

**Managing Complexity:
Heuristics Use in Public Budgeting**

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Managing Complexity:
Heuristics Use in Public Budgeting

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Chapter 1.

Introduction

The public budget has been the subject of a very large and growing literature throughout the years. There are two crucial reasons behind this. First, the budget presents a unique opportunity to study the actual decisions and the decision-making processes of politicians (Danziger 1978; Wlezien and Soroka 2003). Several esteemed scholars have highlighted this in their writings. Based on his studies of the congressional budget process Wildavsky famously stated that “[b]udgeting is the lifeblood of government, the financial reflection of what the government does or what it intends to do” (Wildavsky 1964, 128). Many political statements do not become much more than that, a statement. The budget, on the other hand, provides clear evidence of how politicians prioritize between the many different services that government provides to the public. Without money, there is precious little policy (Hofferbert and Budge 1992). Because the budget makes these priorities clear in one common, comparable, and directional unit, it has been characterized as the most important political manifesto in government (Bowman and Kearney 2014).

Second, the public sector is a major part of daily life in most countries. We interact with the public sector on many levels during a normal day, when going to school, driving on public roads, working in the public sector, and so on. As such, the prioritizations that politicians make concerning the many different services and programs that the public sector is providing have a direct impact on people’s everyday lives. In Denmark, public sector expenditures account for around half of the Danish GDP and has done so for the last ten years.² Accordingly, politicians have a huge influence on people’s lives through the choices they make about the very large sums of money they have at their disposal.

Two important features of budgeting shape the decisional capacity of political decision-makers. The first is the complexity of the task environment (Simon 1990; Bendor 2010). Several aspects demonstrate the high level of complexity present in the decision environment of budgeting. First, the process has a finite time span. There are very clear limits to how long the decision process can be. Meanwhile, none the other political decisions to which government needs to attend goes on standby. Thus, the budgeting process has to run in parallel with all other decision-making tasks. Second, the number of

² According to the Eurostat table: General government expenditure by function (COFOG) (gov_10a_exp)

alternative budget choices and relevant information tied to these is immense. Third, the collective body that makes the final budget decision consists of ideologically diverse politicians who must prioritize between the programs and services provided to the public, and in the end reach a collective decision on the allocation of the limited funds available. The fact that public budgeting is political might thus increase the complexity of the process and create a need for tools that simplify the process.

The second feature is the limited computational capabilities of decision-makers. There are different approaches to studying public budgeting. This dissertation takes its departure in the bounded rationality literature. The bounded rationality literature emphasizes that a central key to understand how the environment shapes decisions is decision-makers' use of heuristics or "rules of thumb" as a tool for simplification. By using heuristics, decision-makers simplify complex problems by following certain decision-making strategies (Jones 2001; Bendor 2010; Lau 2003). Wildavsky (1964) was one of the first to investigate the use of heuristics in budgeting, or what he called "aids to calculation". Even though we know that decision-makers employ these in the budgetary process our knowledge is still limited on many aspects of heuristic decision-making. The aim of this dissertation is to improve this understanding by asking the following overall research question: *In what way and to what extent does the use of heuristics affect the process and the decisional output of public budgeting?*

In particular, the dissertation studies three types of heuristics identified in the budget and bounded rationality literature. First, the use of last year's budget as a shortcut to finding the right budget allocation. Second, the use of accumulated experience throughout the fiscal year as a tool for guiding corrections to last year's budget. Last, the use of comparisons as a tool for decision-making.

In his seminal book, Wildavsky (1964) suggested that the first two of these were essential to budgetary decision-making. Despite being prominent in the early incremental literature as tools to explain the micro-level decision-making process, the study of these has primarily focused on the macro-level (e.g., Davis, Dempster, and Wildavsky 1966, 1974). Thus, whether and to what extent last year's budget shapes the individual spending preferences of politicians has so far been unanswered. Likewise, the question of how the use of this heuristic affects the budget proposals, arguments, and output of the budgetary process, and whether the use of it is affected by adding information to the process, has received limited attention. This dissertation addresses both of these shortcomings by investigating the use of last year's budget as a heuristic at the micro-level.

Very few studies have studied the use of experience as a heuristic in budgeting, and Wildavsky never clarified or formalized this heuristic as he did with that of last year's budget. This dissertation argues that a crucial source of experience that politicians are likely to use in their budgetary decision-making is whether there is a deviation between last year's budget and account. The argument is that, by looking at the deviation, politicians get crucial information about whether the funds allocated cover the actual needs. The actual needs could be the citizens' need for service, but also the demands of bureaucrats and public employees.

The last investigation concerns the use of comparisons and the effect of these on the budgetary process and output. The outset of this study is the broader discussion in the bounded rationality literature of comparisons use as an aid to decision-making by individuals and in organizations. In recent years, a growing literature has begun to look into this (e.g. Nielsen and Baekgaard 2015; Geys and Sørensen 2018; Nielsen and Moynihan 2017; George et al. 2017; Festinger 1954; Salmon 1987), but there is still a considerable lack of knowledge on how the use of comparisons affects individual decision-makers and the process and output in budgeting.

The findings presented in this dissertation represent several new and important contributions to the existing literature. Wildavsky (1964) was among the first to emphasize last year's budget as one of the most important predictors of this year's budget. Results from this dissertation provide new evidence showing that a similar relationship is present when politicians form their spending preferences. If spending last year was relatively high, politicians in general have preferences for lower spending this year and vice versa. Furthermore, experimental evidence from the dissertation shows that last year's budget works well as a heuristic for coordination between decision-makers. However, if more information is available to the decision-makers, the use of last year's budget as a decision-making heuristic becomes less prevalent.

Another budget heuristic discussed by Wildavsky was that budgeting is experiential. Politicians make rough guesses, let experience accumulate, and then make the necessary adjustments. The results show that the experience incurred from deviations between budgets and accounts has substantial influence on the budgetary output, as politicians adjust the output in upwards direction if there was overspending and downwards if there was underspending. The dissertation also provides evidence showing that policies of others have substantial effects on the budget level, but also that neighbors are much more influential in that regard compared to those within a common benchmarking network.

Thus, the dissertation provides two important contributions to the budget literature. First, the dissertation opens up the black box of individual level decision-making by showing that previously identified use of last year’s budget, as a heuristics at the macro level, is also identifiable at the individual level. Second, the dissertation shows how two forgotten and under researched heuristics, namely experience and comparisons, have substantial impacts on the decisional output of the budgetary process. Methodologically, the dissertation also contributes to the literature by systematically investigating these heuristics in analyses that leverages the availability of data across a large number of units and long timespans.

The dissertation consists of this summary report, one published article and three unpublished papers.

Table 1. Articles and papers included in the dissertation

Paper	Title
1	“Negative feedback, political attention, and public policy”. Co-authored with Martin Bækgaard and Peter Bjerre Mortensen. Published in <i>Public Administration</i> (doi:10.1111/padm.12569)
2	“A trade-off between information and clarity? Investigating budgetary coordination in a lab experiment”. Unpublished paper
3	“Budgetary incrementalism revisited: Identifying an ignored experiential heuristic”. Unpublished paper
4	“Policy spillover in local government: A spatial analysis of neighbor and benchmarking effects”. Unpublished paper

Chapter 2.

Theoretical Framework

This chapter presents the theoretical underpinnings of the dissertation. The chapter begins with a general introduction to the bounded rationality framework together with a discussion of how the behavior of boundedly rational decision-makers is expected to shape decision-making in a public budgeting context. The chapter then moves on to specifying and laying out the theoretical framework of the individual articles and papers of the dissertation, and ends with an overview of how the individual papers are connected in the overall theoretical framework.

2.1. Budgeting in a complex decision environment

How humans make decisions has always been a central interest of social science. From early on, the assumption has been that humans are rational decision-makers who, under circumstances of perfect information, could arrive at the optimal solution to a given problem (Bendor 2010). This approach to decision-making has been described as the rational-comprehensive approach, where values and objectives are clarified before going to the empirical analysis, and ends are isolated before finding the means to achieve them (Lindblom 1959).

However, an extensive scholarly tradition has sought to make a break with what many consider unrealistic assumptions about human decision-making capabilities. Herbert Simon is a critical figure within this literature, as he was the first to formulate the theory of bounded rationality in his seminal book *Administrative Behavior* (1947). In this, he argues that decision-makers are trying to act goal oriented and intendedly rational, but also that their difficulties in doing so are much more pronounced than predicted by the rational-comprehensive model of decision-making. In his works, Simon points to two factors constraining decision-makers: “[h]uman rational behavior [...] is shaped by a scissors whose two blades are the structure of task environments and the computational capabilities of the actor” (Simon 1990, 7).

The next subsection will explore whether and to what degree these two factors are at play in the type of decisions investigated in this dissertation by disentangling the characteristics of the decision-making environment and the computational capabilities of the actors involved in these decisions. Following this, a subsection will explore the heuristic tools that budgetary actors use in

order to reach decisions in light of these constraining factors. The last subsection of this chapter will give an overview of the papers and articles that make up this dissertation and the theoretical background of these.

2.2. The characteristics of the budgeting task environment and the budgetary actors

In his works, Simon highlighted a number of task environment characteristics as important in relation to whether decision-makers will be able to act rational or if they would instead be expected to display bounded rational behavior (Bendor 2010).

One important feature of the environment is whether time is a limited resource. This will always be the case in political decision-making, as a government ultimately only has an election period to enact its policies before it is potentially overturned and a new government with different priorities is in office and making the decisions. Time is especially limited in the case of public budgeting, where consequences can be severe both politically and electorally if the process of making new budgets drags out. This decision-making process has to run in parallel with all the other types of political decisions that also need attention and time. Furthermore, in some political settings, such as many types of local government, politicians do not work full time, making time an even more limited resource.

Another feature is the number of alternatives. It is easier to achieve rational decision-making if only a limited number is up for discussion. The number of alternatives to consider in a budgeting process is almost immeasurable, since the process can potentially involve the prioritization between the complete range of services and programs that the government offers to citizens. As an example, the Danish government's proposal for the 2019 budget consisted of 3,514 pages in total (Finansministeriet 2018).

A more general characteristic of decision-making in political environments is the constant presence of divergent interests among decision-makers. The democratic setting of politics stipulates that a majority of an assembly must agree before it is possible to reach a decision. Thus, some degree of coordination between decision-makers is also necessary before decisions are realizable. These characteristics of the budgetary process would not be a hindrance to rational decision-making if decision-makers had unlimited computational power, but as Simon (1990) argues, this is most likely not the case.

According to syntheses of the bounded rationality literature, several properties of human information processing can be highlighted that needs to be considered when we develop theories of political decision-making (Bendor 2010, 16; Jones 2003). First, the amount of information available to decision-

makers in their objective environments will far exceed what they can perceive and attend to. Therefore, it is the selective attention of decision-makers that guide their information processing, rather than lack of information. Second, especially conscious thinking and high-order information processing are largely serial in nature. The consequence is that decision-makers will have a tendency to focus on only a few aspects of the information at a time while ignoring others that might become relevant in the future. Third, the aspirations of decision-makers play a central part in their search for information. A boundedly rational decision-maker will search for information until he can make a decision that he deems to be satisfying rather than seek for an optimal one (Simon 1955).

These properties of human information processing taken together with the characteristics of the budgeting task environments imply that we should anticipate the limitations of human rational behavior to be particularly visible in the context that is the subject of this dissertation.

2.3. Managing budgeting complexity in light of bounded rationality

In order to overcome the obstacles presented by the immeasurable amount of information and number of possible alternatives to choose from, decision-makers employ a range of tools in order to make the decision-making task manageable. Different terms have been used about these tools. Among them the is term heuristics, which could be defined as: "... cognitive shortcuts, rules of thumb for making certain judgments or inferences that are useful in decision-making with considerably less than the complete search for alternatives and the consequences associated with alternatives dictated by rational choice." (Lau 2003, 31).

Wildavsky was one of the first scholars to recognize the consequences of decision-makers being boundedly rational, and that the use of heuristics within budgeting was one of the keys to obtaining a better understanding of the budgetary process. In his seminal observational study of budgeting in the US federal government, Wildavsky (1964) points to several heuristics used by politicians to simplify the decision-making process. His early writings are most famous for introducing the concept of incrementalism into the study of budgeting, which emphasizes the importance of last year's budget as a central component of current budget decisions. However, the subsequent focus on incrementalism has overshadowed some of the other observations made in this study, one example being the proposition that budgeting is experiential. He suggests that politicians start out by making rough guesses on what a budget

allocation should be, let experience accumulate throughout the year before making the necessary adjustments to the budget in the following year.

Another heuristic that has not seen much interest from scholars studying budgeting is the use of comparisons as a heuristic in decision-making. This relates to decision-makers' use of aspiration, which sets the limit to when they will stop searching for solutions to a given problem (Simon 1955). Extant literature suggests that social comparisons are often used for setting aspiration levels (e.g., Festinger 1954; Salmon 1987; Olsen 2017), but whether and to what extent these comparisons influence the budgetary process and the output has not received much attention.

Despite being central in much of the budgetary literature, many questions regarding the influence and consequences of heuristics use in budgeting are still unanswered. As pointed out by Jones (2017, 73) we need to improve our understanding of the rules decision-makers use for choosing among potential alternatives and which parts of a complex environment are chosen as relevant, that is, which information is fed into these rules, in order to gain insight into policy processes such as budgeting. Thus, the papers included in this dissertation aim at improving our understanding of the budgetary process by investigating how these three heuristics affect different aspects of the process. The following subsections will describe each of these heuristics more thoroughly together with the theoretical framework used in the individual papers in order to investigate these.

2.3.1. Last year's budget as the starting point

A central focus in the budgetary literature, and particularly that concerning incrementalism, has been how previous budget decisions affect the budgetary process. A famous quote by Wildavsky encapsulates his view on this: "The largest determining factor of the size and content of this year's budget is last year's budget" (1964, 13). Therefore, attention is only given to a narrow range of increases and decreases in the budget to come (1964, 15). Papers 1 and 2 of the dissertation investigate this claim further. Paper 1 explores whether the spending preferences of the politicians engaged in this process are affected by last year's level of spending, which should be expected if last year's budget has the determining power suggested by scholars of incrementalism. Paper 2 takes a broader look at the budgetary process, and investigates to what extent information about last year's budget works as a coordinative focal point in the budgetary process and whether adding information to the budgetary process affects the use of this as a budgetary heuristic.

2.3.1.1. Last year's budget and political spending preferences

Paper 1 explores why, most of the time, we observe a stabilizing mechanism, such as the one implied by incrementalism, where changes in last year's policy is counteracted in this year's policy. Furthermore, the paper investigates when last year's policy loses its predictive power over this year's policy. Several studies of public policy have found stabilizing mechanisms of negative feedback that work through a thermostatic process in which most changes are counteracted by subsequent changes in the opposite direction (e.g., Hall 1993; Sabatier 1987, 1988; Baumgartner and Jones 2009). Previous literature on policymaking often contains micro-theoretical models of individual decision-making but limits the study of stability and change to the aggregate macro-level of policymaking. The aim of this paper is therefore to study patterns of negative feedback at the individual level.

Within the literature on public opinion formation, Soroka and Wlezien (2010) have shown that a thermostatic model is part of what drives the spending preferences of the most "informed" part of the public. Building on their insights, we argue that a thermostatic model governs the spending preferences of politicians, suggesting that politicians might behave in a similar way. Much like the informed public, politicians could be expected to lower their spending preference in an area if this area has received spending increases. This means that if spending on a given policy area, for instance, is high relative to earlier spending or to spending in comparable political units, they will prefer relatively less spending on that area. On the other hand, if spending on a given area is low, policymakers will tend to prefer relatively more spending on that area.

However, the presence of this thermostatic relationship might be contingent on the level of attention directed at the specific area. A core claim by Jones and Baumgartner (2005a, 329) is that: "Attention at the individual and collective levels governs the shift from stasis to the positive feedback processes...". This quote shows their focus on both negative and positive feedback. The first is the stabilizing process in which changes from the status quo are counterbalanced and the latter is the process by which changes are reinforced instead (Baumgartner and Jones 2002, 13). Thus, a process of negative feedback is the prevailing one when attention to an area is relatively low, but when attention to an area rises, this mechanism may be weakened or even shift to a process of positive feedback (Jones 2001, 144). A few case studies have found support for this claim (e.g., Baumgartner and Jones 2002, 2009), but the type of large-scale systematic empirical analysis that we undertake in this paper has not previously been carried out.

2.3.1.2. Last year's budget and coordination in the budgetary process

As emphasized by Wildavsky, using last year's budget as a starting point reduces complexity because it encompasses all the compromises that have come before this year's budget negotiations (Wildavsky 1964, 13). Paper 2 investigates whether adding information to the budgetary process affects the use of last year's budget as a common focal point in the coordination between decision-makers. Baumgartner and Jones argue that there is a trade-off between information and clarity. As the number of perspectives involved in decision-making increases, the difficulty of decision-making increases exponentially since the complexity of comparing perspectives quickly becomes overwhelming (Baumgartner and Jones 2015, 50-2).

A range of experimental studies, primarily within the fields of economics and finance, seem to support this claim, showing that the value of additional information is not necessarily positive and in some cases negative (e.g., Huber, Kirchler, and Sutter 2008; Zilu, Chris, and Rachel 2014; Weiss 1982). Joyce (2008) is one of the few who studies the consequences of rising amounts of information in the budgetary setting. In his review of US budgetary reforms and practices, he suggests that increased supply of information has negatively affected the budgetary process in a number of ways, because this increase makes it harder for decision-makers to find common ground in the process. However, a study in a more controlled environment is necessary if we want to make a causal claim about the tradeoff between information and clarity in the budgetary process.

The study presented in Paper 2 draws on Schelling's (1960) focal point theory in order to understand how adding information affects the budgetary process. In this, he argues that actors with common goals that cannot or will not communicate are often able to coordinate their actions if they mutually recognized a common focal point (Schelling 1960, 57). In a budgetary setting, the common goal of decision-makers is to reach an agreement on the budget. However, each decision-maker involved in the process has his or her own preferences regarding what would be the best agreement. Thus, in order to reach agreement, decision-makers need a focal point that guides the coordination toward a meeting point where decision-makers can draw up a new budget.

As pointed out by Wildavsky (1964), last year's budget is one of the most important focal points in the budgetary decision-making process. Likewise, several other studies have acknowledged last year's budget as a primary heuristic vehicle for making budgetary decisions (e.g., Jones and Baumgartner 2005a; Jones, Zalányi, and Érdi 2014). One explanation of the usage of last year's budget as a focal point might be that it is a mutually and universally

recognized norm in budgeting that allows decision-makers to coordinate actions to their mutual benefit, minimize risks, and increase stability (Serritzlew 2003; Boyne, Ashworth, and Powell 2000).

However, the use of last year's budget as a common focal point might be affected when introducing additional focal points and, thus, increase the amount of information available to decision-makers. When the number of potential signals one can choose to focus on rises, the likelihood that all parties involved in the process are able to recognize the same focal point decreases (Schelling 1960, 58). A consequence of adding information might therefore be that participants are unable to recognize the same focal point as the one to focus on, and coordination of individual actions become more difficult. Thus, the main theoretical question investigated in Paper 2 is how the amount of information available to decision-makers affects the coordinative powers of last year's budget as the base of the new budget and how adding information affects different sub-stages of the budgetary process. I hypothesize that adding information will lead to more variance across budget proposals, more varied use of arguments, longer negotiations, budgets less reflective of the existing allocation, and budgets less reflective of individual budget proposals.

In addition, Paper 2 also investigates whether the effect of adding information to the budgetary process is affected by the fiscal climate, that is, whether there is money to spend, or if cuts are necessary. A range of studies has suggested that the starting point of the budgetary process is of crucial importance (Caiden 1984; Bozeman and Straussman 1982). As noted by Behn: "If this year's budget is to be less than last year's, the old rules do not apply" (1985, 157). Jick and Murray (1982), for example, find that an "across-the-board" logic is much more prevalent in a cutback scenario. This is a finding that is also supported in newer research, suggesting that additional information matters less in this type of situation (Raudla and Savi 2015).

2.3.2. An experiential budgeting heuristic

Paper 3 investigates a heuristic pointed out by Wildavsky in his seminal book from 1964, namely the use of experience as a tool in budgeting. Compared to the incremental heuristic also uncovered in his book, the study of an experiential heuristic has received surprisingly little interest from scholars. Wildavsky describes decision-makers' use of this heuristic as follows: "One way of dealing with problems of huge magnitude is to only make the roughest guesses while letting experience accumulate. Then, when the consequences of the various actions become apparent, it is possible to make modifications to avoid difficulties" (Wildavsky 1964, 11).

In this paper I argue, that one of the most important sources of experience is whether last year's account fits this year's budget. Here, last year's budget can be seen as a product of the rough guesses that politicians have made about the appropriate level of expenditure within an area. The account, on the other hand, reflects the actual appropriation needed within an area, including both the need for supplementary appropriation and unspent budget allocations. Thus, the deviation between last year's account and last year's budget presents valuable information to politicians, and it reflects the experience they have gathered throughout the budget year, that is, the modifications necessary to avoid difficulties.

The literature investigating this deviation is very limited. Reasons for this could be that detailed, itemized and comparable budget and account data are rarely available or unreliable (Wlezien and Soroka 2003) or that a division of labor has emerged where scholars studying budgets miss the fact that accounts are published between budgets, providing new and updated knowledge to decision-makers. The few studies that do investigate deviation between budget and account focus on this as the dependent variable, and primarily with the aim of explaining overspending as a consequence of institutional and political factors (e.g., Serritzlew 2005; Blom-Hansen 2002; Houlberg 1999; Blom-Hansen 2010). Therefore, they do not help us understand how experience coming from this deviation between last year's budget and account affects decisions on this year's budget.

Building on this argument, Paper 3 proposes an extension of the incremental model developed by Davis, Dempster, and Wildavsky (1966) that incorporates an experiential feedback link. The model suggests that decision-makers will be responsive to deviations and adjust the next budget according to these. Thus, if accounts were higher than the budgets last year, meaning that overspending has occurred, decision-makers will adjust this year's budget upwards. Conversely, if accounts are lower than the budgets, meaning that underspending has occurred, decision-makers will adjust this year's budget downwards

2.3.3. The use of comparisons in budgeting

Paper 4 investigates whether and to what extent the use of comparisons as a heuristic leads to diffusion of similar budget decisions. The use of comparisons as a means of decision-making has a longstanding interest within several of the social sciences, such as psychology (Festinger 1954), economics (Salmon 1987; Kahneman and Tversky 1979), and political science (e.g. Nielsen and Baekgaard 2015; Geys and Sørensen 2018; Nielsen and Moynihan 2017; George et al. 2017; Olsen 2017). According to Simon (1955), boundedly

rational decision-makers tend to search for solutions to problems until they reach a solution that they believe to be satisfying. In order to evaluate whether a solution to a problem is satisfying or not, they need to set an aspiration level, and this is where the use of comparisons becomes relevant. A central question, then, is where to look when making these comparisons. Simon himself was one of the first to suggest that a valuable source of comparison could be social comparisons where data on someone or something “... more or less similar in size, situation, and structure ...” (Simon 1937, 525) would be the an appropriate comparison.

The theoretical framework of Paper 4 is based on the policy diffusion literature, which is concerned with the question of from where policies diffuse and why. Building on the work of DiMaggio and Powell (1983), I argue that local governments, as a response to uncertainty both in relation to one’s own goals but also in relation to the expectations and demands of the surroundings, will mimic other organizations that they find legitimate or relevant. Aspiring for the solutions used in other places thus becomes a cost-effective way to deal with these problems of uncertainty (DiMaggio and Powell 1983, 151). However, depending on the mechanism of diffusion, diffusion (or mimicking) might come from different groups of comparison.

This paper studies two of the most common mechanisms of diffusion, namely competition and learning (Shipan and Volden 2008). In a local government setting the mechanism of competition points to comparison with a group of neighboring local governments. Because citizens are mobile and can move between jurisdictions, a primary concern to the decision-makers of a local government is how to handle the externalities coming from policies adopted in other local governments and thereby ensure that citizens stay and pay their taxes (Bailey and Rom 2004; Tiebout 1956; Peterson 1995, 1981; Shipan and Volden 2008). Because relocating is also costly to citizens, both in terms of direct costs associated with the move, but also in terms of breaking bonds with friends and family, the uncertainty brought on by competition is mostly related to geographical units within close proximity of each other (Berry and Baybeck 2005). Since all local governments have these considerations in relation to externalities, the need to reduce the uncertainty brought on by competition is expected to result in mimicking behavior, where a local government copies the policies of its neighbors.

The bulk of literature investigating competition effects on policy diffusion focuses on the American context. Here competition effects on policy diffusion are identified in a range of policy areas, such as state lottery adoption (e.g., Erekson et al. 1999; Alm, McKee, and Skidmore 1993; Baybeck, Berry, and Siegel 2011; Berry and Baybeck 2005), welfare policies (e.g., Berry and

Baybeck 2005; Bailey and Rom 2004), and antismoking policies (Shipan and Volden 2008).

Policy learning refers to the fact that other local governments can be seen as “Laboratories of Democracy” (Boushey 2010). By observing how other local governments have handled the problems facing them, one can learn from their experiences and use these in the implementation of new policies or adaption of existing ones. The process of learning begins with the identification of a problem and then a search for a solution. In this process of problem solving, learning about policy solutions that have proved themselves elsewhere can be an effective way of reducing the costs of search (Boehmke and Witmer 2004; Berry and Baybeck 2005). Thus, the policies of other local governments that one deems to be legitimate comparisons become the policies to aspire for.

In recent years, learning networks such as benchmarking networks have become increasingly widespread (Kouzmin et al. 1999; Askim, Johnsen, and Christophersen 2008). By comparing the local government with similar local governments, it becomes apparent whether the provided level of service is below, on par with or above that of others. Depending on how a local government thinks it should be placed in reference to its peers, this comparison might reveal areas in need of attention. Second, by carrying out this comparison, it also becomes clear to an organization where to look in order to find policies that can be adapted and implemented within the organization. Therefore, policy diffusion through learning effects in benchmarking networks comes from the import of practices of others within this network (Keehley and Abercrombie 2008, 12; DiMaggio and Powell 1983, 152).

Studies of learning effects have looked at several different contexts, such as between countries (Meseguer 2006; Gilardi, Füglistner, and Luyet 2008), between US states (Volden 2006), and within policy and professional networks (Balla 2001; Mintrom and Vergari 1998). Very few studies have investigated how and to what extent learning effects through participation in benchmarking networks cause policy diffusion, and those who have find mixed results. In a study of municipals participating in benchmarking networks, Houlberg (2000) finds evidence of expenditure convergence across several policy areas within groups that engage in benchmarking. However, in a North Carolina study of local governments’ use of a fiscal benchmarking tool, Gerrish and Spreen (2017) found no evidence of learning caused by this tool, as mean values of the indicators being studied did not change within the investigated period.

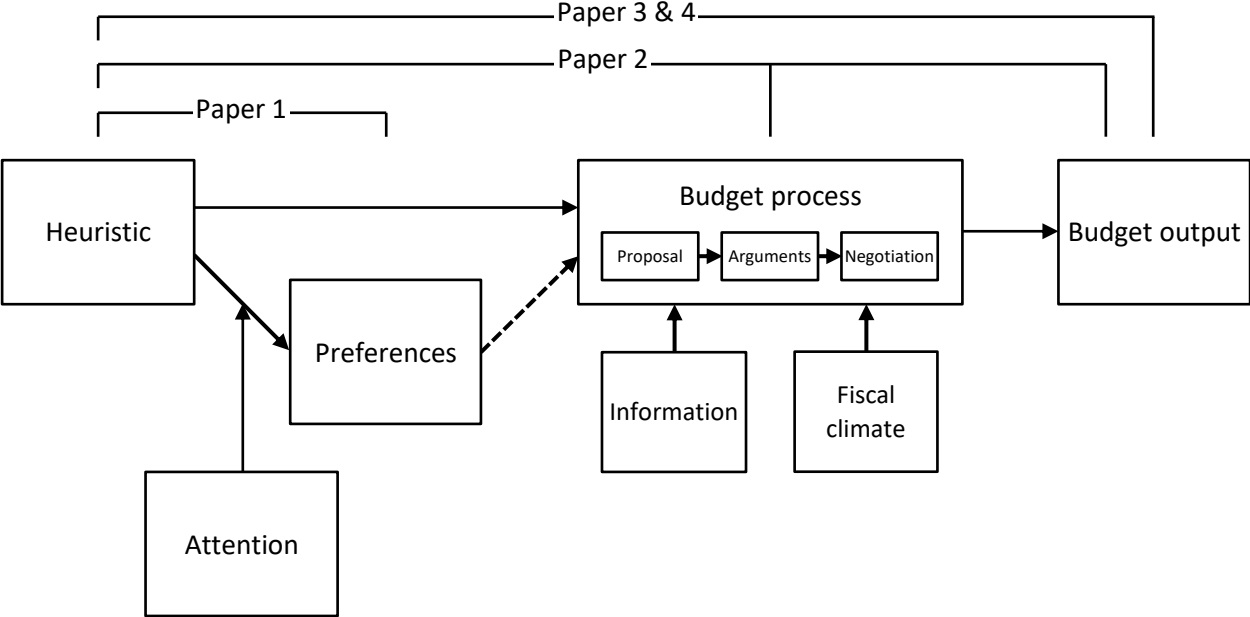
Paper 4 investigates three propositions in relation to these mechanisms of policy diffusion. The first is that mimicking pressure created by the constant competition with neighbor local governments will result in policy diffusion from these. The second is that participation in benchmarking networks will

result in policy diffusion between local governments within these networks, as these networks are created with the specific purpose of facilitating learning between the organizations within them. The last proposition concerns the extent of the mimicking pressure coming from these two groups. There is no reason to think that diffusion caused by these mechanisms cannot occur simultaneously, but the type of pressure coming from competition is likely to have a much stronger presence, as this is constant, ongoing, and tangible, while benchmarking with others might be more sporadic and abstract. Thus, the diffusion coming from neighbors is expected to be stronger than that coming from a benchmarking network.

2.4. Overview of theoretical framework

To round off this theoretical chapter, I will give an overview of how the individual papers contribute to answering the overall research question of the dissertation. Figure 1 below illustrates the relationship between the individual papers and the budgetary process and output that they study. As it is evident from the figure, the dissertation investigates many different aspects of the budgetary process. Paper 1 investigates how the use of last year's budget affects the spending preferences of politicians, and whether this relationship is conditioned by political attention. Paper 2 investigates how last year's budget affects the budgetary process and the decisional output, and whether these are affected by adding information to the process or by changed fiscal climate. Paper 3 examines how experience affect the budget output, and Paper 4 how comparisons between neighbors and within benchmarking networks affect budget output. The dotted arrow illustrates a relationship between preferences and budget process that is not examined in this dissertation. However, the expectation is that politicians' spending preferences affect elements of the budget process, such as budget proposals and budgetary arguments, which will ultimately affect budget output.

Figure 1. Overview of theoretical framework and individual papers



Chapter 3.

Research designs

This chapter describes the research design, data and methods used in this dissertation. The chapter begins with a discussion of some general considerations regarding how to best address the research question of the dissertation. Following this, the chapter gives an overview of the individual papers, the type of data used in these, and a discussion of the measurements of the relevant dependent and independent variables.

3.1. Considerations about the choice of research design

The overall research question of this dissertation concerns in what way and to what extent the use of heuristics affects the budgetary process and the decisional output. In order to answer this question the individual studies in the dissertation have employed a range of different methods and types of data, with analyses of both individual decision-makers and aggregate decisional output.

Many previous studies of heuristics use in budgeting have a strong micro-level model of human information processing but limit their empirical studies to focus on the decisional output observable at the macro-level. Even Wildavsky was quick to make this jump following his path-breaking studies of decision-making in the US federal government, as he and his colleagues began to study budget output instead (e.g., Davis, Dempster, and Wildavsky 1966, 1974). Another example of this is the studies of Jones and Baumgartner, who argue that “... humans are the ‘building blocks’ of organizations, the connection between individual information-processing and organizational information-processing is not metaphorical; it is causal” (Jones and Baumgartner 2005b, 42). This may be true, but the empirical underpinnings of the claim are weak. Therefore, it has been a central concern of this dissertation to address the overall research question through both individual micro-level studies and aggregate macro-level studies of decisional output.

Another consideration influencing the research design choices in this dissertation has been to use the broadest possible set of data sources. By using different data sources, it becomes easier to claim that the results produced are not driven by the same data source used in all studies (Andersen, Pedersen, and Heinesen 2016). To ensure that this is not the case, the dissertation uses both survey, experimental and observational data.

A similar concern regards the empirical methods used, where considerations about validity and generalizability are important. Thus, the dissertation employs randomized experimental methods that present high degrees of internal validity, as the level of control over exposure and timing is superior to any other methods, and ensures strong grounds for causal inference. However, the external validity of this type of design is generally low (Blom-Hansen, Morton, and Serritzlew 2015). Because of this, the dissertation also builds on studies using longitudinal panel data methods with fixed effects, which are high on external validity and lower on internal validity compared to an experimental approach.

An overview of the different research designs, data type and sources is presented in Table 2 below.

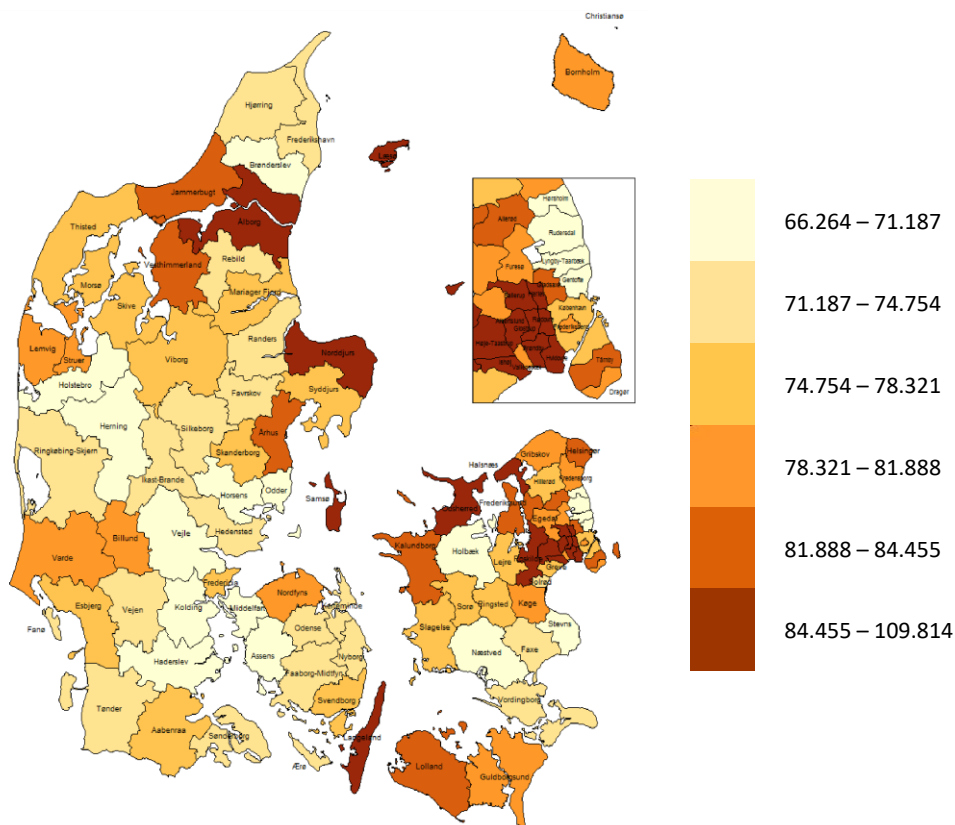
Table 2. Overview of data and research designs used in the dissertation

	Research question	Budget heuristics	Research design	Level of analysis	Data types	Data sources
1	Do preferences of politicians respond in a thermostatic way to policy, and is the level of attention conditioning this?	Last year's budget	Repeated cross-section analysis: Uses a mixed-effects multilevel model	Multi-level	Survey and observational data	Survey of local politicians spending preferences: Three wave surveys of local politicians spending preferences in 2008, 2009, and 2012 (N=~3,000 (small variations across budget area)) Statistics Denmark: Municipal budget and spending data for seven budget areas, including a range structural measures in 2008, 2009, and 2012 (N=294) CAPCAS project: Coding of municipal council agendas for covering seven budget areas in 2008, 2009 and 2012 (N=294)
2	Does adding information to the budgetary decision-making process make it harder to find common ground?	Last year's budget	Laboratory experiment: Uses variance analysis and means calculations to investigate the consequences of added information to the process	Micro	Experimental data	Lab experiment: Data on individual budget proposals and arguments, group budget decisions and time usage (N=120)
3	Do politicians adjust budget levels based on the experience gathered throughout the budget year?	Experience	Panel data analysis: Uses a fixed-effects model to investigate the effect of deviations between last year's account and budget on this year's budget	Macro	Observational data	Statistics Denmark: Municipal budget and spending data for seven budget areas, including a range structural measures from 2007-2017 (N=1,078)
4	Do politicians adjust budget levels based on comparison with neighbor and benchmarking municipalities?	Social comparison	Panel data analysis: Uses a spatial fixed-effects model to investigate the spatial dependence in relation to two comparison groups	Macro	Observational data	ECO-Nøgletal: Municipal budget data, comparison groups and subscription information covering seven budget areas from 2007 to 2017 (N=1,078) Statistics Denmark: Data on a broad range of structural measures from 2007 to 2017 (N=1,078)

3.2. The general context of the papers

Common to all the papers in this dissertation is that they draw, some more than others, on the Danish municipal setting as a central part of the research design. The choice of Danish municipalities as the empirical testing ground has several reasons. The Danish municipalities account for half of the public expenditure in Denmark and provide a full range of services for their citizens from schools to road construction and maintenance. Additionally, they have very similar government structures but are also highly autonomous as they can choose their own levels of taxation and service (Heeager and Olesen 2018).

Figure 2. School budget per 6-16 year-olds (DKK), budget 2018



Source: VIVE – The Danish Center for Social Science Research, <http://eco.vive.dk/land-kort.asp>.

An example illustrating this is Figure 2 above, which shows the mean budget per school aged child in each municipality. As is evident from the figure, the variation across municipalities is quite significant, as the budgeted expenditure per schoolchild varies with up to almost 65 percent between municipalities. The factors mentioned above mean that there is little inter-unit variation in external effects or in government-structure characteristics. Thus, the variation in budgets for schooling that we see in Figure 2, or other municipal

budget areas for that matter, tend to be more directly linked to critical process and structure variables at the municipal level of analysis (Danziger 1978, 17). In addition, high quality and directly comparable spending and budget data are available for these units, specified to individual accounts and validated by external auditors. The high number of units (98 municipalities) coupled with the long time series available create the foundation for empirical testing using powerful statistical estimation tools. In Paper 1, where individual survey data on the spending preferences of politicians is used, the very high number of potential respondents is also an attractive attribute (John 2009). Additionally, as shown in Paper 1, these politicians are very willing to engage in surveys and scientific research in general.

3.3. Research design, data, and methods of individual papers

Beginning with Paper 1, which investigates whether a negative feedback effect of policy on spending preferences exists and whether the level of attention to a particular spending area conditions such an effect. The dependent variable in this study consists of survey data measuring the relative spending preferences of Danish municipal politicians by asking them whether they prefer much more, more, the same, less, or much less spending on a policy area compared to the current level of spending. Three surveys were sent out in 2008, 2009 and 2012 that measured spending preferences within seven different areas, namely schools, child care, elder care, culture and leisure, libraries, administration, and roads.³ The main independent variables consist of observational data in the form of spending measures per inhabitant in each policy area. Spending and budget data came from Statistics Denmark's databases. Furthermore, data on a number of potential confounders were collected from The Ministry of Interiors "Nøgletal" database together with the coding of individual characteristics based on municipal homepages included to improve the precision of statistical estimates. The conditional variable measures the attention given to a specific policy area. This variable contains the number of agenda points dedicated to a topic covered by the policy area under investigation. The data used here is part of the CAPCAS project dedicated to building a

³ Martin Bækgaard collected the survey data used here. See Bækgaard (2008, 2010); and Bækgaard and Nielsen (2013) for more information.

large dataset with coding of municipal agenda points in order to investigate the consequences of agenda setting.⁴

The estimation of such a model must be able to handle the hierarchical nature of the data used in this article, as it involves both individual and municipal level data. The dependent variable consists of three surveys of politicians' spending preferences with an election between the two first and the last surveys. This means that some politicians appear in all the surveys, giving the data a panel-like structure. However, some politicians only appear once or twice, which presents some challenges concerning the estimation of the models. To mitigate this, the article employs a multi-level, mixed-fixed effects model with spending preferences nested at the individual and municipal levels, thereby ensuring that repeated respondents are not driving the results. In addition to this, the models are fitted with clustered standard errors at the municipal level to account for municipal clustering.

Paper 2 investigates how the budgetary decision-making process and output are affected by adding information to the process. The research design employed in the paper is a laboratory experiment that asks a group of participants to compose an individual budget proposal for a fictitious municipal budget, and subsequently, meet and negotiate a final budget while collecting data on budget proposals, budget arguments, time usage, and final budget decisions. The experiment used two types of manipulation in the trials. One manipulation concerned whether participants should cut or increase the budget. The other manipulation concerned how much information participants had available to them. Either they had only the last year's budget or they had both last year's budget and some additional information, in the form of budget developments or budget differences compared to neighboring municipalities. The numbers on developments and differences presented in this last treatment were identical and served as a robustness test.

The questions investigated in this paper concern how adding information affects different steps of the budgetary process. The experimental logic of using randomized assignment of manipulations ensures that people assigned to different treatment groups are comparable on both observable and unobservable characteristics that could otherwise influence the results. Because of this, simple comparisons of means and variance within groups sufficed in answering these questions.

Paper 3 investigates whether politicians adjust the budget level based on the experience collected throughout a budget year. The data sources used in

⁴ The data used here is collected by the CAPCAS project and coded by trained student assistants in combination with machine coding. For more information on the data and coding see Loftis and Mortensen (2018)

this paper are equivalent to those used in Paper 1, but with the important difference that the research question is studied at the macro-level. Thus, the major difference between data sources used in Paper 1 is the absence of individual-level data. Another major difference in relation to the data is the time period studies. The number of surveys available limited the number of years that could be incorporated in Paper 1. This study uses pure observational data and is therefore not subject to these limitations. The data covers a period from 2007, which was the first year following a major amalgamation of Danish municipalities and, thus, an unavoidable data break, until 2017 and covers the same seven budget areas studied in Paper 1. The dependent variable in this study consists of the budget levels decided in the municipalities. The main independent variable measures the deviation between accounts and budget in the previous year, as an expression of the experience collected throughout last year, which should then affect the decision on next year's budget level. Similar to Paper 1, data on a number of potential confounders are collected from "Nøgletal" and included as control variables in the analysis.

Given the longitudinal structure of the data, with repeated observations of accounts and budget output in the municipalities, the estimation of the proposed model used a panel fixed-effects approach. Using fixed-effects provides control for any unobservable fixed confounders in the municipalities. Furthermore, since some intergroup clustering is likely to occur, the estimation of models for each budget area uses municipal cluster robust standard errors.

Paper 4 investigates whether politicians adjust budget levels based on comparisons with two groups, namely neighboring municipalities and municipalities within a common benchmarking network. The budget data used in this paper is essentially the same as those used in Papers 1 and 3, but the areas studied in this paper differ slightly from those studied in the other two papers, as the libraries area is swapped for the unemployment area. Furthermore, the budget accounts used to construct the overall area measures differs slightly. The main reason behind this is that the paper seeks to investigate and compare the spillover from two comparison groups. The benchmarking system used in this paper has well-defined measures for each of the areas investigated regarding which budget accounts to include in these. Since we know that municipalities that use this system are presented with exactly these numbers, they were chosen as the basis for the analysis. Thus, the dependent variable in this study is the budget level within these seven different budget areas. The research question investigated in this paper regards how a municipality is affected by the policy of other municipalities and whether there are traces of spillover between these. As such, this is a question of spatial dependence. In the one setting, it is a question of spatial dependence between neighboring municipali-

ties, and in the other setting a question of spatial dependence between municipalities within the same benchmarking network. Therefore, the main independent variables used in these studies consist of spatial lag variables containing the weighed budget level of other municipalities, as these are hypothesized to influence the budget level of the unit of analysis. The weights used to construct these variables are comparison-group specific. In the case of neighboring municipalities, the weights used are constant across time and budget area, as the relations between municipalities do not change over time or area. However, in the case of benchmarking networks, these weights change with time and they are area specific. They change over time as the composition of comparison municipalities are updated regularly, and the composition of these groups are also specific to each budget area. In addition to these spatial dependence variables, the paper includes a number of independent variables used to control for potential confounders and improve statistical precision. These data and measures are similar to those used in Papers 1 and 3.

The models estimated in this paper are spatial autoregressive models in which the dependent variable of other municipalities are expected to influence the dependent variable of the unit of analysis. A methodological challenge in this type of models would be potential problems of simultaneity, as the direction of causality might go both ways; that is, other municipalities affect the budget level in the unit of analysis, but the unit of analysis also affects the budget level of other municipalities. However, since the budgets in the units of analysis are all enacted at the same time, it is unlikely that this type of simultaneity is present. Therefore, it is more likely that there is a temporal lag between when the policies of other municipalities affect the policy of the unit of analysis. Consequently, a temporal lag is added to the spatial dependence variables. Because this eliminates the simultaneity problem, the paper uses a spatial least square estimation with fixed-effects.

Chapter 4.

Summary of findings

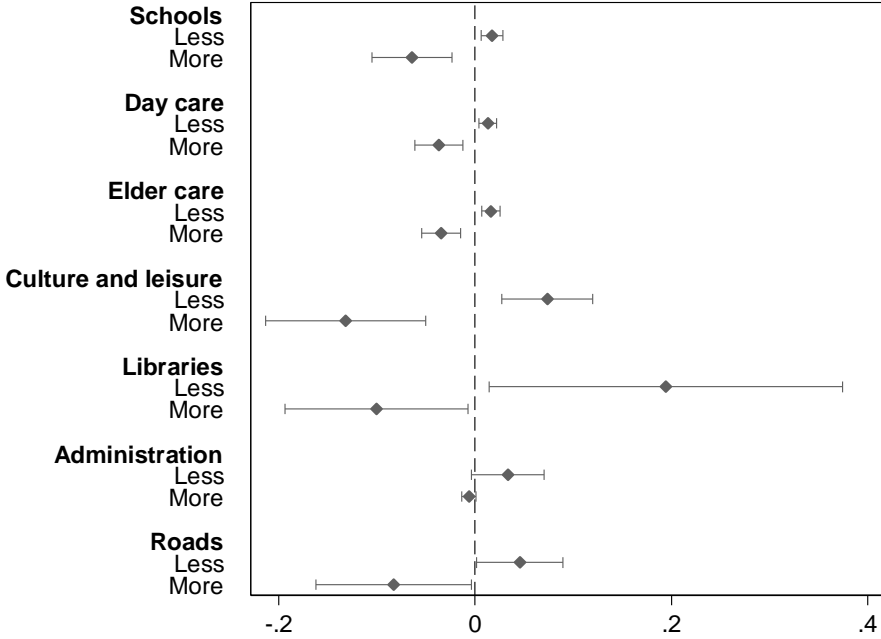
This chapter presents the main findings of the four papers in the dissertation. The structure will follow that of the theoretical chapter and thus begins with presenting the results from the two studies that investigate how last year's budget is used as a heuristic tool. Then, the results from the investigation of the experiential heuristic follows, and last, the results of how the use of comparisons affects budgeting. The chapter will conclude with a section summarizing the results across the individual papers.

4.1. Last year's budget as the starting point

4.1.1. Last year's budget and political spending preferences

Beginning with the results from Paper 1, one of the aims of this paper was to investigate whether a stabilizing negative feedback effect was identifiable across budget areas, suggesting that politicians spending preferences respond to actual expenditure in a thermostatic way. Figure 3 below presents the average marginal effects of the lagged spending variable on the probability of answering "more or much more spending" or "less or much less spending". The estimated marginal effects builds on regression analysis for each budget area. The results of these can be found in Table 5 in Paper 1.

Figure 3. Average marginal effects of lagged spending

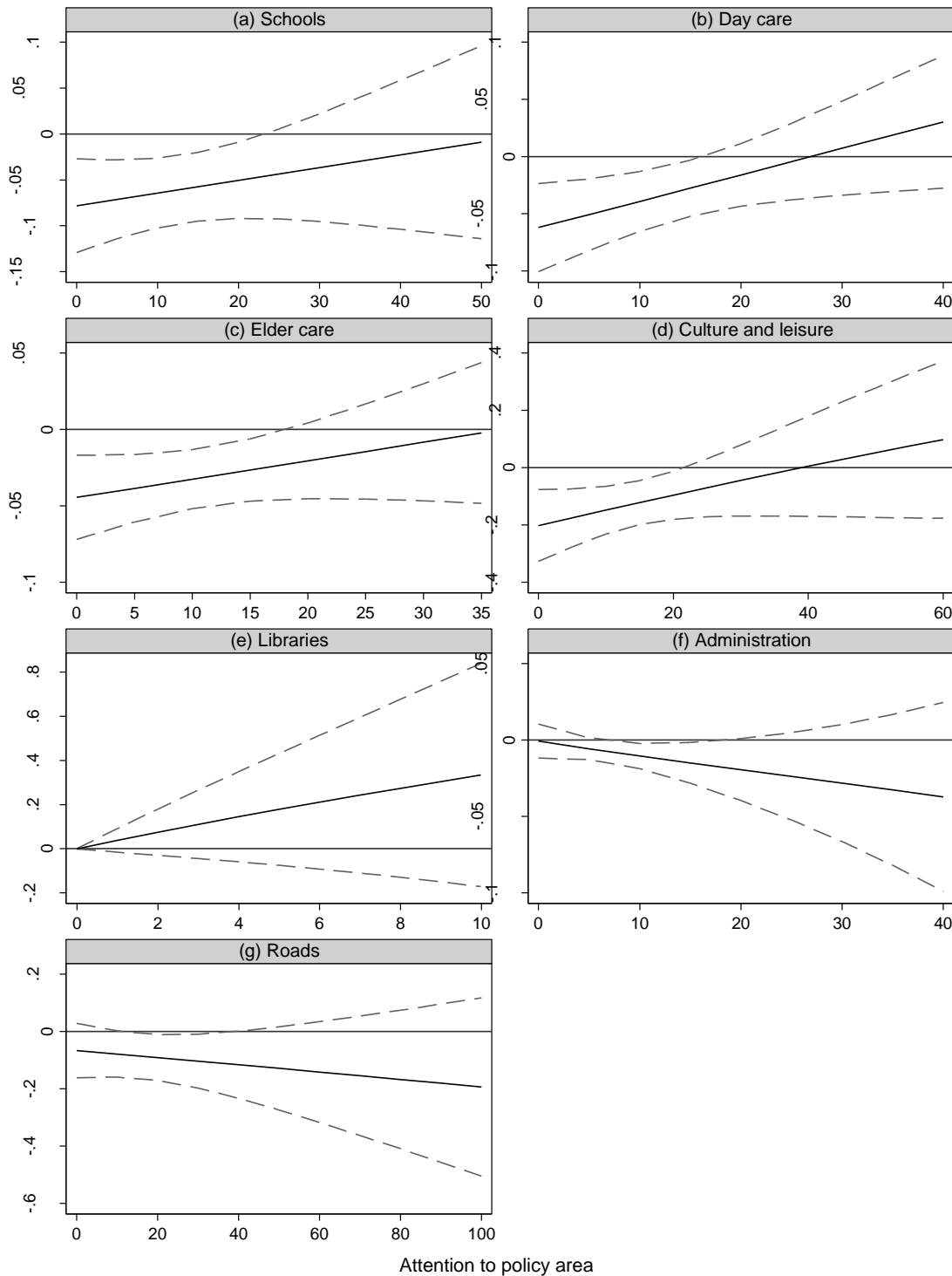


Note: The figure shows the average marginal effects of lagged spending on preferring either “less/much less” or “more/much more” spending. 95% confidence intervals shown.

The results presented in Figure 3 present clear evidence that a negative feedback effect dominates the spending preferences of Danish local government politicians. Within all seven areas, there is a clear tendency for politicians to answer “less” or “much less” when last year’s spending increased, and it decreased the probability of them answering “more” or “much more”. Another notable thing is that the sizes of the estimated marginal effects are very similar across five of the seven areas, with the exception of libraries and culture and leisure. The latter two areas do show a similar pattern, but as the wider confidence intervals show, the estimates are less certain. The consistent negative feedback effect coming from last year’s spending across a broad range of different policy areas is notable and it provides important individual-level support of the central negative feedback effect claimed by large parts of the public policy literature.

The second question investigated in this paper concerns whether the negative feedback of last year’s spending is reduced when political attention rises. Figure 4 below presents the results of the analysis concerning this question

Figure 4.a-4.g. The conditional effect of political attention (marginal effect of spending on preferring more or much more spending)



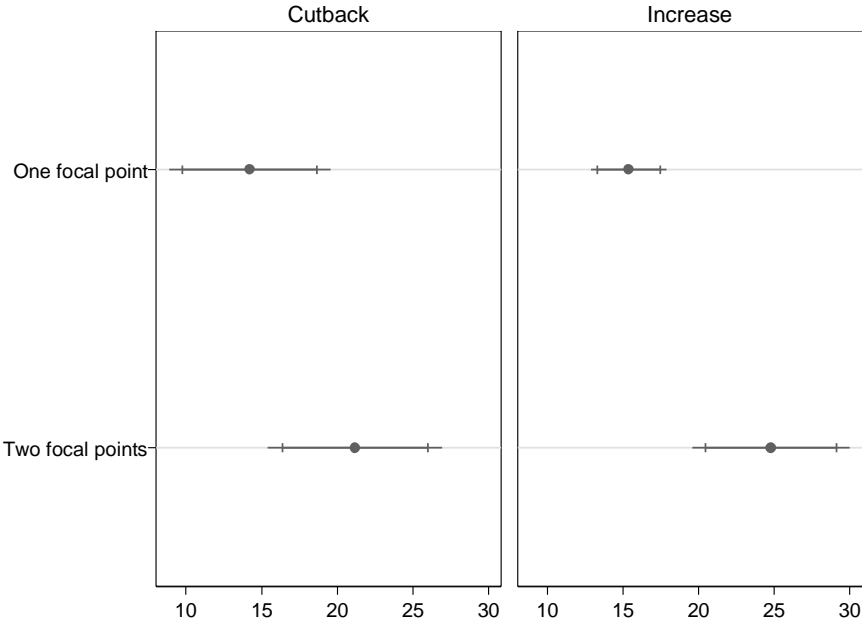
The figure shows the average marginal effects of last year's spending across different levels of political attention. The estimated marginal effects are based on regression analyses for each area that include interactions between spending area attention and last year's spending. The figure shows the expected relationship for the first four of these areas, namely schools, child care, elder

care, and culture and leisure. As attention to these areas increases, the negative feedback relationship between last year’s spending and spending preferences is weakened, and, notably becomes insignificant at a cutoff point of around 20 agenda points. The results presented here show important evidence that the consistent negative feedback relationship between last year’s spending and spending preferences is indeed conditioned by the level of attention, at least for some areas.

4.1.2. Last year’s budget and coordination in the budgetary process

The next results presented here concern whether decision-makers are able to coordinate their actions using information about last year’s budget when information is added to the decision-making process. The first results presented here relate to whether or not variance of individual budget proposals increases when adding information to the process. Figure 5 shows these results.

Figure 5. Mean variance across treatments



Note: Total N=80. Standard deviations (SD) are calculated for each budget area within participant groups, resulting in five SDs per group. The figure shows the mean of group level variance in budget allocations across all budget areas. Means are shown with 95% confidence interval. The vertical mark indicates the boundaries of the 90% confidence interval.

The figure shows the mean variance for each of the four treatments, the one focal point treatment being the one where only the information about last year’s budget was present and the two focal points treatment being the one

where information was added. When we look at the figure, there is a clear tendency in the variance changes when the amount of information increases. The mean standard deviation is around 15 when last year's budget is the only information available to participants no matter whether participants are asked to cut or increase the budget. It is also clear that the mean standard deviation increases in both the cutback and increase scenario when participants receive additional information, but the difference between these is only significant in the increase scenario.

Another question regarded how the arguments used to justify proposals by decision-makers were affected by the added information. Table 3 below presents arguments coded into four different argument categories.

Table 3. Overview of used arguments

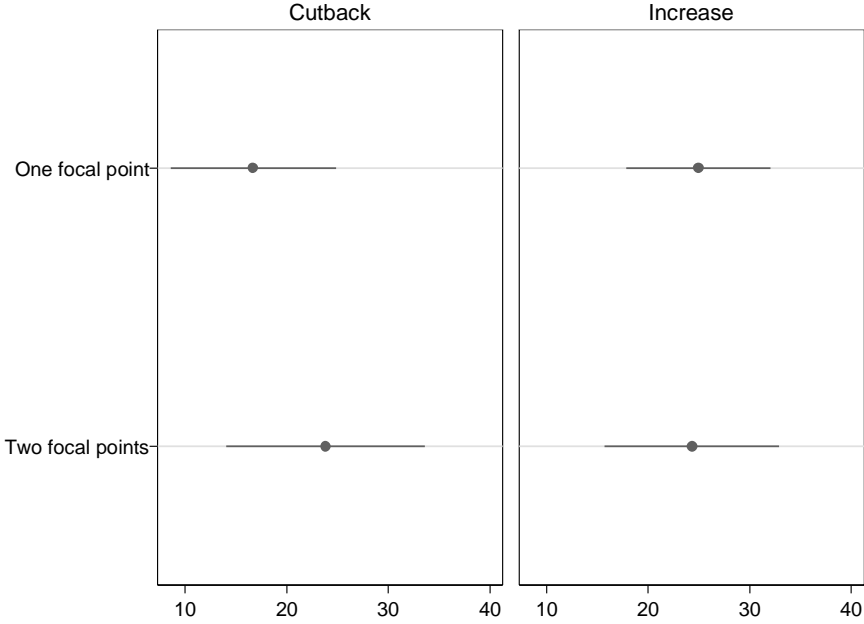
	Budget size	Additional information	Ideology	Strategy	Total
One focal point	42.0% (29)	-	44.9% (31)	13.0% (9)	100% (69)
Two focal points	24.7% (19)	32.5% (25)	39.0% (30)	3.9% (3)	100% (77)

Note: Share of participants mentioning the argument. Absolute number of arguments in parentheses. Arguments from 80 participants in total. Budget size arguments refers to the size of last year's budget as a whole or an individual budget item. Additional information refers to an argument concerning the additional potential focal point provided. Ideology arguments refer to his/her own priorities or beliefs of what is important. Strategy refers to any arguments indicating thoughts about how other participants might act.

The table shows that when additional information is given, participants tends to mention the size of last year's budget much less as a basis of their decision. Furthermore, the table shows that participants use the additional information given to justify their budget proposals. Thus, it is clear that when participants are given the chance to consider additional information when constructing their proposals for next year's budget, participants take both this and all other types of arguments into their considerations. Therefore, the result is a much more varied use of arguments to justify the chosen budget proposal.

The next analysis investigates if the final budget is closer to a proportional distribution of cuts or increases when last year's budget is the only information provided. The argument is tested by a calculation of the distance of the final budget from a proportional distribution of cuts or increases.

Figure 4. Deviation of final budget from a proportional allocation of cuts and increases

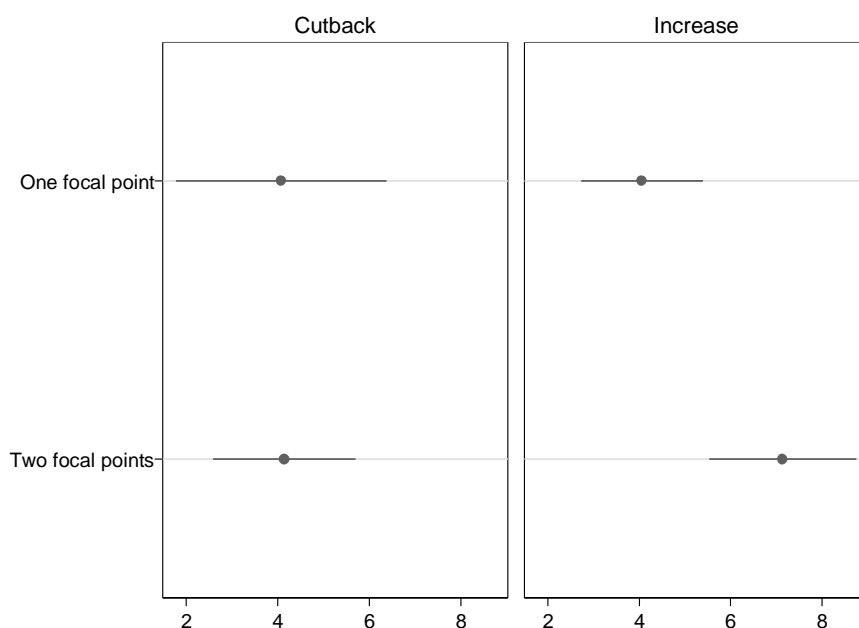


Note: Total N=80. Unit is the mean distance from proportional allocations in million DKK.

It is evident from Figure 4 that no matter whether participants have only last year’s budget or additional information, or whether they are asked to cut or increase the budget, the final budgets are far from a perfectly proportional allocation, since the mean distances to the proportional allocation ranges from DKK 16.7m to DKK 24.9m. This suggests that participants consider other things than the proportional distribution of last year’s budget when they negotiate.

The last analysis concerns whether the rising variance in individual budget proposals also changes the behavior of participants when they have to find a common compromise. In order to investigate this, the following analysis looks at how much the final compromise deviates from the mean of the individual proposals. The results of this analysis are presented in Figure 5 below.

Figure 6: Deviation of final budget from individual proposal averages



Note: Total N=80. Unit is the mean distance from group average in million DKK.

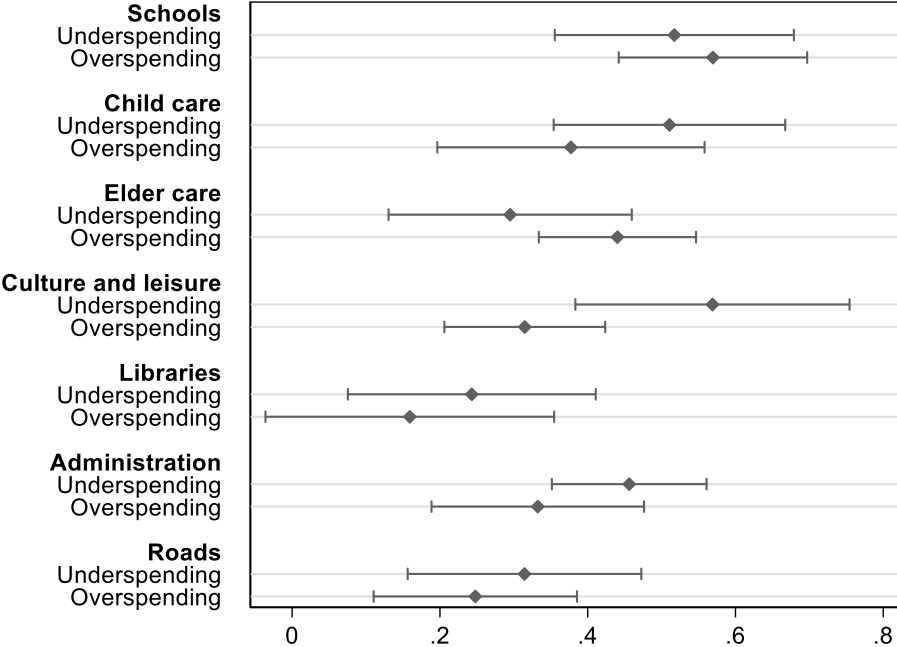
Given the distance in all the treatments presented in the figure, it is clear that the final budgets are not perfect averages of the budget proposals created by participants. Regardless of how much information given to participants, the final budget is around four million DKK away from the mean of their proposals in the cutback scenario. Since an across-the-board logic is also expected in this scenario, this result is consistent with the anticipation that additional information will not matter much to the decisions made by participants. The figure also shows that the deviation between the final budget and the average of individual budget proposals is similar to the cutback results when participants are asked to increase the budget, and only have information about last year's budget available. However, it is also clear that the final budget differs significantly from the average of individual proposals when additional information is given, as the mean distance increase by approximately three million DKK.

Thus, the results show increased variance of budget proposals, increased variation in arguments used, and greater disagreement on the final collective decision when information is added to the process. This demonstrates that increasingly diverse information complicates decision-making and makes coordination around last year's budget more difficult.

4.2. An experiential budgeting heuristic

The aim of Paper 3 was to investigate whether and how politicians adjust the budget based on the experience gained throughout the prior year, here investigated as the deviation between accounts and budgets. The results section in the paper presents a range of regression analyses, both on the overall budget level and within individual budget areas. Furthermore, the analyses are carried out both with and without a split deviation variable in order to investigate for asymmetric effects. The general picture presented in these analyses are very clear and consistent. Thus, in this results summary, the focus will be on effects within the individual budget areas. Figure 7 below displays the point estimates of the split deviation variable across seven budget areas.

Figure 7. Comparison of under- and overspending coefficients



Note: The figure builds on the regression results shown in Table 6 in Paper 3.

The figure shows clear evidence that deviations between last year’s budget and account have considerable influence on this year’s budget. The positive coefficients evident across the figure indicates that if municipalities spend more than what was budgeted the subsequent budget will be increased. Likewise, if municipalities spend less than what was budgeted the subsequent budget will be decreased. This suggests that politicians do seem to take the deviation between budgets and accounts into consideration when deciding on next year’s budget levels. When comparing the point estimates for under- and over-

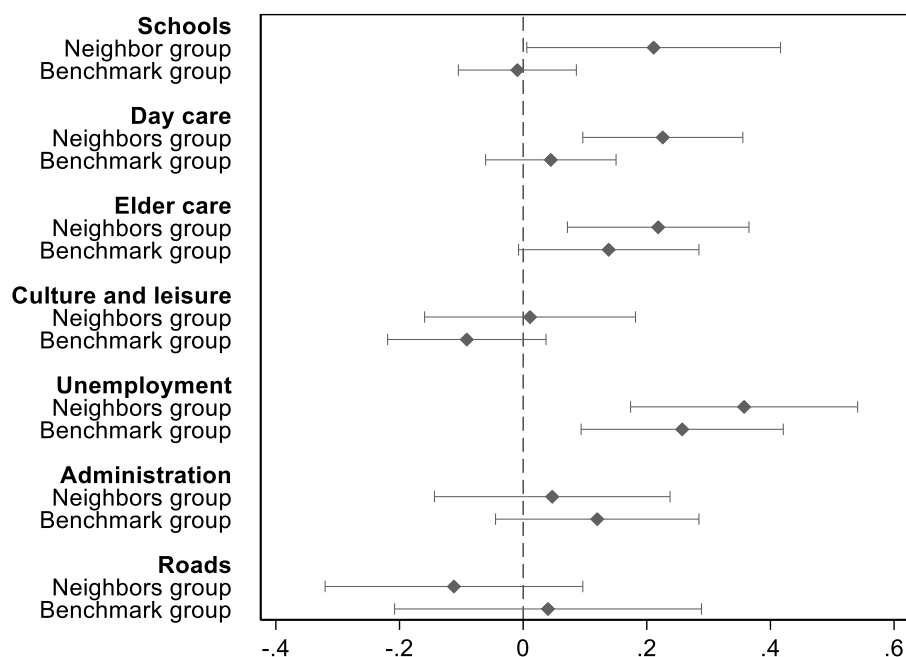
spending and their associated confidence intervals, there is no significant difference in the way politicians react to these deviations, as these intervals overlap within all areas.

In sum, the results presented here shows evidence of a substantial and statistically significant feedback effect across all investigated areas of the municipal budgets. Politicians will take deviations into consideration in the next budgeting cycle, if spending ends up being different from what was allocated in the budget negotiations. Underspensing will result in decreased budgets and overspending will result in increased budgets.

4.3. The use of comparisons in budgeting

Paper 4 investigates whether comparisons within groups of neighbor and benchmarking municipalities lead to policy diffusion in terms of budgeted expenditure. The primary vehicle in the investigation of this is the estimation of the effect of the spatial lag variable for each of these groups within each policy area. Figure 8 below compares the estimated effects of the spatial lag variable within these two groups.

Figure 8: Comparison of spatial dependence from two comparison groups



Note: The figure builds on the regression results shown in Table 2 and 3 in Paper 4.

Beginning with the neighbors group it is clear that there is a positive and significant effect of neighboring municipalities budgeted expenditure last year. These positive coefficients suggests that a municipality increase the budgeted expenditure for the school, child care, elder care, and employment areas in

response to increases in neighboring municipalities. The expectation was that municipalities would adjust their budgets in the same direction as their neighbors, and thus, the results support this expectation. When looking across the different policy areas it is notable, that spatial dependence is only found within four of the seven areas, which could suggest that spatial dependence might be conditioned by area specific differences. When we look at the diffusion effects from benchmarking group members it is clear that they are very limited. Only two areas show signs of spatial dependence, namely the unemployment area and the elder care area, if we accept a 10 percent significance level. However, diffusion does not seem to occur within benchmarking networks in any of the other areas under investigation. Consequently, it seems that spillover between municipalities within a benchmarking network is relatively limited and restricted to a few areas.

When comparing the neighbor and benchmarking groups it is clear, that, with the exception of the administration and roads areas, the coefficients of the neighbor group are consistently larger. This suggests that the general degree of mimicking is higher within the neighbor group as opposed to learning within the benchmarking group. It also suggests that when a municipality learns of policies used elsewhere, the pressure from learning will be less than the competition pressure from neighboring municipalities.

4.4. Overall findings

Based in these findings it is clear that heuristics are a central part of all the different elements of public budgeting investigated in this dissertation. Last year's budget affects the spending preferences of politicians, as they respond to the level of previous spending, and it is a central part of budget proposal construction, arguments given by decision-makers, and the decisional output. However, the results also show that these effects are conditional. When political attention rises, the link between last year's budget and spending preferences weakens. Likewise, when information given to decision-makers increases, the link between last year's budget and budget proposal, arguments and decisional output weakens.

The results also showed that two important unexplored heuristics are used to decide the budget output. First, it show that there is a systematic link between experience of last year's under- and overspending and budget output, as politicians adjust the budget up- or downwards depending on whether needs were met. Second, results showed that comparisons with others are an important driver of budget output, but also that it depends on the pressure that comparisons within these groups create.

Chapter 5.

Discussion and conclusion

The purpose of this chapter is to give an overview of the most important findings of the dissertation. Furthermore, the chapter will discuss two factors that might promote or restrict the use of the heuristics investigated in this dissertation. The first of these is ideology, which is an inherent part of public budgeting that the dissertation only touches on peripherally. The second is the Danish municipal setting, where the politicians and the environment have characteristics different from those in other public budgeting contexts. The chapter ends with some concluding remarks on the contributions made by this dissertation to the budget literature.

5.1. The use of heuristics in public budgeting

Political decision-makers are embedded in a highly complex decision-making environment, where time pressure is high and the amount of information and alternatives available are vast. Furthermore, the collective nature of politics means that divergent interests of other decision-makers are also an unavoidable part of the considerations of political decision-makers. The computational capabilities of political decision-makers and humans in general are also restricted, since selective attention guide their information processing that is concurrently serial in nature, and their search for information is aspiration-based rather than optimal (Bendor 2010; Jones 2003). Because of these complexities and computational limitations, decision-makers rely on “aids to calculation”, “rules of thumb”, or what has collectively been called heuristics (Lau 2003; Wildavsky 1964; Jones 2001). Thus, this dissertation set out to investigate in what way and to what extent the use of heuristics affect the process and the decisional output of public budgeting.

Beginning with the question of *in what way* heuristics influence public budgeting, the dissertation finds that this depends on the heuristic used. Using last year’s budget works as a stabilizing mechanism where decision-makers adjust their preferences in accordance to previous spending. This finding provides important insights into the individual-level basis of the negative feedback mechanism that is a central part of many policy theories and approaches (e.g., Hall 1993; Sabatier 1987, 1988; Baumgartner and Jones 2009). Spending preferences are adjusted downwards if spending last year was relatively high and upwards if it was relatively low.

A somewhat similar stabilizing pattern emerges when looking at budget coordination between decision-makers. When focus is primarily on last year's budget, decision-makers are more aligned, as they agree more on both proposals and final budget and their use of arguments are more similar. However, as seen in the case of the experiential heuristic, the use of a heuristic can also have a disruptive and reinforcing effect, since decision-makers increase the budget if experience tells them that needs were not met, and decreases the budget if more was allocated than needed. This self-reinforcing mechanism makes budgets drift away from their status quo as opposed to the negative feedback link found between last year's budgets and spending preferences. Paper 4 also shows that comparisons with others is one of the drivers behind budget levels. A municipality will have a tendency to increase its own budgets if the municipalities it compares itself to have increased their budgets and vice versa. Comparing with others can therefore create drift away from the status quo when one begins to move in the same direction as others.

Regarding the question of *extent*, the dissertation investigates several of the boundaries surrounding the use of heuristics. Papers 1 and 2 study heuristics at the individual level, finding that the use of last year's budget is a central guideline in the formation of spending preferences, budget proposals, arguments, and final decisions. However, the findings also show that the use of this heuristic is conditional. In general, if attention rises, the influence of last year's budget weakens as a driver of negative feedback in spending preference formation. Likewise, the experimental results suggest that the use of this heuristic diminishes when the amount of information available to decision-makers increases. The results support the claim that there is a trade-off between information and clarity, as the difficulty of decision-making does increase when more information is available (Baumgartner and Jones 2015). The results also shows signs of additional information being more disruptive when there is more money to spend, while the reaction of decision-makers were less clear when asked to cut the budget, suggesting that different logics apply in the cut and increase situations (Behn 1985). Conditionality is also present at the macro-level when studying the use of heuristics in relation to budget output. The paper studying policy diffusion shows that the extent of diffusion varies across comparison groups. Decision-makers do not always follow the decisions of relevant comparisons; it depends on the extent of the pressure coming from making these comparisons.

Another important finding, regarding the extent of heuristic use, is the policy area variation that is evident across most of the papers in this dissertation. It is clear that some policy areas stand out. Evidence of heuristic information processing is primarily found within the school, child care and elder care ar-

eas, while effects are less strong within areas such as culture and leisure, libraries, administration, and roads. The designs used in this dissertation do not allow for a more thorough examination of these differences, but a discussion of this particular finding and possible explanation for it will follow in the next section.

5.2. Policy area differences and the role of ideology

A perhaps obvious statement is that public budgeting is much more than the product of decision-makers' use of budgeting heuristics. The primary focus in this dissertation has been how the use of heuristics affect the process and the output, which leaves another vital perspective of public budgeting largely unexplored, namely ideology. The studies in this dissertation do include ideology as an explanatory factor in the form of controls, as several studies show that the ideology of decision-makers can be strong predictors of budget output (Blom-Hansen, Bækgaard, and Serritzlew 2014; Serritzlew 2005). However, the dissertation does not explicitly examine the interplay between politicians' ideology and use of heuristics, where conditional relationships might be present. Furthermore, the ideological composition of the public might also influence the extent of heuristic use. The dissertation's finding of policy area differences in the systematic analyses of heuristics use gives rise to speculations about ideology as a conditional factor. The policy area differences are relatively consistent in the various studies that find these. However, it is not certain that the dynamics that explain these differences are the same across the various heuristics.

One perspective on how heuristics and politicians' ideology interact is presented in Paper 2. Especially in settings where no one actor has absolute majority, the ground rule is that some compromise between parties with more or less divergent ideological views has to be made. Uncertainty dominates this situation, as there is no obvious way to approach it. Using a heuristic such as last year's budget sets the playing field for the subsequent battle of budget priorities based on ideology. As noted by Wildavsky (1964, 16-7), the budget is a product of years and years of negotiations between ideologically divergent decision-makers aimed at finding the "fair share" of the budget for individual programs and services. Thus, the budget encompasses all the previous compromises made between decision-makers. Using last year's budget is an efficient guideline that decision-makers can use to reduce uncertainty in a complex environment and find the arena where power and ideology can come into play. The findings of policy area differences may speak to this, as the use of this heuristic is primarily found within areas where ideological differences

concerning the provision of public services, such as schools, child care, and elder care, are most likely present. If budgetary actors must be able to make compromises within these areas, this is also where we would expect to find the strongest use of last year's budget as a decisional guide.

Ideology may have different channels of influence on the decisions made in the public budget (Connolly and Mason 2016; Tausanovitch and Warshaw 2014), and thus also the extent of heuristics use in public budgeting. One important channel has been shown to be the ideology and opinions of the electorate that guide decision-makers, as they fear punishment by voters in future elections (Wlezien 2004; Mortensen 2009, 2010). In this case, the ideological positions of voters might interact with the use of heuristics, since their opinions on spending priorities is what guides budgetary decision-making. In Paper 1, that investigates the use of last year's budget as a heuristic for spending preference formation, public opinion might be the reason why the negative feedback link weakens when attention to some areas increases. As shown in several studies of citizens' opinions on public spending, the areas where we see this weakened link is also the areas that are the most popular among citizens (Winter and Mouritzen 2001; Stubager et al. 2016; Mortensen 2006). When attention to an area is low, the negative feedback effect is the default. But when attention increases, the opinions of the public may become the more important factor in the budgetary decision-making process and the reason why the negative feedback effect weakens.

Another channel of influence concerns the ideological standpoint of politicians. In the case of policy diffusion, the ideological standpoint of politicians might explain the general absence of diffusion effects on budget output when investigating these within benchmarking networks. As was noted in the theoretical chapter, learning will only occur from those thought to be legitimate comparisons (DiMaggio and Powell 1983). The benchmarking groups studied here are composed by an external actor based on resource pressure and expenditure needs within each municipality. However, if politicians are ideologically driven, similarities in ideological composition might have much higher weight than the similarities chosen by an external actor when searching for relevant comparisons. If this is the case, municipalities will only compare themselves with those inside the benchmarking network that resemble them in ideological composition. Thus, ideology could be seen as another type of heuristic that guides comparison and learning. Some studies investigating learning as a driver of policy diffusion have suggested that learning occurs between political units that are ideologically similar (Grossback, Nicholson-Crotty, and Peterson 2004; Nicholson-Crotty 2004). The argument given in these studies is that policies in ideologically similar governments are more likely to match the preferences of an adopting government, since policies are

expected to reflect the ideological composition of those that create them (Grossback, Nicholson-Crotty, and Peterson 2004, 525-6). This could explain the weak policy diffusion within these benchmarking networks, and this would be an interesting subject for future research to investigate further.

However, the results of Paper 3 indicate that ideology might not always condition the effects of heuristics. The theoretical section of the paper itself suggests that area differences might occur because of ideologically motivated vested interests that resist cuts and promote increases to the areas that are important to them. However, the results did not show any systematic differences between areas, as decision-makers cut the budget if an area underspends and increase the budget if an area overspends. This could suggest that some heuristics are more sensitive to the ideological standpoints of politicians and citizens, while others are more resilient.

5.3. The local government context

The bulk of the studies in this dissertation builds on analyses of the Danish local government setting and the politicians embedded in this. As discussed in Chapter 3, there are many good and convincing reasons why one should study budgeting in this context. However, this concluding chapter will also discuss the generalizability of these results and how these might be affected by the characteristics of these politicians and their environment relative to the environment and characteristics of full-time career politicians that also engage in public budgeting.

One place to begin this discussion is with the institutional structure of the Danish local governments and the direction in which these draw the results. First, the assembly size of Danish city councils are relatively small, consisting of between nine and 55 members (Act 47/2019). All else being equal, it should be easier to strike deals, make agreements, and find compromises when fewer people have to be convinced in order to form a majority. Empirical evidence supports this, showing that larger assemblies are linked to logrolling and higher transactional costs, resulting in budget growth (Egger and Koethenbuerger 2010; Fiorino and Ricciuti 2007) Thus, in itself, the smaller assemblies may reduce the complexity of the budgetary decision-making relative to larger ones. This could imply that the use of heuristics is less prevalent in the local government context compared to that of larger assemblies.

Second, the parliamentary setting of Danish city councils is without government and opposition. A sharp demarcation between government and opposition might make a decision environment less complicated, as collaborators are known beforehand, are easily identified, and often remain consistent

during an election period. By having this distinction, a large part of the assembly can be discarded as irrelevant collaborators, and effort and attention can be directed at negotiations with the remaining members, especially if the government has a majority in itself or support from a stable majority of the assembly (Laver and Schofield 1998). The absence of this sharp demarcation between government and opposition should entail a more complex decision environment with higher degrees of uncertainty. In such a constellation, majorities may have to form on a case-by-case basis. Thus, the absence of executive government and opposition implies that the use of heuristics is more prominent in this context, then in those that have these parliamentary institutions. However, empirical studies of Danish local government politics shows strong norms of consensus when building local government coalitions (Serritzlew, Skjæveland, and Blom-Hansen 2008). This could suggest that the use of heuristics in this setting is not much different from the parliamentary settings where both a government and opposition is present.

A third aspect of the decision environment is the type of tasks that Danish local governments undertake. At this lower level, the primary focus is on the direct provision of services to citizens and day-to-day operations. The decisions made here are more tangible and less extensive than many of those taken at other levels of government. The consequences associated with increasing budget allocation in order to boost the number of schoolteachers are, all else being equal, much clearer than, for instance, those associated with increasing budget allocations for development of new weapons programs. Complicated decisions that demand considerations of a large range of perspectives are more demanding of the decision-maker. Thus, the type of decision that local government politicians engage in should result in less extensive use of heuristics as a tool for simplification.

A final point concerns the working hours of local government politicians. Most of these are part-time politicians with regular daytime jobs on the side. Politics is a hobby they practice in their spare time, which is often filled with meetings within the party, the council committees, and the city council. Surveys show that more than 50 percent of Danish city councilors work 15 hours a week or more on tasks related to their political position (Dahlggaard et al. 2009, 26). Furthermore, the small size of city councils means that these politicians have to be “experts” within many fields, as opposed to politicians in larger assemblies who might have better options for specialization. The fact that these politicians are part-time politicians is likely to have consequences for the way they process information and make decisions. Simon (1990, 1996) notes that true experts are much better at recognizing specific situational patterns and the appropriate actions in response to these than non-experts are. Like the non-experts, experts use heuristics in their search for solutions, but

because they are experts, they use domain-specific heuristics depending on the task presented to them, and therefore to a lesser extent the more general heuristics investigated in this dissertation. The non-professional nature of the local government politics investigated here suggests that these politicians might be more reliant on the heuristics examined in this dissertation relative to more professional and specialized politicians.

Overall, there is no compelling reason why the dissertation's results should not be transferable to other contexts of public budgeting. It might be that Danish local government politicians are non-experts, and less specialized than their fulltime counterparts, but the tasks they handle are also simpler. This difference might therefore be of less importance in relation to their use of heuristics. However, the smaller size of the city councils might create a less complex decision environment. Thus, the use of budgeting heuristics and need for simplification might be less in this institutional setting, relative to larger ones.

5.4. Concluding remarks

This dissertation has provided new and important insights into the use of heuristics in public budgeting. The first contribution of the dissertation concerns the insight provided of decision-making at the individual level. Extant research showing that previous policy decisions is a central part of current decisions, and claiming that this is due to individual information processing, now has a much more sound micro-foundation to stand on. Furthermore, these studies have improved our understanding of how the use of heuristic affects both the spending preferences, budget proposals, arguments, and budget decisions of decision-makers.

The second contribution of this dissertation concerns the identification and investigation of two overlooked macro-level heuristics governing budgetary decision-making. Both of these comprise important determinants of budget output that future studies should take into consideration. On the one hand, the identification of the experiential heuristic show that a substantial part of budget output is determined by whether previous needs were satisfied or not. If future research wants to investigate predictors of budget output, this difference between account and budget should be included in the analysis, to the extent that the data allows it. Similarly, the diffusion paper shows that comparisons within some groups are important drives of budget output. A spatial lag variable should be included in future analyses of budget output in order to avoid the bias that spatial dependence might cause if not accounted for.

The dissertation also provides a major methodological contribution by systematically investigating in what way and to what extent the use of heuristics

affect the process and decisional output of public budgeting. These systematic analyses revealed policy area differences when some heuristics were used while others revealed consistent effects across areas. As discussed above, these results raise the question of how the ideology of politicians and the public affect the use of heuristics in budgeting. Future efforts should be dedicated to the investigation of how these two important aspects of public budgeting are linked in order to improve our understanding of how the decisions made in this crucial political process take place. Likewise, the discussion of the context of local government raises several questions of how the institutional setting and characteristics of local government politicians might influence heuristic use, and thus how the results of this dissertation travel to other contexts. One way to investigate this further is to replicate this thesis's studies in other contexts, for example at other government levels or in other countries.

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English summary

The public budget has long been at the core of research in political science. There are two primary reasons why this is. First, the budget provides a unique opportunity to study the actual decisions and the decision-making process of politicians by providing clear evidence of how politicians prioritize between the many services that the government provides to the public. Because the budget offers an overview of these prioritizations in one common document, in clear, comparable, and directional units, it has been characterized as one of the most important political manifestos. The second reason is that the public sector is a crucial part of citizens' daily life in most countries. We all interact with the public sector on many levels during a normal day, when going to school, driving on public roads, working in the public sector, and so on. Thus, there are several good reasons as to why we should improve our understanding of how politicians make these budget priorities.

The dissertation takes its departure in the bounded rationality literature, arguing that the complexity of the decision environment and the bounded rationality of politicians has consequences for the decision-making process, one of these being that they use heuristics or "rules of thumb" as tools for simplification. This dissertation investigates in *what way* and to what *extent* three heuristics identified in the budgetary and bounded rationality literature, namely the use of last year's budget, experience, and comparisons, affect the process and output of public budgeting.

The dissertation shows that if spending was relatively high last year, politicians generally have preferences for lower spending this year and vice versa. But it also shows that this stabilizing relationship weakens as the level of attention directed at the spending area increases. A similar stabilizing relationship is found in experimental evidence from the dissertation showing that last year's budget works well as a heuristic for coordination between decision-makers, as budget proposals, budget arguments and final budgets align more when last year's budget is the primary focus of decision-makers. However, if more information is available to the decision-makers, the use of last year's budget as a decision-making heuristic becomes less prevalent.

The dissertation also provides evidence showing that budgeting is experiential. Politicians make rough guesses, let experience accumulate, and then make the necessary adjustments. More specifically, the results show that the experience incurred from deviations between budget and account has substantial significance for the budgetary output. If underspending occurred last year, decision-makers will adjust the budget downwards and if overspending occurred, the budget will be adjusted upwards. Evidence is also provided

showing that policies of others have substantial effects on a municipality's budget level, but also that neighbors are much more influential in that regard compared to those within a common benchmarking network. A municipality will follow if neighboring municipalities adjust their budget upwards and vice versa.

Thus, the dissertation provides two important contributions to the budget literature and our overall understanding of how politicians make budgetary prioritization. First, the dissertation opens up the black box of decision-making on the individual level showing that previously identified use of last year's budget, as a heuristic at the macro level, is also identifiable at the individual level. Second, the dissertation shows how two overlooked budgeting heuristics, namely experience and comparisons, has a substantial impact on the decisional output of the budgetary process. Methodologically, the dissertation also contributes to the literature by systematically investigating these heuristics in analyses that leverage the fact that data is available across a large number of units and for long timespans.

Dansk resumé

Det offentlige budget har længe været en af kernerne i statskundskabsforskningen. Der er primært to grunde til dette. For det første giver budgetter en unik mulighed for at studere politikernes faktiske beslutninger og den politiske beslutningsproces, da de tilvejebringer klare beviser for, hvordan politikere prioriterer mellem de mange services, som det offentlige leverer til borgerne. Fordi budgettet giver et overblik over disse prioriteringer i ét fælles dokument i en klar, sammenlignelig og retningsbestemt enhed, er det blevet karakteriseret som et af de vigtigste politiske manifeste. Den anden grund er, at den offentlige sektor er en afgørende del af borgernes dagligdag i de fleste lande. Vi interagerer alle med den offentlige sektor på mange forskellige niveauer i løbet af en almindelig dag: når vi går i folkeskole, kører på de offentlige veje, arbejder i den offentlige sektor osv. Der er således adskillige gode grunde til, at det er vigtigt at forstå grundlaget for politiske budgetprioriteringer.

Udgangspunktet for denne afhandling er litteraturen om begrænset rationalitet, som argumenter for, at et beslutningsmiljøes kompleksitet og beslutningstagernes begrænsede rationalitet har konsekvenser for beslutningsprocessen, hvoraf en af disse er, at beslutningstagerne anvender heuristikker eller "tommefingerregler" som forsimpelingsværktøjer. Denne afhandling undersøger på *hvilken måde* og i *hvilket omfang* tre heuristikker, som er identificeret i litteraturen om budgetter og begrænset rationalitet, nemlig brugen af sidste års budget, erfaring og sammenligninger, påvirker den politiske budgetproces og dens resultat.

Afhandlingen viser, at politikere generelt har præferencer for lavere forbrug, hvis sidste års forbrug var relativt højt og omvendt, men også at dette stabiliserende forhold svækkes, når graden af opmærksomhed rettet mod området stiger. Et lignende stabiliseringsforhold bliver fundet i eksperimentelle resultater fra afhandlingen, som viser at sidste års budget virker som en heuristik i koordinationen mellem beslutningstagere, da budgetforslag, budgetargumenter og endelige budgetter er mere afstemte når sidste års budget er beslutningstagernes primære fokus. Hvis mere information er tilgængelig for beslutningstagerne, bliver brugen af denne heuristik imidlertid mindre fremtrædende.

Denne afhandling leverer også resultater som viser, at budgetlægning er erfaringsbaseret. Politikere laver grove gæt, lader erfaringer akkumulere og laver derefter de nødvendige justeringer. Mere specifikt viser resultaterne, at de erfaringer som politikerne får fra afvigelsen mellem budget og regnskab har stor betydning for budgetresultatet. Hvis der i et år er et ikke forbrugt budget,

vil beslutningstagerne justere budgettet i nedadgående retning i det efterfølgende år. Hvis der er overforbrug, vil de justere det i opadgående retning. Der fremlægges også resultater som viser, at andre kommuners politik har betydelige indflydelse på en given kommunes budgetniveau. Nabokommuner har i denne henseende større betydning, end de, som man er i fælles benchmark-netværk med. Kommunerne har således en tendens til at tilpasse deres budgetter i enten op- eller nedadgående retning, når nabokommunerne justerer deres budgetter,

Afhandlingen leverer således to vigtige bidrag til budgetlitteraturen og vores overordnede forståelse af, hvordan politikere foretager budgetprioritering. For det første åbner afhandlingen op for den "black box" som individuel beslutningstagning er og viser, at den tidligere identificerede brug af sidste års budget som en heuristik på makroniveau også er identificerbar på individniveau. For det andet viser afhandlingen, hvordan to oversete budgetheuristikker, nemlig erfaring og sammenligninger, har en væsentlig indflydelse på budgetprocessens beslutningsresultat. Metodisk bidrager afhandlingen også til litteraturen gennem sine systematiske undersøgelser af disse heuristikker i analyser, der udnytter at data er til rådighed på tværs af et stort antal enheder og i lange tidsserier.