

# Bidding Strategies & Auction Mechanisms

gTrade  
AdX summit  
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## Outline

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- Discussions about Bernanke, mobile, CPM vs Revenue
- Consequences of changing auction mechanisms
- Impact of changing AdX margin from 20% to 10%/ 5%
- Impact of GDN's participation on AdX

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## Bernanke update

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## Bernanke Performance



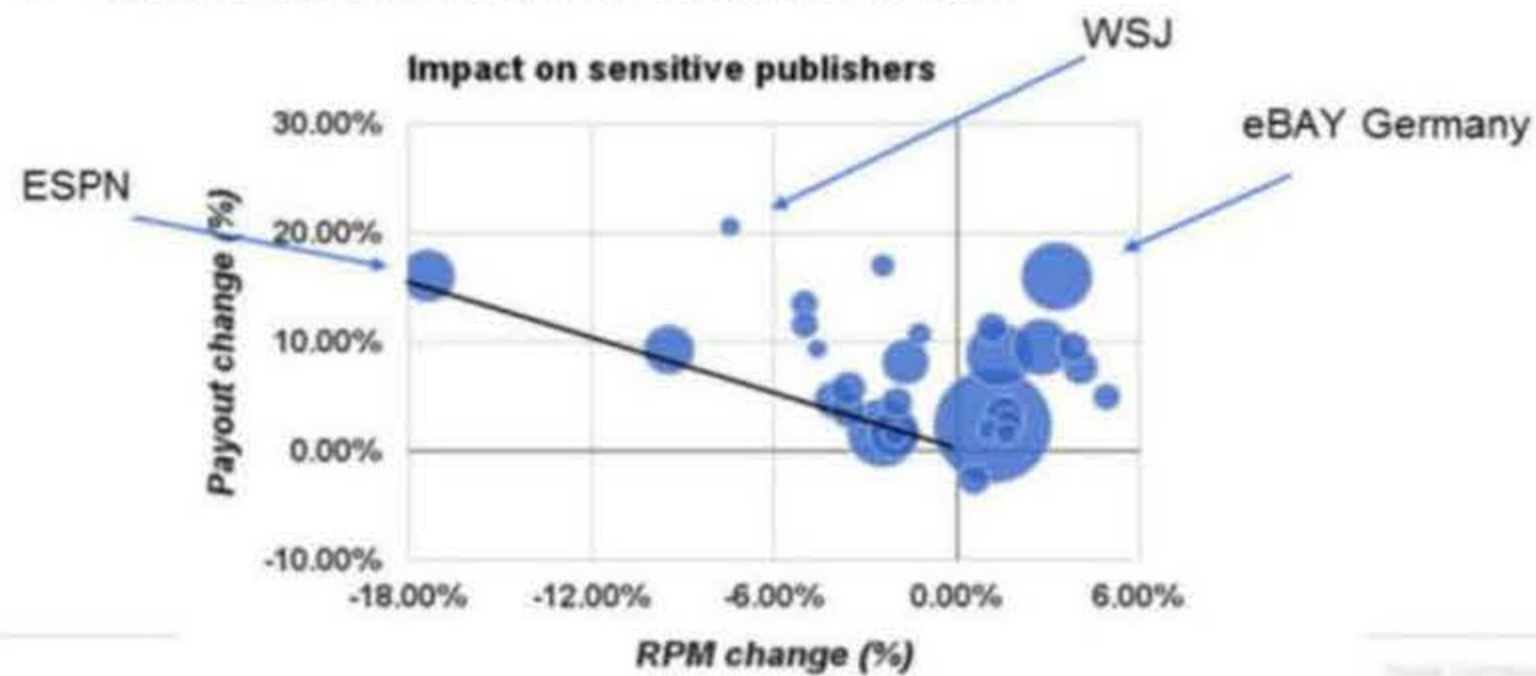
- Bernanke: Increase first bid, decrease second bid while retaining margin and maximizing GDN profit/ revenue
- Launched on Nov, 2013
- [Stats](#): +6.5% revenue, +8.8% publisher payout, +8.8% matched queries, neutral publisher CPM overall.

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# Bernanke Performance

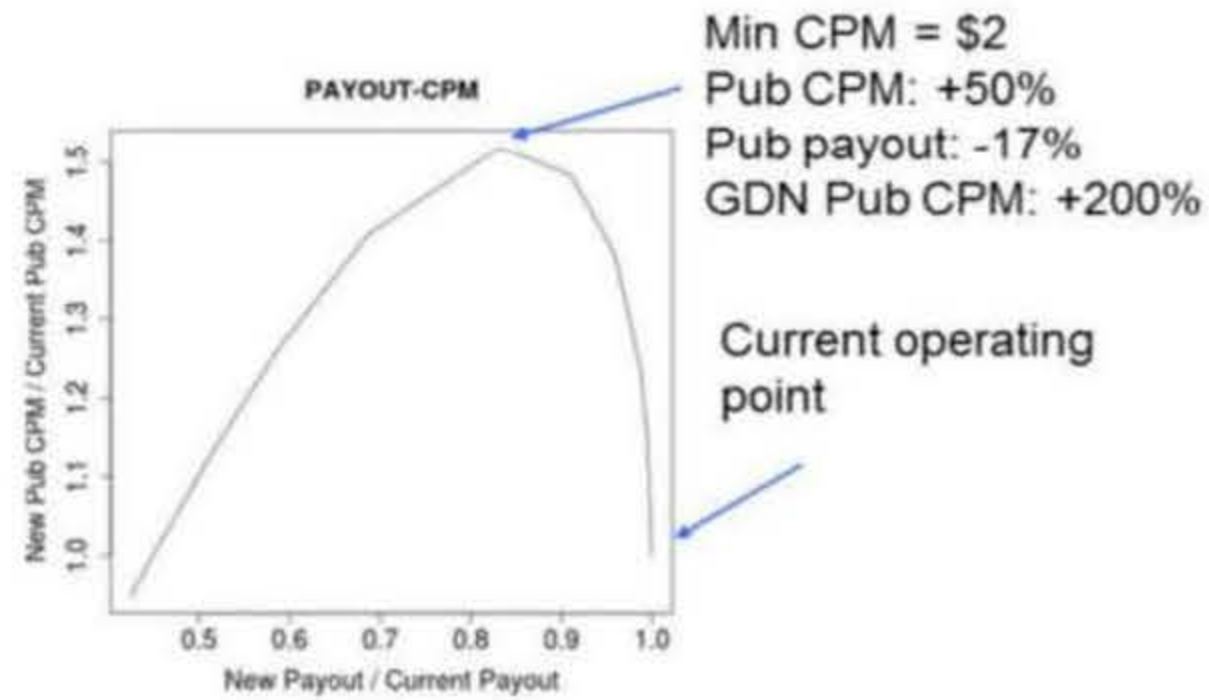


- Good performance for sensitive publishers
  - All but one pub see a revenue gain
- We see a trade-off between pub revenue and pub CPM
  - WSJ: +21% revenue, -7% CPM
  - ESPN: +16% revenue, -15% CPM
- Discussion: What is the ideal trade-off?



## Discussion - CPM vs revenue

- GDN could improve CPM by only bidding on high CPM queries
- This comes at the expense of revenue





## Discussion - CPM on segments

- CPM impact on segments
  - With the earlier launch, on **mobile traffic**, pub revenue dropped 2.3% and CPM dropped 10.5%
  - Mobile CPM dropped after launching Bernanke because of lack of competition
  - At least 1 pub (NBC) complained about CPM on mobile
- Regardless, we can improve CPM and payout on segments at the expense of overall payout
- FindTheBest.com
  - Total revenue: **-8%**
  - Mobile revenue: +49%, mobile CPM: **+56%**

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## Mobile Experiment Results



- In the [mobile constrained version](#) of Bernanke, we improve mobile CPM, payout, but reduce total payout
- Should we launch mobile "fix" that drops revenue?
- Slicings other than mobile (e.g. geo)?

	Total revenue	Mobile revenue	Total payout	Mobile payout	Total CPM	Mobile CPM
Change %	-1.5%	-2.5%	-1.5%	+7%	+0.5%	+8.5%

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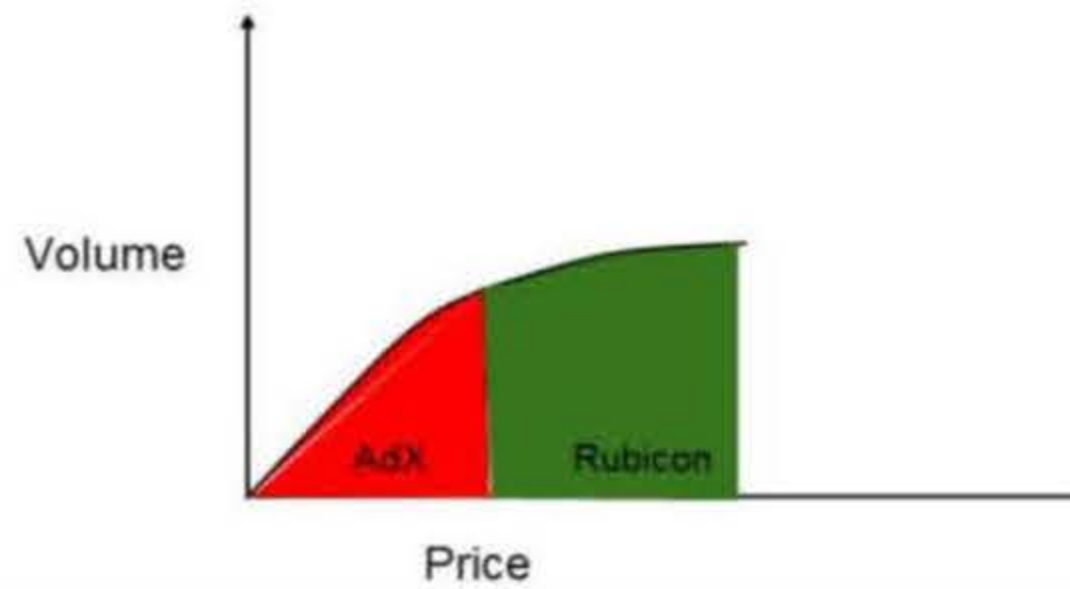


## Auction mechanisms

## Price - Volume curve



- For advertisers, AdX provides cheaper inventory than other exchanges such as Rubikon
- Once advertisers exhaust AdX inventory (marginal cost too expensive), they purchase incremental inventory from Rubikon
- Buyers don't mind paying extra for this inventory as long as it is profitable



Source: Google and Advertiser

## First price auctions?



- Moving towards first pricing by
  - Multiple callouts
  - Dynamic floors
  - Reserve price optimization
- Why not move all the way to first price auctions?
  - Transparent
  - End goal
  - Buyer response may carry over to other exchanges, benefitting AdX - level playing auction field

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## First pricing: Optimistic scenario

No buyer response

Suppose GDN bids  $0.86 \times$  bid for a 14% margin,

Adwords ROI drops 40%; revenue, payout, CPM more than double

	Queries	Revenue	Payout	Profit	Pub CPM
<b>Overall</b>	0%	114%	116%	107%	119%
<b>GDN</b>	0%	84%	84%	86%	85%
<b>AdX buyers</b>	0%	163%	163%	163%	162%

AdX buyers have higher auction discount, so this increase is not entirely surprising

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## GDN ROI



- Currently, ROI for GDN on AdX pubs (as measured using conversions per Dollar) is 6% worse than on AdSense pubs
- GDN has to respond to auction changes (reserve price optimization, dynamic floors, first pricing) to maintain ROI
- Will pubs see a net improvement if GDN (the majority buyer) responds?
- Log simulations to test the impact. Details of the methodology and the analysis summary are available [here](#) and [here](#)

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## Only GDN responds



*GDN advertiser multiplier: 0.6, conversion volume -8%*

	Queries	Revenue	Payout	Profit	Pub CPM
Overall	-9%	62%	69%	47%	86%
	0%	114%	116%	107%	119%
GDN	-23%	-8%	-8%	-8%	19%
	0%	84%	84%	86%	85%
AdX buyers	19%	178%	178%	178%	134%
	0%	163%	163%	163%	162%

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## AdX buyer response



- AdX buyers may respond as well
  - How many will?
  - What will be the extent?
- Even if all AdX buyers respond to keep ROI and margin the same, it might benefit AdX if they extend this bidding behavior to other exchanges
- We consider simplified scenarios where AdX buyers reduce their bid uniformly

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## AdX buyers respond



*GDN advertiser multiplier: 0.6, AdX buyer multiplier: 0.7*

	Queries	Revenue	Payout	Profit	Pub CPM
Overall	-12%	30%	32%	22%	52%
GDN	-18%	-4%	-4%	-4%	17%
AdX buyers	0%	84%	84%	84%	83%

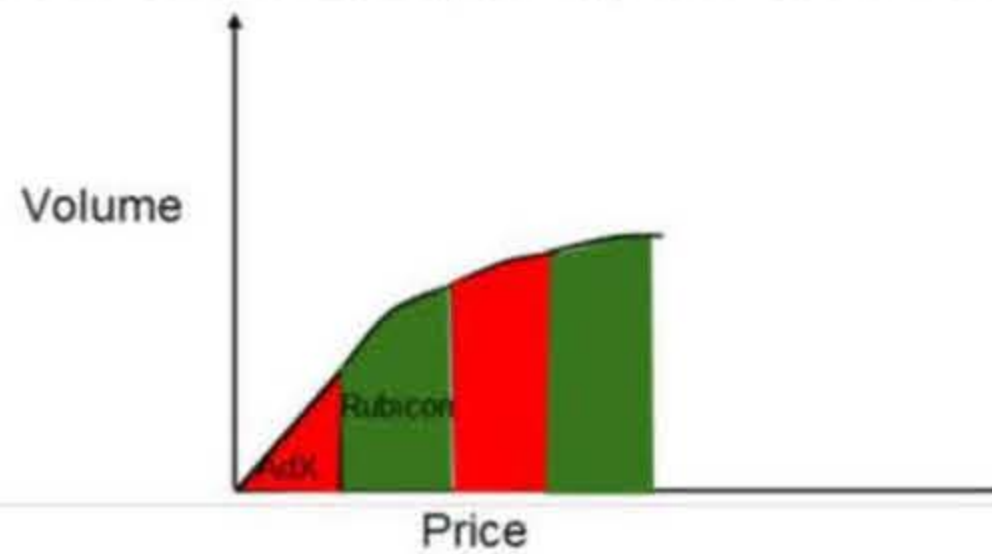
*GDN advertiser multiplier: 0.6, AdX buyer multiplier: 0.4*

	Queries	Revenue	Payout	Profit	Pub CPM
Overall	-16%	-3%	-2%	-7%	15%
GDN	-10%	-1%	1%	-7%	13%
AdX buyers	-26%	-6%	-6%	-6%	27%

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## Interaction with other exchanges

- Suppose advertiser spends \$X on AdX and \$Y on Rubicon
- With no advertiser response, 1st pricing causes spend to increase to \$2X on AdX and \$Y
- To bring spend back to \$X + \$Y, advertiser scales back spending on both exchanges
  - CPMs comparable
  - Naive bidding
- Net result is increased spending fraction on AdX



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## Conclusions



- We *originally* believed that publishers will not gain from a first price auction
- Even if GDN responds, it's likely that we do see a benefit, at least in the short term
- First price auctions may make the playing field uniform with other exchanges, providing benefit in the long term

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## Changing AdX margin

## Changing AdX margin



- The objective of this [analysis](#) is to understand the impact of changing the AdX margin from the typical 20% to 10% or 5%
- Total margin on Adwords ads is still 32%
- Caveat: Bernanke multipliers and throttling rates don't change

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## Major implications



- AdX buyers are now slightly more competitive (except when DRS/ Bernanke is in effect). GDN loses 1% queries to AdX buyers.
- Match rate increases because of smaller margin
- Payout increases because of smaller margin
- Slight drop in revenue when AdX buyers win because of the decrease in margin
- Google profit drops

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## Impact of changing AdX margin

*New margin = 10%, target adw margin = 31.2%*

Winner	Queries	Revenue	Payout	Google Profit
Any		-0.6%	5.1%	-14.4%
GDN	+0.2%	-0.3%	1.9%	-4.7%
AdX buyer	+3.2%	-1.2%	10.9%	-50%

*New margin = 5%, target adw margin = 31.2%*

Winner	Queries	Revenue	Payout	Google Profit
Any		-0.8%	7.7%	-21.0%
GDN	+0.3%	-0.4%	2.9%	-7.1%
AdX buyer	+4.8%	-1.7%	16.4%	-75%

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## GDN margin = 14%



*New margin = 10%, target adw margin = 22.6%*

Winner	Queries	Revenue	Payout	Google Profit
Any		-1.0%	9.7%	-27.2%
GDN	1.8%	-0.3%	9.7%	-20.9%
AdX buyer	1.1%	-2.3%	9.7%	-50.0%

*New margin = 5%, target adw margin = 18.3%*

Winner	Queries	Revenue	Payout	Google Profit
Any		-1.4%	14.4%	-40.0%
GDN	2.5%	-0.5%	14.4%	-30.8%
AdX buyer	1.1%	-3.3%	14.4%	-75.0%

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## **AdX without GDN**

## Queries won currently by AdX buyers



<i>Metric</i>	<i>With GDN bids (won by AdX buyer)</i>	<i>Without GDN bids (won by AdX buyer)</i>		
<i>Daily Queries</i>	2.17B	2.17B		
<i>Daily Google Revenue</i>	\$1,609,225	\$1,325,312		
<i>RPM (revenue / 1000 queries)</i>	\$0.742	\$0.611		
<i>Daily Publisher Payout</i>	\$1,287,380	\$1,060,249		

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## Queries won currently by Adwords buyers



<i>Metric</i>	<i>With GDN bids (won by GDN)</i>	<i>Without GDN bids (won by AdX buyer)</i>		
<i>Daily Queries</i>	5.32B	\$1.47B		
<i>Daily Google Revenue</i>	\$3,795,826	\$321,087		
<i>RPM (revenue / 1000 queries)</i>	\$0.714	\$0.218		
<i>Daily Publisher Payout</i>	\$2,611,289	\$256,870		

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## Overall impact

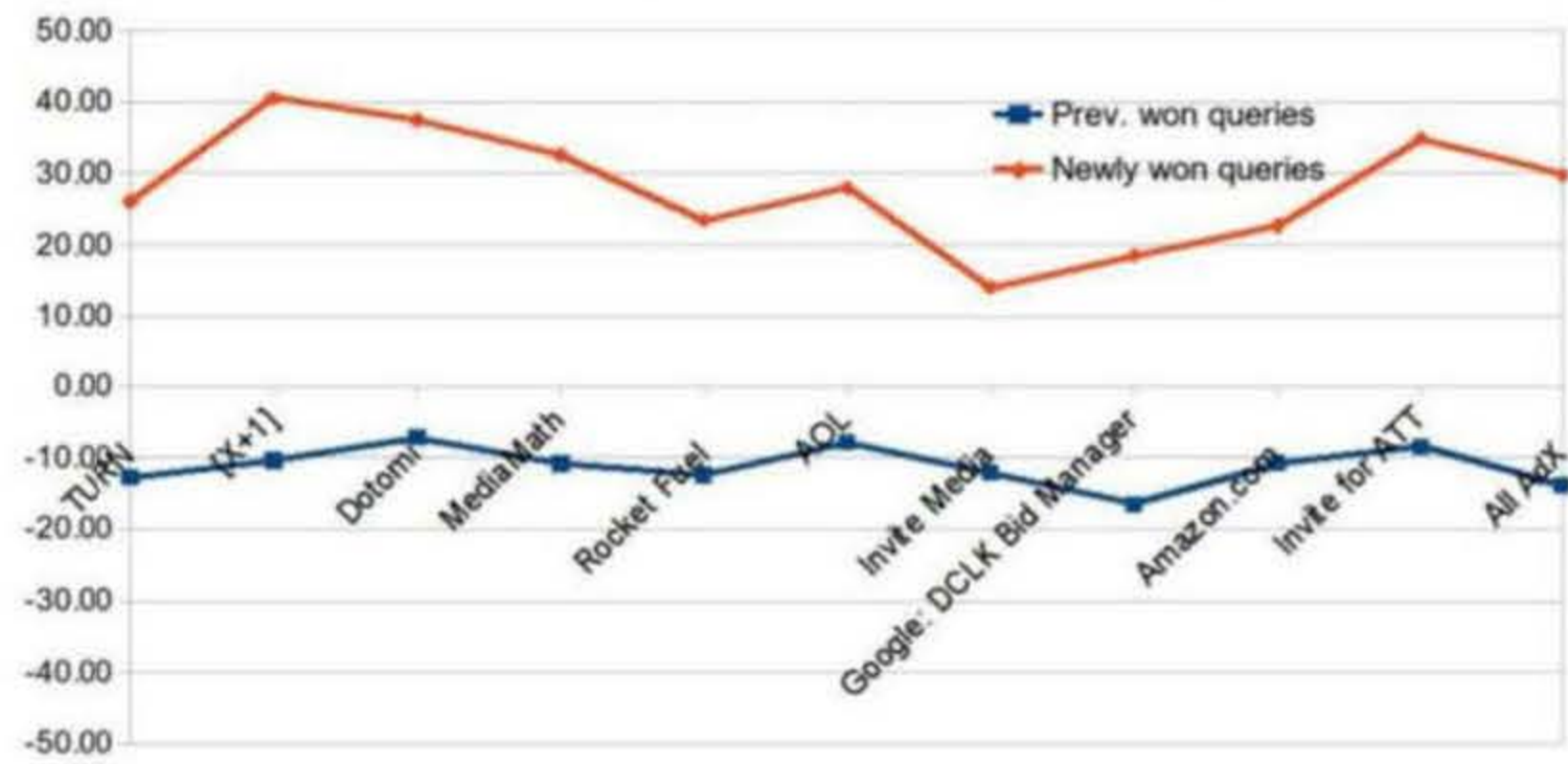


<i>Metric</i>	<i>With GDN bids</i>	<i>Without GDN bids</i>		
<i>Daily Queries</i>	7.49B	3.64B		
<i>Daily Google Revenue</i>	\$5,405,051	\$1,646,399		
<i>RPM (revenue / 1000 queries)</i>	\$0.651	\$0.452		
<i>Daily Publisher Payout</i>	\$3,898,669	\$1,317,119		

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## Impact on individual AdX buyers Google

% Revenue change for AdX advertisers on GDN removal



Source: Google Internal and Proprietary

## Optional slides

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# Cross Priority Ranking

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## Cross Priority Ranking



- Detailed results [here](#)
- Interested in understanding ROI change for adwords buyers because of CPR
- Because of concerns about the interaction between Bernanke and CPR, interested in CPR's impact on Bernanke gains

Mh-CPD	Mh-CVR	Mh-CTR
1.18%	0.73%	1.88%

### Impact of Bernanke

	GDN revenue	GDN payout
CPR	+13.8%	+14.5%
No CPR	+13.0%	+14.2%

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# Competitiveness Analysis

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## Competitiveness analysis



### Post Bernanke second pricing mechanisms

Second pricing mechanism	% queries, GDN wins	% queries, AdX buyer wins
GDN	34%	26%
AdX buyers	16%	33%
Reserve	50%	41%

\* Difference was even starker pre-Bernanke

[Second pricing mechanisms](#) indicate that GDN second prices itself a lot and AdX buyers second price themselves a lot

Source: Competitiveness and Transparency

## Competitiveness landscape



- GDN does not seem to have [competitive bids](#) when AdX buyers win the auction
  - When GDN wins, AdX buyers bid above reserve on 35% queries on Desktop, 19% on mobile
  - When AdX buyers win, GDN bids above reserve on 55% queries on Desktop, 59% on mobile
- AdX buyers get much higher auction discount ( $1 - \text{winner paid} / \text{bid}$ )
  - AdX buyers: auction discount = 0.70
  - GDN: auction discount = 0.45

Source: Competitive and Privacy

## Low overlap

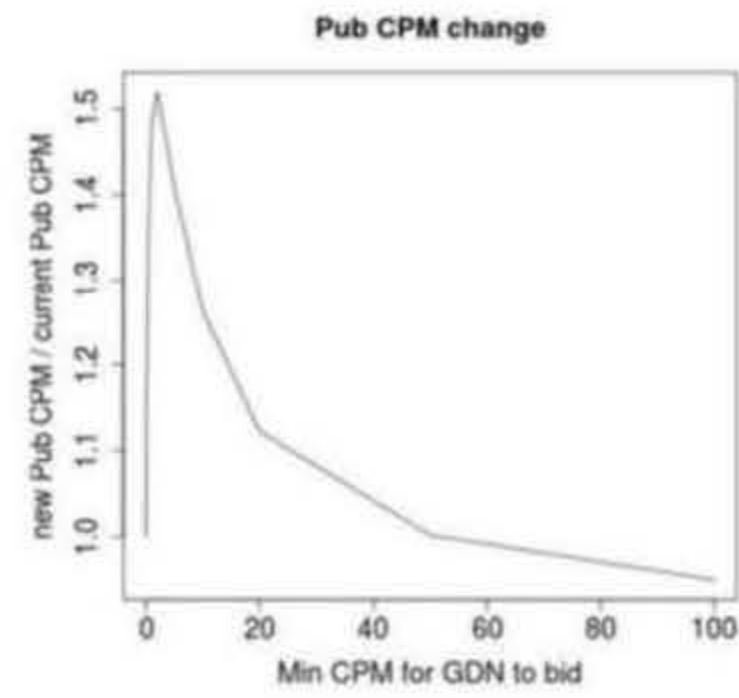
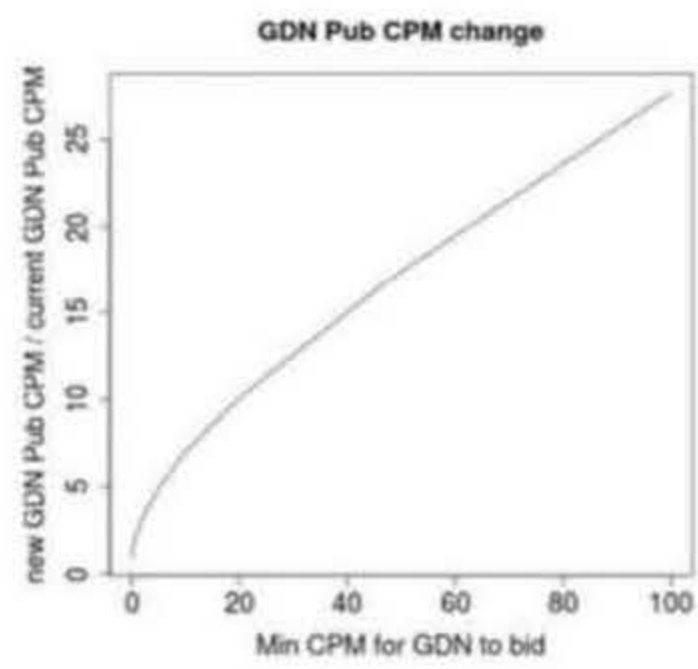


Why do we have low overlap?

- Hypothesis 1: Disjoint cookie spaces
  - But GDN should still have contextual ads...?
  - Multiple callouts with high reserve that AdX buyer matches but GDN's contextual ad does not?
- Hypothesis 2: Missing signals?
- If the auction discount was 45% for AdX buyers (same as for GDN), their spend will go up 80%!

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# CPM change with minCPM



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## Sensitive pub impact



29 Sensitive publishers: Payout +6.5%

- 1 pub had small payout drop (-2%), all other pubs had payout increase (max of 21% for WSJ)
- Only 2 pubs had considerable CPM drop WSJ: -7%, ESPN: -15% (but payout + 16%)

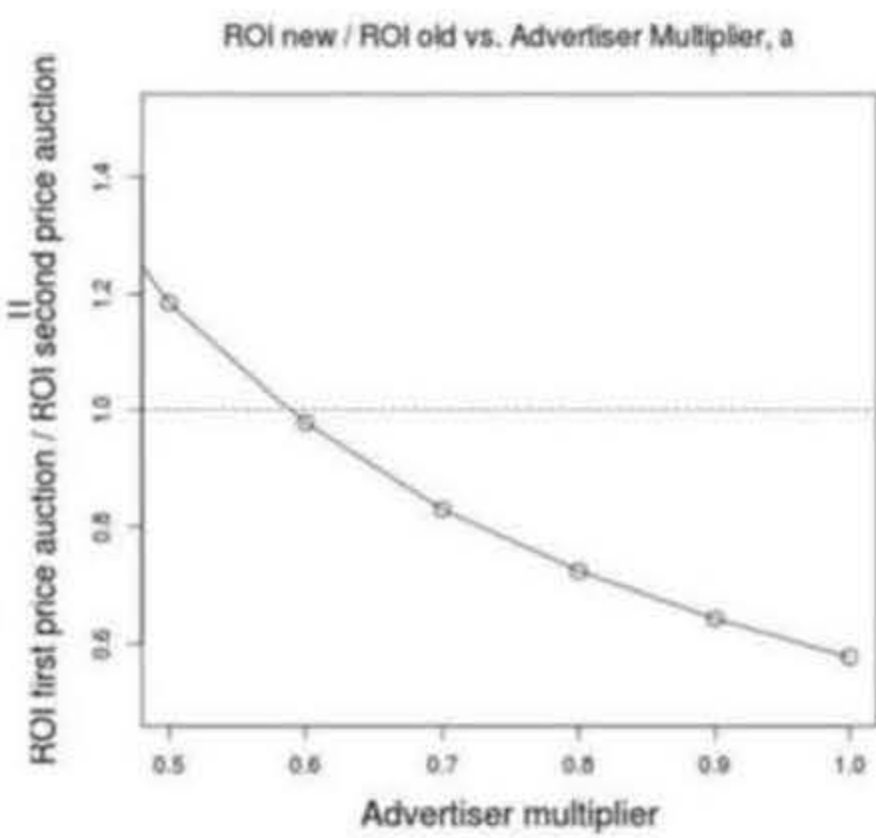
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## GDN response



GDN responds as follows:

- Original first bid =  $x$
- Advertiser charged =  $a * x$
- Bid submitted to the exchange =  $a * b * x$
- Constraints
  - Advertiser CPD does not change
  - Margin = 14% by setting  $b$  to 0.86 (or)
  - Maximize Google profit



Source: Google AdSense and AdWords



## If GDN aims to maximize profit

No AdX buyer response, GDN bid multiplier =  $0.6 * 0.3$  (new margin = 70%)

	Queries	Revenue	Payout	Profit	Pub CPM
Overall	-23%	57%	40%	101%	0.55 -> 1
GDN	-55%	-35%	-76%	58%	0.49 -> 0.25
AdX buyers	50%	233%	233%	233%	0.69 -> 1.52

AdX buyer multiplier: 0.3, GDN bid multiplier =  $0.6 * 0.2$  (new margin = 80%)

	Queries	Revenue	Payout	Profit	Pub CPM
Overall	-30%	17%	-6%	80%	0.55 -> 0.74
GDN	-61%	-38%	-85%	65%	0.49 -> 0.19
AdX buyers	40%	123%	123%	123%	0.69 -> 1.1

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## After filtering



Cap 1st price / 2nd price to 10.0 for AdX buyers

Cap AdX buyer bid to \$200

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## No response + 1st pricing



Suppose GDN bids  $0.86 \times$  bid for a 14% margin,  
Adwords ROI drops 40%; revenue, payout, CPM double

	Queries	Revenue	Payout	Profit	Pub CPM
Overall	0%	101%	102%	96%	0.57 -> 1.14
GDN	0%	84%	84%	86%	0.51 -> 0.94
AdX buyers	0%	129%	129%	129%	0.70 -> 1.57

Even without GDN demand, pubs experimenting on other exchanges  
may see such high CPMs from other buyers

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## Only GDN responds



*GDN advertiser multiplier: 0.6*

	Queries	Revenue	Payout	Profit	Pub CPM
Overall	-9%	47%	51%	34%	0.57 -> 0.94
	0%	101%	102%	96%	0.57 -> 1.14
GDN	-23%	-7%	-7%	-7%	0.51 -> 0.60
	0%	84%	84%	86%	0.51 -> 0.94
AdX buyers	19%	140%	140%	140%	0.70 -> 1.39
	0%	129%	129%	129%	0.51 -> 1.57

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## AdX buyers respond



*GDN advertiser multiplier: 0.6, AdX buyer multiplier: 0.8*

	Queries	Revenue	Payout	Profit	Pub CPM
Overall	-11%	28%	31%	20%	0.57 -> 0.83
GDN	-20%	-5%	-5%	-5%	0.51 -> 0.60
AdX buyers	7%	85%	85%	85%	0.70 -> 1.19

*GDN advertiser multiplier: 0.6, AdX buyer multiplier: 0.5*

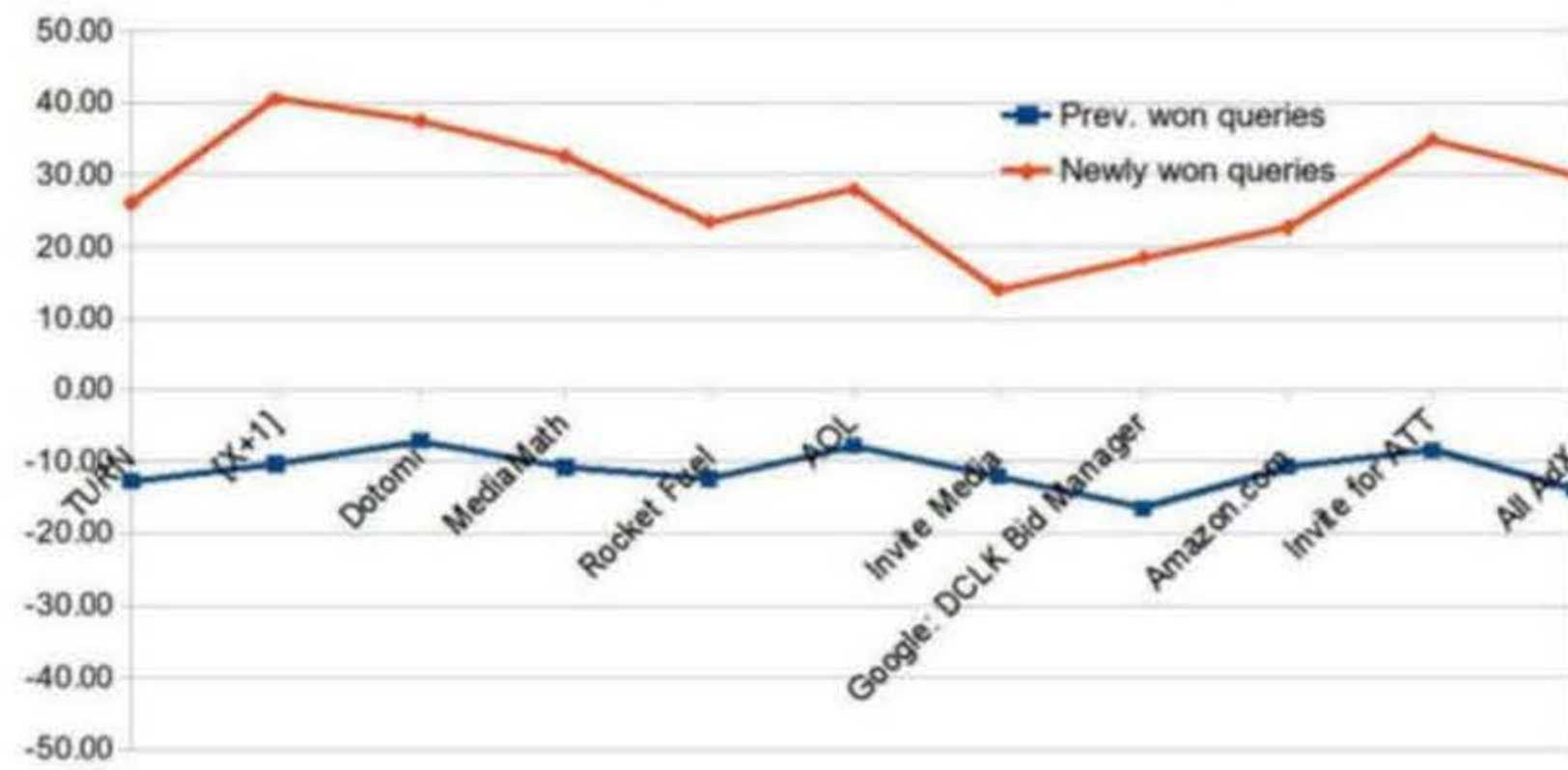
	Queries	Revenue	Payout	Profit	Pub CPM
Overall	-14%	1%	2%	-1%	0.57 -> 0.67
GDN	-13%	-1%	0%	-4%	0.49 -> 0.57
AdX buyers	-15%	5%	5%	5%	0.69 -> 0.86

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% Revenue change for AdX advertisers on GDN removal

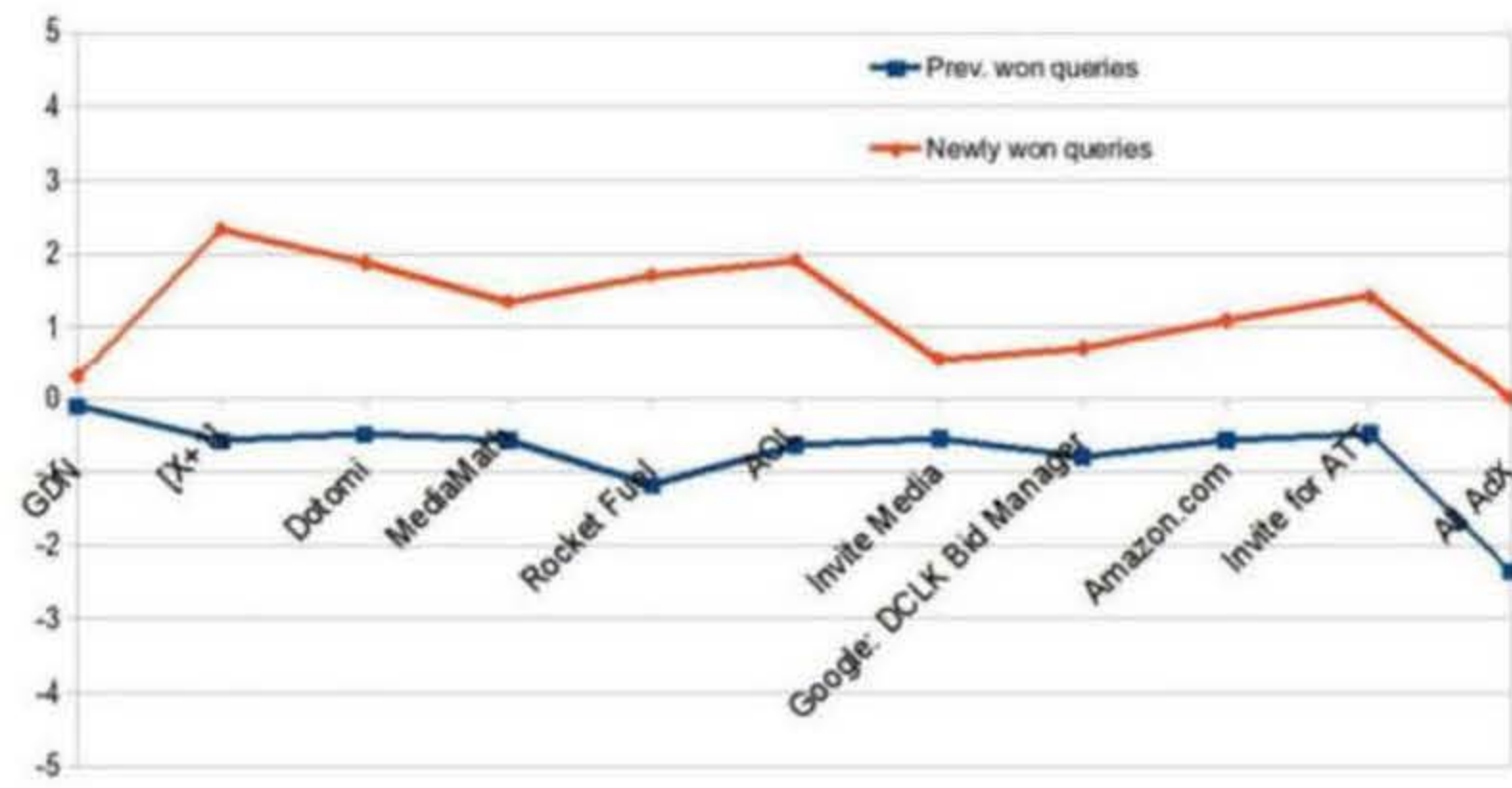


Source: Google Internal and Proprietary





% Revenue change for AdX Advertisers on removal of TURN



Source: Google Internal and Proprietary

## Interaction with other exchanges

- Suppose advertiser spends \$X on AdX and \$Y on Rubikon
- With no advertiser response, 1st pricing causes spend to increase to \$2X on AdX and \$Y
- To bring spend back to \$X + \$Y, advertiser scales back spending on both exchanges
  - CPMs comparable
  - Naive bidding
- Net result is increased spending fraction on AdX

