

Supplementary Material

Supplementary Table S1. Hard-anchor intervals used in the piecewise daily inventory reconstruction. Residual correction indicates how far the raw event-history path missed the next supplied anchor before interval-specific correction was applied.

Interval start	Interval end	Start count	End count	Residual correction
2020-12-31	2021-03-31	3	6	6.0
2021-03-31	2021-04-30	6	6	3.0
2021-04-30	2021-12-31	6	7	0.0
2021-12-31	2022-06-30	7	13	5.0
2022-06-30	2022-12-31	13	15	0.0
2022-12-31	2023-06-30	15	12	1.0
2023-06-30	2023-12-31	12	31	5.0
2023-12-31	2024-05-02	31	28	8.0
2024-05-02	2024-12-31	28	21	-3.0
2024-12-31	2025-04-30	21	12	3.0

Supplementary Table S2. Raw vs anchored census sensitivity (Results). The anchored series uses the piecewise reconstruction defined in the Data and Methods sections; the raw series uses the event-history net flow without anchor correction. Differences between specifications are negligible

Model term	Anchored series (main)	Raw event-history series
Step 1 census OR (per +10 dogs)	2.52 (1.66 – 3.84)	2.50 (1.61 – 3.87)
Step 1 promotion OR	3.30 (1.86-5.88)	3.49 *1.94 – 6.28)
Step 2 promotion IRR	1.14 (0.96-1.36)	1.16 (0.96 – 1.40)

Supplementary Table S3. Zero-truncated Poisson sensitivity for the second-stage conditional placement-count model. The zero-truncated specification formally accounts for positive-count restriction in the conditional model; the point estimate for promotion day is larger under the zero-truncated Poisson, but the wider confidence interval still contains 1.

Specification	Promotion-day IRR (95% CI)	p
Standard Poisson with offset	1.14 (0.96 – 1.36)	0.124
Zero-truncated Poisson with offset	1.68 (0.83 – 3.43)	0.151

Supplementary Table S4. Ljung-Box test for residual autocorrelation in the two operations-model stages. The first-stage model shows no detectable autocorrelation at lags 7, 14 or 28. We interpret the second stage estimates conservatively.

Stage	Lag	Ljung-Box Q	p	Decision at $\alpha = 0.05$
Step 1 (any-placement logistic)	7	3.37	0.848	No detectable autocorrelation
Step 1	14	12.16	0.593	No detectable autocorrelation
Step 1	28	25.83	0.583	No detectable autocorrelation
Step 2 (conditional Poisson)	7	13.33	0.064	Borderline
Step 2	14	31.20	0.005	Autocorrelation detected
Step 2	28	52.45	0.003	Autocorrelation detected

Supplementary Table S5. Firth-penalized return-model sensitivity. Estimates use a custom Firth implementation with Wald confidence intervals. The penalization correction makes essentially no difference to the conclusions, which suggests that small-sample bias in the unpenalized model is modest in this dataset.

Predictor	Unpenalized OR (95% CI)	Firth-penalized OR (95% CI)
Discount-coded adoption	1.98 (0.76-5.13)	2.03 (0.76 – 5.01)
Age (per year)	1.00 (0.84-1.18)	1.00 (0.85 – 1.18)
Length of stay (per 10 days)	0.85 (0.68-1.06)	0.89 (0.68-1.02)

Supplementary Table S6. Dog-level sensitivity model for observed 7-day return after first adoption.

Predictor	OR (95% CI)	p
Discount-coded adoption	1.88 (0.70-5.06)	0.209
Age (per year)	0.98 (0.83-1.17)	0.859
Male (vs. female)	1.79 (0.71-4.49)	0.217
Stray intake (vs. surrender/other)	0.62 (0.24-1.60)	0.321

Predictor	OR (95% CI)	p
Foster history (yes vs. no)	1.57 (0.46-5.33)	0.469
Length of stay (per 10 days)	0.84 (0.66-1.05)	0.129

Supplementary Table S7. Clustered all-adoption sensitivity model for observed 7-day return. Standard errors are clustered at the dog level.

Predictor	OR (95% CI)	p
Discount-coded adoption	1.81 (0.76-4.32)	0.182
Age (per year)	1.01 (0.85-1.20)	0.896
Length of stay (per 10 days)	0.77 (0.46-1.30)	0.323

Supplementary Table S8. Observed 7-day return rates by adoption year and discount coding.

Year	Fee coding	Adoptions	7-day return rate
2019	Not discount coded	199	0.0%
2020	Not discount coded	203	0.0%
2021	Discount coded	15	0.0%
2021	Not discount coded	103	1.9%
2022	Discount coded	60	5.0%
2022	Not discount coded	52	9.6%
2023	Discount coded	25	0.0%
2023	Not discount coded	102	2.9%
2024	Discount coded	109	3.7%
2024	Not discount coded	94	1.1%
2025	Discount coded	5	0.0%
2025	Not discount coded	47	6.4%

Supplementary Table S9. Repeat-return descriptives. A repeat-return regression was not estimated because only one eligible dog experienced two or more observed return episodes.

Eligible group	Dogs	Dogs with 2+ observed return episodes
Dogs with at least 2 recorded adoptions	50	1

Supplementary Table S10. Placement-day placements and start-of-day dog count by promotion grouping.

Promotion grouping	Placement days	Total placements	Mean census	Mean placements/day
Both free and reduced	62	82	19.7	1.32
Free promotion	26	42	27.7	1.62
No promotion	358	512	20.0	1.43
Reduced promotion	44	60	24.4	1.36

Supplementary Table S11. Promotion $\times$ census interaction (first-stage logistic). No detectable interaction: promotion-day association does not vary substantially by start-of-day census in these data.

Term	OR (95% CI)	<i>p</i>
Inventory (+10 dogs) x promotion day	2.33 (0.97 – 5.56)	0.057

Supplementary Table S12. Same-day adoption-level discount share on promotion and non-promotion placement days.

Placement-day group	Days	Archive adoptions	Discount-coded adoptions	Mean discount share
No promotion	358	500	109	19.6%
Promotion day	132	184	146	79.4%

Supplementary Table S13. Alignment between calendar-based promotion timing and adoption-level discount coding.

Sample	Calendar timing	Adoption-level discount flag	N
7-day first-adoption sample	No promotion	Discount coded	92
7-day first-adoption sample	No promotion	Not discount coded	732
7-day first-adoption sample	Promotion day	Discount coded	122
7-day first-adoption sample	Promotion day	Not discount coded	68
Full adoption archive	No promotion	Discount coded	109
Full adoption archive	No promotion	Not discount coded	772
Full adoption archive	Promotion day	Discount coded	146
Full adoption archive	Promotion day	Not discount coded	71

Supplementary Table S14. Confirmed promotion-window descriptives 2019-2025. Windows are runs of consecutive calendar dates flagged in the shelter-verified promotion calendar. Fee-type combinations reflect the types active during the window.

Promotion-calendar feature	Value
Total promotion days, 2019-2025	451
Distinct promotion windows	39
Median window length (days)	2
Mean window length (days)	11.6
Maximum window length (days)	33
Single-day windows	17
Windows of 7+ days	11
Windows by fee type: Free/ Reduced/Combine both fee types	16/10/13
Windows by year: 2019/ 2020/2021 / 2022/ 2023/ 2024 /2025	3/0/1/17/10/4/4

Supplementary Table S15. Placement-model sensitivity to excluding January-March 2021, when day-level timing is weaker. Estimates are essentially identical across the two windows, indicating that the placement side results are not driven by the weaker early segment of the series.

Model term	Main Window (2021-01-01 to 2025-04-30)	Excluding Jan-Mar 2021
Step 1 census OR (per +10 dogs)	2.52 (1.66 – 3.84)	2.58 (1.63 – 4.08)

Model term	Main Window (2021-01-01 to 2025-04-30)	Excluding Jan-Mar 2021
Step 1 promotion OR	3.30 (1.86-5.88)	3.30 (1.85 -5.87)
Step 2 promotion IRR	1.14 (0.96-1.36)	1.15 (0.97-1.36)

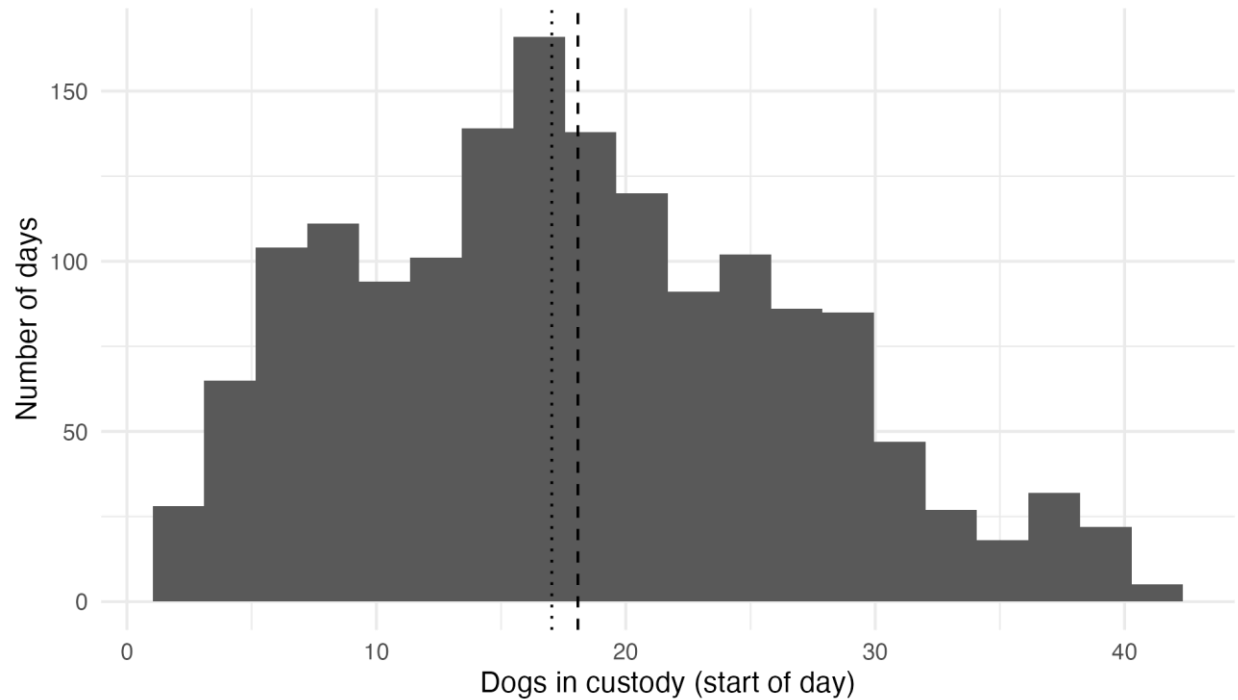
Supplementary Table S16. Coverage of free-text fields used for descriptive parsing in the 7-day return sample.

Field	Nonblank responses	Share of 7-day sample	Median length
Q3	140	13.8%	21
Q8	0	0.0%	--
Q9	131	12.9%	36
Q10	0	0.0%	--
Any text (combined)	219	21.6%	36

Supplementary Table S17. Comparison of first-adoption records included in the parsed-household subset with those excluded from it.

Subset	N	Return rate	Mean age	Mean LOS	Promo share	Discount share
Excluded from parsed-household subset	590	0.8%	6.99	39.3	12.0%	11.5%
Included in parsed-household subset	424	3.8%	4.64	28.1	28.1%	34.4%

Supplementary Figure S1. Distribution of the start-of-day on-site dog count in the January 2021 through April 2025 operations window. Dashed and dotted vertical lines mark the mean and median. The distribution is right-skewed with a modest tail above 30 dogs, consistent with the anchor-verified population range (3-31; Supplementary Table S1) plus the ordinary within-interval variation described in the Data and Methods.



Supplementary Figure S2. Raw event-history inventory path, anchored inventory path, and observed anchor counts used in the daily reconstruction. The anchored series follows the event-history path within each interval while applying a small interval-specific correction so that adjacent observed anchor counts are matched exactly. Periods where the anchored and raw paths diverge modestly reflect these same within-interval corrections, quantified in Supplementary Table S1.



Supplementary Figure S3. Monthly share of adoptions coded as discounted in the full adoption archive.

