Some Company Software

Jeff Parker Technical Assessment
Paywall Analysis
November 10th, 2017

Exploratory

Conversion Rates

Revenue Attribution

About 7% of users paid for a subscription with payments varying from $10 to $50 to $100s

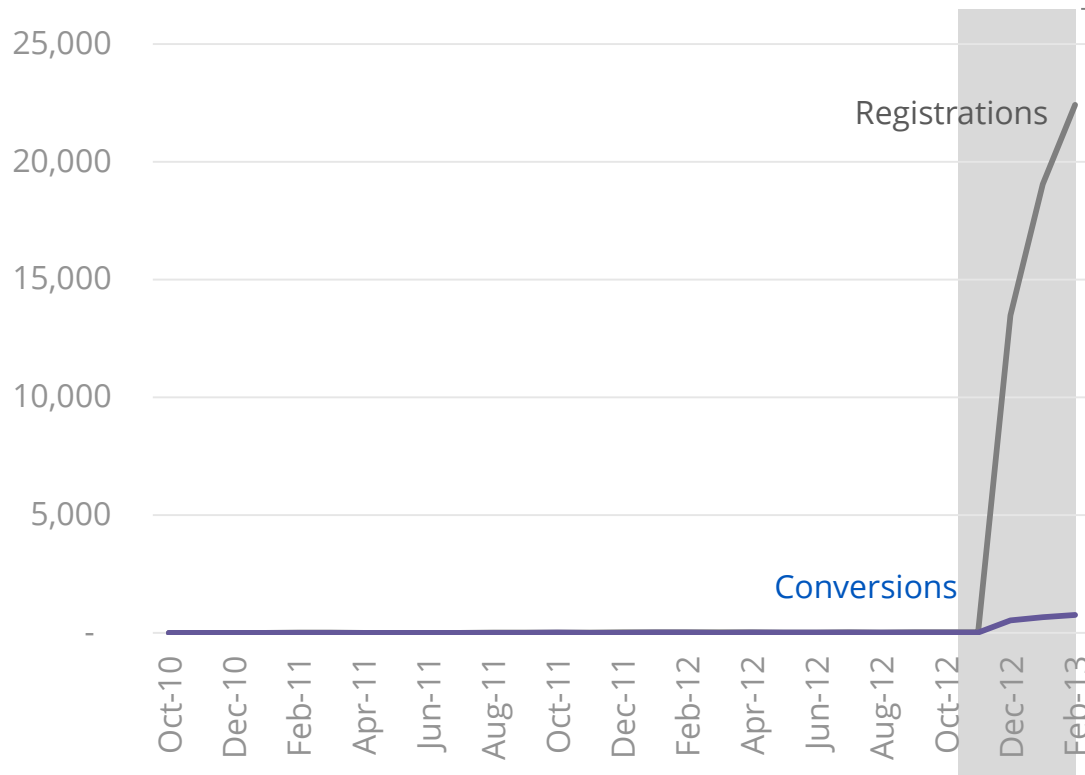## Distribution of Registrants who Ultimately Paid for a Subscription

Distribution of the subscriptions 1st Payment Amount
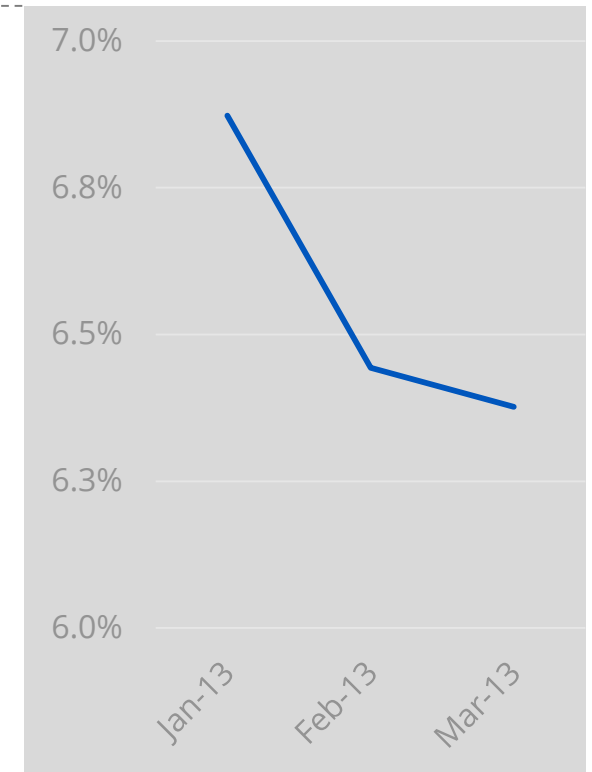

Paid 7%

Not Paid 93%

~$10	~$20	$40 to $100	$100 to $100	$200 to $500	$3,000
325	286	598	326	84	24
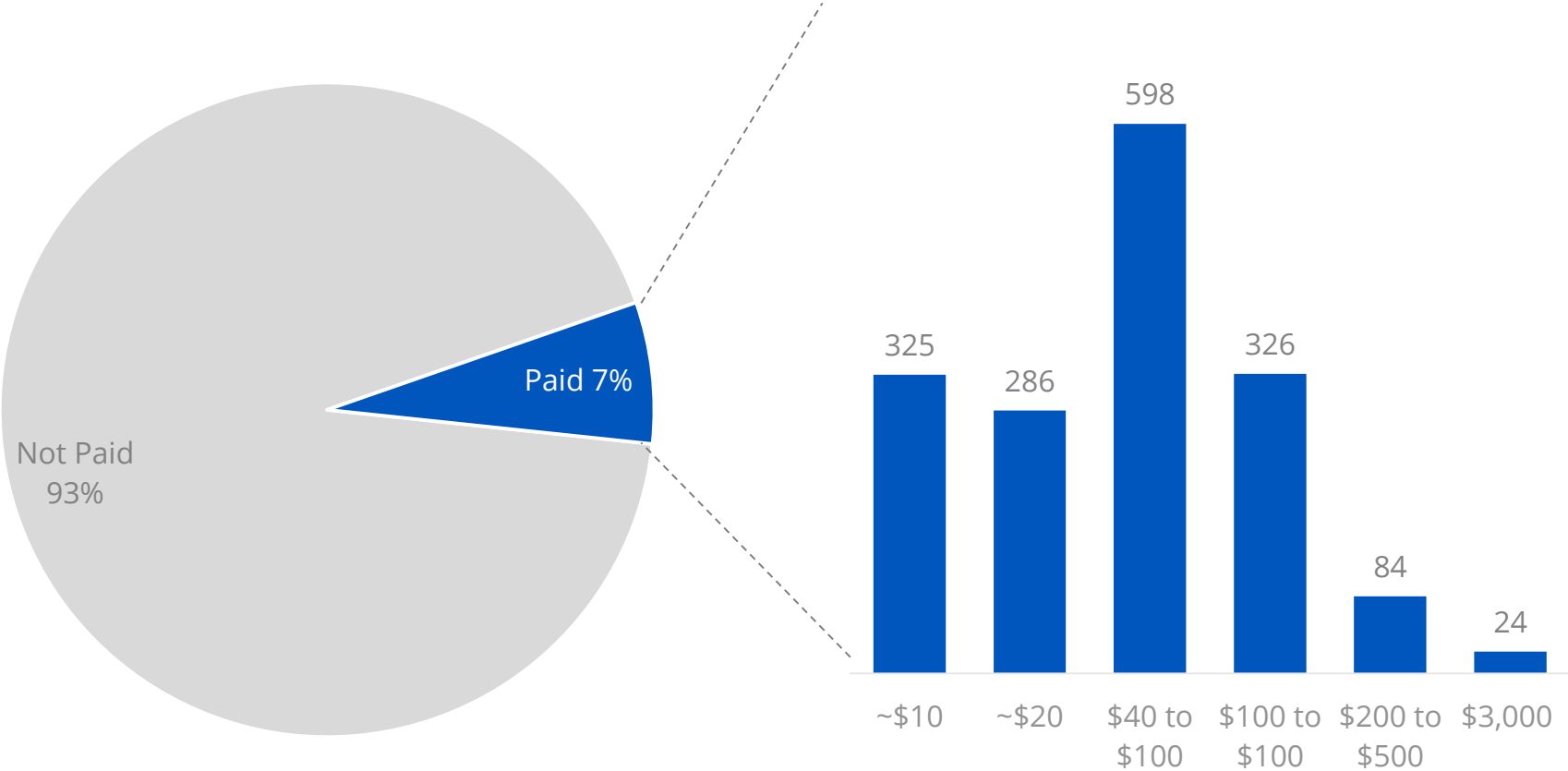
The volume to data dramatically increases in 2013 – the conversion rate in this time frame is about 6.5%

Registrations and Conversions over Time

Conversion Rate in 2013

Registrations

Conversions

25,000
20,000
15,000
10,000
5,000
-

Oct-10 Dec-10 Feb-11 Apr-11 Jun-11 Aug-11 Oct-11 Dec-11 Feb-12 Apr-12 Jun-12 Aug-12 Oct-12 Dec-12 Feb-13

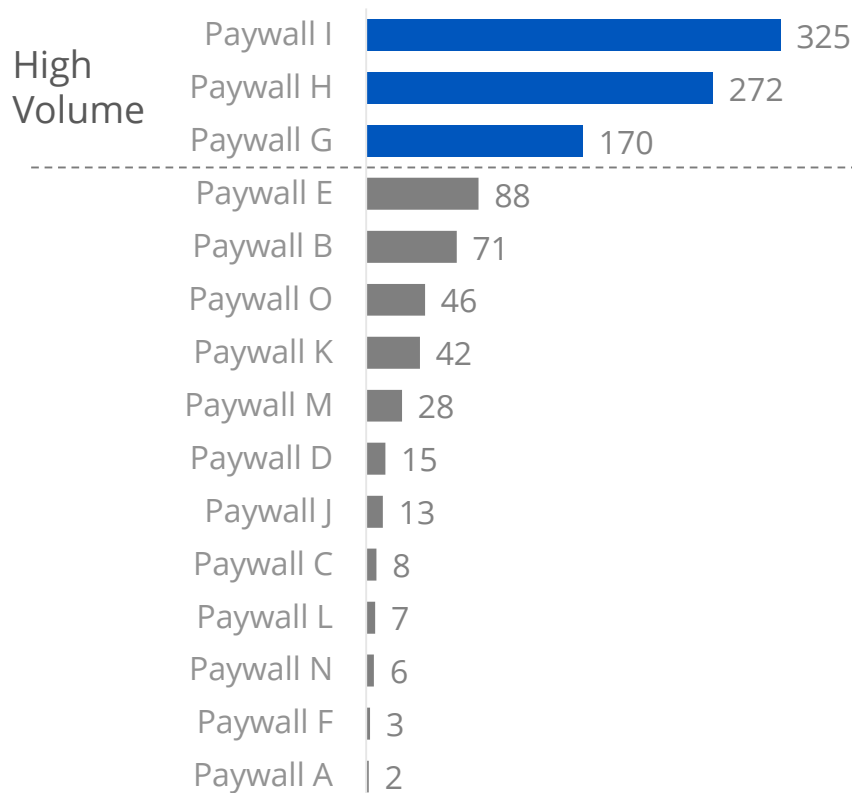7.0%
6.8%
6.5%
6.3%
6.0%

Jan-13 Feb-13 Mar-13

Exploratory

Conversion Rates

Revenue Attribution

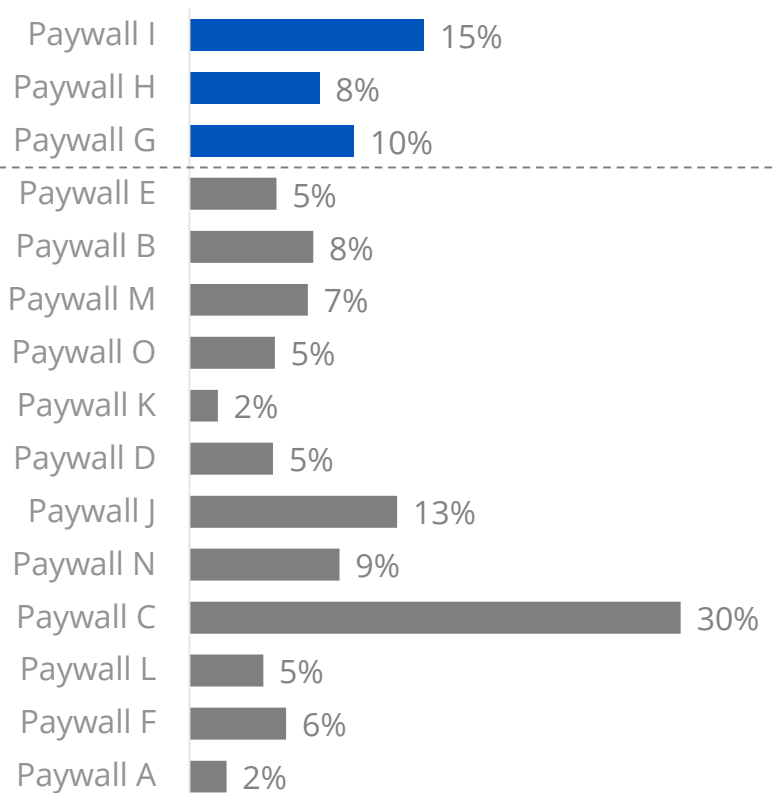# Using the naïve approach of "last paywall wins," Paywalls I, H and G have the best rates with volume

Counts of Last Paywall Seen by Converted Customers

For paywalls seen before first payment date

Conversion Rate of Last Paywall

Count of Last Paywall of Paid Registrants / Count of Last Paywall of All Registrants; For paywalls seen before first payment date

High Volume

Paywall	Count
Paywall I	325
Paywall H	272
Paywall G	170
Paywall E	88
Paywall B	71
Paywall O	46
Paywall K	42
Paywall M	28
Paywall D	15
Paywall J	13
Paywall C	8
Paywall L	7
Paywall N	6
Paywall F	3
Paywall A	2

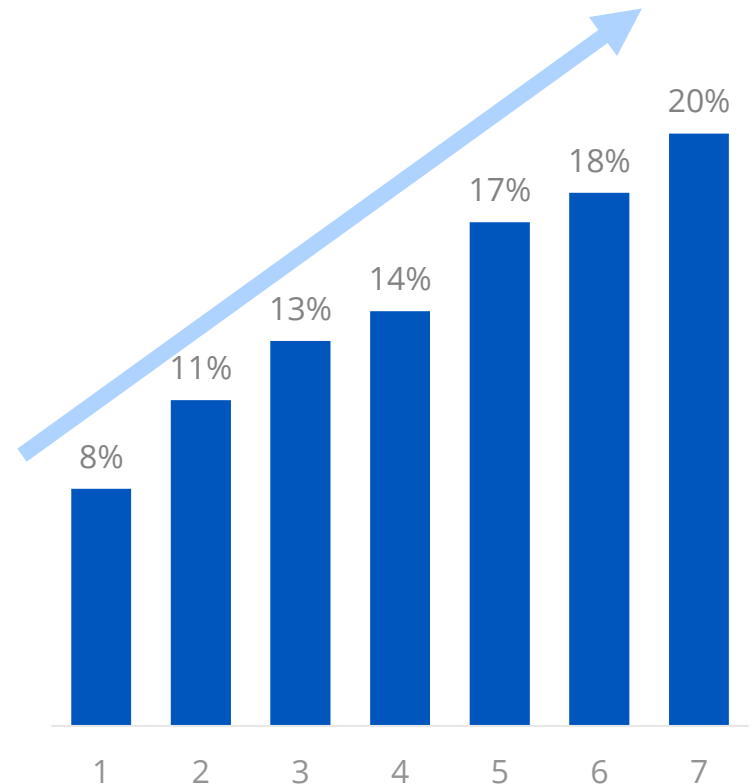| Paywall	Conversion Rate
Paywall I	15%
Paywall H	8%
Paywall G	10%
Paywall E	5%
Paywall B	8%
Paywall M	7%
Paywall O	5%
Paywall K	2%
Paywall D	5%
Paywall J	13%
Paywall N	9%
Paywall C	30%
Paywall L	5%
Paywall F	6%
Paywall A	2%

However, the quantity of paywalls a customer sees is a factor as the conversion rates grow with more paywalls

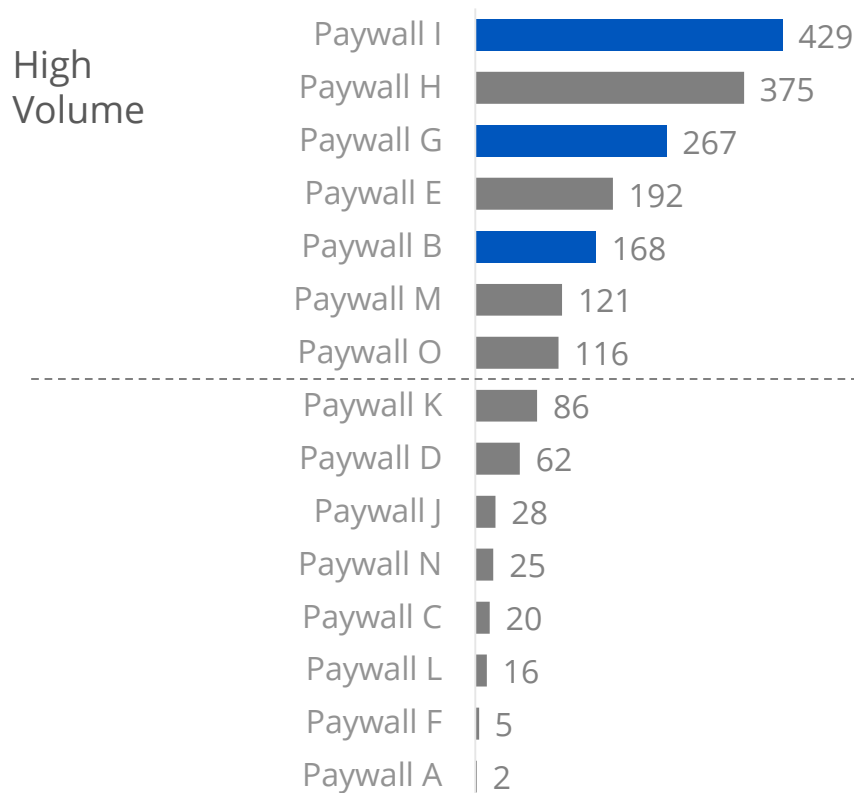## Distribution of Number of Paywalls Seen Before Converting
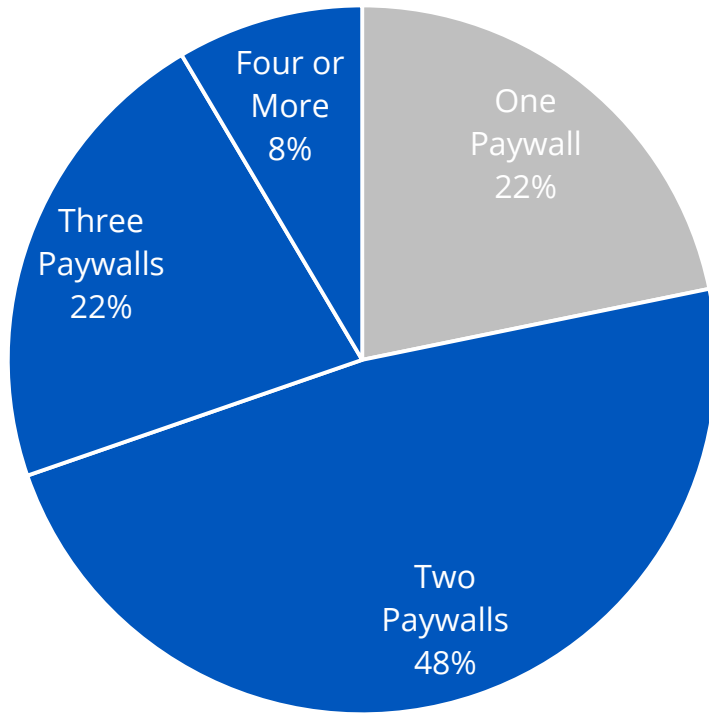
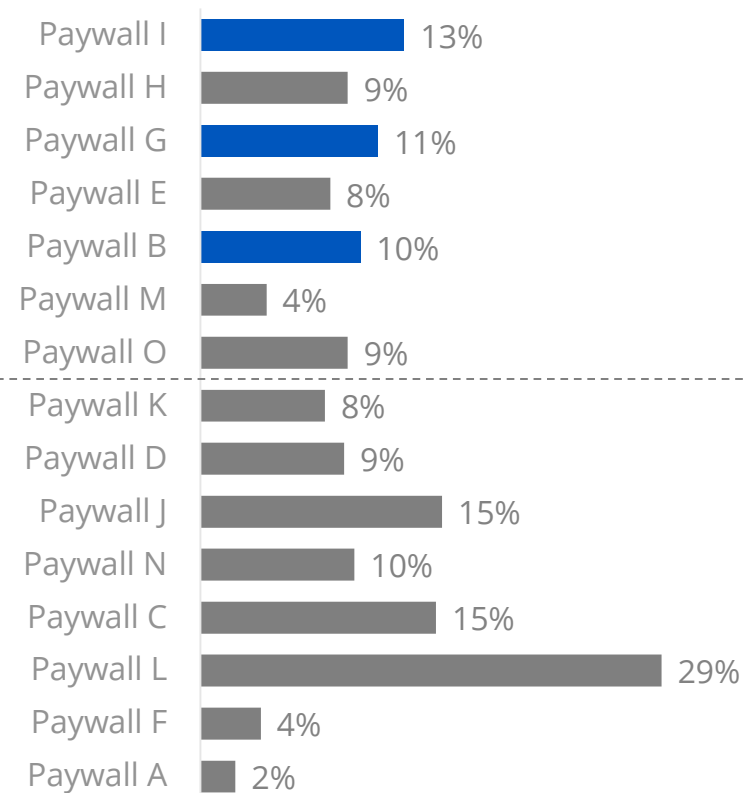## Conversion Rate by Number of Paywalls Seen

A slightly less naïve approach uses all paywalls seen by the registrant

Counts of All Paywall Seen by Converted Customers

Conversion Rate of All Paywalls
Count of Converted Customers that Saw Paywall / Count of Times Paywall Seen

High Volume

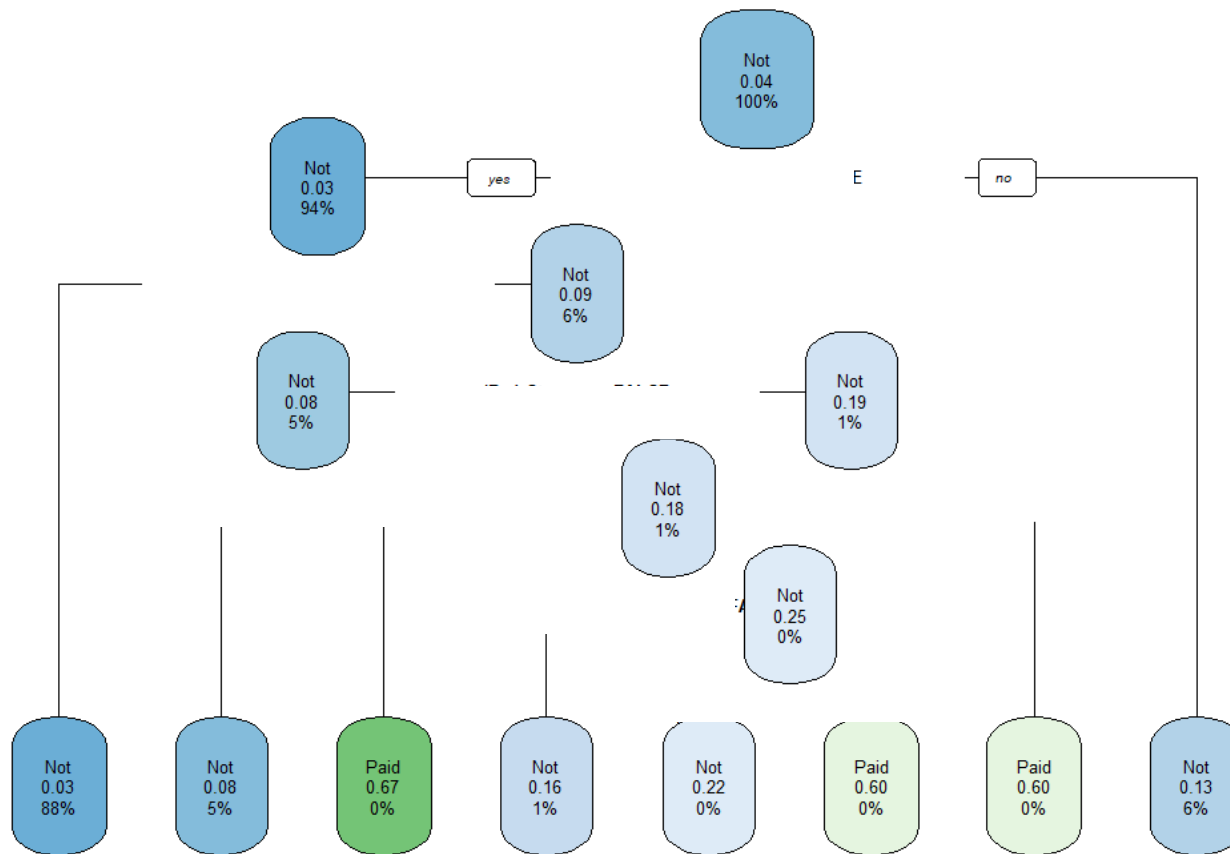| Paywall	Count		Paywall	Conversion Rate
Paywall I	429		Paywall I	13%
Paywall H	375		Paywall H	9%
Paywall G	267		Paywall G	11%
Paywall E	192		Paywall E	8%
Paywall B	168		Paywall B	10%
Paywall M	121		Paywall M	4%
Paywall O	116		Paywall O	9%
Paywall K	86		Paywall K	8%
Paywall D	62		Paywall D	9%
Paywall J	28		Paywall J	15%
Paywall N	25		Paywall N	10%
Paywall C	20		Paywall C	15%
Paywall L	16		Paywall L	29%
Paywall F	5		Paywall F	4%
Paywall A	2		Paywall A	2%

A more advanced approach is to use modelling to determine the best combination of paywalls

Decision Tree on Whether the Paywall Leads to Payment

Traversing right means the paywall was seen; Green means higher conversion rate; Order of paywalls seen not included

Best Combination of Paywalls

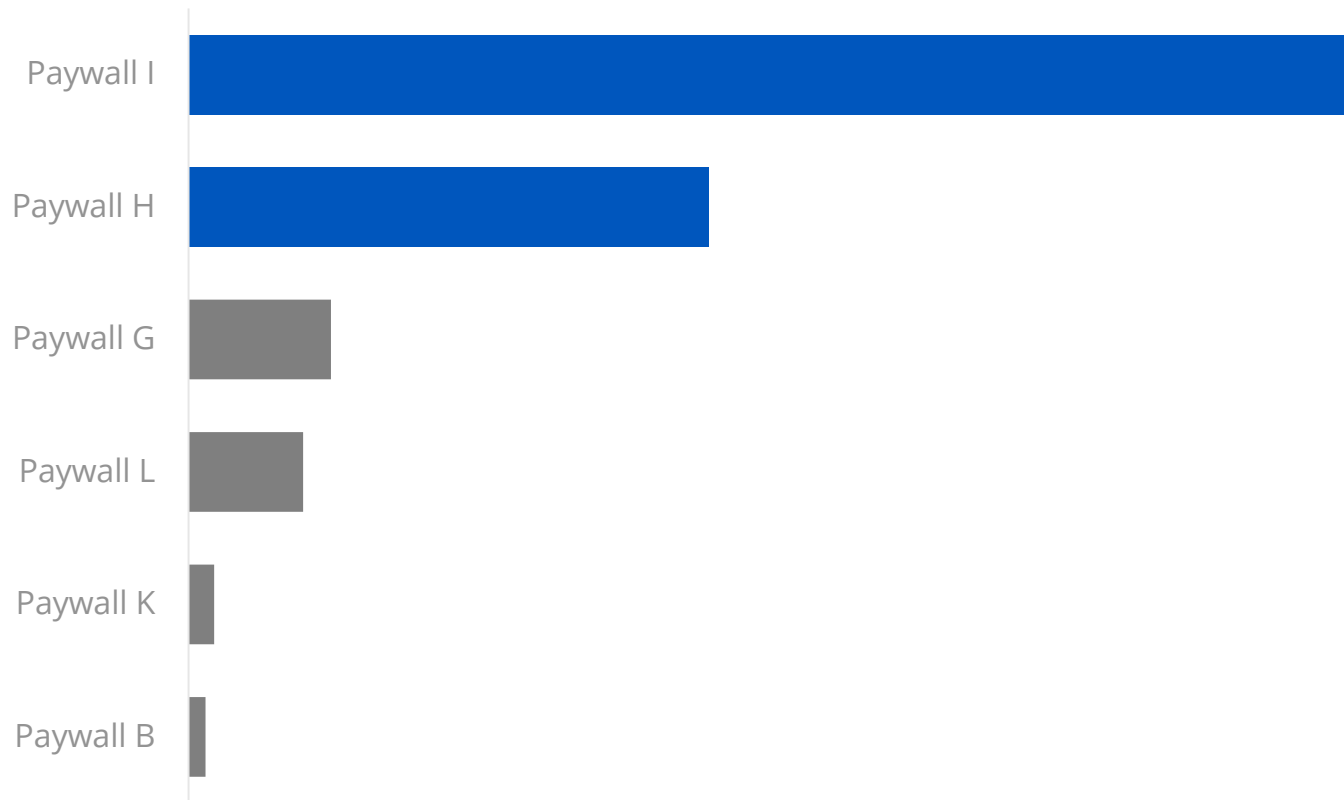### Paywall Seen
- Paywall L
- Paywall B

Paywalls **NOT** Seen:
- Paywall I
- Paywall G

Using a predictive decision tree, we can see how much each paywall *influences* conversion rate

Mathematical Importance of Each Variable in Decision Tree

Scale irrelevant; Increased importance means increased influence (positive and negative) in model

Exploratory

Conversion Rates

Revenue Attribution

Page Limit, PDF and Storage account for the most revenue using the "last payment wins" method

Allocating Revenue to the Last Paywall

For paywalls seen before first payment date

Paywall	Revenue
Paywall I	$10,520
Paywall H	$9,893
Paywall G	$7,299
Paywall E	$4,661
Paywall B	$4,655
Paywall O	$2,944
Paywall K	$2,486
Paywall M	$1,167
Paywall C	$940
Paywall J	$830
Paywall D	$517
Paywall L	$436
Paywall N	$332
Paywall F	$316
Paywall A	$205
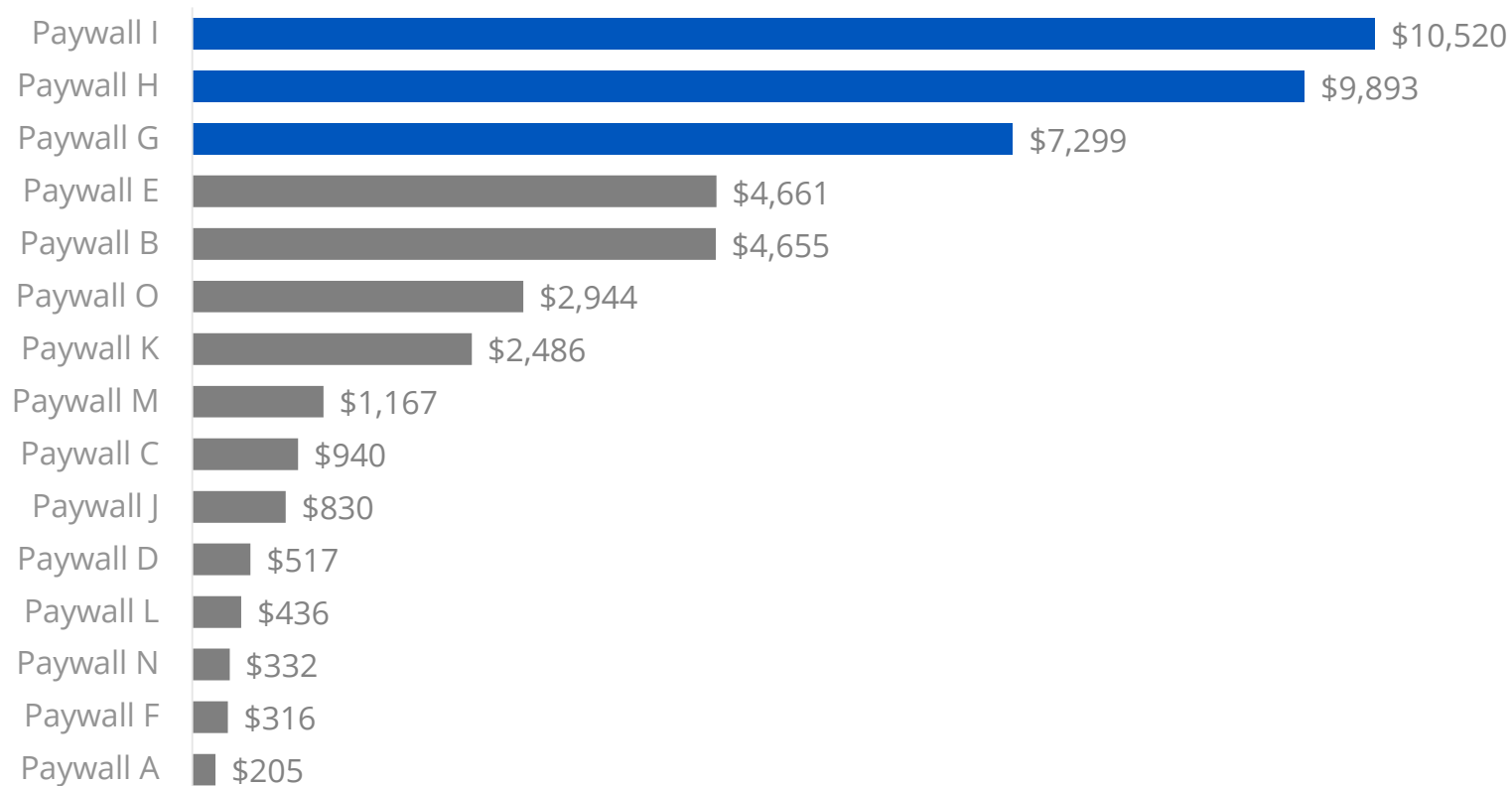
If we attribute equal portion of revenue to each paywall seen, Page Limit and PDF bring in the most

Allocating Revenue to Every Paywall Seen
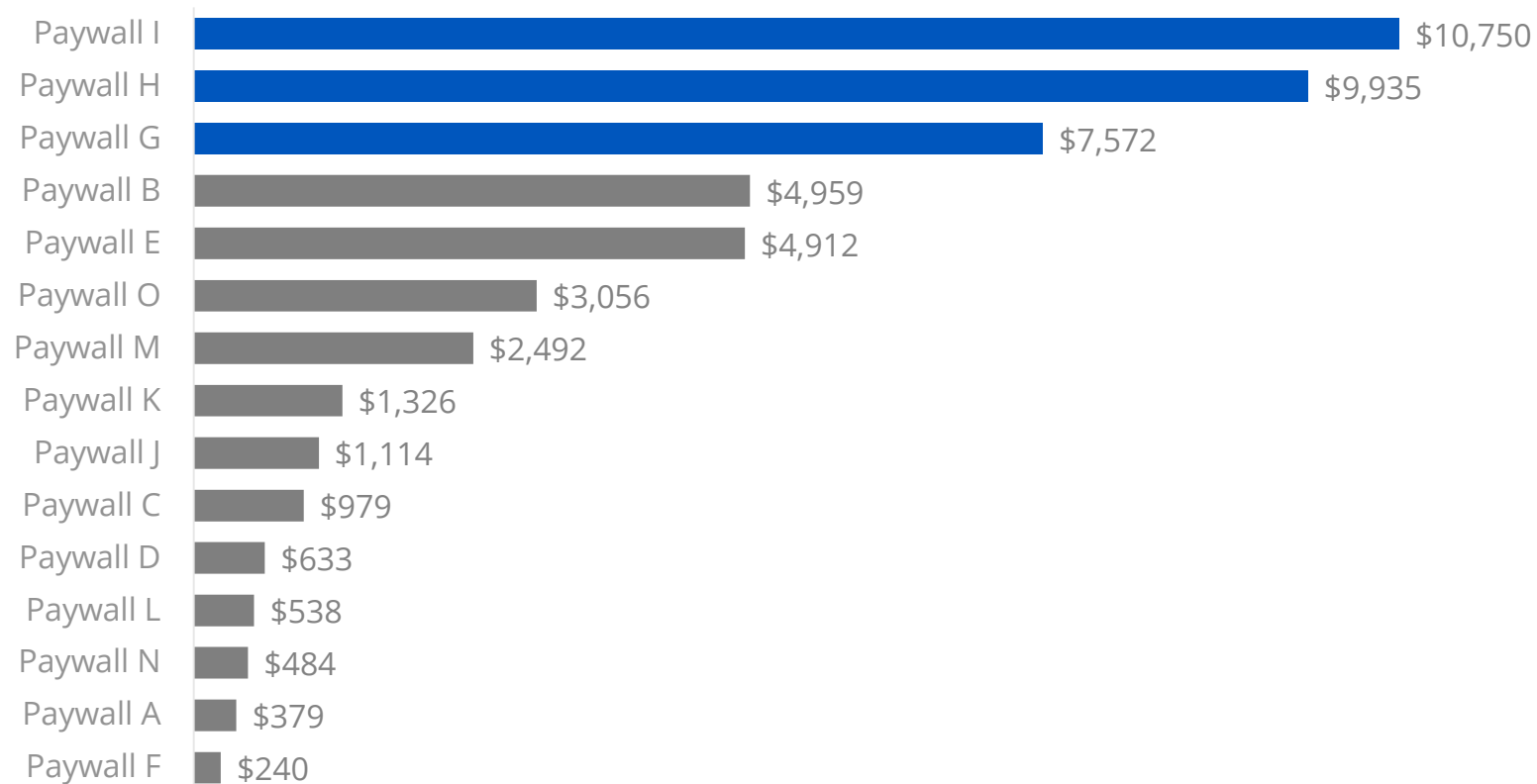
For paywalls seen before first payment date

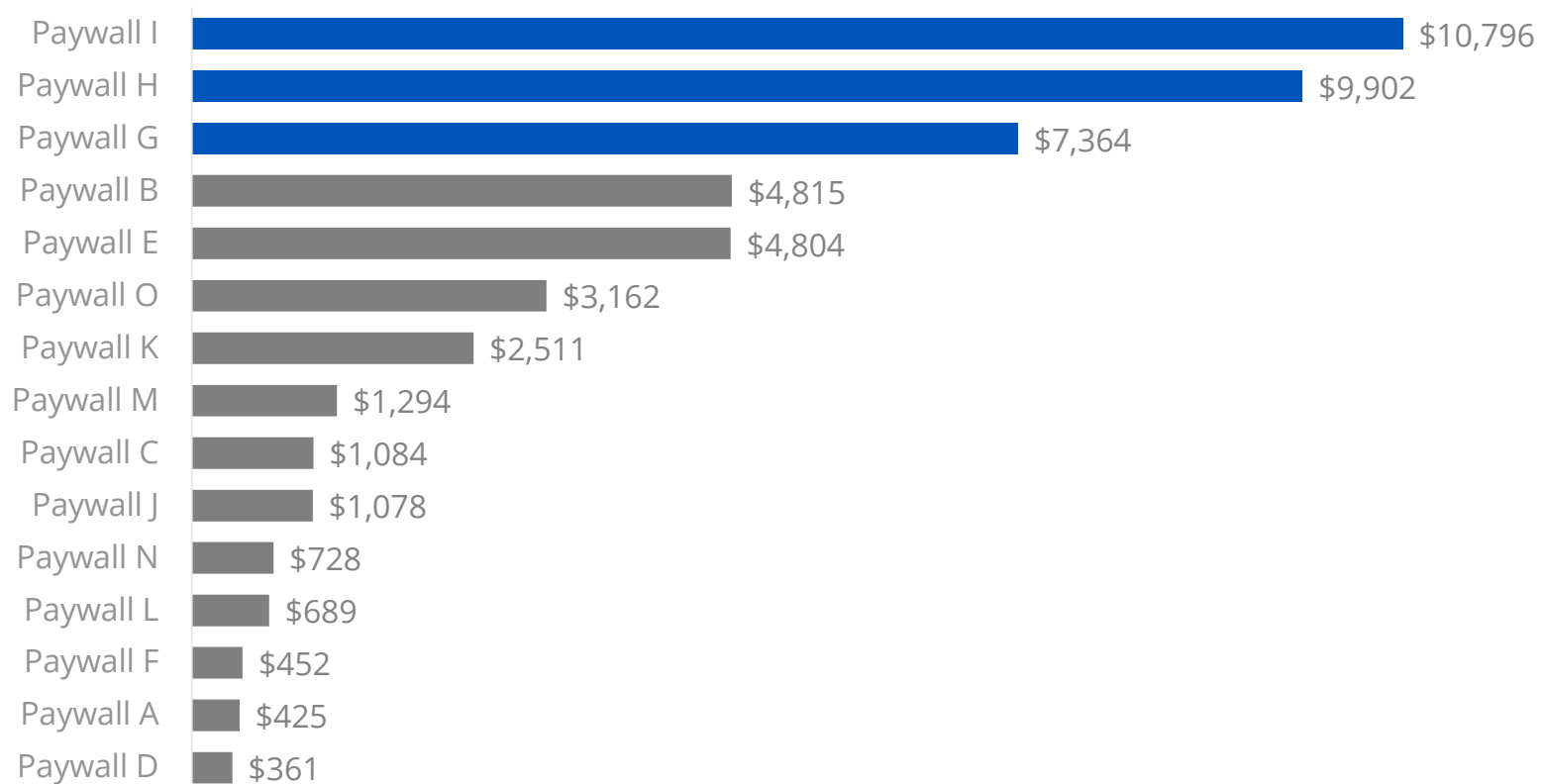| Paywall	Revenue
Paywall I	$10,750
Paywall H	$9,935
Paywall G	$7,572
Paywall B	$4,959
Paywall E	$4,912
Paywall O	$3,056
Paywall M	$2,492
Paywall K	$1,326
Paywall J	$1,114
Paywall C	$979
Paywall D	$633
Paywall L	$538
Paywall N	$484
Paywall A	$379
Paywall F	$240

Giving more weight to the last paywalls seen, Page Limit, PDF and Storage account for the most revenue

Time Weighting Revenue Across Paywalls

For paywalls seen before first payment date

Paywall	Revenue
Paywall I	$10,796
Paywall H	$9,902
Paywall G	$7,364
Paywall B	$4,815
Paywall E	$4,804
Paywall O	$3,162
Paywall K	$2,511
Paywall M	$1,294
Paywall C	$1,084
Paywall J	$1,078
Paywall N	$728
Paywall L	$689
Paywall F	$452
Paywall A	$425
Paywall D	$361

All three weighting methods confirm each other on the most important attributes

Illustration of Different Methods

Most Revenue Attributed

"Last Paywall Wins"

$10 — $10

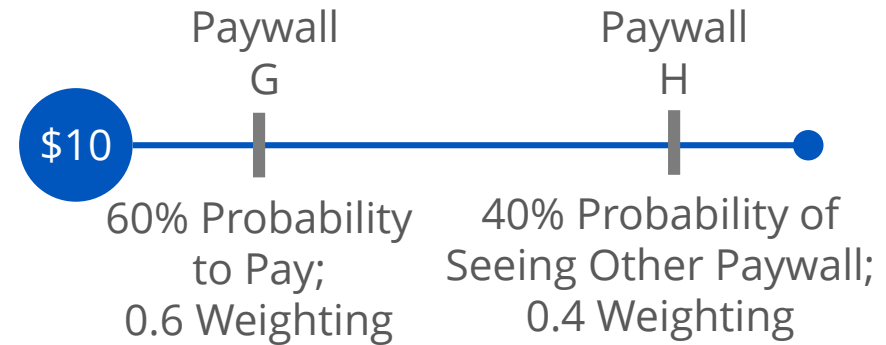- Paywall I
- Paywall H
- Paywall G

"Equal Paywall Weightings"

$3.33 — $3.33 — $3.33 — $10

- Paywall I
- Paywall H
- Paywall G

"Time Weighted Paywalls"

0.1 Weight $0.66 — 0.5 Weight $3.33 — 0.9 Weight $6 — $10

- Paywall I
- Paywall H
- Paywall G

Registration Date
Feb 14, 2013

7 Days

First Payment Date
Feb 21, 2013
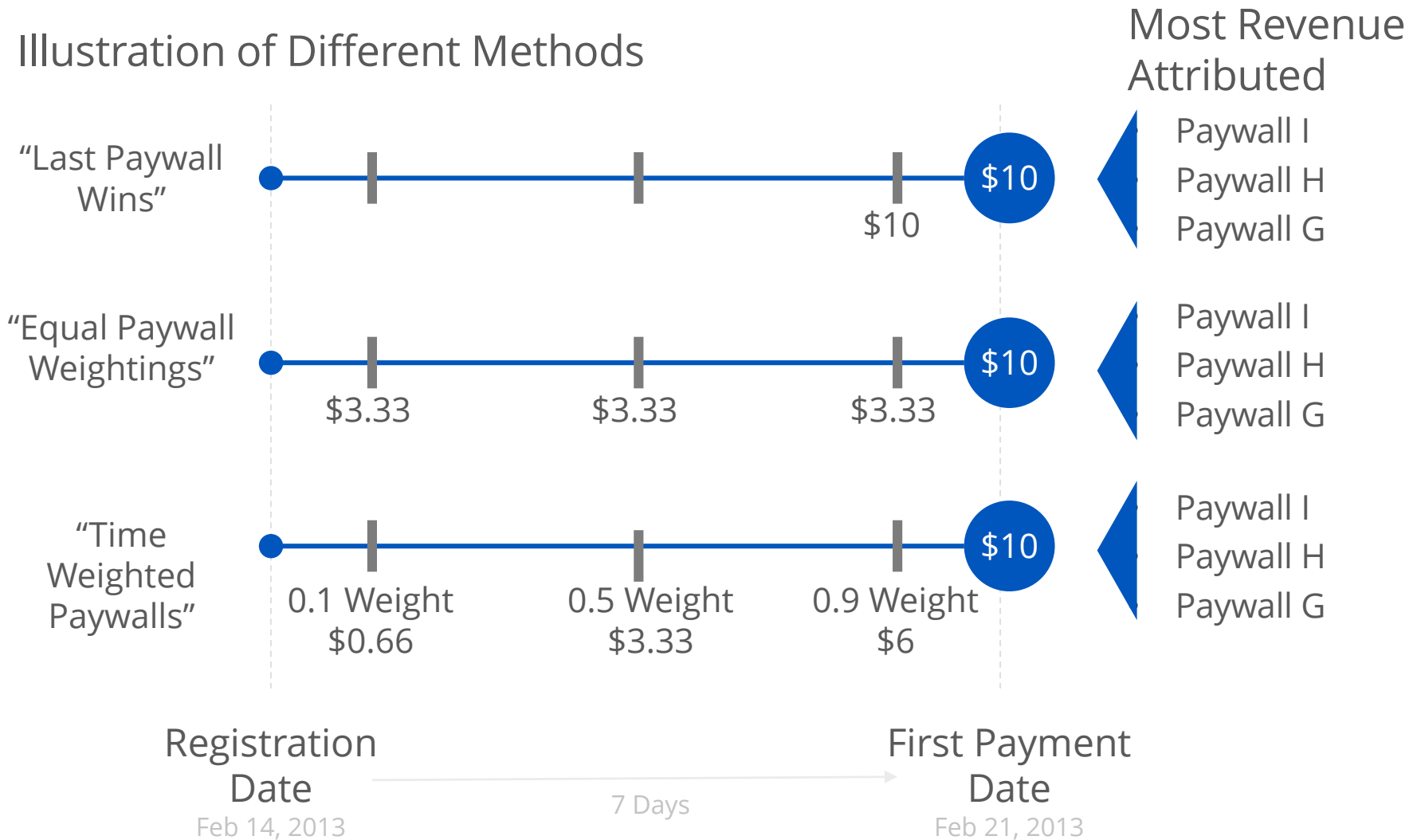
Markov Chains would be able to account for the order in which each paywall is seen and weight accordingly

P(x) = 60%
P(x) = 30%
P(x) = 10%

I
H
G

P(x) = 50% → Register
P(x) = 50% → Another Paywall
P(x) = 60% → Register
P(x) = 40% → Another Paywall
P(x) = 60% → Register
P(x) = 40% → Another Paywall

Pay

$10

Paywall G

Paywall H

60% Probability to Pay;
0.6 Weighting

40% Probability of Seeing Other Paywall;
0.4 Weighting
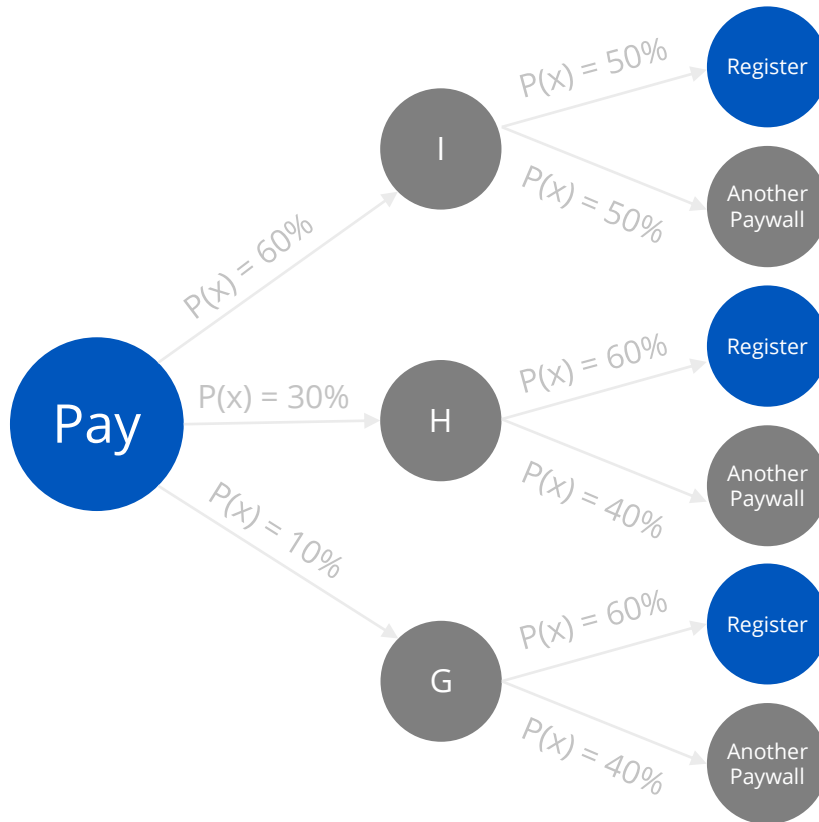
Paywall probabilities would work in reverse chronological order: "Payment" being the initial state and "Registration" being the final state

Exploring combinations, more paywalls does not necessarily translate into a higher first payment

Average First Payment Amount for Combinations
of Top Paywalls

Category	Amount
None of Them	$61
Paywall I Only	$44
Paywall I & Pawall G	$39
Paywall H & Pawall G	$37
Pwayll H Only	$37
Paywall I & Pawall H	$35
Paywall H Only	$32
All Three	$28