Internet commerce supply and sales-tax shielding: Evidence from the Amazon platform

A discussion of research in progress

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Sales tax and e-commerce

- In the US, a seller is not required to collect sales tax on behalf of a state (or local) government if the seller does not have a "*substantial presence*" in that state.
  - Before e-commerce: mail-order catalogue industry.
  - As e-commerce took off: price advantage relative to brick-and-mortar

- Amazon.com founder Jeff Bezos located the company in WA rather than CA to avoid charging sales tax in CA (Stone, 2014).

- Over time, states' political tolerance for sales tax revenue losses declined:
  - Consumers respond (Einav, Knoepfle , Levin, Sundaresan, '14 ; Baugh, Ben-David, Park, '14)
  - E-commerce is a major source of lost sales tax revenue to states.
  - "Market Fairness Act" proposes an internet-tax, has substantial support.

- States litigated/bargained with Amazon to establish the company's *substantial presence*. In several cases Amazon was granted multiyear exemptions in exchange for local investment, e.g. in distribution centers.

Share of US economy with sales tax on Amazon.com
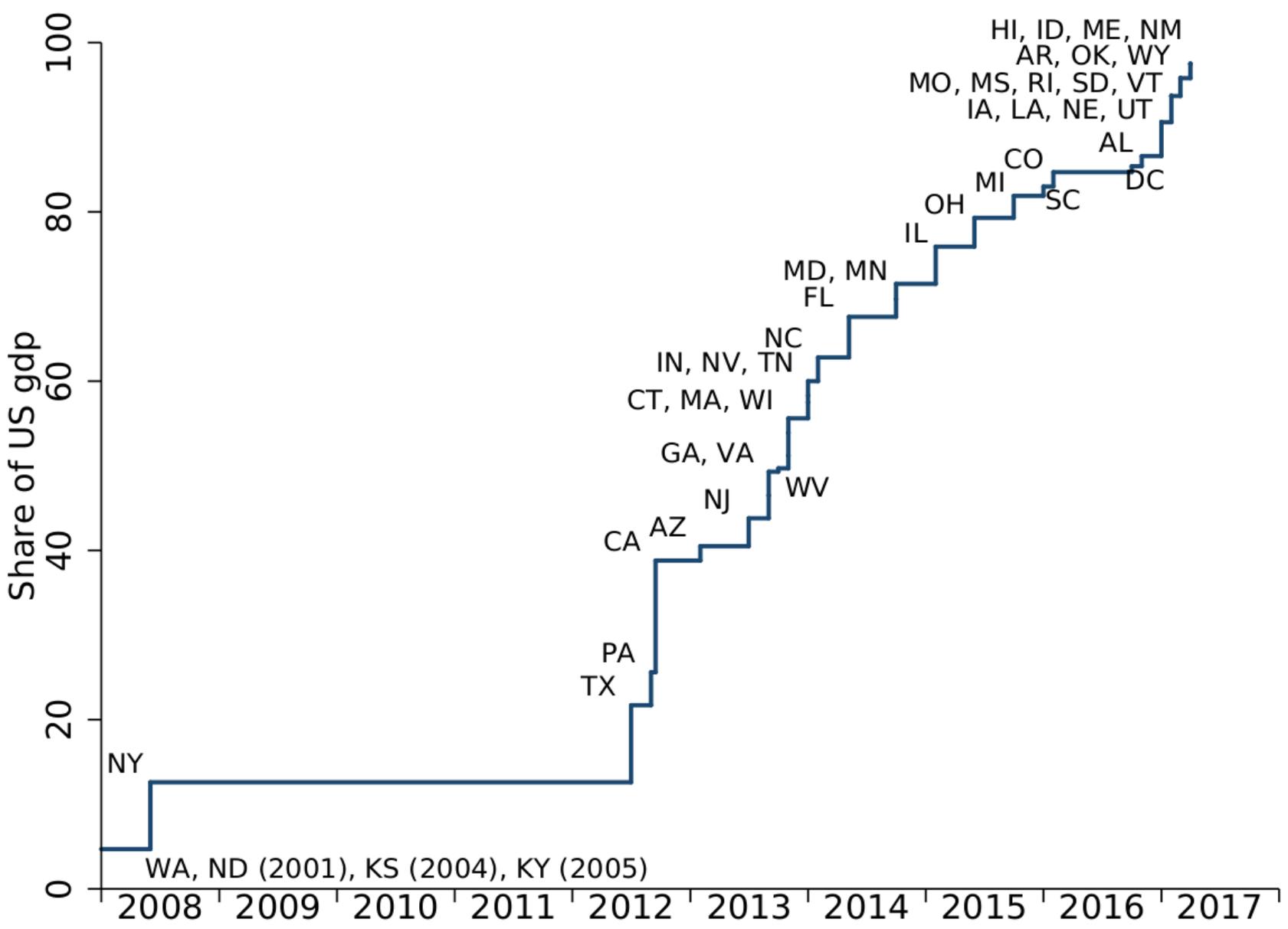
Amazon.com as a sales platform for third party sellers

- Amazon's loss of sales tax exemption implies stronger competition from:
  - Brick-and-mortar
  - E-commerce outlets with smaller state footprints: e.g. NewEgg
  - E-commerce platforms that enable sales by third parties: e.g. eBay

- Strategies available to Amazon.com, as a platform for third party sellers:
  - Regular:
    - Sales are legally made by third parties that usually do not have a substantial presence in buyer's state. 3rd party sellers pay ~15% of revenue as commission to Amazon.
    - Ships from 3rd party seller or non-Amazon distribution center.
  - Fulfilled by Amazon (FBA) program
    - Third party seller rents shelf space at an Amazon warehouse
    - Sales on Amazon.com is legally by a third party: no sales tax.
    - To the consumer, almost indistinguishable from an Amazon.com sale: ships from Amazon warehouse, *Amazon Prime* service available, Amazon handles consumer and returns.
    - "Comingled inventory": FBA sale is fulfilled from Amazon's stock.

Third party sellers

- Third party sellers can compete on (shipping-inclusive) price with Amazon to be listed as the Buy Box (default) option, or featured as "more buying choices"

- Anecdotally, we find 100+ sellers that rename themselves to signal tax-free sale:

seller ID	name	first observed	tax-reference name	first observed
A10VRNVF7ID381	Newline	15 sep 2012	Newline (No Tax)	30 oct 2013
A15NVBGFPAZ5WR	Computer Gear	13 apr 2011	Computer Gear(No Tax everywhere)	14 may 2014
A190GGUJ1L21DJ	Z&W electronics	16 sep 2012	Eagle Direct Tech (NO TAX anywhere)	14 jan 2014
A1E0GSDJKAA7Y3	dealz-4all Inc.	14 dec 2012	dealz-4all Inc.(No Tax anywhere)	15 dec 2013
A1OTXDE1BB46GZ	Nasir Iqbal	28 may 2013	Sweet Deals (Tax Free)	07 apr 2014
A1ZIGI0F8Y83LQ	E-Z shopping	16 oct 2012	E-Z shop (Tax Free)	22 jan 2014
A2GGAPV0F9N2K7	Exclusively Red Tag	31 jul 2012	Exclusively Red Tag (Tax Free Outside Colorado)	21 jan 2014

Empirical strategy

- The Amazon.com platform supplies the same products nationally, to tax and non-tax states.

- Whereas most goods are subject to tax, some are not:
  - Food and grocery products, in most states, are not subject to sales tax.
  - Diapers, in many states.

- Objective: study suppliers of taxed goods, relative to non-taxed goods, as the share of the Amazon domestic market subject to sales tax increases.

Simple differences-in-differences strategy:
- Treatment: Amazon becomes taxed on most goods, but not groceries and diapers.
- Outcome (e.g. good is sold through 3rd PS with FBA option, vs by Amazon.com)
- Variation over time as the share of tax-treated US

Data

- Track product supply on Amazon.com platform
  - Track how each product is sold by Amazon
    - Amazon.com or third party
    - If third party, FBA or not.
  - Track prices, shipping, taxes, etc.
  - We've been downloading 2400 product pages daily since Sep 2012.
  - We download historical data from archive.org

- Does Amazon steer consumers to a particular seller based on the tax-status for the state of the visitor's IP address?
  - Initially, we tracked the same product page daily from CA (taxed state) and from MA (non-taxed state at the time).
  - Answer: no evidence of seller steering or nudging on product pages.
  - We do detect A/B testing on design features.

Trends in 1ˢᵗ position supplier type, by tax status
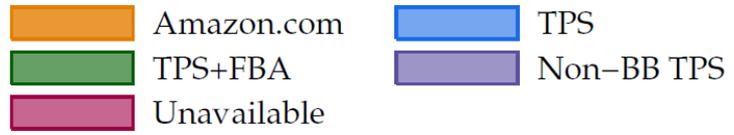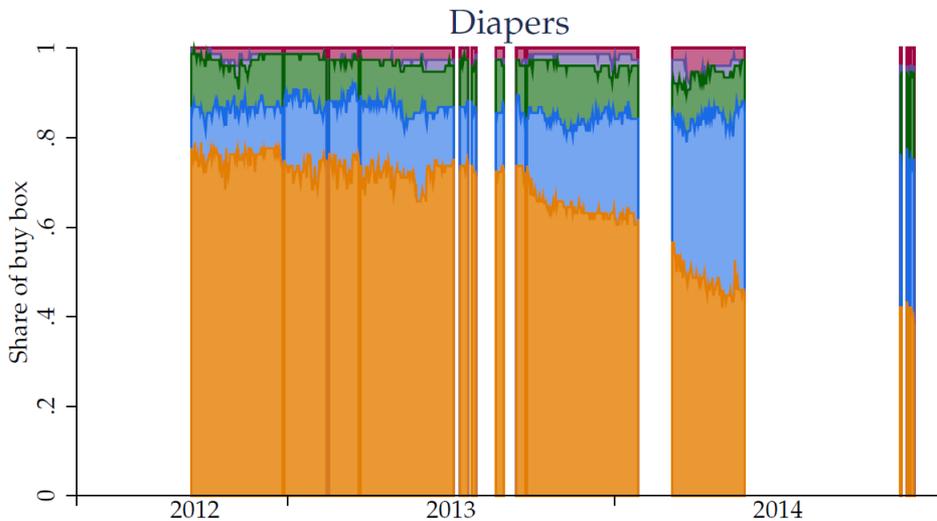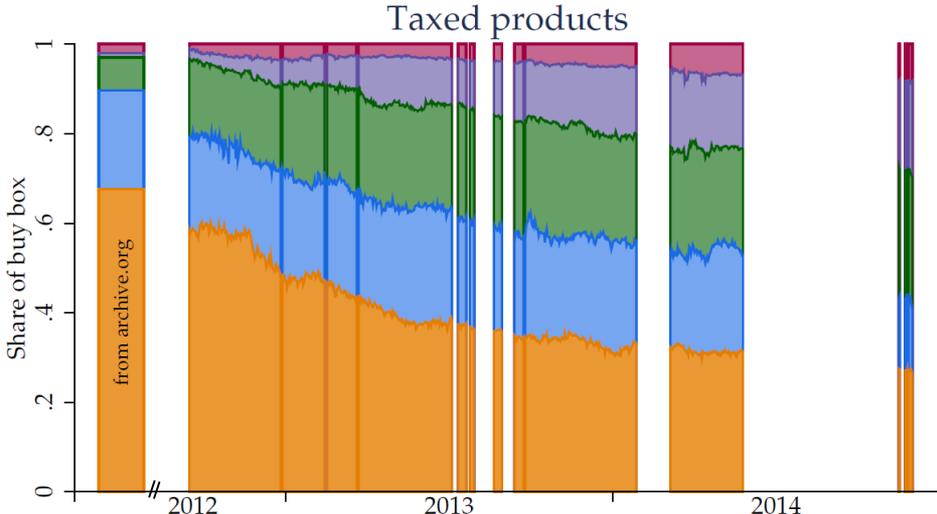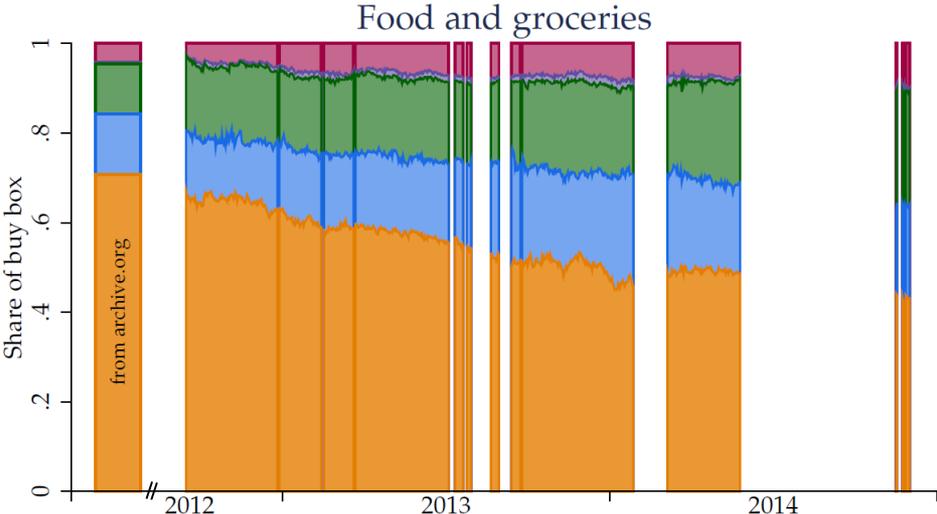
- Fixed panel of 2400 ASINs

- Gaps in data collection are from researcher resource reallocation

"Dynamic" D-in-D for "First seller is a TPS" outcome

	Pooled OLS		ASIN FE		ASIN FE		ASIN FE	
Constant	0.290	[0.002]	0.349	[0.001]	0.351	[0.001]	0.232	[0.003]
taxed	0.081	[0.003]						
taxed $\times \delta_{2011,archive.org}$					0.002	[0.006]	0.014	[0.005]
taxed $\times \delta_{20012thruSep,archive.org}$					-0.067	[0.006]	-0.063	[0.005]
taxed $\times \delta_{2012-11}$	0.027	[0.004]	0.016	[0.003]	0.010	[0.003]	-0.008	[0.003]
taxed $\times \delta_{2012-12}$	0.065	[0.004]	0.054	[0.003]	0.048	[0.003]	0.033	[0.003]
taxed $\times \delta_{2013-6}$	0.151	[0.004]	0.140	[0.003]	0.134	[0.003]	0.103	[0.003]
taxed $\times \delta_{2013-12}$	0.124	[0.004]	0.111	[0.003]	0.105	[0.003]	0.083	[0.003]
taxed $\times \delta_{2014-5}$	0.104	[0.005]	0.093	[0.003]	0.086	[0.003]	0.067	[0.003]
taxed $\times \delta_{2014-11}$	0.091	[0.007]	0.079	[0.004]	0.073	[0.004]	0.071	[0.004]
$\delta_{2011,archive.org}$					-0.002	[0.004]	-0.014	[0.004]
$\delta_{20012thruSep,archive.org}$					0.016	[0.004]	0.021	[0.004]
$\delta_{2012-11}$	0.007	[0.003]	-0.004	[0.002]	-0.002	[0.002]	0.008	[0.002]
$\delta_{2012-12}$	0.023	[0.003]	0.012	[0.002]	0.014	[0.002]	0.014	[0.002]
δ_{2013-6}	0.070	[0.003]	0.059	[0.002]	0.060	[0.002]	0.038	[0.002]
$\delta_{2013-12}$	0.129	[0.003]	0.119	[0.002]	0.120	[0.002]	0.060	[0.002]
δ_{2014-5}	0.147	[0.003]	0.136	[0.002]	0.137	[0.002]	0.061	[0.002]
$\delta_{2014-11}$	0.184	[0.005]	0.173	[0.003]	0.174	[0.003]	0.065	[0.003]
Subscribe and save							-0.482	[0.001]
Rank controls							Yes	
Observations	1345523		1345523		1345523		1345523	
R^2	0.054		0.630		0.630		0.687	

Standard errors in brackets

- Observation: product page at ASIN product ID - date
- Baseline omitted category is Sep-Oct 2012.
- 14 sales rank controls: (6 Dept. rank bins + Cat. rank) × taxed status.

Differences in differences for supply on Amazon.com

Main concern: differential product cycles by tax-status:

Taxed products (e.g. electronics) become obsolete, decline in sales rank and Amazon stops reordering. Supply is provided out of overstock inventory by a third party seller.

We construct a sales-rank position version of the panel:

- We crawl Amazon.com sales rankings daily to obtain the identity of each product in each position of the sales rank distribution.

- For each ASIN in our initial Sep-Oct 2012 sample, we find the ASIN of the product that on any given day occupies the same position in the sales rank distribution.

- Due to changes in Amazon.com category definitions, we've done this for 1600 products.

"Dynamic" DID for "First seller is a TPS" outcome

	Pooled OLS		ASIN FE		ASIN FE		ASIN FE		SalesRank match FE	
Constant	0.290	[0.002]	0.349	[0.001]	0.351	[0.001]	0.232	[0.003]	0.316	[0.009]
taxed	0.081	[0.003]							-0.167	[0.016]
taxed $\times \delta_{2011,archive.org}$					0.002	[0.006]	0.014	[0.005]	0.026	[0.006]
taxed $\times \delta_{2001 2thruSep,archive.org}$					-0.067	[0.006]	-0.063	[0.005]	-0.076	[0.006]
taxed $\times \delta_{2012-11}$	0.027	[0.004]	0.016	[0.003]	0.010	[0.003]	-0.008	[0.003]	-0.011	[0.003]
taxed $\times \delta_{2012-12}$	0.065	[0.004]	0.054	[0.003]	0.048	[0.003]	0.033	[0.003]	0.032	[0.003]
taxed $\times \delta_{2013-6}$	0.151	[0.004]	0.140	[0.003]	0.134	[0.003]	0.103	[0.003]	0.086	[0.003]
taxed $\times \delta_{2013-12}$	0.124	[0.004]	0.111	[0.003]	0.105	[0.003]	0.083	[0.003]	0.070	[0.003]
taxed $\times \delta_{2014-5}$	0.104	[0.005]	0.093	[0.003]	0.086	[0.003]	0.067	[0.003]	0.050	[0.003]
taxed $\times \delta_{2014-11}$	0.091	[0.007]	0.079	[0.004]	0.073	[0.004]	0.071	[0.004]	0.050	[0.005]
taxed $\times \delta_{2014-11}$ on matched ranks									-0.039	[0.006]
$\delta_{2011,archive.org}$					-0.002	[0.004]	-0.014	[0.004]	-0.014	[0.004]
$\delta_{2001 2thruSep,archive.org}$					0.016	[0.004]	0.021	[0.004]	0.025	[0.004]
$\delta_{2012-11}$	0.007	[0.003]	-0.004	[0.002]	-0.002	[0.002]	0.008	[0.002]	0.006	[0.002]
$\delta_{2012-12}$	0.023	[0.003]	0.012	[0.002]	0.014	[0.002]	0.014	[0.002]	0.014	[0.002]
δ_{2013-6}	0.070	[0.003]	0.059	[0.002]	0.060	[0.002]	0.038	[0.002]	0.036	[0.002]
$\delta_{2013-12}$	0.129	[0.003]	0.119	[0.002]	0.120	[0.002]	0.060	[0.002]	0.057	[0.002]
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$\delta_{2014-11}$	0.184	[0.005]	0.173	[0.003]	0.174	[0.003]	0.065	[0.003]	0.060	[0.003]
$\delta_{2014-11}$ on matched ranks									0.051	[0.005]
Subscribe and save							-0.482	[0.001]	-0.470	[0.001]
Rank controls							Yes		Yes	
Observations	1345523		1345523		1345523		1345523		970098	
R^2	0.054		0.630		0.630		0.687		0.682	

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Future directions

- Other preliminary findings:
  - Products that decline in sales rank are increasingly supplied by Third Party Sellers, particularly taxed products, and particularly by non-Buy Box eligible sellers.
  - Products that increase in sales rank are increasingly supplied by Amazon.com, particularly taxed products.

- Goals:
  - study product cycles
  - study incidence on Amazon: changes to Amazon.com's pricing or entry conditional on rank strategies depending on tax status.

- Preliminary work on much larger "wide"datasets, for which we have snapshots with about millions of products.

- The processed position-based data is from a holiday shopping period. We can next eliminate holiday seasonal effects as we have continued to sample.

"Dynamic" DID. Dep var: First seller is a TPS, displaying rank controls

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taxed $\times \delta_{2012-11}$	0.027	[0.004]	0.016	[0.003]	0.010	[0.003]	-0.008	[0.003]	-0.011	[0.003]
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$\delta_{2012-11}$	0.007	[0.003]	-0.004	[0.002]	-0.002	[0.002]	0.008	[0.002]	0.006	[0.002]
$\delta_{2012-12}$	0.023	[0.003]	0.012	[0.002]	0.014	[0.002]	0.014	[0.002]	0.014	[0.002]
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$\delta_{2014-11}$ on matched ranks									0.051	[0.005]
Dept. unranked							0.122	[0.006]	0.068	[0.007]
Dept. rank (10,100]							0.063	[0.005]	0.059	[0.005]
Dept. rank (100,1000]							0.115	[0.005]	0.124	[0.006]
Dept. rank (1000,10000]							0.195	[0.006]	0.196	[0.006]
Dept. rank > 10000							0.244	[0.006]	0.248	[0.006]
taxed × Dept. unranked							0.035	[0.008]	0.083	[0.009]
taxed × Dept. rank (10,100]							0.054	[0.006]	0.057	[0.007]
taxed × Dept. rank (100,1000]							0.114	[0.007]	0.115	[0.007]
taxed × Dept. rank (1000,10000]							0.127	[0.007]	0.142	[0.007]
taxed × Dept. rank > 10000							0.097	[0.007]	0.095	[0.008]
Cat. unranked							0.033	[0.002]	0.045	[0.002]
Cat. sales rank							0.001	[0.000]	0.001	[0.000]
taxed × Cat. unranked							0.127	[0.002]	0.129	[0.003]
taxed × Cat. sales rank							0.001	[0.000]	0.001	[0.000]
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