

Do Household Finances Constrain Unconventional Fiscal Policy?

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*Disclaimer: The views in this paper are those of authors and do not
represent the opinions of the Federal Reserve System.*

Consumption Taxes as Stimulus Tool

- ▶ Main counter-cyclical policy tool in recent decades was short-term interest rate (FFR)
- ▶ Tradition interest rate channel stimulates aggregate demand via intertemporal substitution
- ▶ When Fed funds rate is against ZLB, policy makers need additional tools
- ▶ Possible policy alternatives
 - ▶ unconventional monetary policy (eg QE)
 - ▶ **unconventional fiscal policy:** pre-announced consumption tax increase

Consumption Taxes as Stimulus Tool

Temporary consumption taxes as stimulus have never been used in US → many open questions:

1. Are sales taxes salient enough?
2. Won't credit frictions dampen response of large durables?
3. Won't response be especially low in recessions?
4. Won't the effect be too short-lived?

This paper: use historical sales tax rate changes

Preview of Results

1. Are sales taxes salient enough?

Yes. Consumers bring spending forward to month before taxes increase

2. Won't credit frictions dampen response of large durables?

Yes. Response at low credit scores much smaller than at high scores

3. Won't response be especially low in recessions?

No. Other forces work in opposite direction
→ average response larger in recessions

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Not necessarily. Response is short-lived b/c changes are small. Counter-cyclical policy would be much larger

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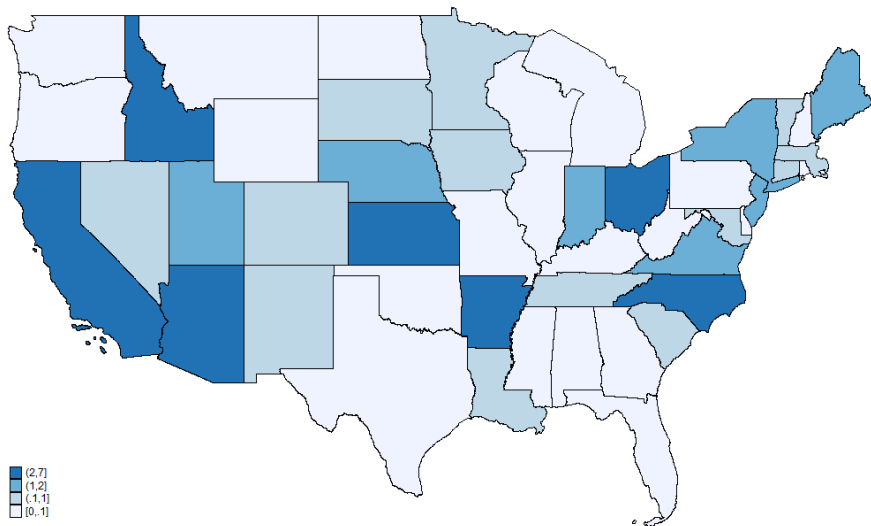
Outline

1. Data
2. Methodology
3. Results
 - 3.1 Tax Salience
 - 3.2 Credit Frictions
 - 3.3 Effectiveness during Recessions
 - 3.4 Evaluation as a Counter-Cyclical Policy Tool

Sales Tax Data

- ▶ State sales taxes, monthly 1999-2017
- ▶ 57 state tax changes
 - ▶ $\Delta\tau_{state}$: $\mu=0.55\%$, $\text{med}=0.25\%$
- ▶ Also Zipcode-level sales taxes from CCH Wolters Kluwer, 2003-2015
 - ▶ over 2,000 distinct local changes
 - ▶ b/c of recording issues at granular zip level, we restrict analysis to state changes

Number of Tax Rate Changes, 1999-2017



Car Sales Data

FRBNY/Equifax Consumer Credit Panel (CCP)

- ▶ number of newly initiated vehicle loans, 1999-2017
- ▶ 5% random sample of individuals w/ Equifax credit report

Experian AutoCount, 2005-2015

- ▶ includes **non-financed purchases** and leases
- ▶ identifies whether **used or new** purchases (not in CCP)
- ▶ *main limitation*: measurement error in timing of purchases
→ some purchases recorded with a lag of about 2 weeks

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Methodology

- ▶ Use **high frequency** of tax & spending **data** and exploit **fiscal inside lag**

Important

- ▶ These are not shocks (ie tax news/information shocks)
- ▶ but predetermined *tax changes*

⇒ Captures **substitution effects**, not income effects
(if consumers are forward-looking optimizers)

$$\Delta \ln(cars_{st}) = \sum_i \beta_i \cdot \Delta \ln(1 + \tau_{s,t+i}) + \gamma_t + z_{st} + \varepsilon_{st}$$

τ : sales tax rate

t : month

s : state

SEs clustered by state

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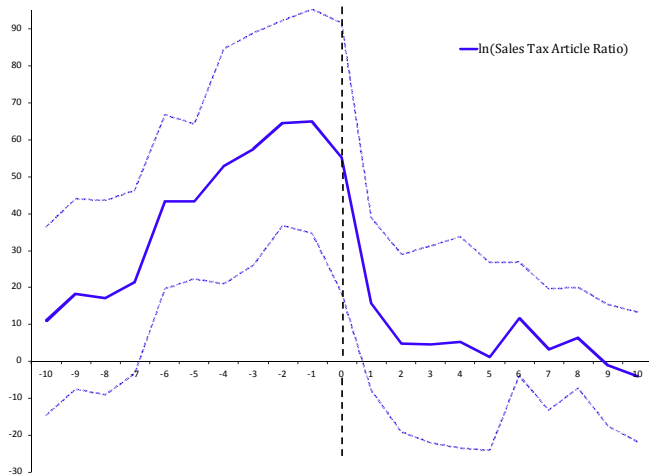
Fiscal Inside Lag: A Lower Bound

- ▶ Lag between passage and implementation of $\Delta\tau$
 - ▶ Baker et al (2018) collect data for 57 state changes 2004-2015
 - ▶ find that median lag = 3 months
 - ▶ = lower bound on fiscal inside lag b/c information available before (media, ballots)
- look at newspaper coverage around $\Delta\tau$

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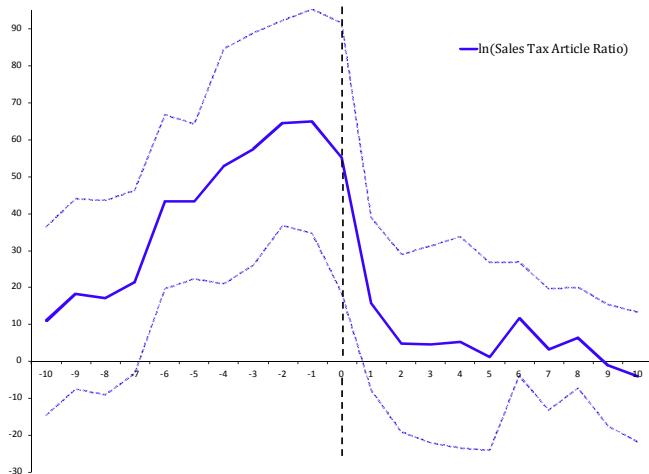
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Fiscal Lag: Evidence from News Articles



- Announcements/news occur several months in advance
- Hence, at the time of the change this is not a shock (*if salient*)
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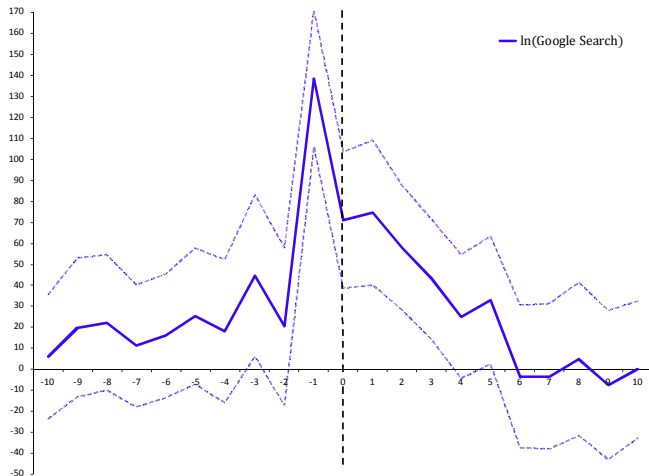
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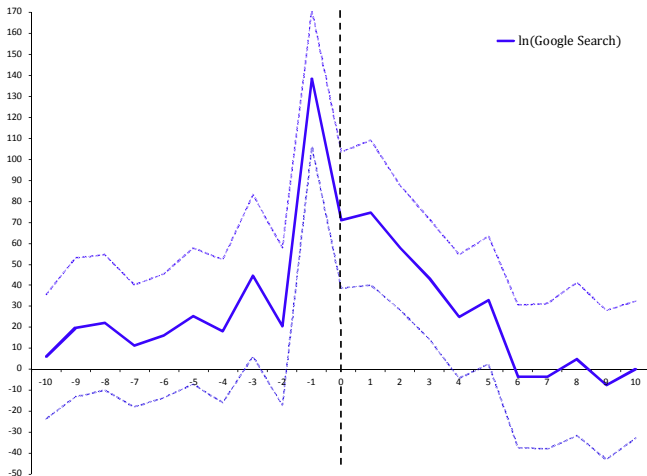


→ Users clearly pay attention to upcoming sales tax rate changes

Do they also change their spending behavior?

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Do they also change their spending behavior?

1. Tax Salience: Car Sales Response

Table 2: Response of Car Purchases to Sales Tax Changes, Equifax CCP Data

	All Tax Changes	Large Changes	Increases	Decreases
	(1)	(2)	(3)	(4)
$\Delta \log(1+\tau)$, lead 1	8.277*** (2.767)	8.825*** (2.624)	8.262*** (2.771)	8.304*** (2.760)
$\Delta \log(1+\tau)$	-9.659*** (1.947)	-10.75*** (2.025)	-11.16*** (2.726)	-5.595*** (1.697)
$\Delta \log(1+\tau)$, lag 1	3.056*** (0.810)	3.126*** (0.717)	3.067*** (0.814)	3.049*** (0.812)
Year-by-month FE	Yes	Yes	Yes	Yes
Observations	5,989,936	5,989,936	5,978,901	5,966,745
R-squared	0.024	0.024	0.024	0.024

→ Yes, car purchases respond to (future) taxes

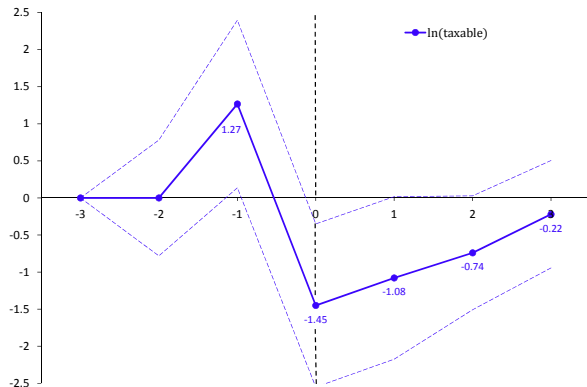
1. Tax Salience: Car Sales Response

We find similar tax elasticities using AutoCount data

- ▶ similar for financed, non-financed cars & leases
 - studying financed purchases does not bias results
- ▶ similar response for used and new
 - important b/c new cars impact aggregate demand more

Comparison with Retail Spending Response

In previous work (Baker, Johnson and Kueng 2018), we look at [AC Nielsen retail spending](#) response:



- similar pattern, but car sales elasticity 7x larger
- in Nielsen, we also see larger responses for more durables and storables

2. Credit Frictions

Won't credit frictions dampen response of durables?

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Table 4: Differential Response Across Credit Scores, Equifax CCP Data

	Credit Score Quintiles				
	1st	2nd	3rd	4th	5th
	(1)	(2)	(3)	(4)	(5)
$\Delta \log(1+\tau)$, lead 1	3.966*** (0.920)	3.399** (1.559)	4.963** (1.996)	7.537*** (2.003)	6.460** (2.602)
$\Delta \log(1+\tau)$	-4.140*** (1.458)	-5.030*** (0.977)	-5.544*** (0.708)	-8.179*** (1.591)	-7.301*** (2.000)
$\Delta \log(1+\tau)$, lag 1	1.170 (0.891)	1.454 (1.052)	0.963 (0.760)	3.330*** (0.815)	3.209*** (0.980)
Year-by-month FE	Yes	Yes	Yes	Yes	Yes
Observations	5,989,936	5,989,936	5,989,936	5,989,936	5,989,936
R-squared	0.007	0.008	0.009	0.010	0.010

→ Yes, low credit scores respond much less.

2. Credit Frictions

AutoCount data shows

- ▶ heterogeneity is driven by new purchases

Why?

- ▶ new car purchases are larger & more often financed
- ▶ used cars use less financing
- ▶ (also different buyer composition)

3. Effectiveness during Recessions

Won't response be especially low in recessions?

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Table 6: Response in Recessions vs. Normal Times

	by NBER Recession Dates		by State Coincident Index	
	Recession	Non-Recession	Recession	Non-Recession
	(1)	(2)	(3)	(4)
$\Delta \log(1+\tau)$, lead 1	15.08*** (2.286)	6.328*** (2.217)	13.51*** (2.558)	5.923** (2.635)
$\Delta \log(1+\tau)$	-17.48*** (2.623)	-7.098*** (1.301)	-16.82*** (2.039)	-6.631*** (1.354)
$\Delta \log(1+\tau)$, lag 1	3.708*** (1.175)	2.867*** (0.923)	3.917*** (0.863)	2.746*** (1.009)
Year-by-month FE	Yes	Yes	Yes	Yes
Observations	524,157	5,471,929	1,129,625	4,866,461
R-squared	0.017	0.025	0.036	0.022

→ No. Response is larger! Composition effects?

3. Effectiveness during Recessions

Table 8: Composition Effects in Recession vs. Normal Times

	Credit Score		Mortgage	
	Recession	Non-Recession	Recession	Non-Recession
	(1)	(2)	(3)	(4)
$\Delta \log(1+\tau)$, lead 1	238.2** (99.50)	120.4 (78.87)	1.514* (0.891)	0.297 (0.465)
$\Delta \log(1+\tau)$	-595.1*** (70.11)	-196.0** (81.13)	-3.062*** (0.599)	0.111 (0.257)
$\Delta \log(1+\tau)$, lag 1	281.5*** (82.16)	172.5** (75.84)	1.835*** (0.487)	0.00962 (0.350)
Year-by-month FE	Yes	Yes	Yes	Yes
Observations	257,048	2,875,428	256,942	2,840,889
R-squared	0.003	0.004	0.002	0.002

→ Yes, larger composition changes during recessions.

3. Effectiveness during Recessions

Table 8: Composition Effects in Recession vs. Normal Times

	ln(Loan Value)		Age	
	Recession	Non-Recession	Recession	Non-Recession
	(5)	(6)	(7)	(8)
$\Delta \log(1+\tau)$, lead 1	3.481*** (0.493)	0.0222 (0.806)	5.697 (12.50)	-7.903 (12.16)
$\Delta \log(1+\tau)$	-1.966** (0.802)	0.330 (0.756)	-88.86*** (23.63)	-17.09 (12.88)
$\Delta \log(1+\tau)$, lag 1	1.357*** (0.438)	1.319** (0.570)	46.02 (34.15)	16.30 (10.13)
Year-by-month FE	Yes	Yes	Yes	Yes
Observations	257,048	2,875,428	256,938	2,838,616
R-squared	0.002	0.002	0.001	0.002

Is it all composition effect?

Table 6: Response in Recessions vs. Normal Times

	by Credit Score Quintile				
	1st	2nd	3rd	4th	5th
	(5)	(6)	(7)	(8)	(9)
$\Delta \log(1+\tau)$, lead 1	3.913*** (1.006)	1.662 (1.675)	4.175** (1.749)	6.436*** (1.539)	4.142* (2.269)
$\Delta \log(1+\tau)$	-2.664* (1.347)	-4.027*** (0.980)	-4.475*** (0.905)	-5.780*** (1.126)	-3.847*** (1.334)
$\Delta \log(1+\tau)$, lag 1	0.477 (1.294)	2.384* (1.205)	1.095 (0.878)	3.751*** (1.252)	2.244* (1.114)
Recession x $\Delta \log(1+\tau)$, lead 1	0.164 (1.122)	5.333*** (1.607)	2.419 (1.889)	3.386 (2.197)	7.116*** (1.618)
Recession x $\Delta \log(1+\tau)$	-4.527** (1.890)	-3.075 (1.958)	-3.281** (1.351)	-7.356*** (2.244)	-10.60*** (1.681)
Recession x $\Delta \log(1+\tau)$, lag 1	2.132 (1.712)	-2.864 (1.917)	-0.409 (1.109)	-1.296 (1.656)	2.963** (1.185)
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Example: more attention to taxes during recessions?

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3. Effectiveness during Recessions

Table 8: Google Searches and Newspaper Articles during Recessions

	Google Searches		Newspaper Articles	
	(2)	(3)	(5)	(6)
$\Delta \log(1+\tau)$, lead 1	50.37*** (9.819)	38.76*** (5.943)	42.34*** (6.146)	45.92*** (6.870)
Recession x $\Delta \log(1+\tau)$, lead 1		57.66*** (13.36)		-16.68 (15.02)
Year-by-month FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	4,814	4,814	7,293	7,293
R-squared	0.745	0.729	0.608	0.599

→ Yes. More Google Searches during recessions, but not more tax newspaper articles or tax changes

4. Evaluation as a Stimulus Tool

Won't the effect just be too short-lived?

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	in levels
$\Delta \log(1+\tau)$, leads 2-4	-2.281 (1.424)
$\Delta \log(1+\tau)$, lead 1	4.973** (2.308)
$\Delta \log(1+\tau)$	-4.707*** (1.106)
$\Delta \log(1+\tau)$, lag 1	-1.636 (1.095)
$\Delta \log(1+\tau)$, lags 2-4	-3.406*** (1.120)
$\Delta \log(1+\tau)$, lags 5-8	-3.845** (1.537)

One-month effect consistent with our previous results w/ AC Nielsen

Does this mean response does not last long enough to be policy relevant?

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Back of the envelope calculation:

- ▶ T : economic life of a car (in years)
- ▶ g : annual growth rate of new car value
- ▶ Value of new & old car: $V_{new} = (1 + g)^T \times V_{old}$

Pulling forward car purchase by one month if

$$\Delta\tau \times V_{new} \geq \frac{V_{old}}{T \cdot 12}$$

With $T = 11$, $g = 2\%$, break-even change = 0.61%

Compares well with observed tax change = 0.55%

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4. Evaluation as a Stimulus Tool

- ▶ Farhi et al (2013) calibrate New Keynesian model to U.S. economy at the ZLB during Great Recession
- ▶ They predict that $\Delta\tau = 10\%$ to overcome recession (from 5% to 15%): $18\times$ observed $\Delta\tau$
- ▶ Based on back-of-envelope calculation, impact on car sales would last 16.5 months with $\Delta\tau = 10\%$
- ▶ For comparison, Great Recession lasted 18 months

Conclusions

Consumption tax changes can be an effective counter-cyclical policy tool

- ▶ consumers are aware of tax incentives and respond accordingly
- ▶ tax elasticities are large
- ▶ composition and attention effects more than offset credit frictions
- ▶ reasonable sized tax change might persist long enough

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Policy Challenge

Designing optimal announcement (“fiscal lag”)

Trade-off

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- ▶ short enough so that they spend during recession

(Also, communicate a compensated change!)

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