (uniqueness, customisation) as monthly rolling budget organisations. While rolling budgets may remain important when conducted quarterly, the relative relationship between strategy and the importance of the different budget reasons should be weaker when rolling budgets are conducted quarterly. Additionally, and as previously outlined, quarterly rolling budgets are often linked to external reporting requirement (quarterly forecasts, for example) – these reasons are independent of strategic choice, further reducing the likelihood of an expected relationship.

3. Research Method

Survey background and population selection

Data for the study was collected using the survey method. The survey method is popularly used in extant budgeting studies (Ekholm and Wallin, 2000; Sivabalan et al., 2009; Libby and Lindsay, 2010) and provides robust questionnaire based information from a moderate level of firm observations.² The sample for the study was sourced from a database provided by CPA Australia, as part of a research project considering the application of budgets in Australian organisations. The CPA Australia database used was drawn using employee job titles. Specifically, we sought managerial titles such as finance manager, CFO and financial controllers. These employees must have been employed in medium/large firms, or business units, and our

² The database contained wide ranging information on annual budgets, rolling budgets and antecedent variables, which we test in a form that extends the findings of Sivabalan et al. (2009) whilst not drawing on the variables reported in that study.

Questionnaire responses

The questionnaire was sent to 2,400 respondents, with a total raw response of 424 firms. We initially excluded firms if they employed less than 20 staff³, and those who had not completed sections of the survey relevant to our construction of key variables. This reduced the sample to 331 firms. We subsequently subtracted firms not using traditional budgets annually, and firms only using the annual budget, without the rolling budget. This reduced our sample to 189 firms. We then excluded the 7 users who were only rolling budget users, in order that the underlying sample was operationally consistent (all firms using rolling budgets and annual budget alongside one another – this remains the dominant style of rolling budget use in organisations), facilitating more construct validity in our results. This reduced the sample to 182 rolling budget firms. The Table 3 total “n” observations of 160 is lower than this number owing to minor incidences of incomplete data relating to specific, individual indicators. The Table 4 (MRB) “n” observations were 83/84⁴ and the Table 5 (QRB) “n” observations were 66/67 (depending on the budget reason).

Managing data validity and potential response error

While the response rate of 7.58% is low (182 of 2400 firms), we note that the overall sample response was 17.67% (424/2400 firms) and that rolling budget samples are very difficult to obtain, as uptake rates have traditionally been low (23% based on Hansen and Van der Stede, 2004). Notwithstanding this, we applied a range of data validity measures to ensure the quality of our data, consistent with protocols recommended in Dillman (2000) and Van der Stede et al (2005). First, we engaged the three step approach

³ We applied the Australian Bureau of Statistics definition for medium and large companies, which is 20 employees or more.

⁴ Note that the sum of observations from Table 4 (MRB) & 5 (QRB) are 10 less than their corresponding model in Table 3 (Total RB sample). This is because a small number of RB users who also use a rolling budget did not use monthly or quarterly rolling budgets. We included them in the total population, as they represent rolling budget users who also use an annual budget, and reveal the breadth of rolling budget use as part of the total RB sample.

recommended in Van der Stede et al (2005) for reducing response error, by conducting survey *pre-testing*, *follow-up procedures* and *non-response bias tests*. We initially conducted pilot tests (pre-testing) of the survey with practitioners holding budget expertise in order to refine our questions. In sending out the survey, consistent with Dillman (2000) and the Van der Stede et al (2005) description of *follow-up procedures*, we posted reminder postcards a month after the initial survey mail-out. We also reminded respondents of the industry report and presentation incentive we were offering to all completing respondents. Finally, the survey mail-out was conducted over two stages, and substantive differences in descriptives were not noted across the two stages nor for early and late respondents to the surveys across both stages.

Survey variables and indicators

Three categories of survey variables were used for our study. These are the RB reasons, uncertainty, and strategy variables. The reasons to budget were expanded from Hansen and Van der Stede (2004), to incorporate nine operational budget reasons by Sivabalan et al. (2009). They are identical to those used in this study. In total there are five planning reasons, two control reasons and two evaluation reasons.

Four uncertainty indicators were used, adapted from Gordon and Narayanan (1984), Govindarajan (1984), and Hansen and Van der Stede (2004). They adopt an internal/external uncertainty perspective, focusing on a stakeholder approach. Demand, technological (process), competition and supply uncertainty are the four single item uncertainty indicator categories used in the study. The former three were sourced from Gordon and Narayanan (1984) and Govindarajan (1984) while the fourth was sourced from Govindarajan (1984). The “predictability” scale used to measure the uncertainty variables also sourced from Gordon and Narayanan (1984).

The strategy variable was adapted from indicators applied in the Chenhall and Langfield-Smith (1998) study. Two indicators were selected from Chenhall and Langfield-Smith (1998). These were the customisation of products and uniqueness of products. Firms focusing to a greater extent on these were argued to be firms applying a more differentiator style strategy, as opposed to a cost leadership strategy.

Survey variable descriptive statistics

Descriptive statistics regarding the rolling budget sample surveyed are provided in Table 1a. For standardisation purposes, we excluded firms conducting rolling budgets who simultaneously prepared the traditional budget for periods other than 12 months.

----Insert Table 1 (a and b) here---

Findings reveal a reasonable spread of mean scores, with minimum and maximum scores spanning the breadth of the scales deployed, generally indicating variation in the breadth of responses. We also provide correlation statistics between all variables used in our model (Table 1b)

4. Model and Findings

4.1 The Model

We investigate how the importance of rolling budgets for various planning, control and evaluation reasons relate to a business unit's strategy and uncertainty. We first report our findings in relation to the entire sample, then segment the sample into quarterly rolling budget firms and monthly rolling budget firms.

For each segment, we investigate the determinants of the firms' response to the importance of rolling budgets for that specific aspect of decision-making. Responses range from 1 to 7, with 1 being the least important and 7 being the most. The explanatory variables capturing firm antecedents are consistent with the indicators as described in the research methods section, and include *business unit uniqueness strategy*, *business unit customisation strategy*, for strategy and *uncertainty in competition*, *uncertainty in supply*, *uncertainty in demand*, and *uncertainty in technology* for the uncertainty antecedent. We include control variables like firm size and the number of years the decision maker has been with the firm. We thus estimate the following ordered probit⁵ model:

$$RB_{reason_i} = \alpha_0 + \alpha_1 LNYEAR + \alpha_2 LNSIZE + \alpha_3 STRATUNIQ +$$

⁵ We apply ordered probit analysis as it is considered more effective for purposes of determining significances when dealing with ordinal dependent variables (Williams, 2006).

where $RB_{reason_i} = RB_CONTCOST, RB_COORDRES, RB_SELLPRICE, RB_PRODCAP, RB_SE, RB_BUE, RB_AP, RB_INNOVBEH, \text{ or } RB_BOD$.

$RB_CONTCOST$ = RB importance in controlling costs;

$RB_COORDRES$ = RB importance in coordination of resources;

$RB_SELLPRICE$ = RB importance in determining selling price;

$RB_PRODCAP$ = RB importance in establishing production capacity;

RB_SE = RB importance in staff evaluation;

RB_BUE = RB importance in business unit evaluation;

RB_AP = RB usage in formulating action plans;

$RB_INNOVBEH$ = RB importance in encouraging innovative behaviour; and

RB_BOD = RB importance in monitoring the board of directors.

The explanatory variables are as follows:

$LNYEAR$ = natural logarithm of number of years decision maker has been with the firm; $LNSIZE$ = natural logarithm of number of employees;

$STRATUNIQ$ = unique strategy;

$STRATCUST$ = customer strategy;

$UNCCOMP$ = uncertainty in competition;

$UNCSUP$ = uncertainty in supply;

$UNCDEM$ = uncertainty in demand; and

$UNCTECH$ = uncertainty in technology.

4.2 Findings

--- Insert Table 2 here ---

Descriptive statistics evidencing the split in our sample across quarterly and monthly rolling budgets are provided in Table 2. Approximately 95% of our sample represented monthly rolling budgeters or quarterly rolling budgeters, thus empirically validating the anecdotally derived expectation that a dominant majority of rolling budgets are conducted monthly or quarterly. With respect to these two dominant rolling budget types, we conducted a univariate t-test and Wilcoxon ranks sum test to examine differences in importance for monthly and quarterly rolling budget firms (Table 2), across the budget reasons as well as antecedent variables.

In relation to H_1 , we noticed that the importance of 8 of the 9 budget reasons were greater for monthly rolling budget reasons than quarterly rolling budget reasons, with two of the nine being statistically significant. We therefore argue that H_1 is supported.

Interestingly, we noticed no statistically significant differences in the uncertainty levels of monthly rolling budget users to quarterly rolling budget users, for either of the four uncertainty variables used. In relation to the broader literature, this result signals that the conduct of shorter period, more frequent rolling budgets (monthly) is not driven by any higher a level of uncertainty than in firms conducting longer period, less frequent rolling budgets (quarterly). Notwithstanding this, we observed differences in the way monthly rolling budget users related to the strategy and uncertainty antecedents, relative to quarterly rolling budget users, as will be outlined.

Total sample findings

The findings for the total RB sample (Table 3) are explained for planning, control and evaluation reasons respectively below.

--- Insert Table 3 here ---

Across the total sample, inverse relationships were observed between all the importance of planning RB reasons and uncertainty. The importance of RB for *formulating action plans* and *engage in innovative behaviour* were inversely related to supplier uncertainty, while the importance of RB for *determining selling prices* and *managing production capacity* were inversely related to demand uncertainty. Interestingly, positive relationships were observed between all five planning reasons and one or both indicators

characterising the differentiation strategy. The importance of RB for *coordinating resources, managing production capacity*, and *engaging in innovative behaviours* positively related to the extent of uniqueness in a product/service, while the importance of RB for *coordinating resources, determining selling prices, managing production capacity* and *formulating action plans* positively related to the customisation of products/service.

We now proceed to outline the control RB reason findings for the total sample. In relation to uncertainty, a positive relation was observed between the importance of RB for *Board of Director monitoring* and the technological uncertainty indicator. In relation to strategy, the importance of both control category RB reasons (*Board of Director monitoring* and *Controlling Costs*) were positively related to the customisation of product/service strategy indicator.

For the evaluation RB reasons, we note that no significant relation was observed between the importance of either of the two evaluation RB reasons and the four uncertainty indicators. For strategy, a positive relation was observed between the importance of both evaluation RB reasons (*staff evaluation* and *business unit evaluation*) and the uniqueness of product/service, while the importance of the *business unit evaluation* reason showed a positive relation to the customisation of product/services.

Directionally, the results for the total RB sample as summarised in Figure 1, reveal that uncertainty inversely relates to planning RB's, positively relates to control RB's and bears no relation to evaluation RB's. Conversely, the differentiation strategy positively correlates to all three categories of RB reasons (planning, control and evaluation).

These results are interesting, but surprising and inconsistent with extant research. Firstly, we note that uncertainty is generally cast as beneficial to organisations in more uncertain environments from a planning perspective (Haka and Krishnan, 2005). We observe that the relation is the opposite (negative). The positive relation between uncertainty and control reasons more consistently relates to extant literature claims of RB benefits (Lynn and Madison, 2004; Hansen, 2011). Finally, the absence of a relationship between uncertainty and the evaluation RB's is somewhat consistent, to Haka and Krishnan (2005) who did not expect a positive relationship, but found a negative relationship. We find no relation.

The positive relation between the importance of RBs and the extent of application of differentiator strategy is in contrast to the expectation that higher order, or more intense management accounting practices such as rolling budgets align to more cost focused strategies (Gordon and Narayanan, 1984; Langfield-Smith, 1997; Langfield-Smith, 2006) as opposed to differentiator strategies.

The above findings cast questions that require more detailed extrapolation. We proceed to dissect the sample into the two dominant RB methods used by our sample firms (MRB and QRB) to better understand the extent to which these findings might be consistent across the two RB forms. Further, as explained previously, rationales exist for why MRB's and QRB's might not show consistent relations, driving our decision to split the sample. Finally, our descriptive data per Table 2 show that the MRB mean scores are higher than the QRB mean scores for 8 of the 9 budget reasons, with two of these reasons (*formulating action plans* - planning, and *Board of Director monitoring*- control) being statistically significantly greater. Also, and interestingly, we find that the mean uncertainty scores for all four uncertainty variables are not statistically significantly different between the MRB and QRB samples. This finding challenges the assumption in extant practitioner studies and some academic studies that more frequent RBs are used in higher uncertainty environments. How might MRBs and QRBs be different, if not in uncertainty? Following is a dissection of the same relationships investigated for the total RB sample, segmented into MRBs and QRBs.

Monthly Rolling Budgets (MRB) & Uncertainty

The importance of the MRB planning reasons shows a positive relationship with competition uncertainty, but a negative relationship with demand uncertainty (Table 4). The *determining selling prices* and *managing production capacity* MRB reasons positively relate to the level of competition uncertainty, and negatively relate to demand uncertainty. Moving onto MRB control reasons, we note positive relations between both MRB control reasons and uncertainty as well as strategy. The importance of the *Board of Director monitoring* reason positively related to the level of demand uncertainty. Finally, the importance of the staff evaluation MRB reason positively related to technological uncertainty. These results, are strongly positive and signal support for H₂.

Monthly Rolling Budgets (MRB) & Strategy

In relation to the differentiation strategy, the importance of three MRB planning reasons (*coordinating resources, managing production capacity and encourage innovative behaviours*) positively relate to the uniqueness of a product/service (Table 4). Furthermore, the importance of the other two planning reasons (*determine selling prices and formulate action plans*) positively relate to the degree of customisation of product/service. For the control budget reasons, the importance of the *controlling costs* reason positively related to the extent of customisation of product/service. Finally, the importance of the staff evaluation MRB reason positively related to the uniqueness of product/services indicator. The persistent positive relationship between budget reasons and the uniqueness/customisation strategy across all three budget reason categories (planning, control and evaluation) indicates support for H₃.

--- Insert Table 4 here ---

Quarterly Rolling Budgets (QRB) & Uncertainty

The importance of three planning QRBs show an inverse relation with uncertainty (Figure 1), consistent with the findings in the total RB sample (Table 5). No relationship is observed between the importance of the control or evaluation QRB reasons and uncertainty.

--- Insert Table 5 here ---

Quarterly Rolling Budgets (QRB) & Strategy

We note that no relationship is observed between the importance of any of the nine QRB reasons and either of the two differentiation strategy indicators. Notwithstanding the range of positive and negative relations found between the total RB sample for planning, control and evaluation reasons to both uncertainty and strategy as well as the dominantly positive relations found between MRB budget reasons importance and strategy/uncertainty as discussed in detail in the prior section, the importance of all the control and evaluation QRB reasons show no relation with any of the uncertainty or strategy indicators (summarised in Figure 1). This suggests that MRB organisations are driving the total sample results, and not QRB organisations.

These results lend support to the practitioner assertions that QRBs are often conducted as an artefact of an external reporting requirement (Neely, et al, 2003) or other factors, and might not be used as concertededly for internal decision making purposes. Consequently, the budget reasons which are dominantly related to the internal decision making function in organisations (planning, control and evaluation) are less likely to relate to the antecedents described when scored as QRBs.

The above directional relations for both MRB and QRB are succinctly summarised in Figure 1, as a basis for comparison alongside the whole sample and QRB results.

5. Discussion

The results reveal a complex range of departures and convergence between the nature of the relationships, justifying our application of a more exploratory tone, citing and *post hoc* rationalising possibilities for their findings. By observing relationships for the entire sample, then monthly and quarterly rolling budgets, we find novel relationships that appear to be at odds with extant research and not previously introduced into the literature. We first generally discuss the value of our findings at the level of rolling budget practice as a whole, then proceed to analyse our findings with respect to the differences between monthly and quarterly rolling budgets from the perspective of the uncertainty and strategy antecedents.

Rolling budget – contribution to extant budgeting research

We theorise that firms budget for reasons relating to “planning” and “control”, and not only “performance evaluation”. This focus on budget motivations/reasons has not been extensive (Libby and Lindsay, 2010) even though theorising on budget logics and practices continues to be advocated (Armitage and Webb, 2013; Bourmistrov and Kaarboe, 2013; Dubin, 1978). We collate our budgeting rationales from the above studies and investigate how they align to strategy and uncertainty, two of the more popularly studied antecedents in management accounting contingency studies (Chenhall, 2003, Gordon and Narayanan, 1984; Langfield-Smith 1997).

Practitioner studies and normative articles abound regarding rolling budgets, but their academic examination has generally remained sparse. Indeed, rolling budgets are now an oft applied predictive control

in organisations (Haka and Krishnan, 2005; Sivabalan et al., 2009), and have been frequently associated with the application of a 'Beyond Budgeting' philosophy (Bogsnes, 2009; Hansen and Van der Stede, 2004; Hope and Fraser, 2003; Henttu-Aho and Järvinen, 2012; Ostergren and Stensaker, 2011).

Rolling budgets have been argued to replace the traditional annual budget, providing a more frequently updated and accurate set of financial numbers that suit increasingly dynamic and competitive business environments (Wallander, 1999). The reality of budget practices, however, indicates otherwise. Sivabalan et al. (2009) find that the vast majority of organisations use the rolling budget alongside (not replacing) the annual budget. Libby and Lindsay (2010) similarly highlight that the annual budget continues to be used by a majority of organisations, unaffected by the application of rolling budgets. Ekholm and Wallin (2011) further show that the perceived usefulness of the annual budget and rolling budget align strongly in organisations that use both.

We acknowledge the burgeoning research observing the simultaneous use of rolling budgets alongside annual budgets in organisations, and wish to understand how motivations for rolling budgets relate to two common firm antecedents (uncertainty and strategy) studied in the management accounting literature. Further, we investigate the extent to which these relationships are consistent across the two dominant forms of rolling budgets (monthly/quarterly) in practice (Wallander, 1999; Hope and Fraser, 2003).

Studies have not investigated whether differences might exist between firms adopting different forms of rolling budgets (monthly versus quarterly). Rather, the few academic articles and practitioner publications have discussed the implementation of rolling budgets in different contexts (Churchill, 1984), linked its existence to enhancing the performance of traditional budgets for operational planning and inhibiting the performance of traditional budgets for performance evaluation (Hansen and Van der Stede, 2004); noted a positive association between the usefulness of annual budgets and rolling budgets (Ekholm and Wallin, 2011; Lamoreaux, 2011), and explored the possibility of rolling budgets completely replacing annual budgets (Banham, 2011; Zeller and Metzger, 2013). Finally, Hansen (2011) conjecture that rolling budgets should raise the total volume and volatility of a firm's output, increase pay for performance sensitivity, and have an overall positive effect on performance. These studies provide valuable insights into the impact of the existence of rolling budgets, but studies specifically studying the impact of conducting rolling budgets

for different reasons on organisational antecedents remain lacking. We further advance a stronger and more granular empirical focus to prior investigations by exploring alignment and deviations in the relationships between monthly rolling budgets (MRB) and quarterly rolling budgets (QRB), against the uncertainty and strategy firm antecedents. We proceed to discuss these learnings below.

Comparing MRB and QRB - Uncertainty

Across the planning, control and evaluation RB categories, our findings reveal that MRBs showed much more persistent, stronger and positive relations with uncertainty than QRBs. The conjecture that rolling budgets are more important in increasingly uncertain environments for planning and control as advanced in Haka and Krishnan (2005) and Hansen, et al, (2003) is refined in our study to be mixed, limited and more complex in relation to MRBs. While the importance of three planning QRBs surprisingly *negatively* relate to uncertainty, the importance of two planning MRBs positively and negatively relate to uncertainty. When using MRBs to *determine selling prices* and *manage production capacity*, companies are more likely to increase their focus on these MRBs if competition uncertainty rises, and demand uncertainty reduces. As competition uncertainty increases, companies could consider the actions of competitors and their effects on the company's accounts as strategically important to manage, and hence emphasise greater importance to planning MRBs in order to keep numbers relevant. By contrast, as customers (demand uncertainty) become more unpredictable and difficult to relate to revenues, companies might apply more symbolic or pre-established methods for estimating revenues, thus reducing their focus on the importance of planning MRBs. These somewhat opposing and unexpected findings reveal a complexity to the way uncertainty impacts the importance of RB's from a planning perspective that is absent in extant studies (Haka and Krishnan, 2005; Hansen, 2011). Finally, the wholly inverse relation found between uncertainty and the importance of planning QRBs diametrically opposes the positive relation expected between QRBs and the level of uncertainty. This effect persisted across three of the four uncertainty indicators used in our study. QRBs, based on this logic, are more likely to be considered as important for planning when uncertainty is lower. The relatively less frequent updating period for QRBs relative to MRBs could lead business units to being more conservative in how they are used for decision making. The more uncertain, the harder it is for

numbers to be estimated, and therefore the less important they might be – these arguments are more consistent with traditional annual budgets (Chenhall and Langfield-Smith, 1998) and not usually associated to rolling budgets.

From a control perspective, the two control QRBs show no relation with uncertainty while one of the control MRBs (*staff evaluation*) shows a positive relation with uncertainty. The positive relation between control MRBs and uncertainty is more traditional to the predictions of extant rolling budget studies (Neely, et al 2003; Haka and Krishnan, 2005), while the absence of a relationship for QRBs is unexpected.

Finally, from an evaluation perspective, the two evaluation QRBs show no relation with uncertainty while one of the two evaluation MRBs (*staff evaluation*) shows a positive relation with uncertainty. Here we note the surprising finding that as uncertainty increases, the importance of the staff evaluation MRB increases. This finding directly contrasts with prior research specifically studying the application for RB's in uncertain environments (Haka and Krishnan, 2005). It is possible that as uncertainty increases, more frequent MRBs are considered valuable to maintain the relevance of outdated numbers, and this effect usurps the adverse impact of moving targets for staff evaluation, as identified in Haka and Krishnan (2005). Or staff evaluation relating to rolling budget use for performance evaluation might not relate to compensation in the way annual budget based evaluation might. Further research is needed to clarify how these contesting effects might interplay in organisations.

The sub-categorisation of the total sample into MRBs and QRBs reveal interesting insights into how RBs might relate to common firm antecedents like uncertainty differently, based on the frequency of RB periods. We find that the importance of planning, control and evaluation MRBs reveal stronger sensitivities to uncertainty than QRBs. Additionally, we note that the adjusted R^2 's of our models for MRBs and QRBs generally exceed those of the parallel models for the total RB sample. This indicates that the sub-categorisation of the sample into MRBs and QRBs allowed for greater explanatory power in the models (ie. movements in the independent variables aligned to movements in the dependent variables better).

These findings additionally challenge our understanding of how common firm antecedents relate to formal financial controls more generally, and introduce the possibility that some types of uncertainty relate

in opposing ways to different reasons for conducting RBs, a finding not currently discussed in the extant literature. Indeed, prior management accounting research has discussed the positive use of budgetary controls in uncertainty (Johansson and Siverbo, 2014) and ambiguity (Frow, et al, 2005). We more narrowly investigate the existence of these deviations for different forms of rolling budgets, identifying both positive and negative relations, adding to the dominantly positive relation identified in these prior studies.

Comparing MRB and QRB – Strategy

The effect of segmenting the total RB sample into MRBs and QRBs is especially marked when considering the relationship between the importance of RBs and strategy. The total RB sample showed a positive relation between the extent of application of a differentiator strategy (as defined by uniqueness and customisation of products/services) and the importance of all three categories of RBs (planning control and evaluation). However, in partitioning the sample, we see that this effect is wholly explained by MRBs and not QRBs. The importance of planning, control and evaluation QRBs show no significant relation with either the extent of uniqueness of products/services or customisation of products/services. By contrast, the importance of all five planning MRBs show positive relations to either the uniqueness or customisation strategy indicators, while one of the control MRBs (*controlling costs*) shows a positive relation with the customisation of products/services, and one of the evaluation MRBs (*staff evaluation*) shows a positive relation with the uniqueness of products/services.

The above strategy comparisons, similar to the MRB/QRB –uncertainty comparisons, show that the importance of MRBs is more sensitive to firm antecedents than the importance of QRBs. This effect is quite uniform and persistent across a range of RB reasons.

We conjecture that MRBs are used more concertedly for internal organisational decision making in a manner more traditionally discussed in academic and practitioner publications on the operating attributes of rolling budgets. The importance of the MRB budget reason scores are higher than the QRB reason scores for eight of the nine budget reasons across the three categories (planning, control and evaluation), and statistically significantly so for two of the nine, one relating to a planning reason (formulating action plans) and one relating to a control reason (*Board of Director monitoring*). Given that the RB budget reasons used

in this study are all related to internal decision making, as gleaned from Hansen and Van der Stede (2004) and Sivabalan, et al (2009), we would expect that their relation to common firm antecedents such as uncertainty and strategy might be more aligned to MRBs than QRBs.

Furthermore, Table 2 shows that the uncertainty level of the MRB and QRB samples are close to identical. This evidences that business units conducting MRB and QRB don't experience different levels of uncertainty. This finding calls into question the assumption in practitioner and academic publications that shorter RB periods (such as MRB relative to QRB) are conducted to tackle higher uncertainty (Sivabalan, 2011; Haka and Krishnan, 2005).

This may also hint at more accurate MRB values than QRB values. Holding uncertainty constant, monthly updates (MRB) are arguably going to lead to more updated and accurate numbers than quarterly updates (QRB). These numbers will therefore be regarded as more relevant and likely to have a more directional effect on planning, control and evaluation as a result (building on Hansen, 2011). Another distinction that relates to this but is subtly different, is that business units might not be conducting MRBs to manage uncertainty, but rather to simply apply analyses more frequently to facilitate decision making, independent of accuracy reasons. Conversely, QRBs might not be forecasting often enough, if these numbers aren't relating to antecedents in ways that might be expected from anecdotal practitioner examples and case studies of this phenomena (Lynn and Madison, 2004).

The above findings collectively lend support to the broader objective of this study, which is the questioning of tacitly accepted links between the importance of management accounting techniques and more dynamic, higher uncertainty, differentiator strategies (Tucker, et al, 2009; Langfield-Smith, 1997). We have sought to problematise and lend subtlety to the nature of these relationships, revealing the need for studies which more specifically investigate how different styles of rolling budgets, when used for a range of alternative planning, control and evaluation reasons, impact organisational practices in ways unexpected and not discussed in dominant practitioner or academic discourses (Tucker and Lawson, 2016; Tucker and Lowe, 2014).

6. Conclusion

Contingency studies in management accounting have conceptually tended to couch management accounting variables aggregately. Budgets are a case in point. By generally assuming uni-directional relations between management accounting techniques such as rolling budgets to more dynamic environments, and accounting focused strategies (cost emphasis), we plausibly under-specify subtleties in such relationships and across sub-samples of budget forms. We investigate the nuanced linkages between the importance of RBs for a range of reasons, and the effect of their disaggregation into their two dominant forms (monthly vs. quarterly) to observe for consistency (or otherwise) in their relation to commonly known antecedents.

Overall, our findings serve to highlight the paper's objective – to problematize established relations and assumptions between rolling budget use, and commonly understood firm level and environmental variables. Practitioner based studies on rolling budgets are many, and broadly assume a positive relation between rolling budgets and higher uncertainty environments and more cost focused strategies. These arguments have broadly remained uncontested. However, a de-constructing of rolling budget use into their different types (MRB and QRB), and an exploration of their applications for a range of planning, control and evaluation reasons consistent with Hanse (2011), Hansen and Van der Stede, (2004) and Sivabalan, et al (2009), reveals these relations to be far more mixed and worthy of further investigation, further bridging the academic –practice gap (Tucker and Lowe, 2014).

Our study suffers from some limitations which must be acknowledged. Firstly, the inherent limitations of the survey method and the variation in capability of one respondent to proxy a wide range of phenomena in organisations has been acknowledged in the past and similarly conceded. Like many prior studies, we applied pilot tests of the survey prior to its dissemination to minimise this effect. Notwithstanding this, the publication of valuable, large scale rolling budget survey studies is of great need in the management accounting literature, that to date has not investigated this practice in detail at an empirically aggregate level. Finally, we note that our sample only had a small base of respondents that only conducted rolling budgets and not annual budgets. Prior research has indicated the strong conjoint use of annual budgets and rolling budgets in organisations, as opposed to the replacement of one with the other (Libby and Lindsay, 2010; Sivabalan, et al 2009). Future research that highlights how firms that conduct

rolling budgets alone, in the absence of an annual budget, might shed even clearer light on how rolling budgets impact organisations and managerial behaviour.

To this end, further studies that test specific budget reasons, or more richly investigate the application of rolling budgets in practice through the use of rich, field based evidence, would be useful in more extensively delineating the manner by which rolling budgets, in their different forms, become embedded in organisations and affect organisational control processes. Also, studies that observe how RB's combine with other MC practices in order to fit in context (strategy, uncertainty or others), using complementarity theory to complement our contingency theory focus (consistent with Grabner and Moers, 2013) will further enhance our understanding of how RB's operate in organisations.

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Table 1: Panel A

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Univariate Statistics: Rolling budget and firm characteristics and antecedent variables for all firms that use rolling budgets

| Variable | Mean | Std Dev | Minimum | Median | Maximum | N |
|---------------------|------|---------|---------|--------|---------|-----|
| <i>RB_CONTCOST</i> | 5.82 | 1.29 | 1 | 6 | 7 | 202 |
| <i>RB_COORDRES</i> | 5.1 | 1.5 | 1 | 5 | 7 | 202 |
| <i>RB_SELLPRICE</i> | 3.73 | 1.98 | 1 | 4 | 7 | 200 |
| <i>RB_PRODCAP</i> | 4.2 | 2.07 | 1 | 5 | 7 | 198 |
| <i>RB_SE</i> | 4.09 | 1.78 | 1 | 4 | 7 | 201 |
| <i>RB_BUE</i> | 5.2 | 1.62 | 1 | 6 | 7 | 200 |
| <i>RB_AP</i> | 5.58 | 1.36 | 1 | 6 | 7 | 201 |
| <i>RB_INNOVBEH</i> | 4.46 | 1.7 | 1 | 4 | 7 | 200 |
| <i>RB_BOD</i> | 5.84 | 1.37 | 1 | 6 | 7 | 200 |
| <i>LNEYEAR</i> | 1.65 | 0.97 | -1.39 | 1.61 | 3.69 | 213 |
| <i>LNSIZE</i> | 7.35 | 2.08 | 3.04 | 7 | 12.97 | 215 |
| <i>UNCCOMP</i> | 3.54 | 1.37 | 1 | 3 | 7 | 210 |
| <i>UNCSUP</i> | 3.16 | 1.31 | 1 | 3 | 7 | 208 |
| <i>UNCDEM</i> | 3.34 | 1.32 | 1 | 3 | 7 | 209 |
| <i>UNCTECH</i> | 3.34 | 1.32 | 1 | 3 | 7 | 209 |
| <i>STRATUNIQ</i> | 4.62 | 1.86 | 1 | 5 | 7 | 208 |
| <i>STRATCUST</i> | 5.03 | 1.68 | 1 | 5 | 7 | 208 |

Note:

The dependent variable is as follows:

RB_CONTCOST = RB importance in controlling costs;
RB_COORDRES = RB importance in coordination of resources;
RB_SELLPRICE = RB importance in determining selling price;
RB_PRODCAP = RB importance in establishing production capacity;
RB_SE = RB importance in staff evaluation;
RB_BUE = RB importance in business unit evaluation;
RB_AP = RB usage in formulating action plans;
RB_INNOVBEH = RB importance in encouraging innovative behaviour; and
RB_BOD = RB importance in monitoring the board of directors.

The explanatory variables are as follows:

LNEYEAR = natural logarithm of number of years decision maker has been with the firm;
LNSIZE = natural logarithm of number of employees;
STRATUNIQ = unique strategy;
STRATCUST = customer strategy;
UNCCOMP = uncertainty in competition;
UNCSUP = uncertainty in supply;
UNCDEM = uncertainty in demand; and
UNCTECH = uncertainty in technology.

Table 1: Panel B (either use this table or version below)

Correlation coefficients and p-values: Rolling budget and firm characteristics and antecedent variables for all firms that use rolling budget (bold typeface indicates significance at greater than 5%).

| | <i>RB_ COORDRES</i> | <i>RB_ SELLPRICE</i> | <i>RB_ PRODCAP</i> | <i>RB_ AP</i> | <i>RB_ INNOVBEH</i> | <i>RB_ CONTCOST</i> | <i>RB_ BOD</i> | <i>RB_ BUE</i> | <i>RB_ SE</i> | <i>LNYEAR</i> | <i>LNSIZE</i> | <i>UNC COMP</i> | <i>UNC SUP</i> | <i>UNC DEM</i> | <i>UNC TECH</i> | <i>STRAT UNI</i> | <i>STRAT CUST</i> |
|---------------------|---------------------------|----------------------------|----------------------------|-------------------------|-----------------------------|----------------------------|-------------------------|-----------------------------|-------------------------|---------------|--------------------------|----------------------------|-------------------------|-------------------------|-----------------------------|----------------------|-----------------------|
| <i>RB_COORDRES</i> | 1 | | | | | | | | | | | | | | | | |
| <i>RB_SELLPRICE</i> | 0.26 0 | 1 | | | | | | | | | | | | | | | |
| <i>RB_PRODCAP</i> | 0.33 0 | 0.4 0 | 1 | | | | | | | | | | | | | | |
| <i>RB_AP</i> | 0.34 0 | 0.19 0.01 | 0.22 0 | 1 | | | | | | | | | | | | | |
| <i>RB_INNOVBEH</i> | 0.32 0 | 0.17 0.02 | 0.27 0 | 0.4 0 | 1 | | | | | | | | | | | | |
| <i>RB_CONTCOST</i> | 0.33 0 | 0.25 0 | 0.21 0 | 0.21 0 | 0.2 0.01 | 1 | | | | | | | | | | | |
| <i>RB_BOD</i> | 0.23 0 | 0.05 0.48 | 0.12 0.11 | 0.29 0 | 0.17 0.02 | 0.09 0.21 | 1 | | | | | | | | | | |
| <i>RB_BUE</i> | 0.24 0 | 0.17 0.02 | 0.2 0.01 | 0.43 0 | 0.32 0 | 0.26 0 | 0.22 0 | 1 | | | | | | | | | |
| <i>RB_SE</i> | 0.3 0 | 0.22 0 | 0.1 0.16 | 0.38 0 | 0.33 0 | 0.14 0.06 | 0.3 0 | 0.47 0 | 1 | | | | | | | | |
| <i>LNYEAR</i> | -0.07 0.36 | -0.05 0.48 | 0.03 0.67 | -0.13 0.08 | 0.02 0.79 | -0.06 0.45 | -0.05 0.5 | -0.12 0.09 | -0.03 0.69 | 1 | | | | | | | |
| <i>LNSIZE</i> | -0.03 0.71 | 0 0.97 | -0.13 0.08 | -0.12 0.1 | 0.06 0.4 | 0.03 0.73 | -0.02 0.82 | 0.1 0.17 | 0.07 0.32 | 0.03 0.73 | 1 | | | | | | |
| <i>UNCCOMP</i> | -0.04 0.55 | 0.01 0.88 | -0.09 0.23 | -0.03 0.73 | -0.09 0.21 | 0.04 0.59 | -0.1 0.17 | -0.11 0.14 | -0.05 0.47 | 0.06 0.42 | -0.11 0.14 | 1 | | | | | |
| <i>UNCSUP</i> | -0.03 0.73 | -0.03 0.64 | -0.12 0.12 | -0.15 0.04 | -0.23 0 | -0.06 0.39 | -0.08 0.3 | -0.19 0.01 | -0.09 0.24 | 0.01 0.88 | -0.09 0.2 | 0.18 0.01 | 1 | | | | |
| <i>UNCDEM</i> | -0.09 0.24 | -0.2 0.01 | -0.2 0.01 | -0.09 0.21 | -0.18 0.01 | 0 0.95 | 0.02 0.83 | -0.14 0.06 | -0.03 0.69 | 0.01 0.86 | -0.21 0 | 0.36 0 | 0.41 0 | 1 | | | |
| <i>UNCTECH</i> | -0.13 0.08 | -0.14 0.06 | -0.03 0.66 | -0.09 0.21 | -0.06 0.39 | -0.07 0.33 | 0.08 0.3 | -0.17 0.02 | 0.01 0.93 | 0.01 0.99 | 0.02 -8 | 0.19 0.01 | 0.22 0 | 0.31 0 | 1 | | |
| <i>STRATUNI</i> | 0.2 0.01 | 0.1 0.2 | 0.19 0.01 | 0.07 0.36 | 0.2 0.01 | 0.12 0.1 | 0.02 0.76 | 0.21 0 | 0.22 0 | 0.05 0.47 | 0.08 0.28 | -0.1 0.18 | -0.08 0.27 | 0 0.99 | -0.19 0.01 | 1 | |
| <i>STRATCUST</i> | 0.13 0.07 | 0.26 0 | 0.18 0.01 | 0.25 0 | 0.14 0.06 | 0.17 0.02 | 0.11 0.13 | 0.15 0.04 | 0.09 0.24 | -0.11 0.15 | -0.09 0.24 | 0.02 0.83 | -0.02 0.81 | -0.06 0.44 | -0.09 0.24 | 0.13 0.07 | 1 |

Table 2

Univariate Statistics: Univariate t-tests and non-parametric Wilcoxon rank sum tests examining differences in responses for monthly and quarterly rolling budget firms

| Variable | Monthly <i>Mean</i> <i>Median</i> <i>n</i> | Quarterly <i>Mean</i> <i>Median</i> <i>n</i> | t-stat (p-value) | Wilcoxon ranksum |
|---------------------|---|---|-------------------------------|-----------------------|
| <i>RB_COORDRES</i> | 5.11 5 109 | 5.04 5 83 | t = -0.32 p = 0.37 | z = -0.29 p = 0.77 |
| <i>RB_SELLPRICE</i> | 3.78 4 108 | 3.67 4 84 | t = -0.37 p = 0.35 | z = -0.34 p = 0.73 |
| <i>RB_PRODCAP</i> | 4.28 5 106 | 4.1 5 83 | t = -0.57 p = 0.28 | z = -0.62 p = 0.53 |
| <i>RB_AP</i> | 5.68 6 109 | 5.42 6 84 | t = -1.30 p = 0.09* | z = -0.73 p = 0.46 |
| <i>RB_INNOVBEH</i> | 4.53 4 108 | 4.3 4.5 84 | t = -0.90 p = 0.18 | z = -0.60 p = 0.54 |
| <i>RB_BOD</i> | 5.94 6 108 | 5.66 6 84 | t = -1.38 p = 0.08* | z = -1.77 p = 0.07 |
| <i>RB_BUE</i> | 5.28 6 108 | 5.15 6 83 | t = -0.55 p = 0.28 | z = -0.73 p = 0.46 |
| <i>RB_SE</i> | 4.24 4 109 | 4 4 84 | t = -0.96 p = 0.16 | z = -0.94 p = 0.34 |
| <i>RB_CONTCOST</i> | 5.76 6 109 | 5.88 6 84 | t = 0.64 p = 0.26 | z = 0.037 p = 0.97 |
| <i>LNYEAR</i> | 1.67 1.74 114 | 1.66 1.61 87 | t = -0.03 p = 0.48 | z = -0.19 p = 0.84 |
| <i>LNSIZE</i> | 7.29 6.95 116 | 7.6 7.24 87 | t = 1.06 p = 0.14 | z = 1.05 p = 0.28 |
| <i>UNCCOMP</i> | 3.56 3 114 | 3.58 3 86 | t = -0.10 p = 0.45 | z = -0.26 p = 0.79 |
| <i>UNCSUP</i> | 3.21 | 3.08 | t = 0.66 | z = 0.78 |

| | 3 | 3 | p = 0.25 | p = 0.43 |
|------------------|------|------|---------------------|-----------|
| | 112 | 86 | ACCEPTED MANUSCRIPT | |
| | 3.33 | 3.45 | t = -0.59 | z = -0.47 |
| <i>UNCDEM</i> | 3 | 3 | p = 0.27 | p = 0.63 |
| | 114 | 85 | | |
| | 3.40 | 3.36 | t = 0.20 | z = 0.12 |
| <i>UNCTECH</i> | 3 | 3 | p = 0.41 | p = 0.89 |
| | 114 | 85 | | |
| <i>STRATUNIQ</i> | 4.53 | 4.81 | t = 1.05 | z = 1.04 |
| | 5 | 5 | p = 0.14 | p = 0.29 |
| | 113 | 83 | | |
| <i>STRATCUST</i> | 5.18 | 4.8 | t = -1.58 | z = -1.81 |
| | 6 | 5 | p = 0.05 | p = 0.07 |
| | 111 | 85 | | |

Table 3:

Ordered probit analysis of firm response about rolling budget importance (1-7) and antecedents: using the **whole** sample of firms that use rolling budgets (all firms also have annual fixed budgets, i.e. FP = 12 months) (n = 160)

| | PLANNING VARS | | | | | CONTROL VARS | | EVAL VARS | |
|-----------------------|--------------------|---------------------|-------------------|--------------|--------------------|---------------|--------------------|---------------|--------------|
| | <i>RB_COORDRES</i> | <i>RB_SELLPRICE</i> | <i>RB_PRODCAP</i> | <i>RB_AP</i> | <i>RB_INNOVBEH</i> | <i>RB_BOD</i> | <i>RB_CONTCOST</i> | <i>RB_BUE</i> | <i>RB_SE</i> |
| <i>LYEAR</i> | -0.01 | -0.03 | 0.10 | -0.05 | 0.04 | -0.03 | -0.01 | -0.13 | -0.04 |
| | -0.13 | -0.36 | 1.17 | -0.59 | 0.40 | -0.28 | -0.11 | -1.41 | -0.45 |
| <i>LNSIZE</i> | 0.00 | 0.00 | -0.11** | -0.07 | -0.02 | 0.01 | 0.06 | 0.05 | 0.03 |
| | 0.10 | -0.05 | -2.53 | -1.51 | -0.35 | 0.11 | 1.29 | 1.15 | 0.67 |
| <i>UNCCOMP</i> | 0.02 | 0.11 | -0.02 | 0.04 | -0.01 | -0.11 | 0.089 | -0.02 | 0.01 |
| | 0.32 | 1.58 | -0.34 | 0.62 | -0.15 | -1.61 | 1.25 | -0.36 | 0.08 |
| <i>UNCSUP</i> | -0.01 | 0.06 | -0.08 | -0.16** | -0.16** | -0.08 | -0.07 | -0.10 | -0.03 |
| | -0.17 | 0.87 | -1.13 | -2.19 | -2.32 | -1.16 | -1.02 | -1.45 | -0.43 |
| <i>UNCDEM</i> | -0.04 | -0.21*** | -0.20*** | -0.08 | -0.11 | 0.01 | 0.06 | -0.01 | -0.04 |
| | -0.55 | -2.71 | -2.58 | -1.03 | -1.39 | 0.17 | 0.77 | -0.13 | -0.47 |
| <i>UNCTECH</i> | -0.04 | -0.07 | 0.08 | 0.03 | 0.05 | 0.15** | -0.06 | -0.02 | 0.10 |
| | -0.55 | -1.10 | 1.15 | 0.45 | 0.75 | 2.16 | -0.93 | -0.37 | 1.49 |
| <i>STRATUNIQ</i> | 0.12** | 0.05 | 0.12** | 0.04 | 0.11** | 0.03 | 0.07 | 0.12*** | 0.13*** |
| | 2.52 | 1.14 | 2.57 | 0.77 | 2.38 | 0.70 | 1.49 | 2.62 | 2.86 |
| <i>STRATCUST</i> | 0.09* | 0.16*** | 0.10* | 0.18*** | 0.06 | 0.14*** | 0.13** | 0.11** | 0.07 |
| | 1.69 | 2.99 | 1.89 | 3.42 | 1.25 | 2.64 | 2.39 | 2.16 | 1.29 |
| Observations | 160 | 159 | 160 | 160 | 160 | 159 | 160 | 160 | 160 |
| Pseudo-R ² | 0.02 | 0.04 | 0.04 | 0.05 | 0.03 | 0.03 | 0.03 | 0.04 | 0.02 |

Table 4:
Ordered probit analysis of firm response about rolling budget importance (1-7) and antecedents: using the sample of firms that use **monthly** rolling budgets (all firms also have annual fixed budgets, i.e. FP = 12 months) (n = 84)

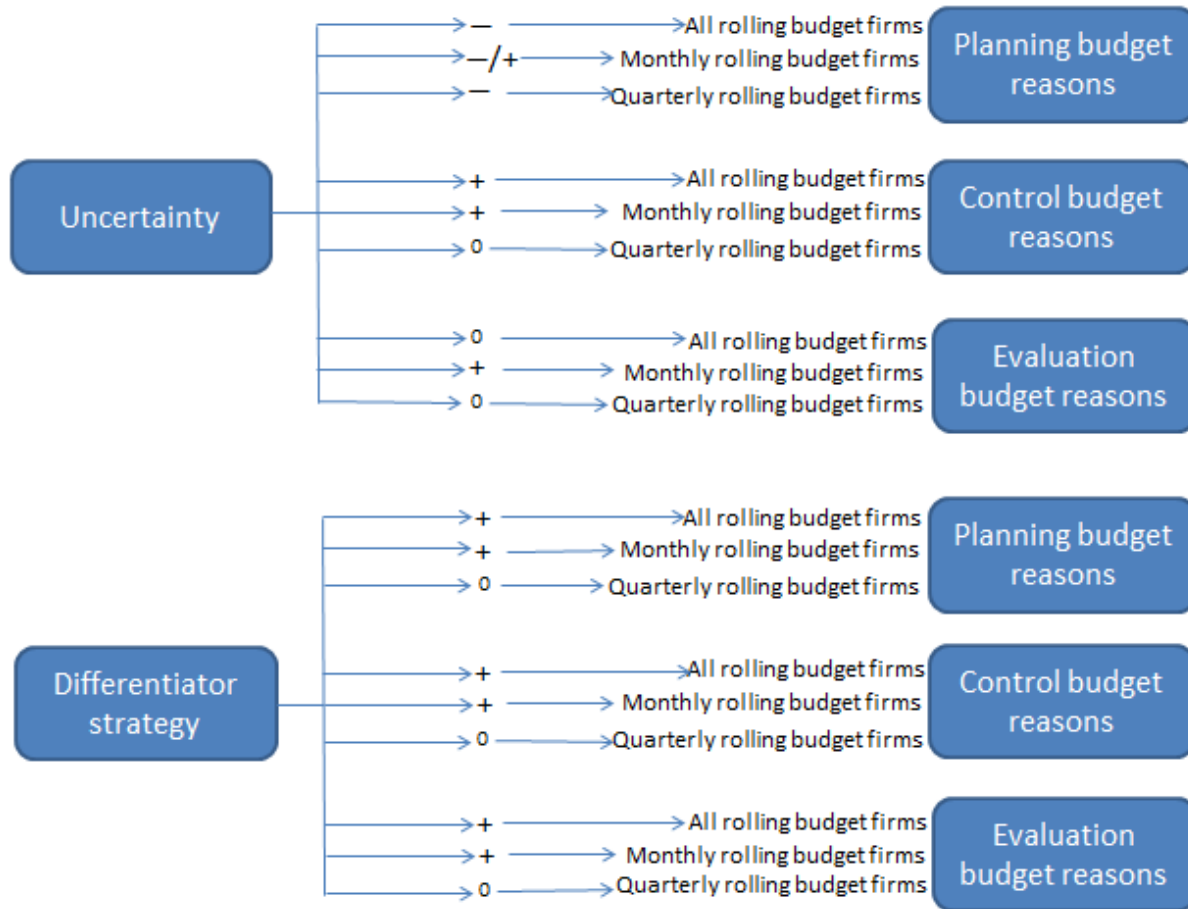
| | PLANNING VARS | | | | | CONTROL VARS | | EVAL VARS | |
|-----------------------|--------------------|---------------------|--------------------|----------------|--------------------|----------------|--------------------|---------------|----------------|
| | <i>RB_COORDRES</i> | <i>RB_SELLPRICE</i> | <i>RB_PROD CAP</i> | <i>RB_AP</i> | <i>RB_INNOVBEH</i> | <i>RB_BOD</i> | <i>RB_CONTCOST</i> | <i>RB_BUE</i> | <i>RB_SE</i> |
| <i>LYEAR</i> | -0.03 | -0.08 | 0.04 | 0.06 | -0.12 | 0.033 | -0.0261 | -0.0395 | -0.0143 |
| | -0.19 | -0.13 | -0.13 | -0.13 | -0.13 | 0.241 | -0.135 | -0.132 | -0.127 |
| <i>LNSIZE</i> | 0.05 | -0.06 | -0.154** | 0.02 | -0.05 | 0.104 | 0.104* | 0.00244 | 0.0149 |
| | 0.75 | -0.06 | -0.06 | -0.06 | -0.06 | 1.632 | -0.062 | -0.0588 | -0.0581 |
| <i>UNCCOMP</i> | 0.09 | 0.214** | 0.152* | 0.05 | -0.02 | 0.001 | 0.108 | -0.00977 | 0.0439 |
| | 0.97 | -0.09 | -0.09 | -0.09 | -0.09 | 0.006 | -0.0966 | -0.0907 | -0.0883 |
| <i>UNCSUP</i> | 0.00 | -0.01 | -0.01 | -0.12 | -0.05 | -0.005 | -0.0723 | -0.103 | -0.077 |
| | 0.02 | -0.11 | -0.10 | -0.11 | -0.10 | -0.041 | -0.107 | -0.103 | -0.101 |
| <i>UNCDEM</i> | 0.12 | -0.283*** | -0.273*** | -0.06 | -0.04 | 0.226** | 0.175 | 0.0341 | -0.0237 |
| | 1.16 | -0.11 | -0.11 | -0.11 | -0.10 | 2.005 | -0.11 | -0.105 | -0.101 |
| <i>UNCTECH</i> | -0.09 | -0.09 | 0.10 | 0.04 | -0.03 | 0.119 | -0.109 | 0.0162 | 0.189** |
| | -1.03 | -0.09 | -0.09 | -0.09 | -0.09 | 1.246 | -0.0927 | -0.0891 | -0.0901 |
| <i>STRATUNIQ</i> | 0.185*** | -0.04 | 0.144** | 0.07 | 0.117* | 0.126 | 0.0648 | 0.118 | 0.169** |
| | 2.58 | -0.07 | -0.07 | -0.07 | -0.07 | 1.629 | -0.0741 | -0.0717 | -0.0706 |
| <i>STRATCUST</i> | -0.01 | 0.297*** | 0.09 | 0.191** | 0.06 | 0.107 | 0.140* | 0.119 | 0.0642 |
| | -0.16 | -0.09 | -0.08 | -0.08 | -0.08 | 1.243 | -0.0852 | -0.082 | -0.0796 |
| Observations | 84 | 83 | 83 | 84 | 84 | 83 | 84 | 84 | 84 |
| Pseudo-R ² | 0.04 | 0.09 | 0.07 | 0.05 | 0.03 | 0.0643 | 0.0535 | 0.0377 | 0.0425 |

Table 5:
Ordered probit analysis of firm response about rolling budget importance (1-7) and antecedents: using the sample of firms that use **quarterly** rolling budgets
(all firms also have annual fixed budgets, i.e. FP = 12 months) (n = 67)

| | PLANNING VARS | | | | | CONTROL VARS | | EVAL VARS | |
|-----------------------|--------------------|---------------------|-------------------|-----------------|--------------------|---------------|--------------------|---------------|--------------|
| | <i>RB_COORDRES</i> | <i>RB_SELLPRICE</i> | <i>RB_PRODCAP</i> | <i>RB_AP</i> | <i>RB_INNOVBEH</i> | <i>RB_BOD</i> | <i>RB_CONTCOST</i> | <i>RB_BUE</i> | <i>RB_SE</i> |
| <i>LNEYEAR</i> | 0.01 | 0.13 | 0.13 | -0.23 | 0.15 | -0.14 | 0.07 | -0.21 | -0.04 |
| | 0.08 | 0.92 | 0.91 | -1.57 | 1.08 | -0.96 | 0.45 | -1.44 | -0.32 |
| <i>LNSIZE</i> | -0.03 | 0.07 | -0.01 | -0.124* | -0.01 | -0.07 | -0.06 | 0.10 | 0.08 |
| | -0.38 | 1.00 | -0.07 | -1.67 | -0.07 | -0.97 | -0.78 | 1.41 | 1.19 |
| <i>UNCCOMP</i> | 0.00 | -0.12 | -0.288** | 0.11 | 0.01 | -0.18 | 0.13 | -0.06 | -0.04 |
| | -0.03 | -1.09 | -2.51 | 0.95 | 0.11 | -1.55 | 1.06 | -0.50 | -0.35 |
| <i>UNCSUP</i> | 0.07 | 0.18 | -0.05 | -0.245** | -0.17 | -0.12 | -0.02 | -0.16 | -0.03 |
| | 0.56 | 1.44 | -0.45 | -2.03 | -1.38 | -0.97 | -0.13 | -1.29 | -0.26 |
| <i>UNCDEM</i> | -0.214* | -0.17 | -0.02 | -0.08 | -0.13 | -0.18 | -0.10 | 0.01 | 0.00 |
| | -1.68 | -1.32 | -0.14 | -0.62 | -1.02 | -1.37 | -0.75 | 0.11 | 0.03 |
| <i>UNCTECH</i> | -0.15 | -0.07 | -0.16 | -0.13 | 0.01 | 0.04 | -0.16 | -0.10 | -0.11 |
| | -1.22 | -0.58 | -1.28 | -1.08 | 0.07 | 0.30 | -1.24 | -0.80 | -0.90 |
| <i>STRATUNIQ</i> | 0.11 | 0.10 | 0.06 | 0.07 | 0.13 | -0.02 | 0.13 | 0.08 | 0.09 |
| | 1.35 | 1.21 | 0.67 | 0.78 | 1.53 | -0.18 | 1.48 | 0.92 | 1.04 |
| <i>STRATCUST</i> | 0.10 | 0.10 | 0.03 | 0.11 | 0.04 | 0.10 | 0.04 | 0.13 | 0.02 |
| | 1.16 | 1.14 | 0.38 | 1.29 | 0.47 | 1.11 | 0.39 | 1.43 | 0.23 |
| Observations | 66 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 |
| Pseudo-R ² | 0.05 | 0.06 | 0.06 | 0.06 | 0.04 | 0.07 | 0.03 | 0.06 | 0.03 |

Figure 1

Summary of relationships between organisational antecedents and the importance of budget reasons



Legend:

“+” Indicates a positive relationship between the antecedent and the “budget reasons” category

“-” Indicates a negative relationship between the antecedent and the “budget reasons” category

“-/+” Indicates both negative and positive relationships between the antecedent and the “budget reasons” category