Cancel Culture: The Role of Transaction Costs and Government Capacity in Failed Public Procurements

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Abstract

Despite the exponential growth in third-party contracting, public management research contains little analysis of procurements gone wrong. Combining theoretical perspectives on administrative capacity and transaction costs, we investigate the propensity for cancellations in public procurement. Drawing on a unique dataset of 5,558 local government contracts in Denmark (worth €24.13 billion), we find that the propensity for cancellations is higher when procurements involve highly asset-specific investments and lower when governments have more administrative capacity. These findings suggest that enhanced focus on capacity building and risk management may help public managers reduce tender failures and capture additional value from public procurement.

Key words: Procurement; contract failure; administrative capacity; transaction costs; third-party contracting.

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Introduction

Governments around the world routinely use third-party contracting to provide goods, services, and public works. In fact, government procurement represents 12% of national GDP in the OECD countries (OECD, 2019), thus making procurement and contract management a core topic for public management research. Public procurement allows public agencies to tap into the expertise, capacity, and innovation of private companies. Apart from unsolicited proposals (Casady and Baxter, 2021), public procurement is often a highly formal, regulated procedure, designed to ensure accountability, proportionality, transparency, and equal treatment as a means of achieving value for money (VfM) (Harland et al., 2019). However, public procurement is often criticized for being both inefficient in awarding third-party contracts (Karjalainen, 2011) and excessively bureaucratic (Di Mauro et al., 2020). Inadequate competencies, procedures, and practices on the part of government are often cited as key barriers for suppliers looking to engage with buying governments (Loader and Norton, 2015). Optimizing procurement processes is thus of critical importance to the mission and values of public organizations (Schotanus et al., 2011; Alonso et al., 2015; Patrucco et al., 2021).

The purpose of this study is to heed recent calls for more research on inefficiencies in the procurement process (Trammel et al., 2020; Patrucco et al., 2016). Specifically, we focus on the central—but overlooked—problem of when third-party contracts fail to make it through procurement, resulting in cancellation in the pre-award tender phase. While there is an extant literature on public procurement and contracting (Brown and Potoski, 2003; Levin and Tadelis, 2010; Wang and Li, 2014; Abutabenjeh et al., 2021; Callens, Verhoest, and Boon, 2022; Chen et al., 2022), procurement cancellations have so far gone unnoticed. This oversight is surprising as value creation through public procurement is inherently dependent on successfully completing the procurement process from issuing invitations for bids to awarding and enforcing contracts (Petersen et al., 2019; Anguelov, 2020).

With limited knowledge on procurement cancellations, public authorities lack a fundamental understanding of how to avoid failure in awarding procurement contracts. Moreover, these cancellations during public procurement can have severe performance implications, as they create significant inefficiencies and carry large sunk transaction costs for both the buyer and supplier side of the relationship. Consequently, cancellations can discourage businesses from engaging with the public sector and potentially cause credibility issues that feed into prevalent perceptions of inefficacy within the public sector (Döring, 2022).

Combining transaction cost economics (TCE) and resource-based theory (RBT), this study examines how transaction attributes and government capacity affect the likelihood of cancellations in the procurement (pre-award) phase of government contracting. Using this rare combination of theoretical perspectives allows us to account for the strategic resources of local governments—i.e., buying organization's administrative and financial resources—as well as economic perspectives on the complexity and asset specificity of the products and services being exchanged. The study utilizes a unique dataset covering the population of 5,558 Danish local government contracts tendered according to the joint European Union (EU) public procurement directives. The data covers all procurements for 60 different products, services and public works contracts over a five-year period from 2017 to 2021, representing a procurement contract value of €24.13 billion in taxpayers' money. We use this data and theoretical perspectives to address the following two research questions:

1) What is the propensity for cancellations in local government procurements?

2) What theoretical factors affect the likelihood of cancellations in local government procurements?

The study offers three contributions to public management research and theory. First, this paper advances our theoretical understanding of public procurement management by combining an economic perspective on transaction cost attributes and a human resource capacity perspective on public procurement management. Second, there have been no previous analyses in the public management field of cancelled procurements using large-N data. Our analysis suggests that cancellations in public procurement by Danish local authorities are very widespread: 1,365 out of 5,558 procurements were cancelled, representing a failure rate of 24.6 percent. This paper thus offers a rare glimpse at the pervasiveness of cancellations in public procurement, using local government procurement as an empirical setting to advance public management theories of procurement (Patrucco, Luzzini, and Ronchi, 2016; Petersen et al., 2019; Patrucco, Agasisti, and Glas, 2021). Third, this study reveals critical elements of public procurement that contribute to procurement cancellations, both from a TCE and RBT perspective. In doing so, the paper offers unique theoretical insights for public management research and recommendations for targeted policy interventions that can harness the contributions of public procurement to strategic objectives and value creation in public organizations (Moore, 2013).

The remainder of this paper is structured into five sections. The next section uses concepts from TCE and RBT to develop hypotheses on how transaction attributes (i.e., complexity and asset specificity) and government capacity (i.e., administrative and financial capacity) influence the likelihood of cancellations in public procurement. The third section presents the population dataset of local government procurements and the methods used in this study. In the fourth section, we answer our research questions by analyzing the propensity of procurement cancellations occur and explaining patterns of variation in these cancellations. Finally, in the last two sections, we conclude with a discussion of our findings and their implications for public management theory and practice.

Transaction Attributes and Public Procurement Failure

In public procurement, both the procuring authority and third-party suppliers face large information, bargaining, negotiation, monitoring, and enforcement costs. These costs incurred by both suppliers and purchasing governments represent *ex ante* and *ex post* transaction cost expenditures (Williamson, 1979). Ex ante transaction costs often include expenses before the execution of a contract or sale, such as "searching for products and suppliers, preparing requirement specifications, evaluating bidders' offerings, and negotiating contract terms" (Barthélemy and Quélin, 2006; Coase, 1937; Marsh, 1998; Melese et al., 2007; Williamson, 1996; as cited in Petersen et al. 2019, 642-643.) Conversely, ex post transaction costs are incurred after the execution of a sale and typically encompass expenses associated with monitoring service performance, assessing product quality, and enforcing contract terms, especially in cases of arbitration, conflict resolution, and contractual renegotiation.

Understanding these types of transaction costs in public procurement is important because high transaction costs can deter potential bidders, thereby limiting competition for contracts. Third parties seeking to acquire government contracts must incur substantial costs in assembling bids that may or may not be selected (Casady et al., 2019). If transaction costs are high, this limits the incentives of suppliers to participate in public procurements. This, in turn, may eliminate the potential for lower costs, ultimately reducing the prospect of achieving better VfM (National Audit Office, 2007; KPMG, 2010). When procurements are cancelled, both the government and potential suppliers incur substantial sunk costs, leading to large inefficiencies in the public procurement process. Therefore, it is important governments allocate sufficient resources and establish procedures to appropriately manage contract risk and improve contract value.

However, third-party contracts do not always deliver their intended value. Sometimes, products and services purchased by governments are more expensive than anticipated, delayed in their delivery, or do not work out for other reasons (Milward and Provan, 2003; Sclar, 2000;

Van Slyke, 2003). In certain cases, procurements are cancelled altogether, meaning no products or services are purchased by the government at all. These failed procurements are the primary focus of this research. We are therefore interested in understanding the transaction cost attributes associated with these procurement cancellations. According to Williamson (1979, 1991, 1996), transaction risks are driven by transaction attributes—i.e., the characteristics of products/services and markets. This means public procurement practices need to reflect the characteristics of the product or service being purchased. For instance, simple products tend to have low uncertainty because they are often available in more standardized and commoditized forms and are supported by robust markets with many buyers and sellers engaging in recurring transactions (i.e., lower asset specificity and higher frequency of exchanges). These transaction attributes lower the need to incur transaction cost expenditures since transaction risks are minimal. On the other hand, complex services, like public works contracts, are inherently more difficult to prepare ex ante (i.e., high uncertainty), often require specialized investments tailored to a procuring authority's needs (i.e., high asset specificity), and typically rely on markets with relatively few buyers and sellers (Girth et al., 2012). As result, these complex services require more transaction cost spending because the contracting risks associated with providing them are higher. Taken together, this conceptualization of transaction attributes in public procurement supports our first two hypotheses:

> Hypothesis 1: Contracting authorities are more likely to cancel public procurements for complex products and services than for simple products and services.

> Hypothesis 2: Contracting authorities are more likely to cancel public procurements for products and services with high asset specificity than those with low asset specificity.

Administrative and Financial Capacity

In addition to complexity and asset specificity, cancellations in public procurement may also be attributed to deficiencies in the strategic—i.e., valuable, rare, difficult to imitate, and non-substitutable—resources of a public organization. Barney (2012) notes that purchasing, as well as supply chain management, can be a source of sustained competitive advantage for a firm in at least some settings. But a public agency' ability to procure various goods, services, and public works contracts is only as good as the resources and capabilities it can leverage. Organizational capabilities are thus needed to bundle, manage, and otherwise exploit resources (Barney, 1991). This resource-based view therefore provides a more internally focused perspective of public procurement and may offer a clearer explanation for why performance results vary in these procurements (Brewer, Wallin, and Ashenbaum, 2014).

Of all the skills and abilities (i.e., resources) a public sector organization needs to procure goods and services (Madhok, 2002), administrative and financial capacity appear to be particularly important attributes for successful procurements. Strong financial capacity allows governments to make additional expenditures related to procurement management. Without investments in critical management personnel, "governments may lack the ability to prepare and complete a tender in a way that maximizes public value (e.g., by taking full advantage of available market competition or minimizing uncertainty)" (Petersen et al. 2019, 644). Scholars have also previously shown that effective contract management strategies —e.g., writing requests for proposals, creating systems to evaluate bid submissions, and monitoring the performance of third-party contractors—help mitigate risks associated with transaction attributes, such as complexity and asset specificity (Joaquin and Greitens 2012; Lawther 2002). This highlights that additional importance of governments investing in their

administrative capacity to manage contract service delivery (Brown and Potoski 2003; Romzek and Johnston 2002). Without hiring and training "administrative, legal, and managerial staff to serve as purchasers, contract drafters, contract specialists, contract managers, and contract enforcers" (Petersen et al. 2019, 644), successful public procurement would not be possible. Yet, this hiring is also costly and constrained by financial capacity as well. Thus, our third and fourth hypotheses about capacity are as follows:

> Hypothesis 3: Contracting authorities with greater administrative capacity are less likely to cancel procurements.

> Hypothesis 4: Contracting authorities with greater financial capacity are less likely to cancel procurements.

Methods and Data

To test our hypotheses, we examine a large population dataset of public procurement cancellations in Danish local governments. Denmark provides an empirical setting of broader international relevance because all procurement contracts above a certain threshold value are tendered according to joint European Union (EU) procurement directives, making the EU the largest economically joint procurement area worldwide. Public authorities in the 27 EU member states are required to send tasks to public tender if contracts exceed threshold values of €215,000 for general goods and services, €750,000 for social and other specific services, and €5,382,000 for public works contracts. The procurement contracts in our dataset are all procured according to rules and procedures featured in common EU directives, thereby offering insights of broader relevance to international procurement research. Our analysis is situated in local government procurement because it allowed us to obtain a

large-N dataset of relatively similar procurements for goods, services, and public works, thereby enabling statistical analysis of theoretical factors explaining procurement failure when holding constant a number of features in the regression analyses.

We draw on a comprehensive population dataset of all 5,558 local government EU procurements for 60 frequently purchased goods, services, and public works procurements in the period 2017 to 2021. The EU procurement regulations require that all public procurements over the threshold values are registered in the joint Tenders European Daily (TED) database. Our dataset includes all Danish local government tenders extracted from the TED database that are quality inspected weekly by the Danish Competition and Consumer Authority. The average contract size in our data is 32.3 million Danish Kroner (app. €4.34 million), meaning that the procurements in our data represent a contract worth of €24.13 billion.[1]

We used detailed and uniform information in the contract data to construct key variables for our analysis, including variables about the procuring authority, the procurement process, the subject of the contract, the award criteria, number of lots, whether the procurement concerned a public contract or a framework agreement, and much more. Additionally, the data also contains information on whether the procurement was completed with a contract award or was cancelled. Moreover, in most instances, the buying authority also provides a reason for cancelling the procurement, which in addition to our main analysis enables more fine-grained analysis of the determinants of various types of procurement cancellations.

To enrich our contract data, we used two additional data sources. First, we manually imported detailed information from Danish administrative registers about local government size, administrative capacity, financial status, ideology of the mayor, and other variables we need to construct several independent and control variables (further presented below). After manually importing these

data, we ran multiple regression models to investigate the main variables of interest for our hypotheses related to administrative and financial capacity as well as relevant control variables. Second, to measure the transaction costs attributes of the procurements (our hypothesis 1 and 2), we build on previous public management research on transaction costs (in particular, Brown and Potoski, 2003; Levin and Tadelis, 2010; Hefetz and Warner, 2012) and conducted a comprehensive survey among 1,085 Danish public procurement managers to measure transaction cost attributes of the goods, services and public works contracts in our data, which we elaborate on below.

Dependent Variable

We use two dependent variables to examine procurement cancellations—i.e., tenders that the procuring authority cancels before awarding the contract. The first, cancellation, is a dummy variable coded as 1 for cancelled tenders and 0 for non-cancelled tenders. The second, reasons for cancellations, is a nominal variable that consists of five categories indicating reasons for why a tender was cancelled in the pre-award phase. These reasons are, in most cases, made public by the procuring authority via the TED database and thus serve as a relevant variable in our dataset. The original variable had 23 groupings, but we aggregated these into five categories based on overlap in the majority of reasons provided.

Independent variables

For our independent variable, we use four measures to capture the capacity of the procuring authority as well as transaction attributes. The first two variables measure two types of capacity. Administrative capacity is the number of full-time administrative employees per 1,000 inhabitants in the local contracting authority. Financial capacity is the average tax-base per 1,000 inhabitants. Both variables originate from Danish administrative registers containing population data for all local governments.

The third and fourth independent variables capture the transaction attributes of product complexity and asset specificity (Williamson, 1996; Hefetz and Warner, 2012). As there is no universal way of measuring transaction attributes objectively, we followed the approach of previous procurement studies (Brown and Potoski 2003; Levin and Tadelis, 2010) by using a survey, which we distributed to 1,085 public procurement officers in Denmark. We use well-tested international survey instruments and scales to measure both asset specificity and product complexity (Brown and Potoski 2003; Levin and Tadelis, 2010; Hefetz and Warner 2012 in the US; In Europe Schoute, Budding, and Gradus, 2018; Petersen et al. 2019). The variable measuring product complexity is based on the respondents' evaluation of how easy or difficult it is to describe a given product in a contract on a scale from 1-5. Asset specificity measures respondents' assessment of sunk costs on a five-point scale from very small to very high. The survey items and product categories appear in full in the appendix.

While we draw on robust and well-tested international measures of transaction cost attributes from other procurement scholars, our study makes three important improvements for measuring transaction attributes in public management research. First, the survey was sent to the entire known population of 1,085 public procurement managers in Denmark, potentially increasing both validity and reliability compared to previous convenience samples of ~40 (or fewer) procurement managers (Brown and Potoski, 2003; Levin and Tadelis, 2010; Petersen et al. 2019; Schoute, Budding, and Gradus, 2018).[2] Moreover, we identified the 60 most common categories of procured products and services for assessment, covering 80 percent of all procurements and representing a total contract worth of €24.13 billion. This extends the coverage of previous studies from the procurement of services (Brown and Potoski, 2003; Levin and Tadelis, 2010; Schoute, Budding, and Gradus, 2018) to also include public procurement of goods and public works contracts (see full list of product catego-

ries in the appendix). Third, we randomized whether respondents were asked to evaluate asset specificity or product complexity as well as which product categories they were presented with to reduce potential question order bias (Thau et al., 2021).

Control Variables

We control for three local government and four contract characteristics. The government contracting indicator measures the share of local government expenditure on goods and services to citizens that is spent on purchasing from private providers (percentage). Income corporate tax is measured as the local governments' net income per inhabitant from taxation of companies (DKK). Area size measures the geographical area of the local government in square meters.

Contract characteristics include how much price is weighted in the evaluation of bids (percentage), if a restricted or open procurement procedure is used (dummy variable 1/0), the number of potential lots that the contract is divided into, and if the contract is a single public procurement or a framework agreement (dummy variable 1/0). Moreover, we control for contract year using four dummy variables with 2017 as the reference. Table 1 summarizes key statistics for all dependent, independent, and control variables. Summary statistics of all the variables are provided in Table 1.

Table 1. Summary statistics for all variables

	Count	Mean	SD	Min	Max
Cancellation	5,558	0.25	0.43	0	1
Administrative capacity (pr. 1000 inhabitants)	5,558	15.05	1.33	11.2	23.9
Financial capacity (taxbase pr.	5,558	187.10	32.10	152.95	388.83

1000 inhabitant)					
Asset specificity	5,558	2.47	0.38	1.36	4.12
Product Complexity	5,558	2.75	0.39	1.94	3.75
Income from corporate tax (pr. Inhabitant, ln.)	5,558	6.83	0.75	2.20	9.82
Government contracting indicator	5,558	26.75	3.77	17.7	48.5
Framework agreement dummy	5,558	1.48	0.50	1	2
Number of lots	5,558	10.94	14.65	1	64
Weighting of price	5,558	0.73	0.28	0	1
Area size	5,558	572.50	399.29	8.7	1,473.4
Year dummies	5,558	2018.85	1.29	2017	2021

Methods of Estimation

Because our dependent variable is binary, we use logistic regression to estimate the effect of capacity, complexity, and asset specificity on the likelihood of procurement cancellations. Furthermore, we use multinominal logistic regression to estimate the effect of our independent variables on the probability of eight different reasons for cancellations. We apply two-way clustered standard errors in the logit model to account for the data structure, which has two levels consisting of product codes and local contracting authority. With a mean variance inflation factor (VIF) of 1.53, there is no concern for multicollinearity. To test the robustness of the models, we used OLS regression, which provided similar results. We also examined fluctuations in the coefficients for our primary independent variables by applying different control variables in the models, but the direction of the coefficients—and for most variables also the effect size and p-value—proved robust across our tests.

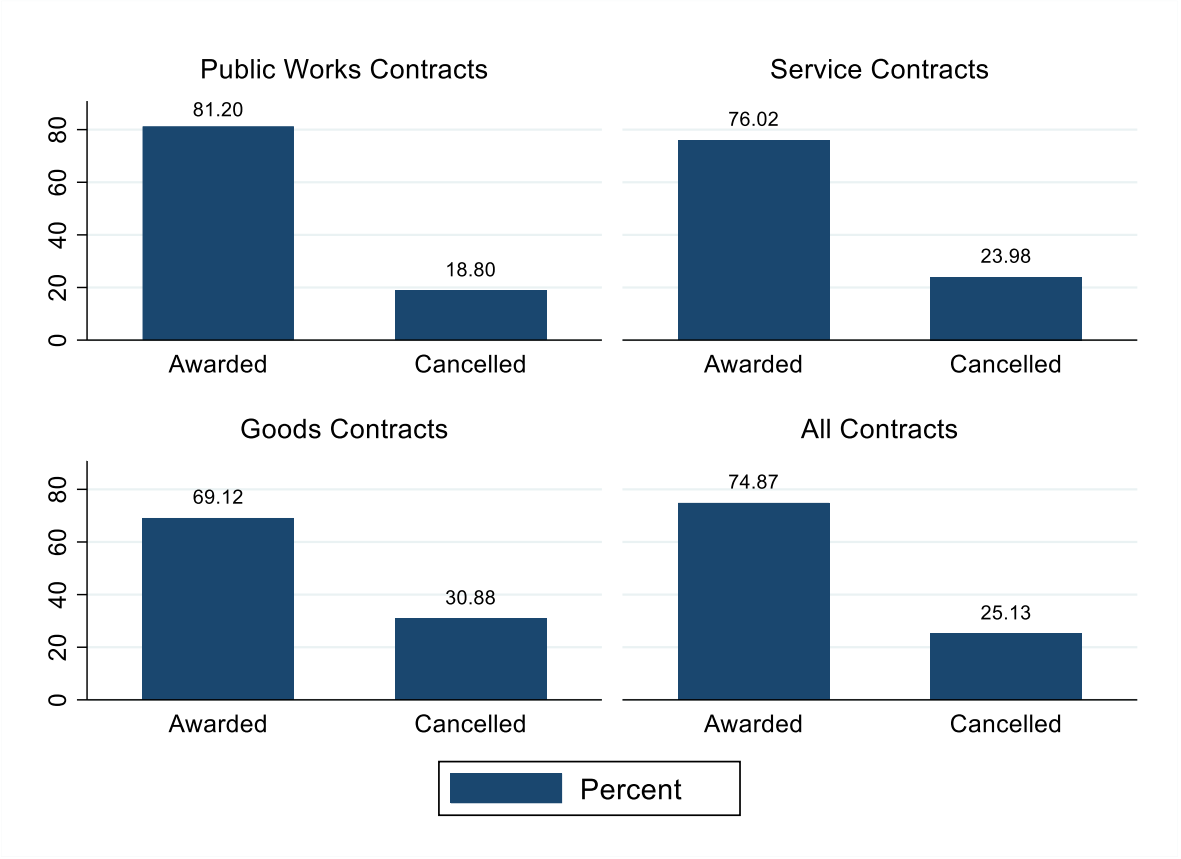
Empirical Results

In this section, we present the empirical results. Due to the lack of previous research on procurement cancellations, we first present descriptive results for the frequency of cancellations across goods, services, and public works procurement. We also present novel data on the reason for cancellations as provided by procuring authorities. We then present the results of logistic regression analysis of factors influencing public procurement cancellations, focusing on the four theoretically grounded hypotheses about government capacity and transaction cost attributes. Finally, we carry out a multinominal logistic regression analysis of factors influencing different reasons for public procurement cancellations.

Descriptive Statistics of Procurement Cancellations

Figure 1 provides an overview of the prevalence of cancellations in Danish local government EU-procurements. The descriptive statistics in Figure 1 reveals that cancellations in Danish local government procurement is very frequent with an average cancellation rate of 25.13 percent. This corresponds to 1,397 out of 5,558 contracts. Furthermore, when we examine cancellations for different types of contracts, Figure 1 shows that cancellations occur most frequently for the procurement of goods (30.88 percent) and service contracts (23.98 percent), while procurement of public works contracts has the lowest percentage of cancellations (18.80 percent). Cancelling every fourth contract may involve significant transaction cost for both buyers and sellers on several accounts: resources spent on preparing the initial tender—or bid—and, in some cases, revising the cancelled contract before sending it to public tender again (De Schepper, Haezendonck, and Dooms, 2015; Petersen, Brown and Potoski, 2021).

Figure 1. Propensity for cancellations for public works, services, and goods procurements



To further explore the nature of public procurement cancellations, Table 2 summarizes the reasons local governments provided for why these procurements were cancelled. According to EU procurement regulations, the procuring authority has the right to cancel a contract at any point during the tendering period but involved bidders must be informed of the cancellation and the underlying cause. As most, but not all, procuring authorities inform potential bidders by announcing the cancellation through TED, we have information about the cancellation reasons for nearly 83 percent of the tenders in our dataset. Table 2 shows that cancellations are typically ascribed to one of two main causes: (1) there are not enough or any bidders resulting in a lack of competition or (2) there are errors or changes made in the tender documents. The third most common reason is related to economic issues, often because the procuring authorities receive bids that are significantly higher than their own estimated value. Table 2 furthermore shows that there is a substantial share of cancellations where the reason is registered as other causes; or no reason is provided by the procurement authority.

Table 2. Overview of reasons for procurement cancellations

	Freq.	Percent
Completed tenders	4161	74.87
Reasons for cancellations:		
Lack of competition	366	6.59
Errors and changes in tender material	112	2.02
Economic reasons	66	1.19
Other causes (unspecified)	582	10.47
No reason provided	271	4.88
Total	**5,558**	**100.00**

Note: The cancellation reasons are known for 1,128 contracts, where the procuring authority have announced the reason in the TED database, corresponding to 82.5 % of the cancelled contracts in our data.

Factors Influencing Procurement Cancellations

To examine the relationship between our independent variables for government capacity and transaction attributes and the likelihood of procurement cancellations, Table 3 displays the results of our logistic regression analysis of factors influencing public procurement cancellations. For a more intuitive interpretation of the substantial meaning of the logistic regression coefficients, the table also includes average marginal effects (AMEs) indicating the percentage point change in the likelihood of public procurement cancellations from a one-unit increase in each independent and control variable in the model.

Table 3. Logistic regression analyses for the likelihood of procurement cancellations

	Model 1: Cancellation	
	Coefficients	*AMEs*
Independent variables		
Administrative capacity	-0.165**	-0.029**
	(0.053)	(0.009)
Financial capacity	-0.005	-0.001
	(0.003)	(0.001)
Asset specificity	0.579**	0.101**
	(0.208)	(0.036)
Product complexity	-0.508*	-0.089*
	(0.215)	(0.037)
Control variables		
Income corporate tax (ln)	0.142	0.025
	(0.159)	(0.028)
Government contracting indicator	-0.004	-0.001
	(0.028)	(0.005)
Public contract *(ref. category: framework agreement)*	0.447*	0.079*
	(0.184)	(0.032)
Number of lots	0.017*	0.003*
	(0.007)	(0.001)
Weighting price	0.031	0.006
	(0.291)	(0.051)
Area size	-0.000	-0.000
	(0.000)	(0.000)
Year dummies (ref.= 2017)		
Year=2018	0.130	0.021
	(0.226)	(0.036)
Year=2019	0.172	0.028
	(0.212)	(0.034)
Year=2020	0.335	0.057
	(0.393)	(0.067)

Year=2021	0.607*	0.110*
	(0.260)	(0.043)
N	5558	5558
Pseudo R^2	0.05	0.05
Clustering at municipalities	Yes	Yes
Clustering at product categories	Yes	Yes

Note: Two-way clustering of standard errors. * $p < .05$, ** $p < .01$, *** $p < .001$. AMEs are the Average Marginal Effects.

Starting with the two independent variables for government capacity, the results show that administrative capacity has a negative and statistically significant influence on procurement cancellations, consistent with our hypothesis 3. For every increase in the number of full-time administrative employees per 1,000 inhabitants, the probability of cancellations decreases by 2.9 percentage points ($p < .01$). This finding corresponds to our theoretical expectations, suggesting that the strategic resources of the procuring authority play an important role in ensuring an efficient procurement process, e.g., by reducing the risk of errors in the tender material and product specifications that might lead to cancellations. Contrary to hypothesis 4, however, the coefficient for financial capacity is not statistically significant. Together, the findings for our government capacity variables suggest that public procurement authorities' administrative capacity may reduce the likelihood of cancellations, whereas financial capacity does not.

For the two independent variables representing the transaction cost attributes of the procurement contract, Table 3 shows the coefficients for asset specificity and product complexity are both statistically significant. With every 1-point increase in the 1 to 5-point scale of asset specificity, the probability of tender cancellation increases by 10 percentage points ($p < .01$), while an increase in product complexity decreases the likelihood of cancellation by 8.9 percentage points ($p < .05$). Thus, while our results support our second hypothesis on the positive association between asset specificity

and procurement cancellations, the results for product complexity are contrary to hypothesis 1, suggesting that cancellations are less likely for more complex products. A possible explanation for the negative association between product complexity and cancellations is that both procurement authorities and private bidders are more likely to find and reveal errors in the request for proposals, product descriptions, and contract material for more simple products than for complex products.

In contrast to the expectations derived from transaction cost theory, simpler contracts may thus be more prone to cancellations because the simpler nature of the product being exchanged makes it easier to objectively identify errors in the contract documents requiring substantial rectifications, which according to EU procurement directives requires a re-tender of the contract. The summary of procurement cancellations for goods, services, and public works contracts found in Figure 1 tentatively supports this interpretation: in contrast to the general expectation that public works and service procurements are more complex, Figure 1 shows that cancellations are more frequent in the procurements of goods. These findings suggest a need for further theoretical work on the link between transaction cost attributes and the propensity for procurement cancellations, which we return to in the discussion section. Finally, as a robustness check, we run the analyzes with interactions to test for moderations between our independent variables (see Appendix Table A2). None of the interaction terms in Table 2A are statistically significant.

Reasons for Procurement Cancellations

We finally look at how capacity and transaction attributes influence the likelihood of different reasons for public procurement cancellations. Table 4 shows the results of our multinominal logistic regression analysis estimating the probability of procurement cancellations because of one of the following reasons: (1) lack of competition, (2) errors in the tender material, (3) economic reasons (e.g., the price

offered exceeds budgets), and (4) other causes such as political and organizational changes. The multinominal regression also includes the results for cancelled tenders where the reason is not publicly announced (see model 5). Completed procurements constitute the baseline for interpreting the log-odds coefficients for each cancellation reason. As with the logistic regression in Table 3, average marginal effects are included in Table 4 to ease interpretation of the substantive effect sizes. When interpreting these results, it is important to bear in mind that N in each response category is smaller than in Table 3, thereby reducing the statistical power to reject the null hypothesis in each of the five models.

For government capacity, the results show that administrative capacity only has a statistically significant association with one out of the five cancellation reasons. Corresponding to the results for cancellations in Table 4, an increase in administrative capacity decreases the likelihood of tender cancellation due to lack of competition relative to completed tenders ($p < .001$). Specifically, adding one extra full-time staff is expected to decrease cancellations due to lack of competition by 1.9 percentage points. For financial capacity, we find a statistically significant association with two cancellation reasons. An increase in financial capacity is expected to decrease the probability of cancellations due to lack of competition ($p < .01$) and economic reasons ($p < .01$) relative to completed tenders. When we calculate the average marginal effects, the p-value increases for both findings, leaving only the coefficient for lack of competition significant ($p < .05$). The p-value is generally higher for the average marginal effects compared to the log-odds because the marginal effects for cancellation reasons are not relative to the baseline of completed procurements but calculated for the model overall.

For transaction attributes, we only find one statistically significant coefficient for the association between asset specificity and economic reasons for cancellations. With a one unit increase in our asset specificity variable, the likelihood of procurement cancellations due to economic reasons is

expected to decrease relative to completed tenders ($p < .001$). Once again, the result is not significant, when we calculate the average marginal effects. Although there are no statistically significant associations between product complexity and any of the cancellation reasons, we observe that the direction of nearly all the coefficients is negative, while the coefficients for asset specificity is mostly positive. This result corresponds to the logistic regression analysis of cancellations in Table 3, demonstrating some consistency in the effect of our measures of transaction attributes on procurement cancellations.

Taken together, most of our independent variables are not statistically significant in the analysis of reasons for procurement cancellations, possibly because of the reduced power when the dependent variable is divided into five categories of cancellations. However, our results do offer a few interesting insights. First, we find more statistically significant associations between the capacity variables and cancellation reasons compared to the transaction attributes, in particular for cancellations due to lack of competition. This difference might suggest that lack of competition relates to the administrative and economic resources that go into market research, product descriptions, and attracting contract bids from private vendors. In addition, asset specificity seems to increase the probability of cancellations due to economic reasons, suggesting that procuring authorities are more likely to receive bids over budget for highly asset-specific products. Meanwhile, the probability of this cancellation reasons decreases with the financial capacity of the buying municipality, possibly reflecting the fact that wealthier municipalities have more financial muscle to absorb above-price contract offers.

Table 4. Multinominal logistic regression for the likelihood of cancellation reasons (Base: Awarded procurements)

	Model 1: Lack of competition		Model 2: Errors and changes in tender material		Model 3: Economic reasons		Model 4: Other causes		Model 5: Not announced	
	Coef.	AMEs	Coef.	AMEs	Coef.	AMEs	Coef.	AMEs	Coef.	AMEs
Independent variables										
Administrative capacity	-0.369*** (0.112)	-0.019* (0.008)	-0.230 (0.195)	-0.003 (0.004)	-0.578 (0.374)	-0.001 (0.001)	-0.164 (0.099)	-0.011 (0.009)	0.050 (0.116)	0.003 (0.004)
Financial capacity	-0.020** (0.008)	-0.001* (0.001)	-0.021 (0.016)	-0.000 (0.000)	-0.115** (0.035)	0.000 (0.000)	-0.003 (0.004)	-0.000 (0.000)	0.008 (0.007)	0.000 (0.000)
Asset specificity	0.617 (0.564)	0.031 (0.034)	0.668 (0.600)	0.011 (0.013)	4.688*** (0.987)	0.006 (0.003)	0.048 (0.339)	-0.003 (0.032)	0.837 (0.604)	0.026 (0.020)
Product complexity	-0.461 (0.531)	-0.021 (0.030)	-0.666 (0.432)	-0.011 (0.009)	0.204 (1.079)	0.000 (0.001)	-0.304 (0.296)	-0.021 (0.026)	-0.875 (0.480)	-0.028 (0.016)
Control variables										
Income corporate tax (ln)	-0.219 (0.196)	-0.014 (0.010)	0.217 (0.213)	0.004 (0.004)	0.893 (1.584)	0.001 (0.002)	0.298 (0.222)	0.028 (0.020)	-0.650 (0.362)	-0.022 (0.011)
Government contracting indicator	0.013 (0.039)	0.001 (0.002)	0.004 (0.057)	0.000 (0.001)	-0.102 (0.194)	-0.000 (0.000)	0.003 (0.032)	0.000 (0.003)	-0.057 (0.056)	-0.002 (0.002)
Public contract *(ref. category: framework agreement)*	0.324 (0.226)	0.013 (0.013)	1.077* (0.504)	0.018 (0.012)	1.430 (0.921)	0.002 (0.001)	0.266 (0.240)	0.017 (0.020)	1.085*** (0.300)	0.035*** (0.009)

Number of lots	0.035**	0.002**	-0.064	-0.001	0.077	0.000	-0.066*	-0.006*	0.080***	0.003***
	(0.012)	(0.001)	(0.037)	(0.001)	(0.040)	(0.000)	(0.029)	(0.002)	(0.016)	(0.001)
Weighting price	0.398	0.024	-0.662	-0.015	-0.147	-0.000	0.655	0.060	-2.248*	-0.076**
	(0.440)	(0.027)	(0.421)	(0.009)	(1.804)	(0.002)	(0.391)	(0.035)	(0.902)	(0.028)
Area size	-0.000	-0.000	-0.001	-0.000	-0.001	-0.000	0.000	0.000	-0.001	-0.000
	(0.001)	(0.000)	(0.001)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Year dummies (ref. 2017)										
Year=2018	2.095**	0.059**	1.322	0.005	15.361***	0.011*	1.792**	0.098**	-2.276***	-0.131***
	(0.721)	(0.019)	(1.116)	(0.004)	(3.203)	(0.005)	(0.603)	(0.036)	(0.534)	(0.034)
Year=2019	2.215***	0.061**	2.973**	0.030	16.762***	0.014***	1.751**	0.088**	-1.604*	-0.116**
	(0.632)	(0.022)	(1.095)	(0.015)	(1.879)	(0.004)	(0.613)	(0.028)	(0.713)	(0.039)
Year=2020	2.740**	0.106*	2.834*	0.026	17.519***	0.018*	1.676*	0.080*	-19.560***	-0.152***
	(0.968)	(0.048)	(1.112)	(0.015)	(1.979)	(0.007)	(0.699)	(0.035)	(0.371)	(0.034)
Year=2021	2.944***	0.127***	3.411***	0.041*	3.906*	0.000	2.251***	0.136**	-19.966***	-0.152***
	(0.780)	(0.037)	(0.800)	(0.019)	(1.643)	(0.000)	(0.622)	(0.045)	(0.715)	(0.034)
N	5558		5558		5558		5558		5558	
Pseudo R^2	0.23		0.23		0.23		0.23		0.23	
Clustering at municipalities	Yes		Yes		Yes		Yes		Yes	
Clustering at product categories	Yes		Yes		Yes		Yes		Yes	

Note: Two-way clustering of standard errors. * $p < .05$, ** $p < .01$, *** $p < .001$. AMEs are the Average Marginal Effects. Coefficients are log-odds.

Discussion

The results of our analysis offer important theoretical and practical contributions for public procurement. Applying well-known public management theories (e.g., transaction cost economics) to public procurement, we first show there is a strong positive association between asset specificity and procurement cancellations. This finding largely confirms our theoretical expectations. Yet, when it comes to product complexity, the findings contradict our hypothesis derived from transaction cost theory—i.e., cancellations are less likely for more complex products and services. Our data reveals simpler contracts may be more prone to cancellations because it is easier to objectively identify errors in these procurements, unlike more complex products and services where errors and issues may arise after the tender has been awarded (i.e., ex post).

Outside of transaction cost economics, our research also contributes to theory commonly applied in other disciplinary fields studying public procurement. Taking a resource-based view (Barney, 2012), our analysis shows that the administrative capacity of public procurement authorities may reduce the likelihood of cancellations, whereas financial capacity does not. This finding suggests that lack of adequate competencies, processes, and practices impact the ability of public organizations to procure goods, services, and public works from third-party suppliers (Loader and Norton, 2015).

Taken together, this (re)conceptualization of public procurement cancellations using transaction cost economics and resource-based theory helps advance our understanding of public procurement as a key contributor to broader public management goals, especially if we view procurement as a precondition for the performance of public service delivery (i.e., efficiency, effectiveness, accountability, and transparency). Thus, more theoretical work is needed to link transaction cost attributes and administrative capacity with the public sector's propensity for contract cancellations.

Our findings also have practical implications for public procurement management. The financial value of procurements and the high frequency of cancellations suggest significant potential

for improved practice through targeted initiatives aimed at reducing the propensity for cancellations. Local procuring authorities with more administrative capacity are less likely to cancel public tenders, suggesting that human resources in the procurement function can positively reduce procurement failure. Purchasing authorities can use these insights to invest in recruitment or/or employees for strengthened administrative capacity: in substantial terms, our empirical findings suggest that increasing administrative capacity may significantly reduce the likelihood of procurement cancellations. In addition to recruiting, procuring authorities can increase access to administrative resources through intermunicipal procurements, enabling individual authorities to harness necessary skills, knowledge, and resources by linking up with the administrative procurement capacities of other local governments. Joint purchasing may further offer economies of scale and, thereby, more attractive purchasing prices (Karjalainen, 2011; Kauppi and Van Raaij, 2015).

As stated above, our finding that procurements of asset-specific products are more prone to cancellations also aligns well with insights from the public management literature, suggesting procurements are more risky when exchanges involve high sunk costs (Hefetz and Warner, 2012; Anguelov, 2020). Public procurement authorities can use these insights to target management efforts to reduce risk in procurements for services, goods, and public works involving high sunk costs. Public buyers can reduce sunk costs on both the buyer's and seller's side by developing templates for product requirements and contract specifications, thereby lowering the sunk costs for both parties involved. By reducing the risk of lock-in due to high switching costs, procuring authorities have an opportunity to capture significant value from improved procurement efficiency. Likewise, private sellers may incur lower transaction risk by finding it easier and less costly to bid on public tasks. This may help expand the supplier market and make public buyers less exposed to the disadvantages of exchanging in thin markets (Girth et al., 2012).

Finally, the results for product complexity have implications for procurement management practice as well. Contrary to the theoretical expectations derived from transaction cost economics, our results suggest that public authorities are more likely to cancel contracts for simple products than for complex products. One possible explanation for this is buyers and sellers may be more likely to find errors and shortcomings in the tender material and descriptions of simple products because the attributes of simpler products are more easily verified. Thus, procurements for these products are more easy to cancel. This result is supported by our finding that goods procurements have the highest failure rate, contrary to conventional wisdom that public works and services are generally more complex to exchange. Complex products involve more uncertainty (Williamson, 1979, 1996; Brown and Potoski, 2003; Anguelov, 2020). Consequently, it is harder to ascertain deficiencies in the contract material in the ex-ante phase, which may increase the risk of failed exchanges in the ex-post phase if the contract is not appropriately specified. This suggests more emphasis in public management should be placed on mitigating contract failure throughout all phases of the market exchange, not merely in the procurement phase.

Conclusion, Limitations, and Future Research

This study was designed to investigate failure in public procurements, benefitting from a comprehensive population dataset of 5,558 goods, services of public works contracts procured by Danish local governments from 2017 to 2021, representing a contract worth of €24.13 billion. The broader relevance of our analysis is bolstered by the use of procurement contracts awarded (or cancelled) according to common EU-procurement directives—the largest joint public procurement area worldwide—and a theoretical contribution combining transaction cost attributes and human resource capacity for effective public procurement management. Our findings suggest that cancellations are widespread in local government procurements, representing 24.6 percent of all contracts put out for tender. Our

regression analyzes indicate that cancellations are more widespread when procurements involve asset specific investments—i.e., when high sunk costs are prevalent, whereas administrative and financial capacity in the buying public organizations reduce the propensity for cancellations. Together, these findings offer insights that suggest that governments can invest in administrative resources and reduce procurement failure by taking management steps to mitigate cancellations, especially when exchanging products involving highly asset-specific investments.

While offering a rare theoretical and empirical perspective on failure in public procurement, this study also has several limitations. A limitation to our data is that we do not have data on the relationship between cancellations and other outcomes, such as costs, quality, and satisfaction with the contractual relationship. While being potentially costly for buyers and sellers alike, cancellations can potentially also lead to improvements in bad contracts, which are subsequently subject to re-tendering. Another limitation of our study is that our variables for human resources and capacity are measured at the organizational level. We are thus unable to examine the importance of individual-level skills and competences among procurement officers in the purchasing organizations. Finally, our study is limited to the empirical setting of Danish governments, which limits the potential for generalizing the results to other contexts and national settings.

Future research can build on and extend this study by collecting data on procurement contract performance, thereby linking cancellations in the procurement phase (i.e., ex ante) to contract outcomes in the delivery (ex post) phase of the contract relationship. Such research has the potential to offer further knowledge about the significance of procurement annulments for subsequent contract success and failure. Another important task for further research is to expand our study to other empirical contexts, thereby broadening public management research on procurement success and failure to additional institutional settings. Finally, future research should conceptualize and empirically measure knowledge, skills, and competencies among public buyers and link them to organizational

capacities and performance. Linking procurement competencies more closely to the transaction cost attributes of each exchange has the potential to make procurement a more strategic function that offers additional public value to public organizations.

References

Abutabenjeh, S., Anguelov, L., Brunjes, B. M., Dimand, A. M., & Rodriguez-Plesa, E. (2021). Supplying the pandemic response: The importance of public procurement. *Journal of Emergency Management (Weston, Mass.)*, *18*(7), 189-208.

Alonso, J. M., Clifton, J. and Díaz-Fuentes, D. (2015), Did new public management matter? *Public Management Review*, *17*, 5, pp. 643–660.

Anguelov, L. G. (2020). Monitoring arrangements for outsourced public services: the importance of service characteristics for the distribution of oversight responsibilities. *International Public Management Journal*, *23*(2), 252-275.

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*, 99–120.

Barney, J. B. (2012). Purchasing, supply chain management and sustained competitive advantage: The relevance of resource-based theory. *Journal of Supply Chain Management*, *48*(2), 3-6.

Barthélemy, J. and Quélin, B. V. (2006). Complexity of Outsourcing Contracts and Ex Post Transaction Costs: An Empirical Investigation. *Journal of Management Studies* 43(8): 1775–97.

Brewer, B., Wallin, C., & Ashenbaum, B. (2014). Outsourcing the procurement function: Do actions and results align with theory?. *Journal of Purchasing and Supply Management*, *20*(3), 186-194.

Brown, T. L., and Potoski, M. (2003). Contract Management Capacity in Municipal and County Governments. *Public Administration Review* 63(2): 153–64.

Brunjes, B. M., & Anguelov, L. (2021). Terminating Contracts for Convenience: Agency, Administrative Discretion, and Mutual Dependence. In *Academy of Management Proceedings* (Vol. 2021, No. 1, p. 11670). Briarcliff Manor, NY 10510: Academy of Management.

Callens, C., Verhoest, K., & Boon, J. (2022). Combined effects of procurement and collaboration on innovation in public-private-partnerships: a qualitative comparative analysis of 24 infrastructure projects. *Public Management Review*, 1-22.

Casady, C. B., & Baxter, D. (2021). Procuring healthcare public-private partnerships (PPPs) through unsolicited proposals during the COVID-19 pandemic. *Journal of Public Procurement*.

Casady, C., Flannery, D., Geddes, R. R., Palcic, D., & Reeves, E. (2019). Understanding PPP tendering periods in Canada: A duration analysis. *Public Performance & Management Review*, *42*(6), 1259-1278.

Chen, Y., Bretschneider, S., Stritch, J. M., Darnall, N., & Hsueh, L. (2022). E-procurement system adoption in local governments: the role of procurement complexity and organizational structure. *Public Management Review*, *24*(6), 903-925.

Coase, R. (1937). The Nature of the Firm. *Economica* 4(16): 386–405.

De Schepper, Steven, Elvira Haezendonck, and Michaël Dooms (2015). Understanding Pre-contractual Transaction Costs for Public–Private Partnership Infrastructure Projects. *International Journal of Project Management* 33(4): 932–46.

Di Mauro, C., Ancarani, A., & Hartley, T. (2020). Unravelling SMEs' participation and success in public procurement. Journal of Public Procurement, 20(4), 377-401.

Döring, M. (2022). 'Explain, but make no excuses': service recovery after public service failures. Public Management Review, 24(5), 799-817.

Farr, M. (2016). Co-production and value co-creation in outcome-based contracting in public services. *Public Management Review*, *18*(5), 654-672.

Harland, C. M., Eßig, M., Lynch, J., & Patrucco, A. (2021). Policy-led public procurement: does strategic procurement deliver?. *Journal of Public Procurement*.

Girth, A. M., Hefetz, A., Johnston, J. M., and Warner, M. E. (2012). Outsourcing Public Service Delivery: Management Responses in Noncompetitive Markets. *Public Administration Review* 72(6): 887–900.

Hefetz, A., & Warner, M. E. (2012). Contracting or public delivery? The importance of service, market, and management characteristics. *Journal of Public Administration Research and Theory*, *22*(2), 289-317.

Joaquin, M. E., and Greitens, T. J. (2012). Contract Management Capacity Breakdown? An Analysis of U.S. Local Governments. *Public Administration Review* 72(6): 807–16

Karjalainen, K. (2011). Estimating the cost effects of purchasing centralization—Empirical evidence from framework agreements in the public sector. *Journal of Purchasing and Supply Management*, *17*(2), 87-97.

Kauppi, Katri, and Erik M. Van Raaij (2015). Opportunism and Honest Incompetence—Seeking Explanations for Noncompliance in Public Procurement. *Journal of Public Administration Research and Theory* 25(3): 953–79.

KPMG. (2010). *PPP procurement: Review of barriers to competition and efficiency in the procurement of PPP projects*. Sydney, Australia: KPMG Corporate Finance.

Lawther, W. (2002). Contracting for the 21st Century: A Partnership Model. Washington, DC: IBM Center for the Business of Government.

Levin, J., & Tadelis, S. (2010). Contracting for government services: Theory and evidence from US cities. *The Journal of Industrial Economics*, *58*(3), 507-541.

Loader, K., & Norton, S. (2015). SME access to public procurement: An analysis of the experiences of SMEs supplying the publicly funded UK heritage sector. *Journal of Purchasing and Supply Management*, *21*(4), 241-250.

Madhok, A. (2002). Reassessing the fundamentals and beyond: Ronald Coase, the transaction cost and resource-based theories of the firm and the institutional structure of production. *Strategic Management Journal*, *23*(6), 535-550.

Marsh, A. (1998). Local Governance: The Relevance of Transaction Cost Economics. *Local Government Studies* 24(1): 1–18.

Meehan, J., Menzies, L., & Michaelides, R. (2017). The long shadow of public policy; Barriers to a value-based approach in healthcare procurement. *Journal of Purchasing and Supply Management*, *23*(4), 229-241.

Melese, F., Franck, R., Angelis, D. and Dillard, J. (2007). Applying Insights from Transaction Cost Economics to Improve Cost Estimates for Public Sector Purchases: The Case of U.S. Military Acquisition. *International Public Management Journal* 10(4): 357–85

Milward, H. B., and Provan, K. G. (2003). Managing the Hollow State: Collaboration and Contracting. *Public Management Review* 5(1): 1–18.

Moore, M. H. (2013). *Recognizing Public Value*. Boston, MA: Harvard University Press.

National Audit Office. (2007). *Improving the PFI tendering process.* Report by the Comptroller and Auditor General; HC 149 Session 2006–2007. London: HMSO.

OECD 2019. *Government at a Glance 2019*. Paris: OECD Publishing.

Patrucco, A. S., Agasisti, T., & Glas, A. H. (2021). Structuring public procurement in local governments: the effect of centralization, standardization and digitalization on performance. *Public Performance & Management Review*, *44*(3), 630-656.

Patrucco, A. S., Luzzini, D., & Ronchi, S. (2016). Evaluating the effectiveness of public procurement performance management systems in local governments. *Local Government Studies*, 42(5), 739-761.

Petersen, O. H., Baekkeskov, E., Potoski, M., & Brown, T. L. (2019). Measuring and managing ex ante transaction costs in public sector contracting. *Public Administration Review*, 79(5), 641-650.

Petersen, O. H., Potoski, M., & Brown, T. L. (2021). Businesses' transaction costs when contracting with governments: the impact of product complexity and public contract management experience. *International Public Management Journal*, 1-27.

Romzek, B. S., and Johnston, J. M. (2002). Effective Contract Implementation and Management: A Preliminary Model. *Journal of Public Administration and Theory* 12(3): 423–53

Schoute, M., Budding, T., & Gradus, R. (2018). Municipalities' choices of service delivery modes: The influence of service, political, governance, and financial characteristics. *International Public Management Journal*, *21*(4), 502-532.

Schotanus, F., Bakker, E., Walker, H., & Essig, M. (2011). Development of purchasing groups during their life cycle: from infancy to maturity. *Public Administration Review*, *71*(2), 265-275.

Trammell, E., Abutabenjeh, S., & Dimand, A. M. (2020). A review of public administration research: where does public procurement fit in?. *International Journal of Public Administration*, *43*(8), 655-667.

Thau, M., Mikkelsen, M. F., Hjortskov, M., & Pedersen, M. J. (2021). Question order bias revisited: a split-ballot experiment on satisfaction with public services among experienced and professional users. *Public Administration*, *99*(1), 189-204.

Sclar, E. D. (2000). *You Don't Always Get What You Pay For: The Economics of Privatization*. Ithaca, NY: Cornell University Press.

Van Slyke, D. M. (2003). The Mythology of Privatization in Contracting for Social Services. *Public Administration Review* 63(3): 296–315.

Wang, C., & Li, X. (2014). Centralizing public procurement in China: Task environment and organizational structure. *Public Management Review*, *16*(6), 900-921.

Williamson, O. E. (1979). Transaction-cost economics: the governance of contractual relations. *The Journal of Law and Economics*, *22*(2), 233-261.

Williamson, O. E. (1991). Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly* 36(2): 269–96.

Williamson, O. E. (1996). *The Mechanisms of Governance*. Oxford: Oxford University Press.

Appendix

Table A1. Product complexity and asset specificity for all surveyed products

Product Category	No.	Product Complexity					Asset specificity				
		Mean	SD	Min	Max	N	Mean	SD	Min	Max	N
Office and school supplies - blackboards, paper, ink, and writing utensils	1	3.48	1.05	1	5	63	2.68	0.94	1	5	53
Catering centre equipment and domestic appliances	2	3.32	1.00	1	5	75	2.79	0.95	1	5	80
Indoor lighting - lamps and light bulbs	3	2.35	0.97	1	5	80	2.20	0.98	1	5	81
Waste containers	4	1.94	0.90	1	5	88	1.79	1.05	1	5	87
Furniture and fixtures - office and school furniture	5	2.07	0.97	1	5	87	1.74	0.81	1	5	93
Coffee and tea	6	3.48	0.89	2	5	65	3.02	0.95	1	5	58
Cleaning supplies, garbage bags, etc,	7	2.79	1.01	1	5	67	2.89	1.02	1	5	63
Computers and tablets	8	2.27	0.94	1	5	71	2.49	1.03	1	5	76
Toys, sporting equipment, and musical instruments	9	2.65	0.87	1	5	66	2.00	0.84	1	4	55
Signs, traffic control, and street lighting	10	2.17	0.89	1	4	69	1.82	0.93	1	5	65
Apparel, uniforms, etc,	11	3.23	0.98	1	5	75	2.17	0.88	1	5	75
Heavy equipment vehicles - busses, trucks, refrigerated vans	12	2.47	0.89	1	4	76	2.56	1.01	1	5	55
Cleaning of work apparel	13	2.91	1.05	1	5	79	1.92	0.87	1	5	65
Personal care products - toiletries, toilet paper, and infant care	14	2.91	0.98	1	5	65	2.68	1.07	1	5	53
Light vehicles - cars, mini busses, etc,	15	2.74	1.10	1	5	76	2.70	1.01	1	5	60
Fuel - gas, oil, wood pellets	16	3.05	1.21	1	5	76	3.83	1.14	1	5	69
Residential solid waste collection	17	2.88	1.03	1	5	68	2.36	0.95	1	5	72
Cleaning and window cleaning in public buildings	18	2.28	0.98	1	5	87	2.47	0.99	1	5	75
Maintenance of green areas, sports facilities, etc,	19	2.92	1.08	1	5	61	2.62	0.86	1	4	45
Installation of internet and network connections	20	2.30	1.01	1	4	87	1.94	0.89	1	5	82

Street cleaning and draining of rainwater gullies	21	3.07	1.18	1	5	61	2.54	1.01	1	5	59
Operation of school busses	22	2.38	0.93	1	4	61	2.42	0.89	1	5	59
Operation of public busses - public transit	23	2.94	1.19	1	5	50	4.12	0.88	2	5	43
Medical equipment and products - beds, wheel-chairs, walkers, shower chairs, and commodes	24	2.01	0.72	1	4	73	1.76	0.72	1	4	78
Maintenance of street lights, signs, and lane markings	25	2.77	0.85	1	4	64	2.80	0.83	1	5	51
Miscellaneous food	26	2.13	0.92	1	4	91	2.35	0.84	1	5	60
Maintenance of elevators and ventilation systems	27	2.39	0.93	1	5	75	2.29	0.77	1	4	63
Dental products - dentures and other equipment	28	2.30	0.89	1	4	77	2.73	0.94	1	5	74
Emergency call devices, burglary protection, and fire extinguishing material	29	2.69	0.95	1	5	62	1.98	1.03	1	5	59
Winter services - snow plowing/sanding	30	3.75	0.85	2	5	79	2.64	1.00	1	5	56
Rodent control	31	3.44	0.89	1	5	72	2.81	0.99	1	5	59
Gifts and rewards	32	2.25	0.80	1	5	76	2.54	0.92	1	5	61
Electronic systems for fire and burglary prevention	33	3.58	0.95	2	5	72	2.77	1.03	1	5	53
Operation and maintenance of fire engineering facilities	34	3.11	1.05	1	5	87	1.84	0.79	1	4	86
Undertaker and funeral services	35	2.57	0.91	1	5	86	2.55	1.13	1	5	82
Cafeteria and catering	36	3.18	1.07	1	5	78	2.71	1.10	1	5	55
Building and construction material	37	2.73	1.06	1	5	71	2.22	0.97	1	5	59
Medical consumption materials - health service items, ostomy products, compression products, diabetes aids	38	2.67	0.91	1	5	64	2.76	1.12	1	5	46
Solid waste disposal	39	2.27	0.75	1	4	73	2.66	0.92	1	5	59
Special driving and referred driving	40	2.48	0.95	1	4	66	3.00	1.07	1	5	45
Insurance services	41	2.67	1.27	1	5	54	1.36	0.76	1	5	64
Installation of sewarage, district heating, etc,	42	2.29	1.10	1	5	73	2.19	1.00	1	4	63
Repair and maintenance of vehicles	43	2.59	0.92	1	5	58	2.77	0.88	1	4	52

Maintenance of streams	44	2.68	0.95	1	5	63	2.72	0.81	1	4	54
Fire prevention and emergency services	45	1.95	0.66	1	4	75	2.04	0.84	1	5	68
Payroll systems	46	1.97	0.77	1	4	86	1.64	0.80	1	5	69
Banking and asset management	47	2.70	0.93	1	5	83	2.45	0.94	1	5	71
Tradesman services	48	3.46	0.94	1	5	76	3.03	1.13	1	5	75
Temporary services	49	2.07	0.75	1	4	89	1.83	0.76	1	4	80
Legal services	50	2.61	0.92	1	5	76	2.70	1.11	1	5	64
Interpreting services	51	2.64	1.12	1	5	88	2.61	0.99	1	5	69
Engineering and architect consultancy	52	2.57	0.92	1	5	90	1.94	0.89	1	4	93
Management training and continuing professional development	53	2.28	0.81	1	4	85	2.03	0.98	1	5	74
Turnkey and individual trade contracts in construction	54	2.28	0.93	1	5	83	1.75	0.69	1	3	69
Danish lessons for foreigners	55	2.50	0.87	1	4	76	2.86	0.68	1	4	43
IT consultancy and program development	56	3.44	1.06	1	5	61	2.48	0.94	1	5	58
Job training programs	57	3.43	1.04	1	5	69	2.40	0.94	1	5	58
Home services for the elderly - practical and personal assistance	58	2.50	0.97	1	5	68	2.74	0.94	1	5	53
Educational offers related to job training programs	59	2.09	0.91	1	4	77	2.28	0.98	1	5	72
Coaching and mentoring programs, including the employment area	60	3.39	1.06	1	5	72	2.46	0.88	1	5	67

Table A2: Logistic regression of the likelihood of procurement cancellations with interactions

	Model 1	Model 2	Model 3	Model 4
Administrative capacity	-0.091 (0.334)	0.650 (0.542)	-0.164** (0.055)	-0.166** (0.053)
Financial capacity	-0.005 (0.003)	-0.006 (0.003)	0.006 (0.012)	0.006 (0.010)
Asset specificity	1.018 (1.961)	0.572** (0.208)	1.387 (1.017)	0.583** (0.207)
Measurability	-0.508* (0.215)	3.963 (3.179)	-0.500* (0.218)	0.261 (0.830)
Administrative capacity * Asset specificity	-0.029 (0.134)			
Administrative capacity * Measurability		-0.298 (0.211)		
Financial capacity * Asset specificity			-0.004 (0.005)	
Financial capacity * Measurability				-0.004 (0.004)
Income corporate tax (ln)	0.141 (0.159)	0.143 (0.159)	0.139 (0.160)	0.140 (0.158)
Government contracting indicator	-0.004 (0.027)	-0.005 (0.028)	-0.004 (0.027)	-0.005 (0.028)
Contract type	0.446* (0.185)	0.445* (0.183)	0.443* (0.183)	0.449* (0.184)
Number of lots	0.017* (0.007)	0.017* (0.007)	0.016* (0.007)	0.017* (0.007)
Weighting price	0.030 (0.292)	0.035 (0.285)	0.021 (0.292)	0.022 (0.293)
Area size	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Year=2018	0.131 (0.227)	0.135 (0.223)	0.124 (0.232)	0.124 (0.225)
Year=2019	0.171 (0.214)	0.191 (0.211)	0.167 (0.213)	0.164 (0.211)

Year =2020	0.334	0.361	0.329	0.325
	(0.394)	(0.389)	(0.395)	(0.392)
Year =2021	0.607*	0.623*	0.606*	0.601*
	(0.260)	(0.261)	(0.263)	(0.257)
Observations	5558	5558	5558	5558
Pseudo R^2	0.05	0.05	0.05	0.05

Standard errors in parentheses. Note: Entries are logistic regression coefficients. * $p < .05$, ** $p < .01$, *** $p < .001$.

[1] There is information for the final contract for 4,139 procurements in our data. We calculated the average contract worth and multiplied it by the 5,558 contracts in our data

[2] The survey was distributed to 1,085 public procure managers in Denmark. The respondents were randomized across the two transaction cost attributes, i.e., product complexity and asset specificity, to reduce the risk of response alignment across these two theoretical constructs. Question order was moreover randomized using both block randomization and question order randomization. Following the international procurement literature (E..g, Brown and Potoski, 2003; Levin and Tadelis, 2010; Hefetz and Warner, 2012) we used a balanced 5-point Likert scale including a ´Don't know" response option to measure our two transaction cost variables, with a "1" indicating that, for each product, procurement managers assess it is easy to describe and monitor service quality (product complexity) and find and replace vendors (asset specificity), and a "5" indicating that it is very difficult to describe and monitor service quality (product complexity) and find and replace vendors (asset specificity). We received 393 responses for a response rate of 36.22 percent.