

Year-End Purchases in Finnish Municipalities

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Abstract

Using comprehensive data on ten million purchases over a period of four years, I study the timing of spending in 19 municipalities in Finland. December accounts for 13.0% of recorded purchase volume. December figures importantly in the spending of all administrative functions, including the central administration which is supposed to monitor the other functions. Matching budget data with purchase data, I provide direct evidence that the recorded December spending share is positively associated with the unused budget at the beginning of December. Moreover, it is negatively associated with recorded spending in January and February.

Keywords:

Year-end spending, public procurement

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1. Introduction

In many government and local government entities, unspent budgets do not carry forward from one year to the next. This “use it or lose it” feature gives an incentive for the budgetary units to exhaust their budgets at the end of the fiscal year. Using comprehensive data on ten million purchases over a period of four years, this paper analyzes the timing of spending in 19 municipalities in Finland. The results can be summarized as follows.

December accounts for 13.0% of recorded purchase volume. Apart from that, there is a notable volume peak at the end of December: 3.9% of annual purchase volume is recorded on the last day of the year. The December volume share is by far the highest for investments (22.4%), followed by materials and consumables (15.0%) and services (12.3%). December figures importantly in the spending of all administrative functions, including the central administration which is supposed to monitor the other functions. Matching budget data with purchase data, I provide direct evidence that the recorded December spending share is positively associated with the unused budget at the beginning of December. Moreover, it is negatively associated with recorded spending in January and February. The latter result appears to be at least partly driven by the fact that many purchases billed in January and February are recorded as expenses already in the previous December.

I am not the first to study year-end spending. Zimmermann (1976), Hurley, Brimberg, and Fisher (2014), and Baumann (2015) find a peak in spending at the end of the year in the U.S., Canada, and UK. Balakrishnan et al. (2007) document that high spending volume at the end of a fiscal year is associated with low spending volume early next year. Liebman and Mahoney (2013) show that information technology investments made at the end of the fiscal year tend to be of much lower quality than those made earlier in the year.

My paper contributes to this literature

in two ways. First, I am to my knowledge the first to provide direct evidence that year-end spending share is positively associated with unused budget. Second, I study spending decisions at the local government level, as opposed to spending by federal agencies or by the central government.

The paper proceeds as follows. The next section describes the data. Section 3 presents the empirical results. Section 4 discusses the economic significance of the results.

2. Data

The data set includes two main components: bill data and budget data. I describe these components below.

Bill data. By the end of year 2016, 21 Finnish municipalities had posted their bills on the internet, typically from years 2012–15. This open access data, which includes comprehensive information on external bills (with the exception of bills from some self-employed persons, left out for privacy reasons), forms the core of the data set. Five municipalities (Joensuu, Jyväskylä, Kotka, Lieto, and Pyhtää) supplied at my request more detailed information on the bills than is available in the public domain. Two municipalities (Kauniainen and Puumala) leave out some key data items, so I exclude them from the data set. This leaves me with a final sample of 19 municipalities.

The bill data includes information on the following items: municipality, organizational unit conducting the purchase (generally the cost center: there are altogether almost 15,000 different cost centers in the data), value in euros, account, account group, the day the purchase is recorded in the municipality accounts, i.e. the record date, and the supplier. For Kirkkonummi, cost center data is not available. For Helsinki, the data is readily aggregated to the cost center – account – month – supplier level. In addition, Sotkamo reports the record date for each bill at the monthly level. All municipalities follow

similar account hierarchies, which allow me to categorize the bills into six expense types and 42 detailed expense types. I also use the cost center data to classify the administration function each bill belongs to. These classifications are harmonized across municipalities.

Budget data. Three cities—Espoo, Tampere, and Vantaa—post on the public domain detailed information on their budgets that can be matched with the bill data. This budget data, disaggregated to the cost unit and account level, often reports data on actuals. When the actuals differ less than 1% from the actuals for the corresponding unit and account in the bill data, I consider the two data items to be matched. (They do not necessarily match because the actuals in the budget data include internal bills). For the matched cases I draw inferences from the budgeted data and the actuals in the bill data.

3. Results

Table 1 Panel A reports on the composition of the municipality sample. The raw data includes 10.26 million bill observations with a total value of 28.6 billion euros. I discard about 308,000 bills (3.0% of the number of bills) that are not external bills at least in the usual sense of the word. These observations relate, among others, to receipts of income, salaries of municipality’s own employees, and service of debt. The combined value of these bills is slightly negative, –0.05 billion million euros. Moreover, I exclude about 9000 bills (0.1% of the number of bills) which do not include information on their amount or in which the amount is zero. This leaves me with a sample of 9.94 million observations. The combined value of the bills in the sample is 28.7 billion euros. About 2% of all purchase observations are rebate bills with a negative value.

Table 1 reports descriptive statistics on the sample by municipality. The sample is geared towards large municipalities: it includes the five largest and five of the ten next-largest Finnish cities. Combined, the sample mu-

nicipalities accounted for 40% of the Finnish population at the beginning of 2015. There are altogether 60 municipality-year observations in the data. The number of bill observations varies largely with the length of the time series and the size of the municipality. An exception to this is Helsinki for which the bill data was readily aggregated to the monthly level. Excluding Helsinki, the average purchase size is 2130 euros and the median is 104 euros.

Table 2 and Figure 1 report the monthly distribution of recorded purchase volume by expense type. The purchases tend to be clustered at the end of the year: December accounts for 13.0% of annual purchase volume. Apart from the general tendency for the purchases to cluster in the last month of the year, there is also a noticeable peak on the last day of the year: December 31 alone accounts for 3.9% of annual recorded purchase volume. This is in remarkable contrast to the six days before that, i.e. December 25–30, which combined account for 0.7% of the annual purchase volume. This suggests that the last-week peak in purchases documented by Liebman and Mahoney (2013) may largely be due to a last-day peak in purchases. The recorded December 31 share also is much larger than the recorded last-day share for the other months, on average 0.5%. There is also a smaller peak in recorded purchase volume in June, i.e. just before the prime holiday month of July (which tends to be slower than usual). The beginning of the year has unusually slow purchase volume, with January and February accounting for 6.4% and 7.0% of the recorded purchase volume respectively.

There are cross-sectional differences between expense types by record month. *Investments* have by far the largest seasonality, with December (January) accounting for 22.4% (2.6%) of recorded purchase volume. *Materials and consumables* have the second-largest seasonality: December accounts for 15.0% of the purchase volume and January 6.2%. *Services*, which is by far the largest expense category,

comes third with a 12.3% December share. *Rental and leasing costs* is the only expense type for which the year-end seasonality patterns are less remarkable, perhaps because the bill schedules are agreed upon well in advance.

Municipality accounting rests on the accrual principle: accounting transactions should be recorded in the period in which they actually occur, rather than the period in which the cash flows related to them occur. The year the bills are recorded follows from this principle. However, the principle applies less well to the monthly level: the bills may be recorded at different speeds at different times of the year depending on the expediency of the recording. To gain insight into this expediency, I use more detailed date data than is available for the main sample. Seven municipalities—Joensuu, Kotka, Kuopio, Lieto, Oulu, Pyhtää, and Sastamala—complement the record date data (which is the relevant date from the point of view of budgeting) with data on the billing date. Joensuu, Kuopio, and Oulu also report the payment date, and Joensuu and Oulu additionally the due date. For Oulu this additional information is available only from year 2015.

Figure 2 compares purchase volume by bill record and billing month for the seven municipalities from which I have both billing and record data. Billed volume has a less pronounced December seasonality than recorded volume. Moreover, unlike recorded volume, billing volume has no discernible seasonality at the beginning of the year. There is also no evidence of seasonality in billing during the summer months.

Table 3 reports these results more formally. In January, 6.0% of bills are recorded and 8.2% billed. The billing share is close to 8.5%, the share of a 31-day month of the number of calendar days in a year. The December billing share, 10.4%, is less remarkable than the December recorded share, 12.8%, which is close to the full sample December recorded share of 13.0%.

Table 4 reports the speed at which bills are recorded by month. As reported in the second column, the volume-weighted average difference between the billing date and the record date is 7.0 calendar days. This difference is at its smallest in December, 3.9 days. The December result can be largely attributed to the speedy recording of bills on the last day of the year: the bills are recorded on average 2.4 days *before* the billing date. For the median bill, the lag is zero days. These results are in marked contrast with the six days before the last day, December 25–30, for which the average difference equals the yearly average difference, 7.0 days. These results are consistent with the idea that bills are recorded faster, not slower, in the month of December than in other months. Thus, they go against the idea that the high year-end volume in the recording of bills would simply be an outcome of a preference to clear a backlog of accumulated bills before the turn of the year. Figure 3 shows this result visually.

Column 3 (column 4) of Table 4 reports the volume-weighted average difference between the due date (payment date) and the record date. Bills are recorded on average 5.8 (12.1) days before the due date (payment date). In December, however, bills are recorded earlier than in any other month relative to these benchmarks: the record date is 9.4 days before the due date and 17.7 days before the payment date. For bills recorded on the last day of December, the differences relative to record date are even larger: 21.8 and 24.2 days. These results support the earlier conclusion that bills are more likely to be recorded quickly in December than in the other months.

Is the peak in year-end spending driven by unused budgets? The analyses in Liebman and Mahoney (2013) and others implicitly assume this, but there is no direct evidence that this indeed is the case. I offer insight into this matter by merging budget data with bill data. The budget data is from three cities at the city – cost center – account – year level. Although

budgets generally do not bind at this fine of a level, they can be expected to matter if the sums are large enough to affect the budget of the organizational unit for which the budget does bind.¹ Therefore, I focus on observations with budgets of at least 10 million euros. I hypothesize that the unused share of budget in a budget category at the beginning of December is positively associated with actual spending share in the same budget category in December.

Figure 4 presents evidence that is consistent with this hypothesis. The unused budget share is highly significantly positively correlated ($r = 0.77$, t -value = 7.05) with the budgetary unit's actual spending share: a one percentage increase in the recorded unused budget share is associated with a 0.34 percentage point increase in the recorded December spending share. Although not reported formally, I also study the same relation as in Figure 3 for units with smaller budgets. I find a similar though weaker relation ($r = 0.20$, t -value = 3.68) when the budget ranges from EUR 1 to 10 million. Here, a one percentage point increase in the unused budget share is associated with a 0.069 percentage point increase in the recorded December spending share.

Does the year-end spending behavior apply to all parts of the municipality organization? Table 5 addresses this question by reporting the December purchase share by administrative function and expense type. Here, it is particularly interesting to study whether the central administration—which monitors the other functions—is subject to the same year-end spending behavior as the other functions. My results suggest this indeed is the case. Although the central administration

has the lowest aggregate recorded December purchase share, 11.2%, it has by far the highest *Materials & consumables* purchase share in December, 32.5%. Moreover, 26.7% of its *Investments* are recorded in December. *Culture, youth & sports* and *Education* are the administrative functions with the largest December spending shares, 16.4% and 15.9% respectively.

Table 6 reports on the timing of the purchases by detailed expense type. Column 3 sorts the 42 detailed expense types based on their December purchase share. This share is at least 20% for ten expense types, of which seven belong to the *Investments* category. Column 4 reports the combined share of January and February purchases. As shown by Figure 5, and consistent with Balakrishnan et al. (2007), the December share has an inverse relation with the combined January and February share ($r = -0.37$, t -value = -2.58; without one outlier, $r = -0.41$ and t -value = -2.91). Here, I scale the January and February purchases with the sum of the purchases from January to November. I exclude December from the denominator to avoid the December share and the combined January and February share to be mechanically related to one another. Column 5 reports the aggregated purchase volume for each detailed expense type. By far the biggest detailed expense type is *Customer services* (12.55 BEUR), followed by *Building maintenance* (3.35 BEUR) and *Office, bank, and professional services* (1.80 BEUR).

Table 7 column 2 reports the December share of recorded purchase volume by municipality. The volume is by far the largest in Jyväskylä, where it is on average 18.0% and in every sample year at least 16.7%, followed by Oulu (14.5%), Joensuu (14.3%), and Vantaa (14.0%). The municipalities with the smallest

¹ Unfortunately, I cannot test this directly. The budget data and the bill data generally do not match at the level where the budget binds because the bill data excludes internal purchases. Internal purchases are important for many accounts.

fractions are Paimio (7.5%), Lappeenranta (9.5%), and Sotkamo (9.5%). Given that the results in Figure 5 suggest that a large December share may be at least partly compensated by a lower share in January and February, I also report the combined January, February, and December share in column 3. This combined share displays less variation than the December share, ranging from Nokia (24.5%) to Kirkkonummi (29.1%).

4. Economic significance

How much extra do municipalities spend at the end of the year? To be able to answer this question, I first compare the December purchase share to how much municipalities would purchase in December were it not the last month of the fiscal year. This includes taking a stand both on how large the December purchase share actually is, and what constitutes “normal” December purchase share.

There are two candidates for the actual December volume share estimate: recorded volume (13.0%) and billing volume (10.4%). Recorded volume has the benefit of belonging to the correct year because of the accrual principle. Even if the late- and early-year purchase volumes may not be fully comparable (as Table 3 and Figure 2 suggest), late-year purchase volumes are likely to be more comparable with one another. In my sample, recorded December volume differs from recorded November (October) volume by 4.5% (4.3%). Billing volume has the benefit of not being subject to time variation in the urge (or lack of it) to record the bills. Indeed, Table 3 and Figure 2 show that billing volume shows much less monthly variation than recorded volume.

There are also two candidates for the normal December volume share estimate, one

based on the number of business days (7.2%) and another based on the number of calendar days (8.5%).³ Both candidates have their merits. The use of business days can be justified by the fact that business (including the recording of bills) is usually only conducted on business days. On the other hand, the use of calendar days can be justified by the fact that many bills, in particular ongoing service bills, relate to the number of calendar days the service covers.

The combined external purchase volume in my sample is 7.6 billion euros per year. Given that the sample municipalities account for about 40% of the Finnish population, the combined external purchase volume of all Finnish municipalities is of the order of 19 billion euros per year.

A conservative estimate of excess spending share in December would be the difference between the billing volume share and the number of calendar days share, $10.4\% - 8.5\% = 1.9\%$. A generous estimate of excess spending share would be the difference between the recorded volume share and the number of business days share, $13.0\% - 7.2\% = 5.8\%$. Multiplying these differences with total spending volume suggests that Finnish municipalities’ excess external spending volume in December ranges from 360 million euros to 1.1 billion euros per year.

The magnitude of the welfare loss caused by excess spending is hard to gauge. Part of the excess spending is used for expenses the budgetary units would incur anyway, but only later, causing little welfare loss. The fraction of this kind of spending is unknown. At the same time, part of the excess spending is likely to be of subpar quality, causing potentially a significant welfare loss. Although the quality of

³ I exclude from business days the First of May Eve, Midsummer Day Eve, Christmas Eve, and New Year Day Eve, which are not official holidays but in Finland often considered as such.

the year-end spending is unobservable in the data, one can get an idea of the effect of timing on the quality of spending from Liebman and Mahoney (2013). They find that information technology spending in the last week of the fiscal year is 5.7 times more likely to have an overall rating in the bottom two quality categories compared to spending during the rest of the year. When generalizing this result to Finland, one must bear in mind that the

sensitivity of the quality of spending to being rushed may vary across expense types. This is a particularly important consideration in my sample, where over 80% of the spending is on services. There is a much smaller year-end peak in service spending than in information technology spending, which suggests that the average quality of year-end spending is probably higher than the quality of year-end information technology spending.

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Table 1
Sample characteristics by municipality

This table reports information on the size of the sample municipalities along with the number and volume of their purchases and the number of years from which the purchase data is available. Helsinki has fewer purchases than what the purchase volume would suggest because the raw data is aggregated to the cost center – account – month – supplier level. The number of inhabitants is the average number from the sample years. Municipality size rank is from the beginning of 2015.

Municipality	Size rank	# inhabitants	Years	# observations	Volume, BEUR
Espoo	2	261,060	4	2,271,987	3.51
Helsinki	1	612,286	4	505,577	8.58
Vantaa	4	208,254	4	905,232	2.92
Hämeenlinna	14	67,845	3	370,212	0.79
Joensuu	12	74,579	4	544,592	1.09
Jyväskylä	7	134,659	4	779,106	1.45
Jämsä	50	21,965	3	162,697	0.25
Kirkkonummi	28	38,247	2	88,435	0.25
Kotka	19	54,684	4	347,367	0.81
Kuopio	8	106,886	4	706,020	1.46
Lappeenranta	13	72,701	3	276,502	0.94
Lieto	59	18,175	3	127,722	0.18
Nokia	33	32,887	2	110,535	0.17
Oulu	5	188,038	4	1,081,676	2.58
Paimio	95	10,600	2	38,369	0.07
Pyhtää	173	5,365	4	41,766	0.09
Sastamala	42	25,296	1	17,822	0.06
Sotkamo	97	10,561	1	61,992	0.08
Tampere	3	220,254	4	1,501,196	3.38
Totals		2,164,339	60	9,938,805	28.66

Table 2
Distribution of purchase volume by record month and expense type

This table reports the monthly distribution of purchase volume by expense type. The last column reports the monthly distribution of the number of purchases. The third-last (second-last) line reports purchase volume on the last seven calendar days except for the last calendar day (last calendar day) of the year. The last line reports the fraction each expense type accounts for the total purchase volume. The expense types correspond to the most commonly used account groups and they are harmonized across municipalities. Last-week and last-day statistics exclude purchases from Helsinki and Sotkamo for which bill registration data is available only at the monthly level.

RECORD MONTH	SHARE OF PURCHASE VOLUME BY EXPENSE TYPE							SHARE OF #OBS
	INVESTMENT	SERVICES	MATERIALS & CONSUMABLES	FINANCIAL AID	RENTAL & LEASING COSTS	OTHER OPERATING COSTS	TOTALS	TOTALS
1	2.6%	6.5%	6.2%	7.0%	9.0%	15.0%	6.4%	5.7%
2	4.3%	7.1%	7.1%	7.6%	6.8%	7.6%	7.0%	7.0%
3	5.0%	7.9%	8.2%	7.7%	8.6%	4.5%	7.8%	8.5%
4	6.6%	8.3%	9.1%	9.2%	8.6%	10.7%	8.3%	8.3%
5	6.4%	8.0%	9.5%	9.7%	7.6%	7.7%	8.1%	8.6%
6	10.9%	9.3%	8.5%	9.9%	8.9%	9.4%	9.3%	8.5%
7	6.7%	7.2%	5.8%	7.0%	8.3%	3.7%	7.0%	5.7%
8	7.9%	8.0%	6.9%	7.3%	7.4%	5.4%	7.9%	7.5%
9	8.8%	8.0%	7.3%	7.9%	8.1%	6.8%	8.0%	8.8%
10	9.1%	8.8%	7.9%	8.0%	9.5%	8.8%	8.7%	9.4%
11	9.2%	8.5%	8.5%	7.4%	7.6%	8.5%	8.5%	9.1%
12	22.4%	12.3%	15.0%	11.2%	9.7%	11.9%	13.0%	12.8%
of which in:								
Last week – last day	1.5%	0.7%	1.0%	0.4%	0.2%	1.0%	0.7%	0.9%
Last day	8.4%	3.7%	5.1%	4.0%	1.1%	3.2%	3.9%	4.0%
% of purch. vol.	4.8%	82.0%	8.4%	2.5%	1.9%	0.4%	100.0%	

Table 3
Comparison of purchase volume by record and billing month

This table reports the distribution of purchase volume by the record and billing month. The last column reports the difference between the volume share recorded and billed. The second-last (last) line reports purchase volume on the last seven calendar days except for the last calendar day (last calendar day) of the year. The sample consists of the seven municipalities for which data on billing date is available. The calculation in the two last lines exclude the municipality of Sotkamo, for which record data is available only on the monthly basis.

MONTH	SHARE OF ANNUAL PURCHASE VOLUME		
	RECORDED	BILLED	DIFFERENCE
1	6.0%	8.2%	-2.2%
2	7.3%	7.9%	-0.5%
3	8.0%	7.8%	0.2%
4	8.1%	8.5%	-0.4%
5	8.4%	8.1%	0.3%
6	9.0%	8.3%	0.7%
7	7.9%	7.9%	-0.1%
8	7.3%	7.6%	-0.3%
9	8.0%	8.0%	0.1%
10	8.5%	8.8%	-0.3%
11	8.5%	8.3%	0.2%
12	12.8%	10.4%	2.5%
of which in:			
Last week – last day	0.8%	0.3%	0.4%
Last day	5.4%	1.8%	3.6%

Table 4
Speed of bill recording by record month

This table reports the monthly distribution of the bill-volume-weighted average number of calendar days between record date and billing date (column 2), record date and due date (column 3), and record date and payment date (column 4). A positive (negative) number for a given date type suggests that the date has occurred before (after) the record date. The analysis excludes about 0.02% of the bills for which the absolute value of the difference between the dates exceeds 365 calendar days. The last line reports the number of municipalities for which data on other dates than the record date is available. For the bill date, the last-week and last-day figures are calculated based on six municipalities.

VOLUME-WEIGHTED # OF CALENDAR DAYS BETWEEN RECORD DATE AND			
RECORD MONTH	BILLING DATE	DUE DATE	PAY DATE
1	9.1	-3.6	-9.7
2	6.8	-7.2	-13.3
3	7.7	-6.6	-10.8
4	6.8	-5.7	-9.7
5	9.7	-5.7	-10.0
6	7.1	-4.8	-11.2
7	6.6	-4.6	-11.7
8	7.9	-4.2	-10.8
9	6.7	-3.1	-13.7
10	6.2	-8.3	-13.9
11	8.3	-3.2	-8.1
12	3.9	-9.4	-17.7
of which in:			
Last week – last day	7.0	-14.4	-14.4
Last day	-2.4	-21.8	-24.2
Full year	7.0	-5.8	-12.1
# municipalities with data	7	3	2

Table 4
December purchase volume share by administrative function and expense type

This table reports the December share of aggregate recorded purchase volume by administrative function and expense type. The last column reports the fraction each administrative function accounts for the total purchase volume. The expense types correspond to the most commonly used account groups and they are harmonized across municipalities. Central administration refers to the core administrative processes such as the mayor’s office and municipal council, along with accounting, finance, law, human relations, and strategic initiatives. Health & social refers to the health and social services. Education includes early childhood, primary, and secondary school education. Culture, youth, & sports refers to culture, youth, and sports related activities. Adult education is also included in this function. Technical & zoning includes technical, building supervision, and zoning functions along with emergency services. This function also includes building general infrastructure such as roads. Incorp. & misc. units refers to incorporated and miscellaneous units. The definitions of the administrative functions are harmonized across municipalities.

FUNCTION	SHARE OF DECEMBER PURCHASE VOLUME BY EXPENSE TYPE						SHARE OF AGGREGATE PURCHASE VOLUME	
	INVESTMENT	SERVICES	MATERIALS & CONSUMABLES	FINANCIAL AID	RENTAL & LEASING COSTS	OTHER OPERATING COSTS		
Central administration	26.7%	10.7%	32.5%	11.2%	6.1%	9.7%	11.2%	16.0%
Health & social	29.5%	11.7%	11.9%	13.3%	10.0%	10.8%	11.8%	45.1%
Education	31.0%	15.9%	16.3%	9.5%	7.2%	16.8%	15.9%	6.3%
Culture, youth & sports	22.9%	16.0%	16.9%	5.9%	9.6%	21.8%	16.4%	2.4%
Technical & zoning	20.2%	13.6%	16.8%	13.4%	10.3%	10.7%	14.9%	22.2%
Incorp. & misc. units	45.4%	13.4%	12.9%	9.1%	10.5%	14.5%	13.5%	7.9%

Table 5
Timing of purchases by detailed expense type

This table reports the December share (column 3) and the combined January and February share (column 4) of aggregate recorded purchase volume by detailed expense type. The detailed expense types are sorted based on the December volume share. The last column reports the purchase volume. The expense types and detailed expense types correspond to the most commonly used account groups and subgroups and they are harmonized across municipalities.

EXPENSE TYPE	EXPENSE TYPE, DETAILED	DEC / FULL YEAR	(JAN + FEB) / (FULL YEAR - DEC)	TOTAL VOL., MEUR
Investment	Subscribed capital	53.9%	10.2%	47
Investment	Other tangible assets	42.7%	13.9%	1
Investment	Intangible assets	41.3%	8.2%	6
Materials & consumables	Capitalized mat. & consumables	39.2%	5.4%	30
Investment	Software	36.9%	15.1%	2
Investment	Other cap. long-term expenditure	35.8%	5.8%	3
Materials & consumables	Machinery & equipment	25.8%	12.7%	272
Investment	Fixed structures & installations	23.9%	9.5%	30
Investment	Machinery & equipment	21.9%	8.8%	1,073
Services	Education & culture	20.0%	12.1%	205
Materials & consumables	Heating, electricity & water	18.6%	19.4%	647
Materials & consumables	Clothing	18.5%	14.2%	33
Investment	Land & waters	17.8%	15.5%	41
Services	Office, bank & prof. services	17.2%	14.1%	1,804
Investment	Advance payments	17.2%	7.9%	171
Services	Other services	15.5%	12.7%	550
Services	Capitalized services	15.0%	11.0%	551
Services	Lodging & catering	14.4%	12.5%	769
Services	Travel & transporting	13.8%	14.2%	703
Services	Social & health	13.7%	13.2%	699
Services	Building maintenance	13.3%	12.2%	3,350
Services	Printing & ads	13.2%	16.2%	62
Services	Post & telecommunication	13.2%	15.2%	233
Services	Equipment maintenance	12.8%	16.3%	193
Materials & consumables	Other materials	12.6%	15.3%	190
Services	Cleaning	12.3%	13.0%	546
Materials & consumables	Building materials	12.1%	12.4%	259
Other operating costs	Other operating costs	11.9%	25.6%	103
Materials & consumables	Office & school supplies	11.7%	13.2%	87
Materials & consumables	Fuel & lubricants	11.6%	19.3%	60
Financial aid	Financial aid to households	11.4%	15.8%	389
Services	Customer services	11.2%	16.9%	12,553
Financial aid	Financial aid to institutions	11.0%	17.1%	342
Materials & consumables	Groceries	10.6%	17.5%	313
Materials & consumables	Cleaning supplies	10.5%	14.8%	50
Materials & consumables	Medicine & medical supplies	10.1%	12.4%	331
Rental & leasing costs	Rental & leasing costs	9.7%	17.5%	533
Services	Share of other coop. services	8.2%	21.0%	1,252
Services	Share of taxation costs	8.0%	7.3%	0.02
Investment	Buildings	7.9%	6.2%	5
Materials & consumables	Literature	6.5%	15.6%	136
Services	Insurance	3.0%	65.2%	26

Table 6
Timing of purchases by municipality

This table reports the December share (column 2) and the combined January, February, and December share (column 3) of aggregate recorded purchase volume by municipality.

MUNICIPALITY	ANNUAL RECORDED SHARE	
	DEC	JAN+FEB+DEC
Espoo	12.5%	26.1%
Helsinki	12.6%	27.0%
Vantaa	14.0%	27.8%
Hämeenlinna	11.3%	25.7%
Joensuu	14.3%	27.6%
Jyväskylä	18.0%	27.6%
Jämsä	11.8%	27.3%
Kirkkonummi	13.7%	29.1%
Kotka	12.5%	27.0%
Kuopio	12.4%	25.9%
Lappeenranta	9.5%	25.1%
Lieto	10.1%	25.5%
Nokia	11.2%	24.5%
Oulu	14.5%	24.7%
Paimio	7.5%	24.8%
Pyhtää	12.0%	27.0%
Sastamala	12.3%	29.0%
Sotkamo	9.5%	24.8%
Tampere	12.0%	24.7%

Figure 1
Annual purchase volume share by record month

This figure reports the annual purchase volume share by record month. The figure is based on the data reported in the second-last column in Table 2.

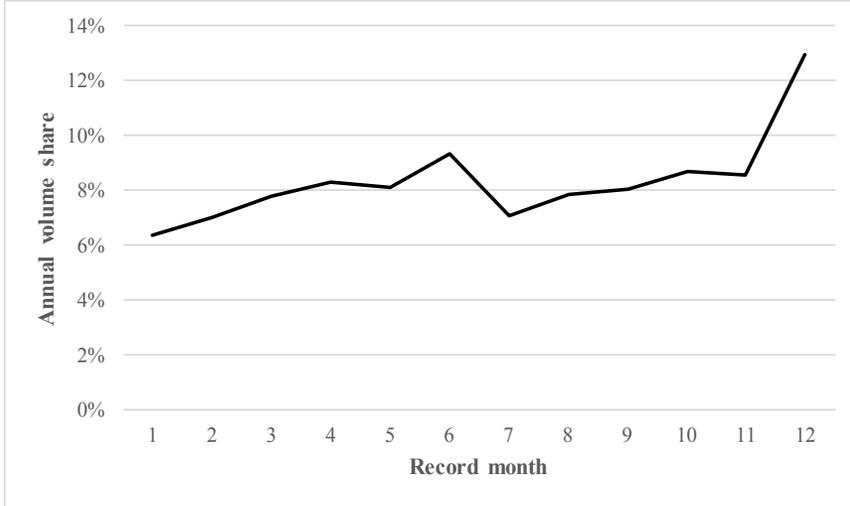


Figure 1
Annual purchase volume share by record and billing month

This figure reports the annual purchase volume share by record and billing month. The sample includes bills from the seven municipalities for which data on billing date is available. The figure is based on the data reported in the second and third columns of Table 2.

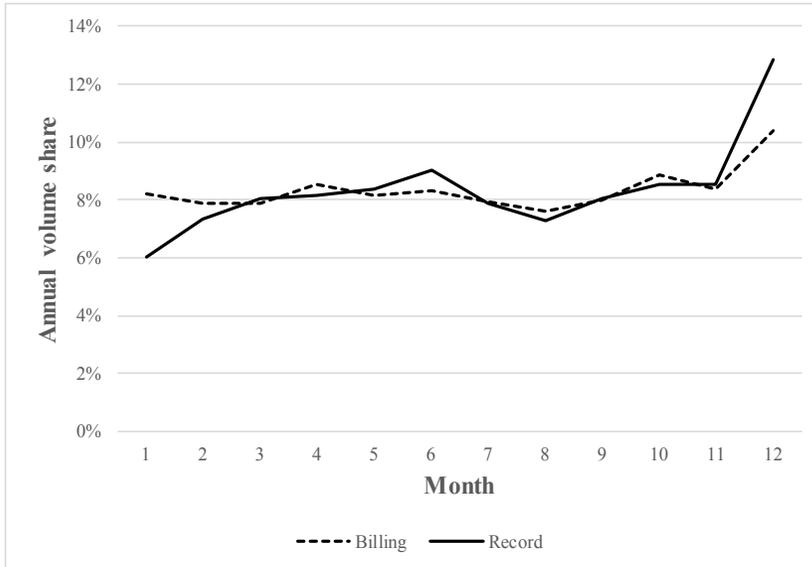


Figure 3
Weighted average number of days between record date and billing date by record month

This figure reports the bill volume weighted average number of calendar days between the record date and the billing date by record month. The figure is based on the data reported in the second column in Table 3.

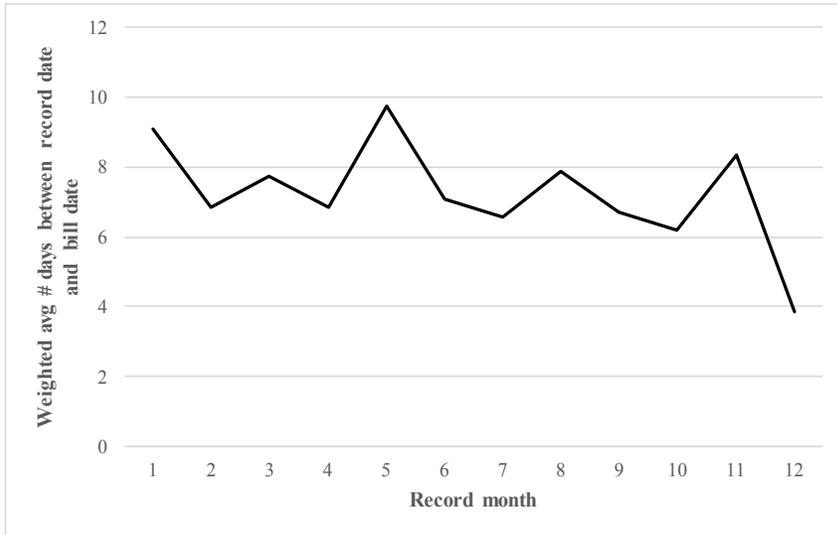


Figure 4
Unused budget and December purchases

This figure reports the relationship between the unused share of the annual budget at the beginning of December and the December share of annual purchase volume. The budget data is from the cities of Espoo, Tampere, and Vantaa from 2012–15, and it is reported for each city at the cost center – account level. Observations where the actual spending reported in the budget data differs more than 1% from the corresponding spending in the purchase data are excluded from the analysis. In addition, I require the budget to be at least 10 million euros. One outlier observation for which the unused budget share exceeds 200% is excluded from the figure. The number of observations is 36.

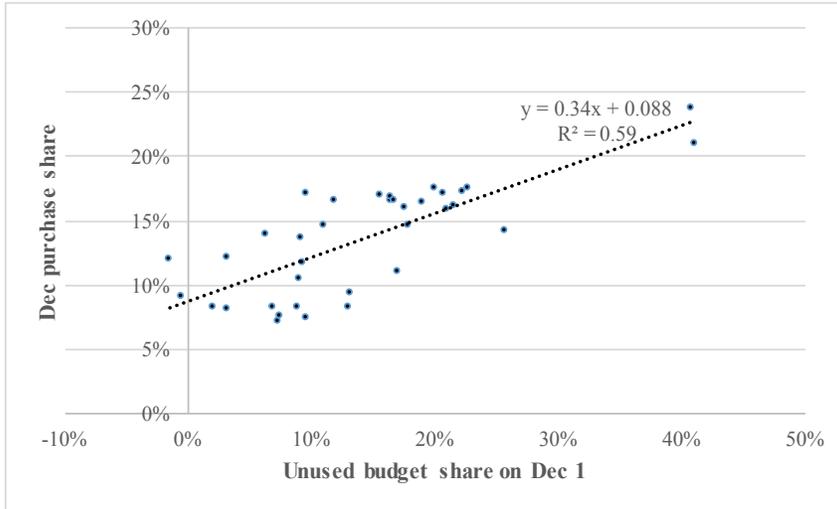


Figure 5
 The relationship between early-year and December purchases,
 detailed expense types

This figure reports the relationship between the combined January and February share and December share of annual purchase volume by detailed expense type. One outlier observation (insurance services) is excluded from the figure. The figure is based on the data reported in the third and fourth columns of Table 5. The number of observations is 41.

