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**On a Spending Spree:**

**The Real Effects of Heuristics in Managerial Budgets**

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Arizona State University (ASU)



\* Researchers' own analyses derived based in part on (i) retail measurement/consumer data from Nielsen Consumer LLC ("NielsenIQ"); (ii) media data from The Nielsen Company (US), LLC ("Nielsen"); and (iii) marketing databases provided through the respective NielsenIQ and the Nielsen Datasets at the Kilts Center for Marketing Data Center at The University of Chicago Booth School of Business. The conclusions drawn from the NielsenIQ and Nielsen data are those of the researcher(s) and do not reflect the views of Nielsen. Nielsen is not responsible for, had no role in, and was not involved in analyzing and preparing the results reported herein.

# Motivation

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- Textbooks: CEO's main job is to allocate resources to best opportunities
- Surveys: a firm faces hundreds of daily allocations (impractical for CEO)  
→ most are delegated to subordinates via **spending budgets**

## Theory:

Firms **continuously** allocate capital to **stochastically** arising opportunities



## Practice:

Spending budgets are **lumpy**, **persistent**, and anchored on **deadlines**

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## This paper:

How do the simplifying **heuristics in managerial budgets** affect capital allocation, project selection, and investment outcomes?

# Empirical Setting

## ■ Resource allocation

- **≈ \$800 billion** in advertising spending at 525 public firms
- **Comparable to CapEx** and **55% greater than R&D** for sample firms



## ■ Itemized expenditures and projects

- **3.4 million** itemized expenses; mean expenditure **≈ \$120,000**
- **Weekly spending** and project details
  - **Make use of fiscal yearend to identify patterns**



## ■ Outcomes

- Transaction-level **scanner data** linked to projects
- **100 billion transactions** → price, quantity, time stamp, location
- **Over 50% of physical retail sales** in groceries and drug stores



High-frequency data on **one of the largest expenditures** linked to sales

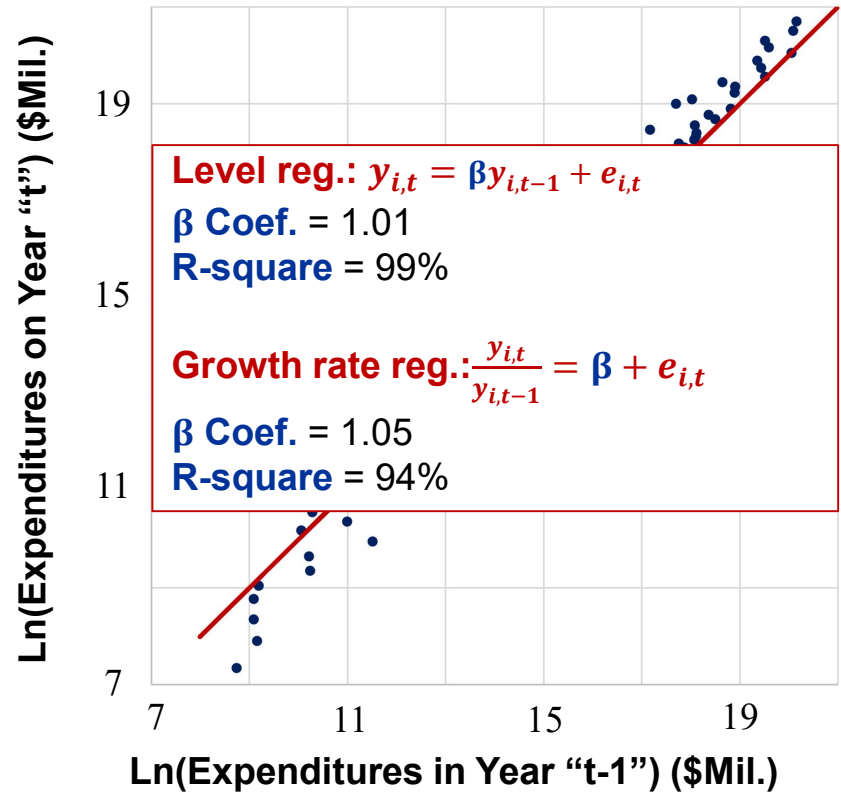
# Motivating Heuristics: **Nominal Rigidity**

**Surveys:** 62% of executives report minimal year-over-year adjustments in advertising budgets

➤ (Agrawal et al. 2020)



**Anchoring** on nominal amounts

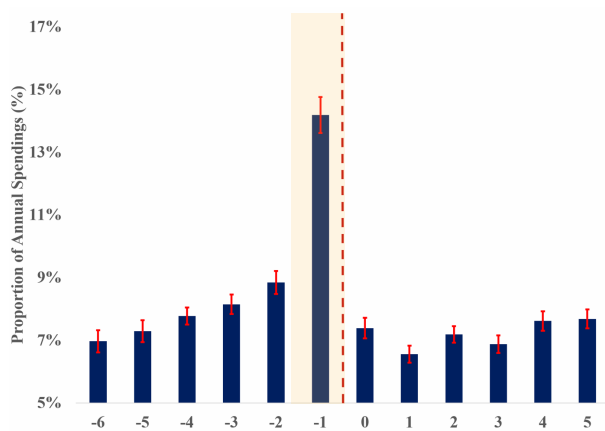


Budgets show strong **nominal rigidity** and **anchor** on previous year level

Identification: trace intra-year spending to infer running **surplus** or **deficit** relative to **nominal anchor points** → study outcomes near **budget deadlines**

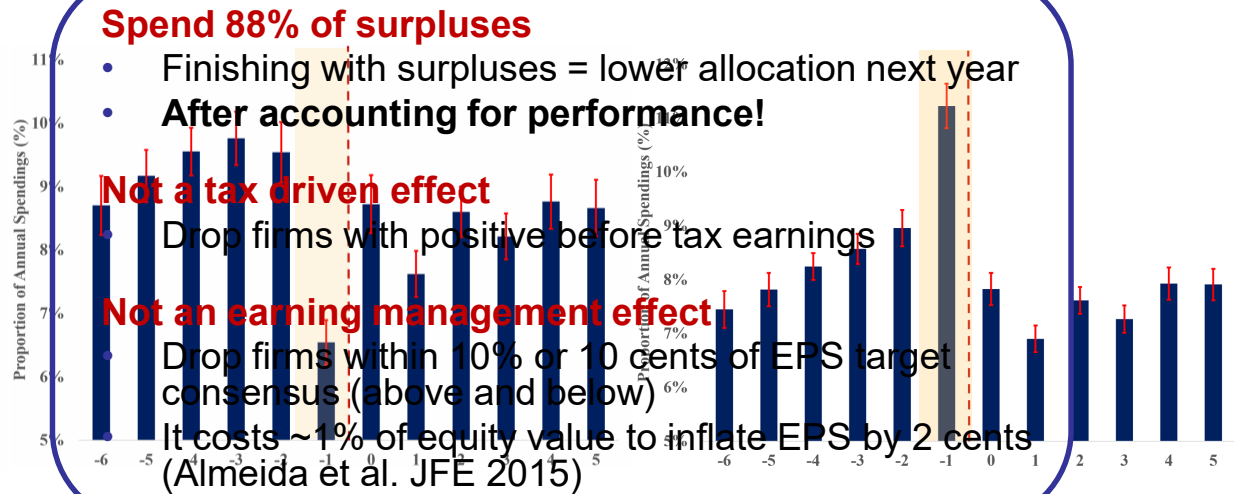
# Main Results in a Figure

$$\text{Remaining budget by month 12} = 1 - \frac{\text{Expenditure during first 11 months}}{\text{Previous anchor point}}$$



Surplus in month 12

Remaining budget  $> 1/12$



Deficit by budget deadline

Full sample

Remaining budget  $\leq 0$

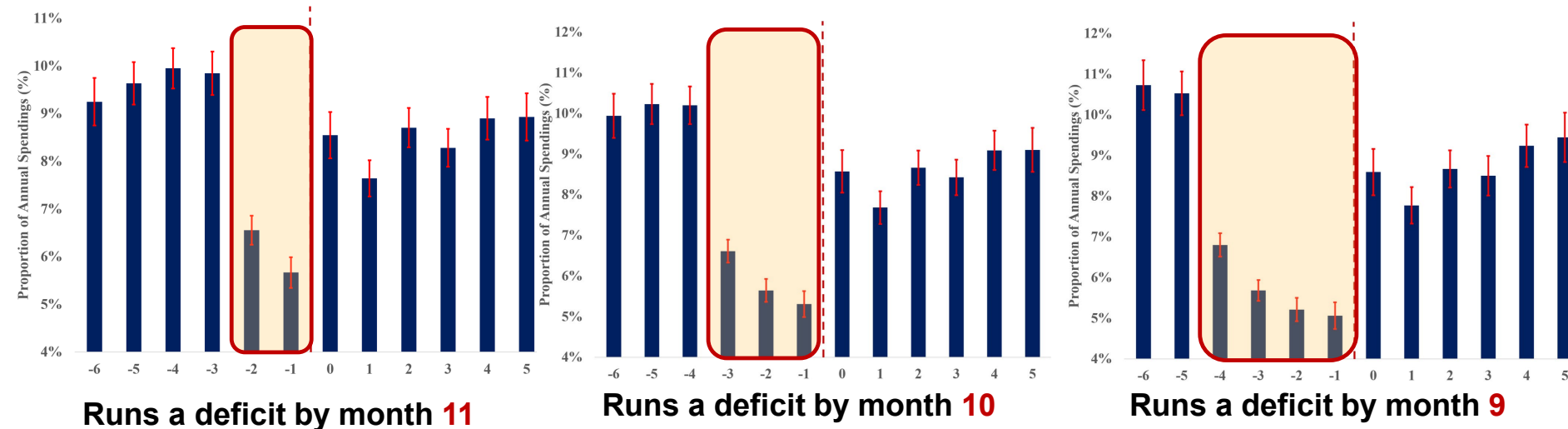
- Running a **surplus** → spend it before the budget reset deadline
- Running a **deficit** → reduce end-of-year expenditures by **56%** YoY

# Stronger Effects if Running a Deficit Early

Measure remaining budget by month  $X$  as:  $1 - \frac{\text{Expenditure during First } X-1 \text{ months}}{\text{Previous year total expenditure}}$

Patterns are robust over any horizons

- By month **11, 10, 9...**



- Not a December effect:** robust to using only firms with budget deadlines in other months of the year (46% of firms)



- Not a manager selection effect:** No spending drop (spike) if the same manager is running on budget

How do the spending **sprees & halts** affect a firm's **allocation efficiency**?



# Summary: Main Findings

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## ■ Real Effects

- Budget deficit halts spending **irrespective of invest. options** → **foregone investment**
- Surplus-driven spending before deadlines → **sharp decline** in project outcomes

## ■ Mechanism

- Mismatch of **budget heuristics** (deadlines & nominal rigidity) with **invest. opportunities**
- Effects disappear after **budget refill date** and shift when a firm changes **fiscal yearend**
- No underperformance if deadlines coincide with a **spike in invest. opportunities**

## ■ Governance

- Subordinates **prioritize spending rights** over value maximization, particularly when difficult to monitor: more hierarchical layers & reporting units
- **Strong principals (private equity & activists)** **eliminate heuristics** and switch to zero-based budgeting that follows invest. opportunities → higher efficiency

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Budget heuristics generate investment frictions and managerial opportunism

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# **1. Measuring Expenditures and Outcomes**

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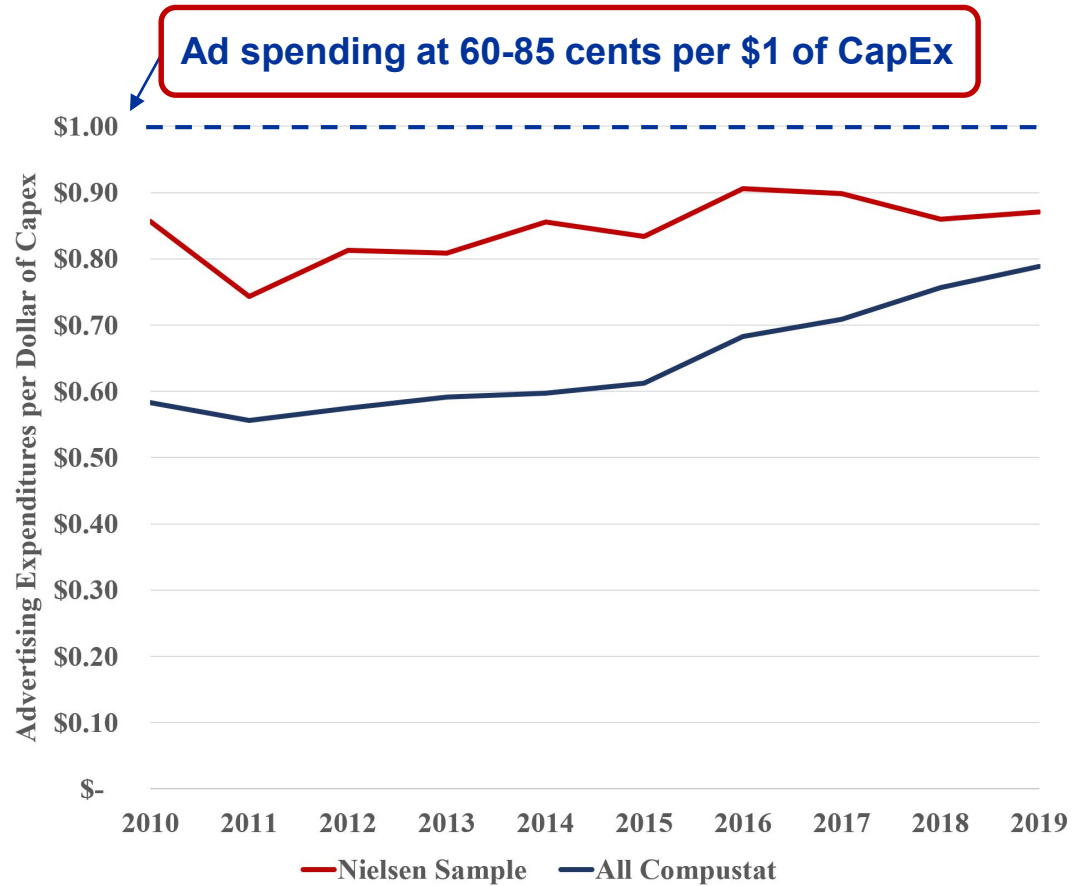
# Data: Advertising Projects

## 1. Expenditures

AdIntel → Micro-level, high-frequency data on advertising



- \$109M per year for ave. firm
- Ad **performance metrics**
- Similar weight as **CapEx** & **R&D** in corp. budgets
- Over **20%** of **U.S. CapEx**



# Data: Project Spending and Outcomes

## 1. Expenditures

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## 2. Sales

Nielsen Scanner Data → Retail sales



- **Retail sales**
  - Firm level
  - Product level
  - Price, quantity, location
- **Match advertising projects with sales** by product & firm

## 3. Firms

GS1, Execucomp, Compustat, Lexis Nexis Corp



- **Match** firms with products using **GS1**
- **Fiscal year-end date**
- **Zero-based budgeting**
- Organizational structure
- Management pay and tenure
- Financials

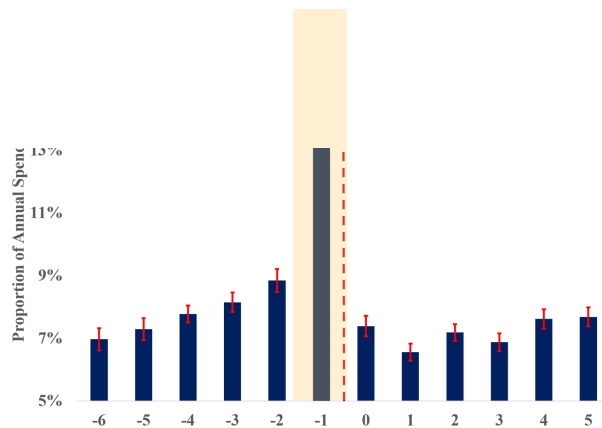
1. One of the largest corporate expenditures and a key driver of sales
2. A large sector of the economy > **20% of total U.S. CapEx**
3. **Precise measures of spending** at high frequency linked to project outcomes

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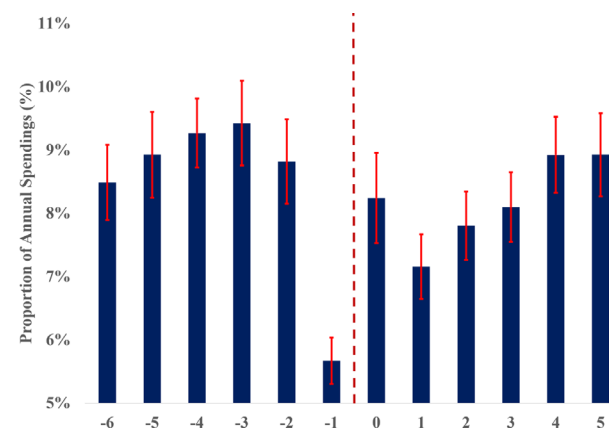
## 2. Budget Surpluses and Deficits

### Resource allocation over the fiscal year

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Running a surplus by month 12



Running a deficit by month 12

# Year-end resource allocation

	Spending <sub>i,k,t</sub>					
	(1)	(2)	(3)	(4)	(5)	(6)
$(\beta_1)$ Last Month <sub>i,t</sub>	3.37*** (14.77)	2.62*** (11.30)	2.66*** (11.42)	2.65*** (11.37)	2.92*** (13.69)	2.81*** (13.12)
$R^2$	0.00	0.01	0.01	0.02	0.04	0.11
F-Statistics	218.07	127.75	130.38	129.32	187.50	172.05
No. Obs.	413,202	413,202	413,202	413,202	413,124	413,124
Month FE	No	Yes	Yes	Yes	No	No
Fiscal Year FE	No	No	Yes	No	No	No
Firm FE	No	No	Yes	No	No	No
Firm*Fiscal Year FE	No	No	No	Yes	Yes	No
Product Category*Month FE	No	No	No	No	Yes	Yes
Product Category*Fiscal Year*Firm FE	No	Yes	Yes	Yes	No	Yes

Spending<sub>i,k,t</sub> = share of variable fiscal year expenditure in the product category  $k$  and otherwise

**Year-end spending is 2.81 pp (34%) higher than in other months**



**Prod. Cat.\*Month:** Business seasonality for each product (e.g., candies in October)

**Prod. Cat.\*Year\*Firm FE:** Investment opport. set, demand shifts cross firms

# Budgeting Rules Across Spending Categories

- Do budget rules drive similar spending sprees in **CapEx & intangibles?**
- Suggestive evidence from corporate disclosures (10-k):

- Investment in fixed assets

- “Many customers whose fiscal year is the calendar year spend their remaining budget authorizations in the fourth calendar quarter prior to new budget constraints...”



- Investment in intangibles

- “Our revenue historically has fluctuated quarterly and has generally been highest in the second quarter of our fiscal year due to corporate calendar yearend spending trends in our major markets..”



Budget rules & deadlines apply to a **broad set of resources**

Disclosures hint at similar patterns in other investments



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## **3. Project Performance**

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- Sales and financial outcomes
- Market penetration
- Customer reach

# Advertising Performance

<b>Panel A: Ad-to-Quantities Elasticity</b>		$\ln(\text{Qty}_{i,k,t})$	$\ln(\text{Qty}_{i,k,t+1})$	$\ln(\text{Qty}_{i,k,t+2})$	$\ln(\text{Qty}_{i,k,t+3})$
	(1)	(2)	(3)	(4)	(5)
$(\beta_1) \ln(\text{Spending Amount}_{i,k,t} + 1)$	0.04*** (9.90)	0.04*** (9.71)	0.02*** (9.47)	0.02*** (8.19)	0.02*** (8.88)
$(\beta_2) \ln(\text{Spending Amount}_{i,k,t} + 1) * \text{Last Month}_{i,t}$	-0.02** (-2.52)	-0.01* (-1.91)	-0.01 (-1.32)	-0.00 (-0.83)	-0.00 (-0.71)
$(\beta_3) \text{Last Month}_{i,t}$	0.26*** (4.47)	0.13*** (2.70)	0.04 (0.98)	-0.00 (-0.08)	-0.00 (-0.06)
No. Obs.	67,320	67,263	66,317	66,141	66,045
<b>Panel B: Ad-to-Sales Elasticity</b>		$\ln(\text{Sales}_{i,k,t})$	$\ln(\text{Sales}_{i,k,t+1})$	$\ln(\text{Sales}_{i,k,t+2})$	$\ln(\text{Sales}_{i,k,t+3})$
	(1)	(2)	(3)	(4)	(5)
$(\beta_1) \ln(\text{Spending Amount}_{i,k,t} + 1)$	0.05*** (10.74)	0.04*** (10.13)	0.02*** (9.64)	0.02*** (8.78)	0.02*** (9.21)
$(\beta_2) \ln(\text{Spending Amount}_{i,k,t} + 1) * \text{Last Month}_{i,t}$	-0.01* (-1.96)	-0.01* (-1.75)	-0.01 (-1.36)	-0.00 (-0.19)	-0.01 (-1.07)
$(\beta_3) \text{Last Month}_{i,t}$	0.23*** (4.03)	0.12*** (2.62)	0.04 (0.76)	-0.04 (-1.02)	-0.03 (-0.66)
No. Obs.	67,320	67,263	67,285	67,302	67,342
<b>Controls</b>	$\sum_{m=1}^{11} \gamma_m * \ln(\text{Spending Amount}_{i,k,t-m} + 1),$ $\sum_{m=1}^{11} \rho_m * \ln(\text{Peer Spendings Amount}_{i,k,t-m} + 1)$				
Month FE	No	Yes	Yes	Yes	No
Fiscal Year FE	No	No	Yes	No	No
Firm FE	No	No	Yes	No	No
Firm*Fiscal Year FE	No	No	No	Yes	Yes
Product Category*Month FE	No	No	No	No	Yes

$\text{Sales}_{i,k,t}$  = share of firm  $i$  fiscal year sales in **product category  $k$**  received in month  $t$

**Ad efficiency:** Year-end spending generates **25% less sales**

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## 4. Optimality and Governance

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- **Alternatives** to rigid budgets
- What would **strong shareholders** do?



# Evidence So Far

- **Real effects**: managers **overspend** surplus funds → projects **underperform**
- **Interpretation**: is budgeting still the **best solution** under resource constraints?

	Hypotheses		
	Efficient Investment	Constrained optimum	Agency
Project performance	Strong ❌	Weak ✅	Weak ✅
Can alternative policies do better?	No	No	Yes

# Evidence So Far

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<b>Can alternative policies do better?</b>	No	No	Yes

- **Constrained optimum**
  - Despite frictions, **budget heuristics are optimal** under costly monitoring
  - **For shareholders**: budgeting = **second-best** under constraints
- **Agency**
  - Removing rigid budgeting **would improve** allocation efficiency
  - **But managers resist forfeiting control** over spending

# What if we Eliminate Budget Heuristics?

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- **Zero Based Budgeting (ZBB)** – a method of resource allocation that starts with a “zero base” and allocates funds in response to arising needs without a guaranteed amount or a nominal link to prior year’s spending
- Advantages:
  - Most heuristics gone: **anchoring, nominal-rigidity, deadlines, shortage/surplus**
  - Follows investment opportunities
- Costs:
  - More frequent project reviews and supervisor involvement
  - Unpopular with admins & middle management → internal resistance

# From the **Inside** of Capital Budgeting

McKinsey  
& Company

- McKinsey Report (2018):
  - “**Resources get stuck...** We studied resource allocation at 1,500 companies over a 20-yr period. **90% of the dollars stay** where they were the year before.”
  - Switching to ZBB → **savings of 10-25%** in one year and higher returns
  - Challenge: “unlock that tight grip that managers have over their budgets”

BAIN  
& COMPANY

- Bain Management Tools Survey (2017):
  - Middle management resists ZBB
  - ZBB gets **lowest scores in manager satisfaction** among 25 tools studied

1. Managers **reluctant to forfeit control** over spending
2. **Strong principals** needed to overcome internal resistance

# What would a **Strong Principal** Do?

The New York Times

Dec. 29, 2022

## *What's Gone at Twitter?*

Twitter managers have been told to approach their spending with a tactic known as “zero-based budgeting,” or operating under the assumption that spending should start at nothing, and teams should justify individual costs.



Test: what if **strong principals** with value maximization incentives take control?

→ private equity & activist investors

- Is there a change in capital budgeting policy?
- What's the effect on spending & efficiency?



# Strong Principals and Excess Spending

	Spending <sub>i,k,t</sub>					
	Public Controls			Non-PE-Backed Private Controls		
	(1)	(2)	(3)	(4)	(5)	(6)
$(\beta_1)$ Last Month <sub>i,t</sub>	3.44*** (15.12)	2.71*** (11.62)	2.86*** (13.27)	3.79*** (4.54)	2.80*** (3.02)	3.05*** (3.77)
$(\beta_2)$ Last Month <sub>i,t</sub> * PE backed <sub>i,t</sub>	-3.50** (-2.25)	-3.59** (-2.29)	-3.24*** (-2.84)	-3.84** (-2.58)	-3.91** (-2.55)	-4.99*** (-4.58)
$(\beta_3)$ PE Backed <sub>i,t</sub>	0.28** (2.07)	0.22 (1.00)		0.35** (2.41)	0.27 (0.91)	
No. Obs.	413,760	413,760	413,682	39,510	39,510	39,312
Month FE	No	Yes	No	No	Yes	No
Fiscal Year FE	No	Yes	No	No	Yes	No
Firm FE	No	Yes	No	No	Yes	No
Firm*Fiscal Year FE	No	No	No	No	No	No
Product Category*Month FE	No	No	Yes	No	No	Yes
Product Category*Fiscal Year*Firm FE	No	No	Yes	No	No	Yes

Private equity investors target firms with **greater yearend spending**

→ PE-back firms mitigate yearend spending vs. public or other private firms  
 → PE-backed cost cutting doesn't induce a more rigid resource allocation

Mechanism: **how** do PE firms curb yearend spending sprees?

# Implementing a ZBB Strategy

	Spending <sub>i,k,t</sub>					
	(1)	(2)	(3)	(4)	(5)	(6)
( $\beta_1$ ) Last Month <sub>i,t</sub>	3.53*** (15.20)	2.78*** (11.75)	2.80*** (11.79)	2.79*** (11.74)	3.07*** (14.17)	2.96*** (13.57)
( $\beta_2$ ) Last Month <sub>i,t</sub> * Zero – Based Budget <sub>i,t</sub>	-2.59*** (-3.35)	-2.59*** (-3.35)	-2.34*** (-2.81)	-2.34*** (-2.80)	-2.31*** (-3.04)	-2.24*** (-2.93)
( $\beta_3$ ) Zero – Based Budget <sub>i,y</sub>	0.18** (2.08)	0.17** (2.10)	0.12 (0.86)			
No. Obs.	413,202	413,202	413,202	413,202	413,124	413,124
Month FE	No	Yes	Yes	Yes	No	No
Fiscal Year FE	No	No	Yes	No	No	No
Firm FE	No	No	Yes	No	No	No
Firm*Fiscal Year FE	No	No	No	Yes	Yes	No
Product Category*Month FE	No	No	No	No	Yes	Yes
Product Category*Fiscal Year*Firm FE	No	No	No	No	No	Yes

**Zero – Based Budget<sub>i,t</sub>** = a binary variable equal to 1 if firm  $i$  uses a zero-based budgeting during fiscal year  $y$ , and 0 otherwise

- ZBB **eliminates spending sprees**
- accommodates flexible allocations
- responsive to competition

Firms' voluntary adoption of ZBB spread through peer network

# Strong Principals and Excess Spending

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$(\beta_2)$ Last Month <sub>i,t</sub> * PE backed <sub>i,t</sub>	-3.50** (-2.25)	-3.59** (-2.29)	-3.24*** (-2.84)	-3.84** (-2.58)	-3.91** (-2.55)	-4.99*** (-4.58)
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Product Category*Month FE	No	No	Yes	No	No	Yes
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# Conclusion

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- Managerial budgets **facilitate delegation** but give rise to ad-hoc heuristics:
  - Sharp reset deadlines
  - Anchoring
  - Nominal rigidity

} **Investment frictions & opportunism**
- Capital budgeting is an intermittent process with **sharp inflection points**

Micro evidence on the **inner workings of capital budgeting**

**challenges the view** of a continuous allocation to arising opportunities

# Monitoring Costs and Yearend Spending

Panel A: Monitoring Cost	Spending <sub>i,k,t</sub>			
	Firm Flatness		No. Hierarchical Layers	
	(1)	(2)	(3)	(4)
(β <sub>1</sub> ) Last Month <sub>i,t</sub>	2.80*** (7.37)	2.38*** (6.75)	2.87*** (7.56)	2.50*** (7.11)
(β <sub>2</sub> ) Last Month <sub>i,t</sub> * Complexity <sub>i,t</sub>	1.18** (2.45)	1.11** (2.46)	1.08** (2.23)	0.94** (2.09)
(β <sub>3</sub> ) Complexity <sub>i,t</sub>			-0.06 (-1.04)	
No. Obs.	368,526	368,448	368,526	368,448

Panel B: Short on Cash	Spending <sub>i,k,t</sub>			
	HP Index		Short on Cash	
	(1)	(2)	(3)	(4)
(β <sub>1</sub> ) Last Month <sub>i,t</sub>	4.18*** (12.82)	3.52*** (11.14)	4.16*** (12.97)	3.54*** (11.96)
(β <sub>2</sub> ) Last Month <sub>i,t</sub> * Fin. Constraint <sub>i,t</sub>	-1.64*** (-3.61)	-1.36*** (-3.16)	-1.59*** (-3.52)	-1.44*** (-3.31)
(β <sub>3</sub> ) Fin. Constraint <sub>i,t</sub>			0.21*** (4.58)	
No. Obs.	368,526	368,448	368,526	368,448
Product Category*Month*Firm FE	No	Yes	No	Yes
Product Category*Fiscal Year*Firm FE	No	Yes	No	Yes

## 2 measures of monitoring Cost:

- No. units a top managers monitors
- Avg. distance between the CEO and the lowest level subordinate

Firms with **higher monitoring costs** have greater yearend spending

# Monitoring Costs and Excess Spending

Panel A: Monitoring Costs	Spendings <sub>i,k,t</sub>			
	Firm Flatness		No. Hierarchical Layers	
	(1)	(2)	(3)	(4)
(β <sub>1</sub> ) Last Month <sub>i,t</sub>	2.80*** (7.37)	2.38*** (6.75)	2.87*** (7.56)	2.50*** (7.11)
(β <sub>2</sub> ) Last Month <sub>i,t</sub> * Complexity <sub>i,t</sub>	1.18** (2.45)	1.11** (2.46)	1.08** (2.23)	0.94** (2.09)
(β <sub>3</sub> ) Complexity <sub>i,t</sub>	(-1.43) (-1.43)		-0.06 (-1.04)	
No. Obs.	368,526	368,448	368,526	368,448

Panel B: Short on Cash	Spendings <sub>i,k,t</sub>			
	HP Index		Short on Cash	
	(1)	(2)	(3)	(4)
(β <sub>1</sub> ) Last Month <sub>i,t</sub>	4.18*** (12.82)	3.52*** (11.14)	4.16*** (12.97)	3.54*** (11.96)
(β <sub>2</sub> ) Last Month <sub>i,t</sub> * 1(Fin. Constraint <sub>i,t</sub> )	-1.64*** (-3.61)	-1.36*** (-3.16)	-1.59*** (-3.52)	-1.44*** (-3.31)
(β <sub>3</sub> ) 1(Fin. Constraint <sub>i,t</sub> )	0.12*** (2.88)		0.21*** (4.58)	
No. Obs.	368,526	368,448	368,526	368,448
Product Category*Month*Firm FE	No	Yes	No	Yes
Product Category*Fiscal Year*Firm FE	No	Yes	No	Yes

**2 measures of cash constraints:**

→ *Hadlock and Pierce Index*

→ *Cash ratio*

**Cash constrained** firms curb pre-deadline spending sprees

# Yearend Spending and Budget Constraints

	Spending <sub>i,k,t</sub>					
	(1)	(2)	(3)	(4)	(5)	(6)
(β <sub>1</sub> ) Last Month <sub>i,t</sub>	5.78*** (19.15)	4.98*** (16.93)	5.01*** (16.99)	5.05*** (17.17)	5.30*** (18.93)	5.68*** (20.12)
(β <sub>2</sub> ) Last Month <sub>i,t</sub> * Budget Depleted <sub>i,t</sub>	-5.70*** (-18.84)	-5.31*** (-18.65)	-5.34*** (-18.85)	-5.48*** (-19.37)	-5.46*** (-18.87)	-6.29*** (-21.34)
(β <sub>3</sub> ) Budget Depleted <sub>i,t</sub>	-1.54*** (-18.14)	-1.94*** (-23.03)	-1.92*** (-22.44)	-1.95*** (-22.35)	-1.91*** (-22.13)	-2.89*** (-22.20)
No. Obs.	413,202	413,202	413,202	413,202	413,124	413,124
Month FE	No	Yes	Yes	Yes	No	No
Fiscal Year FE	No	No	Yes	No	No	No
Firm FE	No	No	Yes	No	No	No
Firm*Fiscal Year FE	No	No	No	Yes	Yes	No
Product Category*Month FE	No	No	No	No	Yes	Yes
Product Category*Fiscal Year*Firm FE	No	No	No	No	No	Yes

**Budget Depleted<sub>i,t</sub>** = a binary variable equal to 1 if firm *i* already **spent more than last year** by month *t* of the fiscal year, and 0 otherwise

Managers running a **deficit** reduce spending by **2.89 pp (35%)**

**Deficit effect** strongest at yearend:

$$\beta_1 + \beta_2 + \beta_3 \quad \mathbf{-3.5 \text{ p.p.}}$$

**→ Curbs overspending**

Do the yearend spending sprees **affect performance?** **Next >>**

# Why is Performance Lower at Yearend?

	Viewership Total Time $e_{i,k,t}$			Market Penetration (%) $i,k,t$		
	(1)	(2)	(3)	(4)	(5)	(6)
$(\beta_1) \ln(\text{Spending Amount}_{i,k,t} + 1)$	743.61*** (5.25)	642.09*** (5.59)	323.09*** (6.43)	105.80*** (15.00)	99.46*** (15.41)	72.22*** (19.06)
$(\beta_2) \ln(\text{Spending Amount}_{i,k,t} + 1) * \text{Last Month}_{i,t}$	-175.31** (-2.19)	-162.94** (-2.28)	-67.51** (-2.15)	-16.16*** (-3.65)	-15.22*** (-3.87)	-6.07** (-2.04)
$(\beta_3) \text{Last Month}_{i,t}$	2,524.09** (2.20)	2,002.13** (2.11)	938.66** (2.06)	227.52*** (3.57)	199.75*** (3.62)	83.80* (1.97)
No. Obs.	46,339	46,322	45,042	41,958	41,940	40,573
Month FE	No	Yes	Yes	Yes	No	No
Fiscal Year FE	No	No	Yes	No	No	No
Firm FE	No	No	Yes	No	No	No
Firm*Fiscal Year FE	No	No	No	Yes	Yes	No
Product Category*Month FE	No	No	No	No	Yes	Yes
Product Category*Fiscal Year*Firm FE	No	No	No	No	No	Yes

## Viewers Reached (Mil.) \* Hours Aired

- Reach intensity

## Viewers Reached/Viewers Universe

- Ability to reach all viewers

- *Yearend surplus projects:*
  - **21%** lower viewership
  - **8%** lower market penetration

Mechanism: is the performance decline linked to **budget rigidity**?



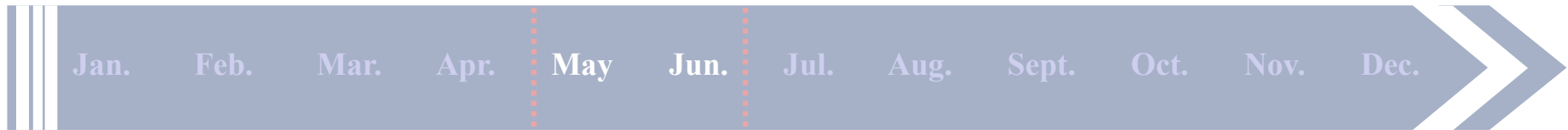
# How do networks sell TV inventory?

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Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sept. Oct. Nov. Dec.

# How do networks sell TV inventory?



## Upfront Season

When it airs

→ Up to 12 months from booking

Guarantees

→ No. of Impressions  
→ ~Amount of viewers



## Remnant & Non-Pre-Emptible

When it airs

→ 1-4 weeks from booking  
→ At most a quarter

Guarantees

→ No Guarantee  
→ At best: guarantee to run

# Mismatch with Arriving Opportunities

	TV Spendings <sub>i,k,t</sub>					
	(1)	(2)	(3)	(4)	(5)	(6)
(β <sub>1</sub> ) Last Month <sub>i,t</sub>	5.78*** (19.15)	4.98*** (16.93)	5.01*** (16.99)	5.05*** (17.17)	5.30*** (18.93)	5.68*** (20.12)
(β <sub>2</sub> ) Last Month <sub>i,t</sub> * Upfront Season <sub>i,y</sub>	-5.70*** (-18.84)	-5.31*** (-18.65)	-5.34*** (-18.85)	-5.48*** (-19.37)	-5.46*** (-18.87)	-6.29*** (-21.34)
(β <sub>3</sub> ) Upfront Season <sub>i,y</sub>	-1.54*** (-18.14)	-1.94*** (-23.03)	-1.92*** (-22.44)	-1.95*** (-22.35)	-1.91*** (-22.13)	-2.89*** (-22.20)
No. Obs.	413,202	413,202	413,202	413,202	413,124	413,124
Month FE	No	Yes	Yes	Yes	No	No
Fiscal Year FE	No	No	Yes	No	No	No
Firm FE	No	No	Yes	No	No	No
Firm*Fiscal Year FE	No	No	No	Yes	Yes	No
Product Category*Month FE	No	No	No	No	Yes	Yes
Product Category*Fiscal Year*Firm FE	No	No	No	No	No	Yes

**Upfront Season<sub>i,t</sub>** = a binary variable equal to 1 if firm *i* fiscal yearend falls during the upfront season, and 0 otherwise

## Rigid deadlines

→ **Excess spending** pre-deadline

**Out of budget** → weak response to **competition** (peer ads)

Are budget rules a **constrained optimum** or can some firms do better?

# Robustness

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- **Firm changes of FY end**

- After budget deadlines shift, the effect around the **old deadlines disappears**, and **reemerges before the new deadlines**

- **Omitted variables**

- Robust to a variety of **granular high-dimensional fixed effects**:  
→ Firm\*Product Category\*Month fixed effects

- **Small divisions only ( less than 1% of **budget** or **total sales**)**

- Helps account for **nonrandom year-end dates**

- **Alternative explanations**

- Tax incentives
- Earnings management
- December effect
- Financial reporting → private firms

# Advertising Performance

Panel A: Ad-to-Quantities Elasticity	ln(Qty <sub>i,k,t</sub> )	ln(Qty <sub>i,k,t+1</sub> )	ln(Qty <sub>i,k,t+2</sub> )	ln(Qty <sub>i,k,t+3</sub> )	
	(1)	(2)	(3)	(4)	(5)
(β <sub>1</sub> ) ln(Spending Amount <sub>i,k,t</sub> + 1)	0.04*** (9.90)	0.04*** (9.71)	0.02*** (9.47)	0.02*** (8.19)	0.02*** (8.88)
(β <sub>2</sub> ) ln(Spending Amount <sub>i,k,t</sub> + 1) * Last Month <sub>i,t</sub>	-0.02** (-2.52)	-0.01* (-1.91)	-0.01 (-1.32)	-0.00 (-0.83)	-0.00 (-0.71)
(β <sub>3</sub> ) Last Month <sub>i,t</sub>	0.26*** (4.47)	0.13*** (2.70)	0.04 (0.98)	-0.00 (-0.08)	-0.00 (-0.06)
No. Obs.	67,320	67,263	66,317	66,141	66,045
<b>Controls</b>	$\sum_{m=1}^{11} \gamma_m * \ln(\text{Spending Amount}_{i,k,t-m} + 1),$ $\sum_{m=1}^{11} \rho_m * \ln(\text{Peer Spendings Amount}_{i,k,t-m} + 1), \delta * \text{Average Monthly Price}_{i,k,t}$				
Month FE	No	Yes	Yes	Yes	No
Fiscal Year FE	No	No	Yes	No	No
Firm FE	No	No	Yes	No	No
Firm*Fiscal Year FE	No	No	No	Yes	Yes
Product Category*Month FE	No	No	No	No	Yes

Qty<sub>i,k,t</sub> = share of firm *i* fiscal year quantities sold in **product category** *k* received in month *t*

**Ad efficiency:** Year-end spending generates **25% less** quantities sold