Discussion:
Shopping for Lower Sales Tax Rates
By: Baker, Johnson, Kueng

Gabriel Chodorow-Reich
Harvard University and NBER

Yale Junior Finance
September 23, 2017

Overview

1. Review and comment on main findings.
2. Discuss negative contribution.
3. Discuss positive contribution.

Main empirical findings

1. Spending lower in month sales tax takes effect.

Main empirical findings

1. Spending lower in month sales tax takes effect.
    - Symmetric result for sales tax decrease (why not pool?).

Main empirical findings

1. Spending lower in month sales tax takes effect.
    - Symmetric result for sales tax decrease (why not pool?).
2. Effect roughly half higher purchases in month -1 and half lower purchases in month 0.

Main empirical findings

1. Spending lower in month sales tax takes effect.
    - Symmetric result for sales tax decrease (why not pool?).
2. Effect roughly half higher purchases in month -1 and half lower purchases in month 0.
3. Similar short run response for both non-exempt and exempt goods.

Main empirical findings

1. Spending lower in month sales tax takes effect.
    - Symmetric result for sales tax decrease (why not pool?).
2. Effect roughly half higher purchases in month -1 and half lower purchases in month 0.
3. Similar short run response for both non-exempt and exempt goods.
    - Response of exempt goods driven by households which shop infrequently and purchase exempt and non-exempt goods at the same store.

Main empirical findings

1. Spending lower in month sales tax takes effect.
   - Symmetric result for sales tax decrease (why not pool?).
2. Effect roughly half higher purchases in month -1 and half lower purchases in month 0.
3. Similar short run response for both non-exempt and exempt goods.
   - Response of exempt goods driven by households which shop infrequently and purchase exempt and non-exempt goods at the same store.
4. Number of shopping trips falls.

Main empirical findings

1. Spending lower in month sales tax takes effect.
    - Symmetric result for sales tax decrease (why not pool?).
2. Effect roughly half higher purchases in month -1 and half lower purchases in month 0.
3. Similar short run response for both non-exempt and exempt goods.
    - Response of exempt goods driven by households which shop infrequently and purchase exempt and non-exempt goods at the same store.
4. Number of shopping trips falls.
5. Larger effects on more durable goods.

Main empirical findings

1. Spending lower in month sales tax takes effect.
    - Symmetric result for sales tax decrease (why not pool?).
2. Effect roughly half higher purchases in month -1 and half lower purchases in month 0.
3. Similar short run response for both non-exempt and exempt goods.
    - Response of exempt goods driven by households which shop infrequently and purchase exempt and non-exempt goods at the same store.
4. Number of shopping trips falls.
5. Larger effects on more durable goods.
6. Little to no long-run spending response.

Model results

- Four prices facing consumer: $(1+\tau_-)\,P_-^n, (1+\tau_+)\,P_+^n, P_-^e, P_+^e$.
- Anticipated shock: $\tau_+ > \tau_-$.
- Full pass-through assumption: $P_-^e = P_+^e, P_-^n = P_+^n$.

- No long-run responses of spending/consumption imply small elasticities of substitution over time and across goods.
- Short-run then driven by inventory accumulation.

Model results

- Four prices facing consumer: $(1+\tau_-)\,P_-^n, (1+\tau_+)\,P_+^n, P_-^e, P_+^e$.
- Anticipated shock: $\tau_+ > \tau_-$.
- Full pass-through assumption: $P_-^e = P_+^e, P_-^n = P_+^n$.
  - Crucial to equate long-run spending with consumption.
  - Theory and previous evidence consistent with $P_+^n \lesseqgtr P_-^n$.
  - Testable using KNCP. Discuss and report it.
- No long-run responses of spending/consumption imply small elasticities of substitution over time and across goods.
- Short-run then driven by inventory accumulation.

A cautionary tale

- How would you estimate consumption response to sales tax increase?

A CAUTIONARY TALE

- How would you estimate consumption response to sales tax increase?
- Look for a control group:
  - Exempt goods and services?
  - Spending across the border?
  - Spending by agents far away?
- SUTVA: treatment must not affect outcomes of non-treated (control) units.

A CAUTIONARY TALE

- How would you estimate consumption response to sales tax increase?
- Look for a control group:
  - Exempt goods and services?
    - ⋆ No! Shopping complementarities.
  - Spending across the border?
  - Spending by agents far away?
- SUTVA: treatment must not affect outcomes of non-treated (control) units.

A CAUTIONARY TALE

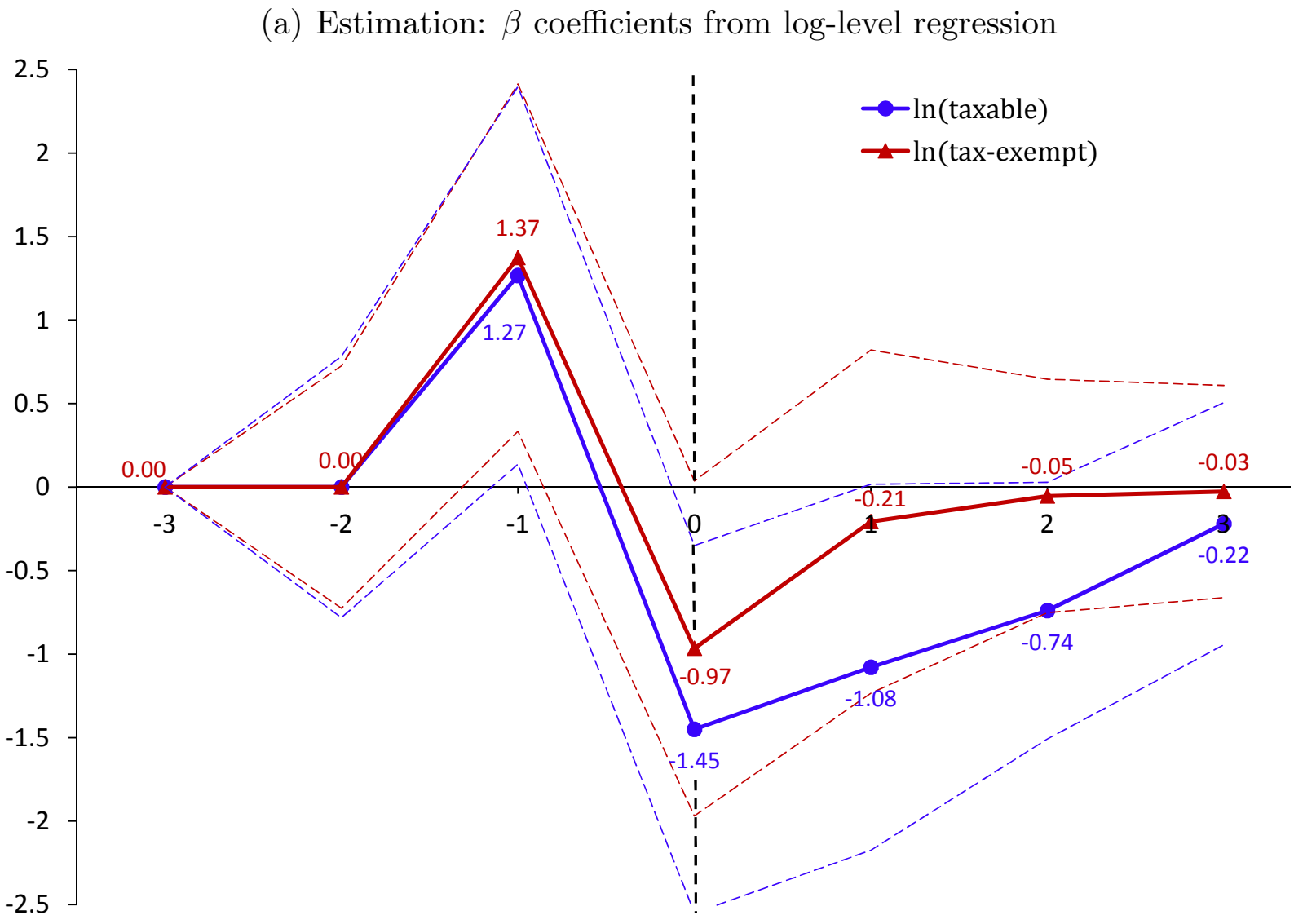
- How would you estimate consumption response to sales tax increase?
- Look for a control group:
  - Exempt goods and services?
    - ⋆ No! Shopping complementarities.
  - Spending across the border?
    - ⋆ No! Substitution to shopping in lower tax areas.
  - Spending by agents far away?

- SUTVA: treatment must not affect outcomes of non-treated (control) units.

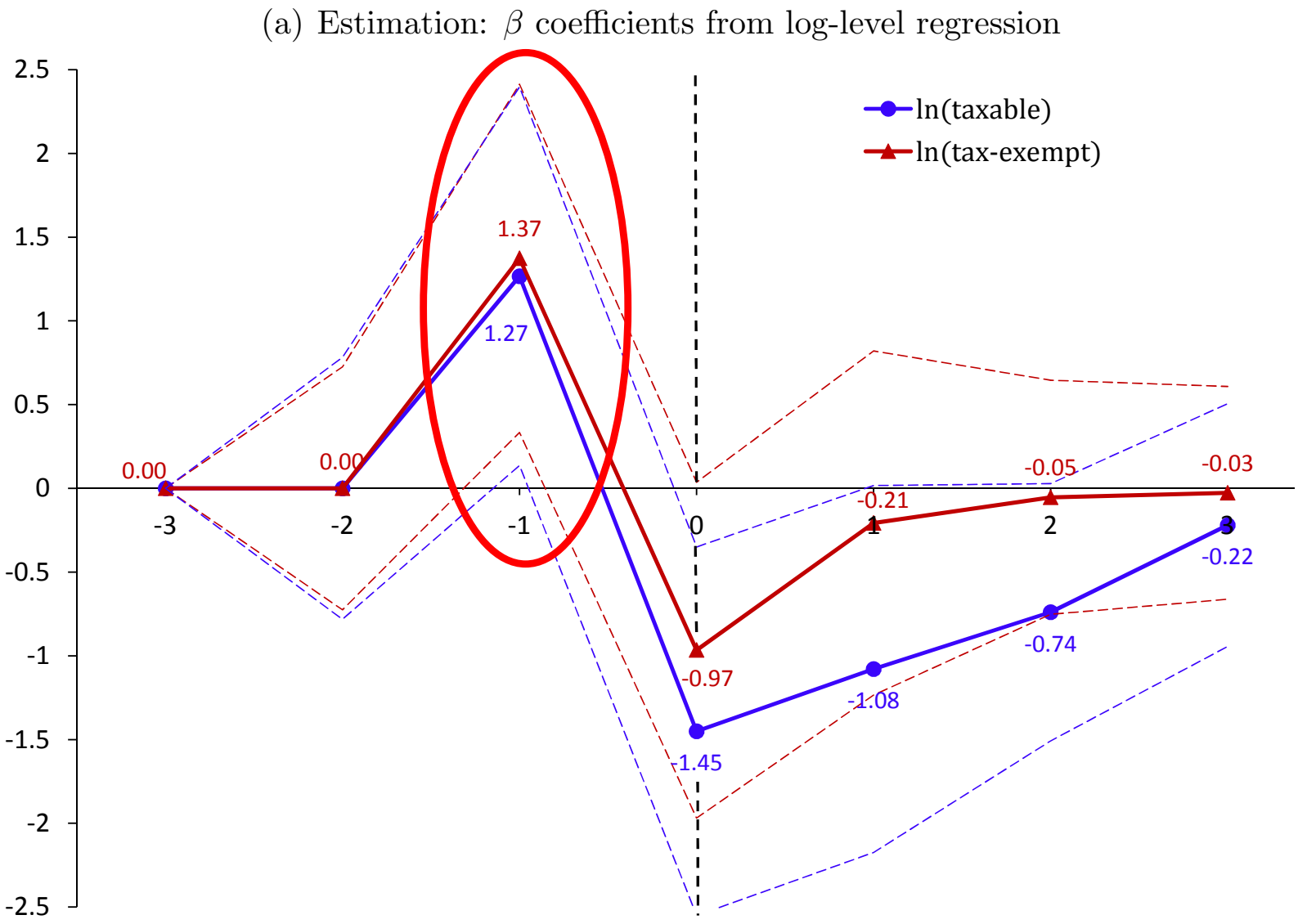
A CAUTIONARY TALE

- How would you estimate consumption response to sales tax increase?
- Look for a control group:
  - Exempt goods and services?
    - ⋆ No! Shopping complementarities.
  - Spending across the border?
    - ⋆ No! Substitution to shopping in lower tax areas.
  - Spending by agents far away?
    - ⋆ Maybe? Endogeneity of sales tax changes. Also an issue here...
    - ⋆ Unemployment rate control helpful but not perfect.
- SUTVA: treatment must not affect outcomes of non-treated (control) units.

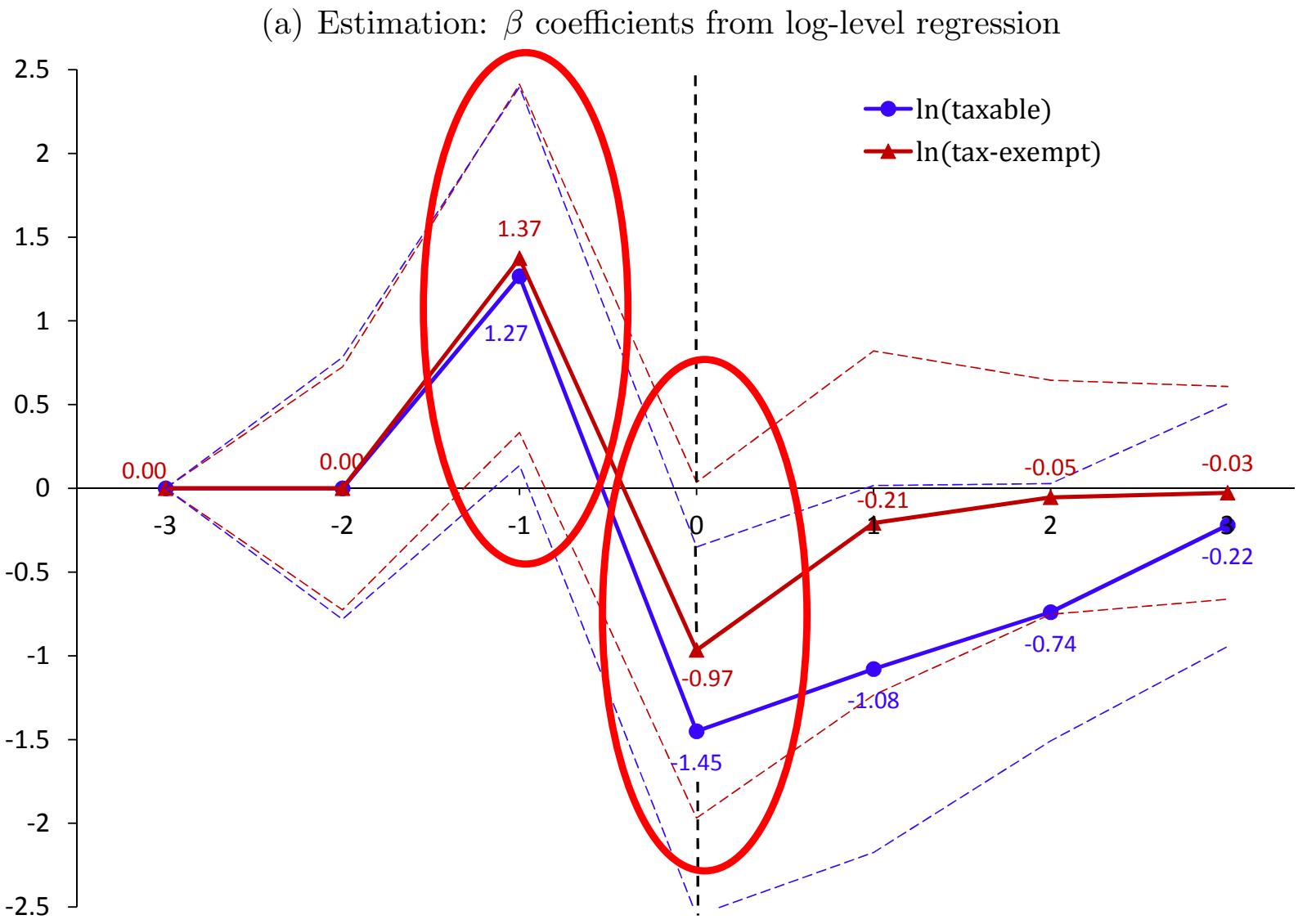
EXEMPT VERSUS NONEXEMPT



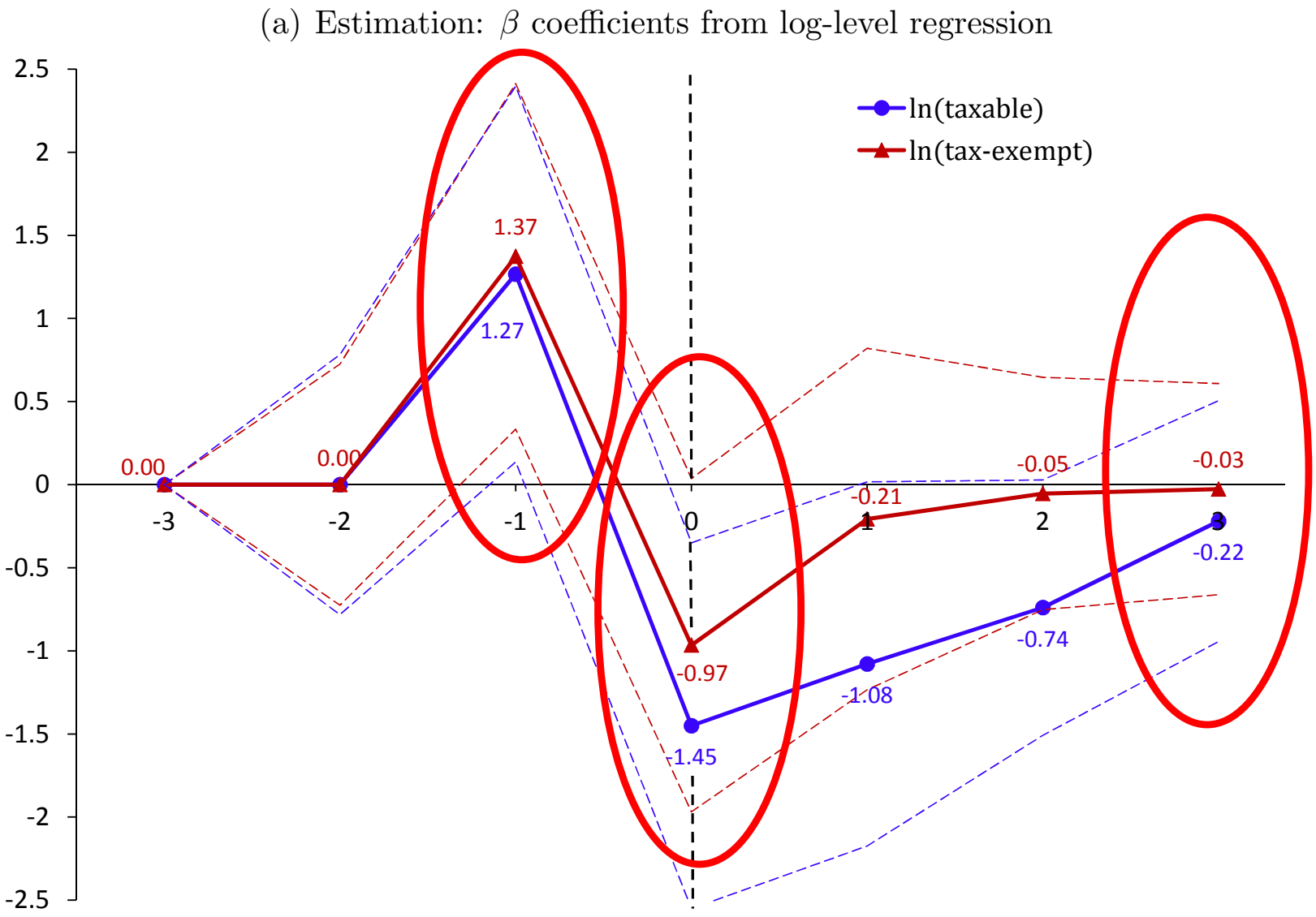
EXEMPT VERSUS NONEXEMPT



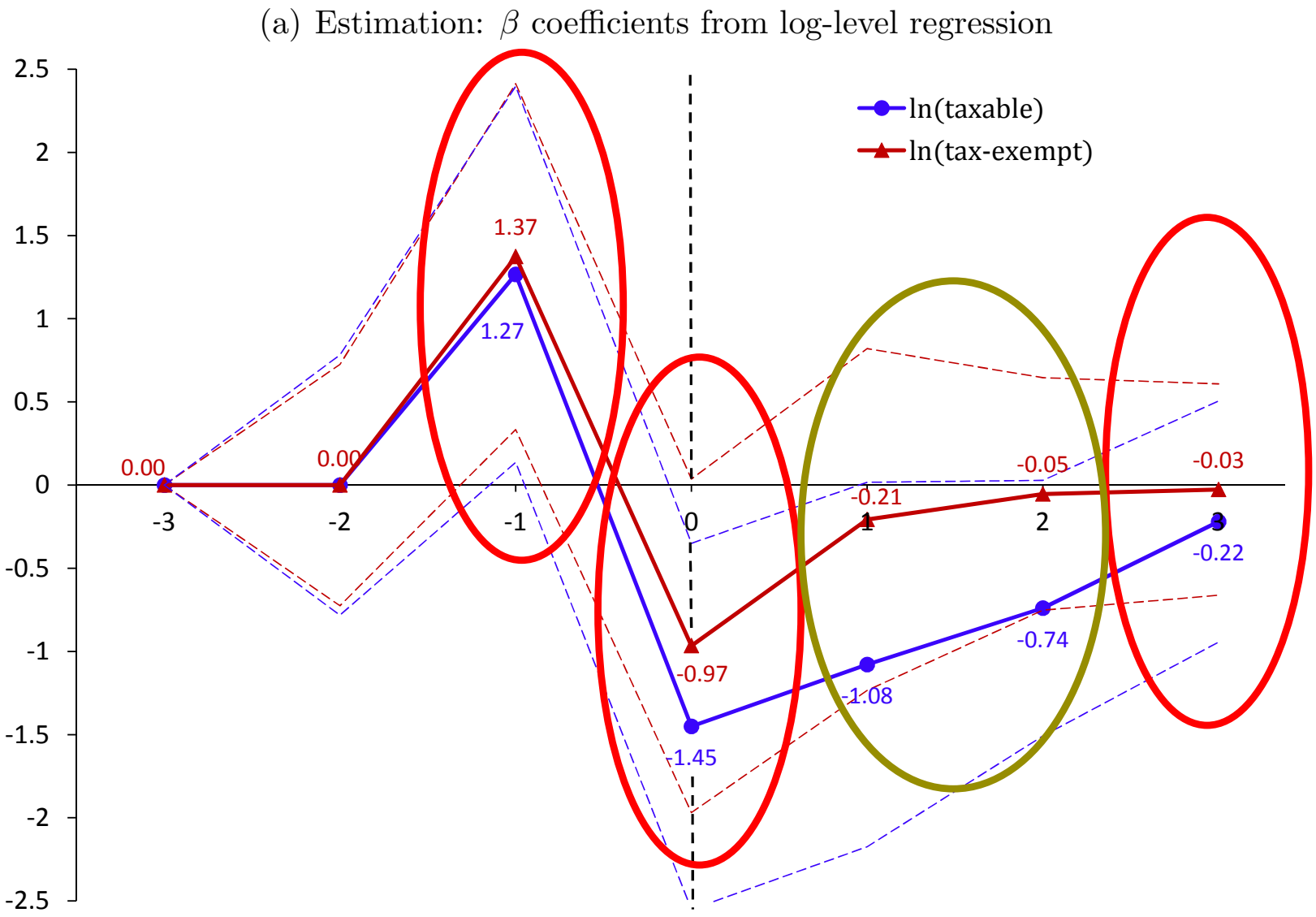
EXEMPT VERSUS NONEXEMPT



EXEMPT VERSUS NONEXEMPT



EXEMPT VERSUS NONEXEMPT



Quantitative magnitude

- Spending per household per month:

KNCP:	$350

Quantitative magnitude

- Spending per household per month:

KNCP:	$350
CE:	$4,090

Quantitative magnitude

- Spending per household per month:

KNCP:	$350
CE:	$4,090
NIPA PCE:	$6,900

Quantitative magnitude

- Spending per household per month:

KNCP:	$350
CE:	$4,090
NIPA PCE:	$6,900
Durable goods:	$780
Nondurable goods:	$1,530
Services:	$4,590

Quantitative magnitude

- Spending per household per month:

KNCP:	\$350
CE:	\$4,090
NIPA PCE:	\$6,900
Durable goods:	\$780
Nondurable goods:	\$1,530
Services:	\$4,590

- About 5% of total expenditure.
- Mostly nondurable goods. Expect (and paper shows) substitution increasing in durability.
- Total spending response could be larger and more persistent.

Quantitative magnitude

- Spending per household per month:

KNCP:	\$350
CE:	\$4,090
NIPA PCE:	\$6,900
Durable goods:	\$780
Nondurable goods:	\$1,530
Services:	\$4,590

- About 5% of total expenditure.
- Mostly nondurable goods. Expect (and paper shows) substitution increasing in durability.
- Total spending response could be larger and more persistent.
- Broader data sets: Polk (auto spending, zipcode), CE (total spending, public state or confidential zipcode).

Pricing and advertising

- Dorfman and Steiner (1954) model:

$$\max_{P_i, A_i} \{P_i Y_i - C(Y_i) - \kappa A_i\}$$

s.t.

$$Y_i = \xi(A_i) \left(\frac{P_i}{P}\right)^{-\sigma} Y$$

and where:

$$Y = \left[\int_0^1 \xi_i^{\frac{1}{\sigma}} Y_i^{\frac{\sigma-1}{\sigma}} di\right]^{\frac{\sigma}{\sigma-1}},$$

$$P = \left[\int_0^1 \xi_i P_i^{1-\sigma} di\right]^{\frac{1}{1-\sigma}},$$

$$\xi_i = \xi(A_i) = A_i^{\gamma}.$$

Implications of Dorfman-Steiner

$$\text{FOC } (P_i): \qquad P_i = \frac{\sigma}{\sigma - 1} C'(Y_i).$$

$$\text{FOC } (A_i): \qquad A_i = \left(\frac{\gamma \sigma^{-1}}{\kappa} \right) P_i Y_i.$$

- Suppose Y up due to expenditure shifting before tax increase:
  - $\partial P_i / \partial Y_i > 0$ (if convex costs).
  - $\partial A_i / \partial (P_i Y_i) > 0$.
- Price response may undo part of tax jump.
- Advertising may amplify response of exempt items.
- Complications if sales used for advertising purpose.

ADVERTISING

Nitpicking/questions

- Interpretation of Google Trends difficult. More search could mean less available information.
- Store advertising and newspaper articles could be complements or substitutes.
- Hard to interpet interaction with newspaper coverage. News articles could be about anticipatory spending responses (reverse causality).
- Allocating income effects to date of law passage possibly internally inconsistent. Ricardian equivalence implies no income effects. Salience implies income effects emerge at implementation.
- Endogeneity: stack into event time and control for unemployment rate, consumption growth at passage.
- Description of data in paper incomplete:
  - Thomson OneSource reports exempt categories? What about hand-collected data?
  - KNCP item spending is net of tax. What about total trip amount?

Conclusion

- Interesting results.
- Negative and positive contribution.
- Policy? Depends on wealth effects at announcement. Large deficit-financed local government spending multipliers (Chodorow-Reich, 2017). Suggestive that temporary sales taxes are effective financing.

Appendix slides