

## HOW MARKETERS THINK ABOUT DEMAND-SIDE PLATFORMS (DSP) WITH INCOMPLETE INFORMATION

Tom Triscari  
Lemonade Projects  
tom@lemonadeprojects.com

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### ABSTRACT

This paper is for marketers and other programmatic advertising stakeholders seeking clarity on how demand-side platforms (DSP) calculate fees in exchange for processing display ads in auction exchanges.

When marketers decide to buy open-web ad impressions from publishers using a DSP, they know in advance that certain fees will be taken from their ad budget by a supply chain of various adtech companies.

In this highly competitive, pay-to-play auction environment, marketers also typically look to minimize transaction fees and maximize the amount of available "working media" that ends up buying ads on publisher websites.

With marketers now spending over \$70 billion on what has become a routine method of open-web media buying, the informational and financial impact of having visibility into transaction fees has become particularly meaningful over recent years.<sup>1</sup> And if marketers have incomplete information on how the totality of DSP transaction fees are taken from ad budgets, they won't be able to responsibly assess a DSP's value as a service provider.

The information gap between what marketers perceive as *media cost* and the actual *media cost* that transpires in ad auction clearing prices might help explain what has become known as the "unknown delta."<sup>2</sup>

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<sup>1</sup> [This Year Next Year: Global 2021 End-Of-Year Forecast](#), GroupM, December 2021.  
[Programmatic ad spend worldwide 2017-2021](#), Statista, 2021

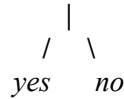
<sup>2</sup> The difference between reported DSP fees as a function of Net Advertiser Cost and actual DSP fees after variable costs are considered may help explain the "unknown delta" described in [ISBA's programmatic transparency study](#).

## PROGRAMMATIC REASON FOR BEING

Programmatic advertising is synonymous with the ability to run ads on publisher sites — but only to a predesignated target audience of specific users. For instance, when a marketer's DSP gets an auctioned bid request from an ad exchange, its backend technology (databases, servers, and computation) asks a very simple primary question *before* submitting a bid response back to the exchange:

### Diagram 1

*Is the user ID in this bid request in my target audience segment?*

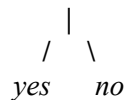


If the answer is "yes," then the DSP will calculate a bid price and submit it back to the exchange. The exchange will then select a winner from among other competing DSP bids. If the answer is "no," then the DSP will submit a \$0 bid price signaling a null bid to the exchange.

While the original invention of programmatic advertising came along to execute audience targeting at the individual user ID level, this doesn't mean marketers don't also use it for classic contextual ad campaigns. For example, when a DSP is utilized to buy ad impressions only from a specific list of certain websites that are believed to have contextually relevant content (e.g., food ads on recipe sites or sports gear on sports news websites), the DSP's backend technology will ask a different primary question before making a bid:

### Diagram 2

*Is the publisher that sent this bid request on my contextual target website list?*



If the answer is "yes," the DSP will calculate a bid price, submit it back to the exchange, and the exchange will select a winning DSP bid. If the answer is "no," the DSP will submit a \$0 bid price.

In either case, the DSP incurs meaningful costs during this number-crunching process that get passed along in the price marketers pay for DSP services.

## CAMPAIGN CRITERIA AND SUPPLY CHAIN ACTORS

Imagine a generalized scenario where a marketer has \$10 in ad budget to spend on one thousand open-web ad impressions bought via a programmatic auction mechanism. Since the \$10 budget constraint will buy one thousand impressions, the effective cost per mil impressions (CPM) is also \$10 and equal to the total ad budget.

With \$10 of ad budget ready to go, the marketer provides additional constraints described in a "campaign brief" that various supply chain actors follow during the bid-buying process. All subsequent supply chain transaction fees will be taken from this \$10 budget, leaving some amount of working media at the end.

**Table 1**  
Campaign Brief

**Ad budget:** \$10  
**Impressions to Buy:** 1000  
**Creative Ad Type:** 50% banner ads, 50% video ads  
(500 impressions each)  
**Audience Target:** male/female (or undeclared),  
in the US with income over \$50K

### Supply Chain Actors

1. Media Agency: The marketer's media agency — aka "hands-on-keyboard" (HOK) — manages the campaign setup, monitoring, and reporting on the marketer's behalf.
2. DSP: The HOK agency operator uses a DSP.
3. Data Providers: Within the DSP platform, the HOK agency operator will identify and select the target audience segment from one of many data providers made available by the DSP platform in what is typically called a "data marketplace."<sup>3</sup>
4. Verification Vendor: Since ad inventory sold in programmatic auctions can come from hundreds to hundreds of thousands of unknown or dubious websites, marketers and media agencies typically deploy a verification vendor to monitor ad quality in three specific areas:<sup>4</sup>
  - Invalid Traffic to make sure ads are served to humans, not bots.
  - Ad Viewability based on standards set by the Media Ratings Council (MRC).<sup>5</sup>
  - Brand Safety to know if the website context where the ad is served is appropriate and aligned to the advertiser's stated values.
5. Ad Server: After an ad impression is bid on and won by the DSP, the marketer's ad server will get a request from the user's browser (or app) to send the actual ad unit, which will load in the user's browser or app along with the content.<sup>6</sup>

### Supply Chain Actor Fees

Each of these five supply chain actors (Agency, DSP, Data Provider, Verification, Ad Serving) is a for-profit business. Like any other business in a competitive landscape, programmatic adtech supply chain companies seek economies of scale to minimize their marginal cost of processing

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<sup>3</sup> See Tradedesk's 225+ data partners at <https://www.thetradedesk.com/us/our-platform/our-partners>.

<sup>4</sup> See [Integral Ad Science](#) (NASDAQ: IAS), [DoubleVerify](#) (NYSE: DV), or [MethodMedia Intelligence](#) for more information on verification vendors.

<sup>5</sup> See [Media Ratings Council](#) (MRC).

<sup>6</sup> See [Google Campaign Manager](#) and [Flashtalking](#) for more information on ad serving technology.

an ad impression in order to price their services at or above marginal cost, thus earning a profit for shareholders and other stakeholders.

1. Assume the marketer's Media Agency (or programmatic unit inside the agency) charges a 15% fee on ad budget to set up, manage, and report on the campaign. This fee is disclosed in a contract between the marketer and the media agency.<sup>7</sup>
2. Assume the DSP charges a 10% "tech fee" on the ad budget flowing through its platform to bid on ad impressions. Also, assume the DSP applies the same 10% fee as a cost markup on any audience data bought inside its data marketplace. Both of these costs will be detailed in the advertiser's (or agency's) contract with the DSP.
3. Assume the Data Provider charges a \$1.00 CPM for its audience data. Every time the DSP wins an ad impression, the Data Provider earns \$0.001. So, after the campaign ends, one thousand impressions will be served, generating a total of \$1.00 in revenue for the data provider.
4. Assume the Verification Vendor also charges on a CPM basis as ad impressions run on publisher sites and in apps. Since banner ads are "lighter" and less complex than video ads, typical CPM fees are around \$0.05 for banners and \$0.10 for videos. Given the marketer's campaign brief in Table 1 aims to serve 50% banner ads and 50% video ads, the weighted average CPM paid to the verification vendor is \$0.075.
5. Similar to verification vendors, the Ad Server provider also charges different prices for banner and video ads on a CPM basis. Assume the typical price for banner ads is around \$0.05 and \$0.25 for video ads, amounting to a weighted average price of \$0.15.

All the supply chain fees paid by marketers to adtech suppliers can be separated into two types: 1) CPM-based (cost per mil); and 2) percentage of ad budget fee.

**Table 2**  
Supply Chain Fees

Media Agency Fee	15%	percentage fee on ad budget
DSP Tech Fee	10%	percentage fee on budget
Audience Data Cost	\$1.00	CPM
Verification Provider Cost	\$0.075	CPM
Ad Server Cost	\$0.15	CPM

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<sup>7</sup> In some cases over the recent past, marketers have elected to run programmatic operations with an "in-house" team. In these cases, the operating cost is assumed to be roughly the same as outsourcing to a media agency. For example, labor cost and productive output will level out to be roughly the same cost independent of where the labor is taking place.

## SETTING A CAMPAIGN BUDGET LIMIT

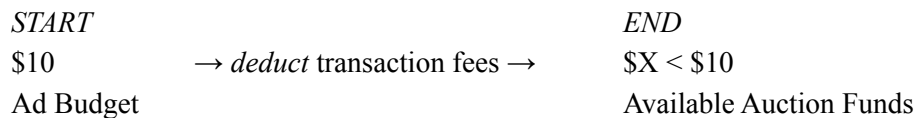
Prior to the media agency executing the campaign, the advertiser will have signed an insertion order (IO) outlining the work to be done in the campaign brief. Given the \$10 budget limit, all the supply chain transaction fees must be deducted by the DSP's internal accounting protocols in order to determine how much is left over for bidding in auctions.

Once the marketer allocates \$10 in ad budget to its media agency for programmatic buying, the media agency is now charged with campaign setup and management in its preferred DSP platform. As the fees in Table 2 are deducted, the remaining net amount of *Available Auction Funds* is used to buy ad impressions in ad exchanges.

## FROM ADVERTISER COST TO MEDIA COST

Once the advertiser's \$10 budget constraint is put in place, that's all supply chain actors get to work with. This is the source of all subsequent supply chain transaction fees.

### Diagram 1



The first cost deducted from the ad budget by the DSP is the media agency's 15% service fee. After applying this fee, \$1.50 is taken from the ad budget.

**Table 3**  
Net Advertiser Cost

<b>Fee</b>	<b>Amount</b>	<b>Net</b>
<b>Total Advertiser Cost (budget constraint)</b>		<b>\$10.00</b>
Media Agency Fee	\$1.50	\$8.50
Audience Data Fee	\$1.00	\$7.50
Ad Server Fee	\$0.15	\$7.35
Verification Provider Fee	\$0.08	\$7.28
<b>Net Advertiser Cost</b>		<b>\$7.28</b>

The next three costs to come off the advertiser's ad budget are all CPM-based. Assuming a \$1.00 CPM for audience data, \$0.075 CPM for verification, and a \$0.15 CPM for ad serving, these additional fees amount to an extra \$1.23, leaving \$7.28 in *Net Advertiser Cost*.

In essence, these costs are known amounts that will be invoiced and paid to each supply chain actor as the DSP buys ad impressions in auction exchanges.

With the Net Advertiser Cost known, the DSP uses it as the basis for the two fees it charges. According to the fees in Table 2 above, the DSP applies its 10% tech fee to net advertiser cost, which comes to \$0.73 (rounded up). The DSP will also apply the same 10% fee to the audience data procured from its data marketplace setup. Since the audience data costs \$1.00 CPM, the DSP earns a \$0.10 markup, leaving \$6.45 in what is commonly referred to as *Media Cost*.

**Table 4**  
Media Cost

<b>Fee</b>	<b>Amount</b>	<b>Net</b>
<b>Total Advertiser Cost (budget constraint)</b>		<b>\$10.00</b>
Media Agency Fee	\$1.50	\$9.00
Audience Data Fee	\$1.00	\$8.93
Ad Server Fee	\$0.15	\$8.78
Verification Provider Fee	\$0.08	\$7.28
<b>Net Advertiser Cost</b>		<b>\$7.28</b>
DSP Tech Fee	\$0.73	\$6.55
DSP Data Markup	\$0.10	\$6.45
<b>Media Cost</b>		<b>\$6.45</b>

Table 4 represents what a marketer will see after running a cost report in a typical DSP platform to get a view into working media performance. In most cases, the advertiser is seeking to answer two questions:

- *Can I get an itemized cost breakdown report inclusive of all charges taken from my ad budget?*
- *How much is left over for actual media buying (e.g., media cost) when all the transaction fees are taken into account?*

#### **MEDIA COST VS. AVAILABLE AUCTION FUNDS**

As far as the marketer knows, the “media cost” reported in DSP platforms is what’s left over to bid on in programmatic ad auctions. However, this is the point where two additional and generally unreported costs are introduced:

1. DSP Cost of Goods Sold (COGS), also known as *carrying cost*; and
2. DSP Exchange Billing Fees

#### **Cost of Goods Sold (COGS)**

The concept of variable cost (aka cost of goods sold, cost of sales, etc.) for a DSP is the same as any other business. For DSPs, COGS are expenses related to server hosting fees, data processing fees, and depreciation of data center equipment. Every time a DSP processes a bid request,

various "big data" computations occur within the DSP's server clusters and generate a variable cost.<sup>8</sup>

For instance, imagine a DSP incurs \$1.00 CPM in variable cost for every 1000 impressions that it processes into winning bids. If the DSP charges a \$5.00 CPM for its services and also incurs \$10 million in fixed costs (staff, rent, overhead), then it will generate a \$4.00 *contribution margin* (price–variable cost) and break-even after producing 2.5 billion ad impressions.<sup>9</sup>

### DSP Exchange Billing Fees

Exchange billing fees are also variable in nature. At the end of every accounting period, a DSP tabulates and reconciles what it owes each exchange from which it bought ad impressions. While this cost is generally unobservable but assumed to be defined in the contract between a DSP and marketer (or media agency), anecdotal information suggests that a 1% to 5% billing fee is calculated with *media cost* as the anchor value and passed on to advertisers.

From an accounting and operational perspective, the DSP will typically rely on internal back-office functionary resources and/or an outsourced processing firm to handle ad exchange billing and reconciliation.

Whatever the case may be, the important feature of variable costs for a profit-seeking business is to pass these costs on to customers in the price charged for services. If a DSP is unable to price its services above variable cost, then it will never generate a profit.

Assuming COGS for a medium-sized DSP with meaningful economies of scale are 10% and exchange billing fees are 3%, \$0.74 in total variable costs are deducted from the reported media cost. After this accounting treatment, \$5.71 remains for Available Auction Funds.

**Table 5**  
Available Auction Funds

<b>Fee</b>	<b>Amount</b>	<b>Net</b>
<b>Total Advertiser Cost (budget constraint)</b>		<b>\$10.00</b>
Media Agency Fee	\$1.50	\$8.50
Audience Data Fee	\$1.00	\$7.50
Ad Server Fee	\$0.15	\$7.35
Verification Provider Fee	\$0.08	\$7.28
<b>Net Advertiser Cost</b>		<b>\$7.28</b>
DSP Tech Fee	\$0.73	\$6.55
DSP Data Markup	\$0.10	\$6.45
<b>Media Cost</b>		<b>\$6.45</b>
DSP COGS	\$0.57	\$5.88
SSP Billing Fee	\$0.17	\$5.71
<b>Available Auction Funds</b>		<b>\$5.71</b>

<sup>8</sup> COGS are a significant expense for DSPs. Public filings from two well-known DSPs — Tradedesk (NASDAQ: TTD) and Criteo (NASDAQ: CRTO) — indicate variable costs are roughly 5% to 10% of the ad budget flowing through their respective platforms.

<sup>9</sup> Breakeven is equal to fixed cost divided by contribution margin. Contribution margin is equal to price charged minus variable cost.

Given this variable cost reality that all businesses face, four important equalities emerge:

**Equality 1**

$$\text{Advertiser Cost} = \text{Reported DSP Media Cost} + \text{Transactions Fees}$$

**Equality 2**

$$\text{Reported DSP Media Cost} = \text{Auction Clearing Price} + \text{DSP Variable Cost}$$

**Equality 3**

$$\text{Available Auction Funds} = \text{Auction Clearing Price}$$

**Equality 4**

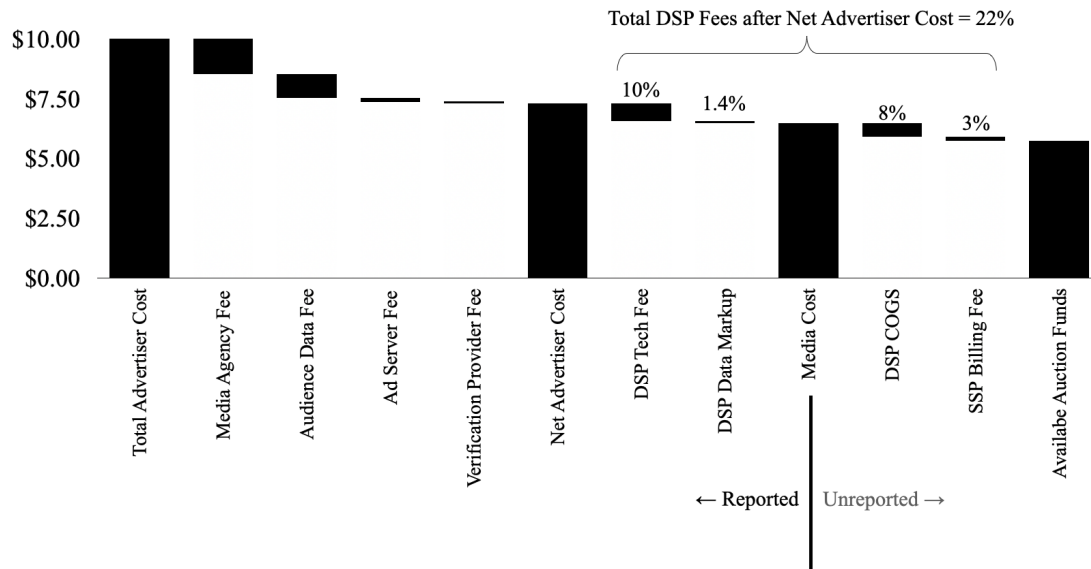
$$\text{Available Auction Funds} = \text{Auction Clearing Price} = \text{Working Media}$$

Therefore, when a marketer logs into a DSP platform looking for an itemized campaign cost report, and the DSP does not make auction clearing prices transparent, marketers cannot reliably ascertain the true price of DSP services.

If the marketer only gets to know about Equality 1 above, but not Equality 2 which shows the real cost of media (auction clearing price), then the true service fee is unknown because the true cost of the media is also unknown.

**Diagram 2**

Cost Waterfall: From Advertiser Cost to Available Auction Funds



As illustrated in Diagram 2 above, at face value, the marketer would be under the impression that DSP tech fees are just 11.4% (DSP tech fee plus the markup on the DSP’s data marketplace). The marketer would also be under the false impression that working media is a function of the *media cost* (Equality 1 above) reported within the DSP platform.



However, after accounting for DSP variable costs that have been deducted from bid prices, the real DSP fee is 22%.<sup>10</sup>

**Table 6**  
Real DSP Fees

		DSP COGS				
		5%	10%	15%	20%	25%
<b>DSP</b> <b>Exchange</b> <b>Billing Fee</b>	<b>1%</b>	16%	20%	24%	28%	32%
	<b>2%</b>	17%	21%	25%	29%	33%
	<b>3%</b>	18%	22%	25%	29%	33%
	<b>4%</b>	18%	22%	26%	30%	34%
	<b>5%</b>	19%	23%	27%	31%	35%

With a possible range of unknown but plausible DSP COGS (5% to 25%) and exchange billing fees (1% to 5%), a marketer who wrongly assumes 11.4% DSP fees (based on DSP contract terms) could be paying anywhere from 16% to 35%+ in actual DSP fees when *auction clearing price* is the real cost of media. Moreover, the downstream issues of misjudging real DSP fees can also lead a marketer to a false understanding of working media that then influences many other downstream operational and supply chain decisions.

### REASONS FOR INCOMPLETE DSP FEE INFORMATION

General observation suggests marketers have somehow been conditioned to think about DSP service fees with incomplete information. Perhaps the most obvious explanation is that marketers are simply unaware that DSPs pass on variable costs to meet normal profit expectations. No matter the reasons for this knowledge gap, incomplete information will interfere with a marketer’s ability to assess the difference between the real fees paid for DSP services and the value provided.

Given the overwhelming complexity of programmatic advertising at large, marketers simply may not know to ask their DSP about the variable cost effects on ad budgets and working media outcomes.

As for DSP profit-seeking interests, management might be reluctant to disclose the reality of variable costs for two observable reasons. The first involves *sales pitch risk*; it may be determined that disclosing and discussing variable costs during sales pitches would not only introduce confusion but also increase the risk of losing the deal. In addition, sales teams would have to move clients up a steep learning curve just to openly discuss the topic, so the rationale of sales maximization would likely lead management to avoid the issue altogether.

<sup>10</sup> The difference between reported DSP fees as a function of Net Advertiser Cost and actual DSP fees after variable costs are considered may help explain the “unknown delta” described in [ISBA’s programmatic transparency study](#).

Secondly, it may simply be easier to sell DSP services to clients by getting them to focus on 10% tech fees attached to “media cost.” The notion of media cost is a universally known concept that marketers tend to understand, as opposed to the complexity of explaining the reality of variable costs that result in higher DSP fees. The sales thinking might be, *if marketers don't know enough to ask about variable costs, then less information creates a more probable sale.*

No matter the reasons or rationale, the hard fact of the matter is that unless DSPs are able to price services above variable cost, they will not be able to produce a profit for investors.

## CONCLUSION

If DSPs don't provide data to marketers on auction clearing prices, there is no way for marketers to understand and judge the real costs of DSP services.

What this paper attempts to illustrate is a *normative* view on how DSP fees *should function* when variable costs are included in profit-seeking endeavors. From a *positive* school of thought, the real fees marketers *actually* pay to DSPs (or any other supply chain actor) can only be known by collecting and matching empirical data from all supply chain sources.

Supply chain data collection is perhaps the most viable and effective conduit to flatten the marketer's learning curve. However, data collection and matching can be quite complex. Conventional techniques are prone to errors and rely on an independent ability to verify whether the data provided by supply chain actors is accurate, tamper-free, and complete.

Once these logistical challenges are coordinated and overcome, marketers will have created the circumstances to correct the informational imbalance between their objective of maximizing working media with their supply chain's incentive to maximize profits.