# Bidding Strategies & Auction Mechanisms

Google

gTrade

AdX summit

February 5, 2014

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# Outline

Google

- 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

Google

# Bernanke update

# Bernanke Performance

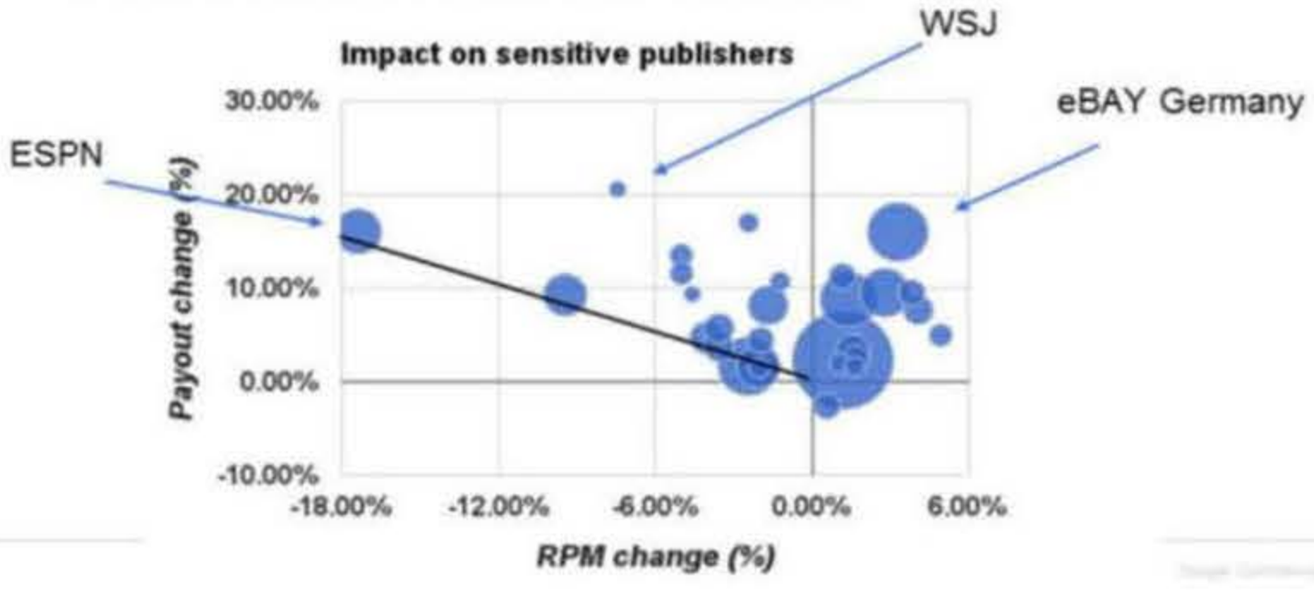
Google

- 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.

# Bernanke Performance

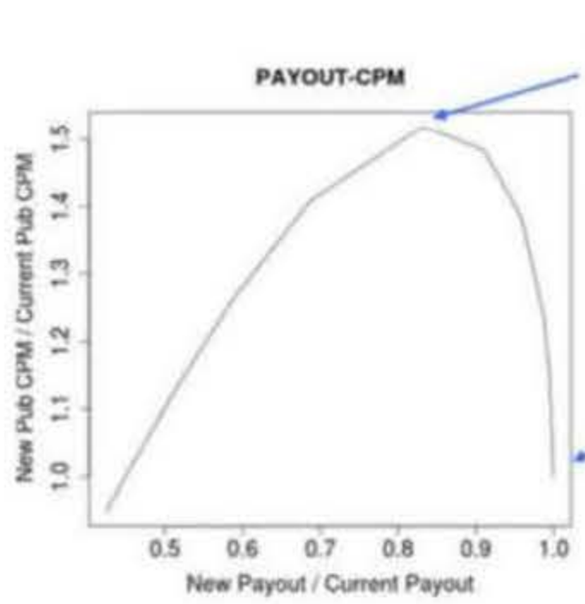
Google

- 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




Min CPM = $2
Pub CPM: +50%
Pub payout: -17%
GDN Pub CPM: +200%

Current operating point

## Discussion - CPM on segments

Google

- 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%**

# Mobile Experiment Results

Google

- 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% |

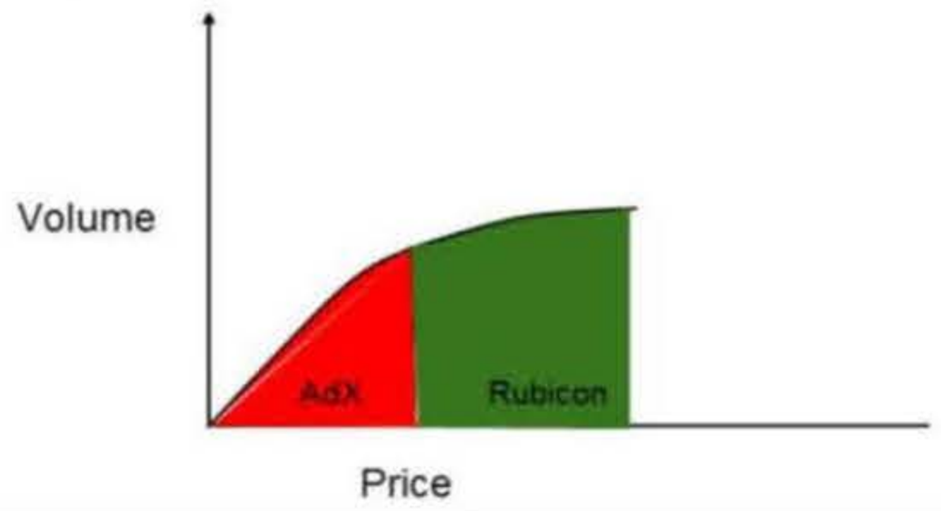
Google

# Auction mechanisms

# Price - Volume curve

Google

- 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



## First price auctions?

Google

- 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

## First pricing: Optimistic scenario Google

No buyer response

Suppose GDN bids 0.86 * bid for a 14% margin,

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

| | Queries | Revenue | Payout | Profit | Pub CPM |
|---|---|---|---|---|---|
| **Overall** | 0% | 114% | 116% | 107% | 119% |
| **GDN** | 0% | 84% | 84% | 86% | 85% |
| **AdX buyers** | 0% | 163% | 163% | 163% | 162% |

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

# GDN ROI

Google

- 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

# Only GDN responds

Google

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

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

# AdX buyer response

Google

- 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

# AdX buyers respond

Google

*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% |

## 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



## Conclusions

Google

- 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

Google

# Changing AdX margin

# Changing AdX margin

Google

- 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

# Major implications

Google

- 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

# Impact of changing AdX margin Google

*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% |

# GDN margin = 14%

Google

*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% |

Google

# AdX without GDN

# Queries won currently by AdX buyers

Google

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

# Queries won currently by Adwords buyers

Google

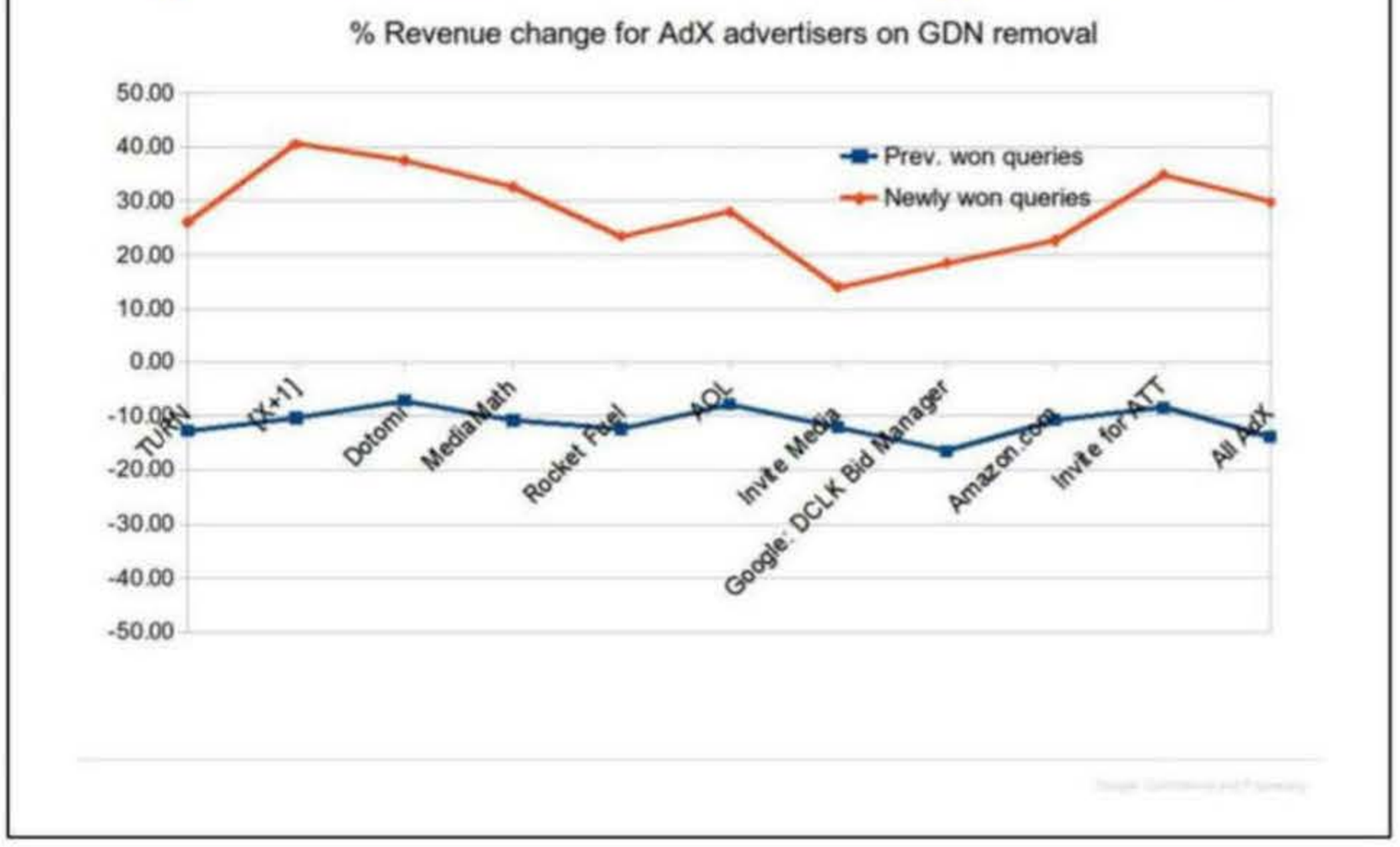
| *Metric* | *With GDN bids (won by GDN)* | *Without GDN bids (won by AdX buyer)* | | |
|---|---|---|---|---|
| *Daily Queries* | 5.32B | $1.47B | | |
| *Daily Google Revenue* | $3,795,826 | $321,087 | | |
| *RPM (revenue / 1000 queries)* | $0.714 | $0.218 | | |
| *Daily Publisher Payout* | $2,611,289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

# Overall impact

Google

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

# Impact on individual AdX buyers Google



# Optional slides

Google

Google

# Cross Priority Ranking

# Cross Priority Ranking

Google

- Detailed results here
- Interested in understanding ROI change for adwords buyers because of CPR

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

- Because of concerns about the interaction between Bernanke and CPR, interested in CPR's impact on Bernanke gains

Impact of Bernanke

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

Google

# Competitiveness Analysis

# 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

# Competitiveness landscape

Google

- 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 - winner paid / bid)
  - AdX buyers: auction discount = 0.70
  - GDN: auction discount = 0.45

# Low overlap

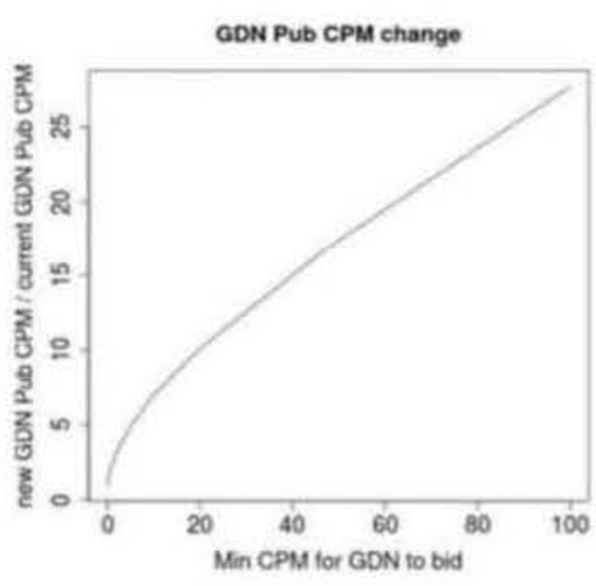
Google

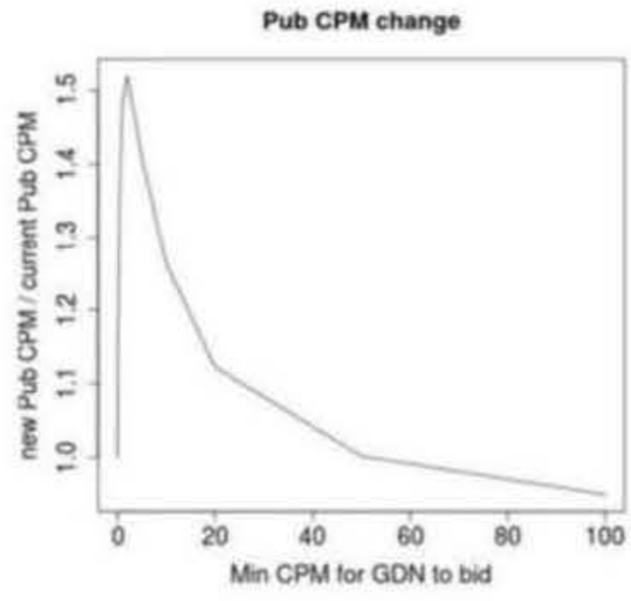
Why do we have low overlap?

- 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%!

# CPM change with minCPM

Google



# Sensitive pub impact

Google

29 Sensitive publishers: Payout +6.5%

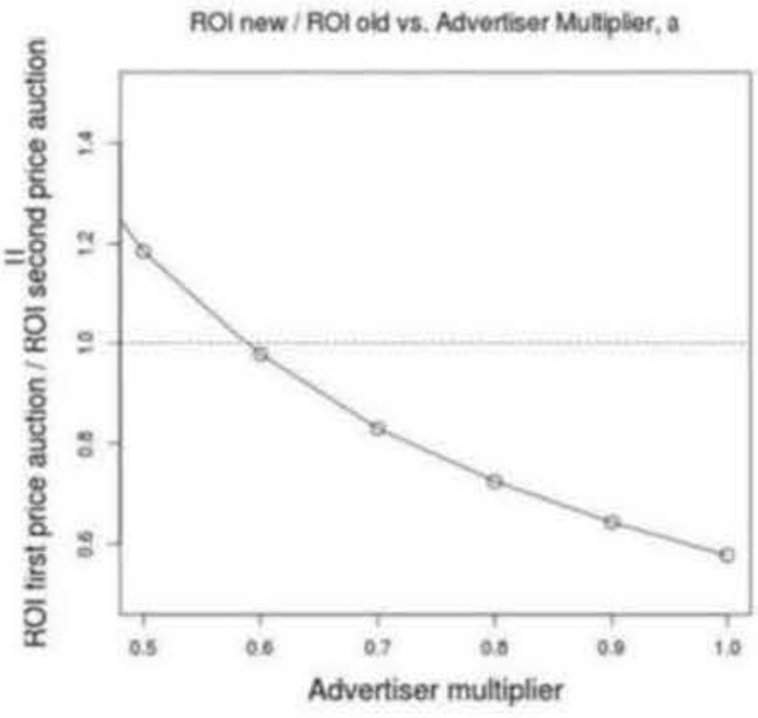
- 1 pub had small payout drop (-2%), all other pubs had payout increase (max of 21% for WSJ)
- Only 2 pubs had considerable CPM drop WSJ: -7%, ESPN: -15% (but payout + 16%)

# GDN response

Google

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



# If GDN aims to maximize profit Google

*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 |

## After filtering

Google

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

Cap AdX buyer bid to $200

# No response + 1st pricing

Google

Suppose GDN bids 0.86 * 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

# Only GDN responds

Google

*GDN advertiser multiplier: 0.6*

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

# AdX buyers respond

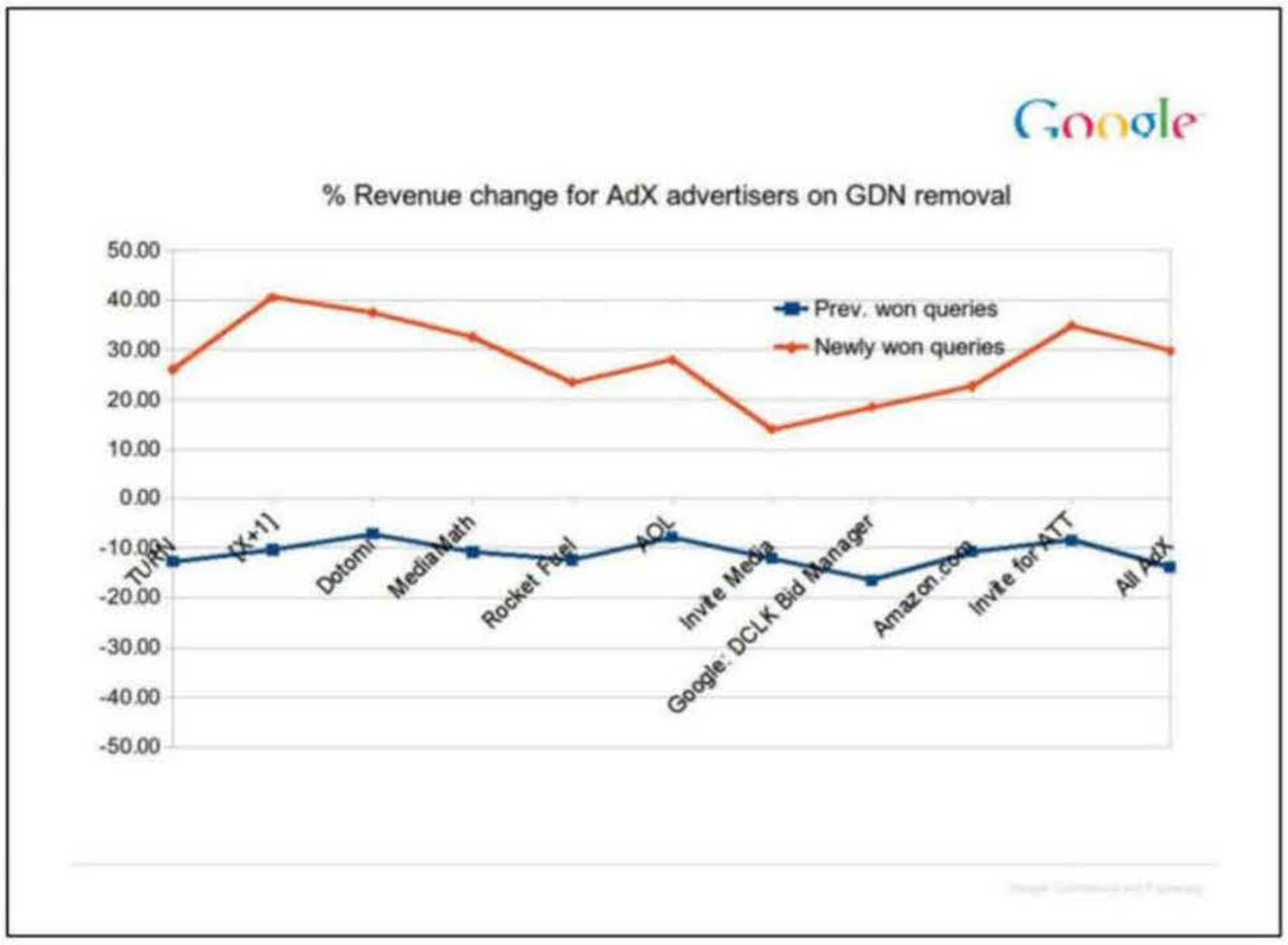
Google

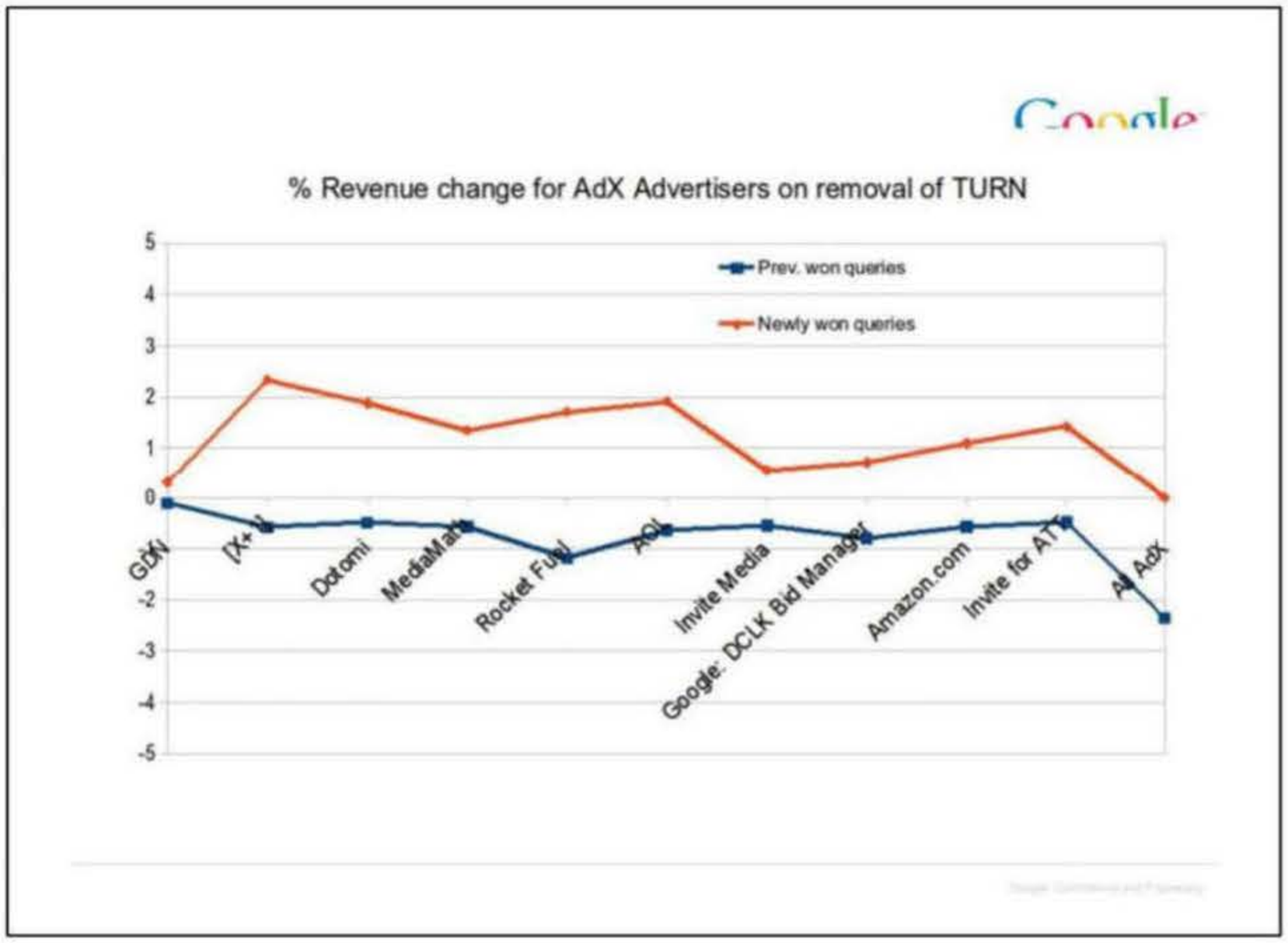
*GDN advertiser multiplier: 0.6, AdX buyer multiplier: 0.8*

| | 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 |


Google
% Revenue change for AdX advertisers on GDN removal
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
Prev. won queries
Newly won queries
TURN
[X+1]
Dotomi
MediaMath
Rocket Fuel
AOL
Invite Media
Google: DCLK Bid Manager
Amazon.com
Invite for ATT
All AdX


% Revenue change for AdX Advertisers on removal of TURN
Prev. won queries
Newly won queries
5
4
3
2
1
0
-2
-3
-4
-5
GDN
[X+1]
Dotomi
MediaMath
Rocket Fuel
AOL
Invite Media
Google: DCLK Bid Manager
Amazon.com
Invite for AT
All AdX

## 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

