

Bayesian Pattern Recognition & Forecasting (MH)

Store: testville_002

Target: avg_retention_rate

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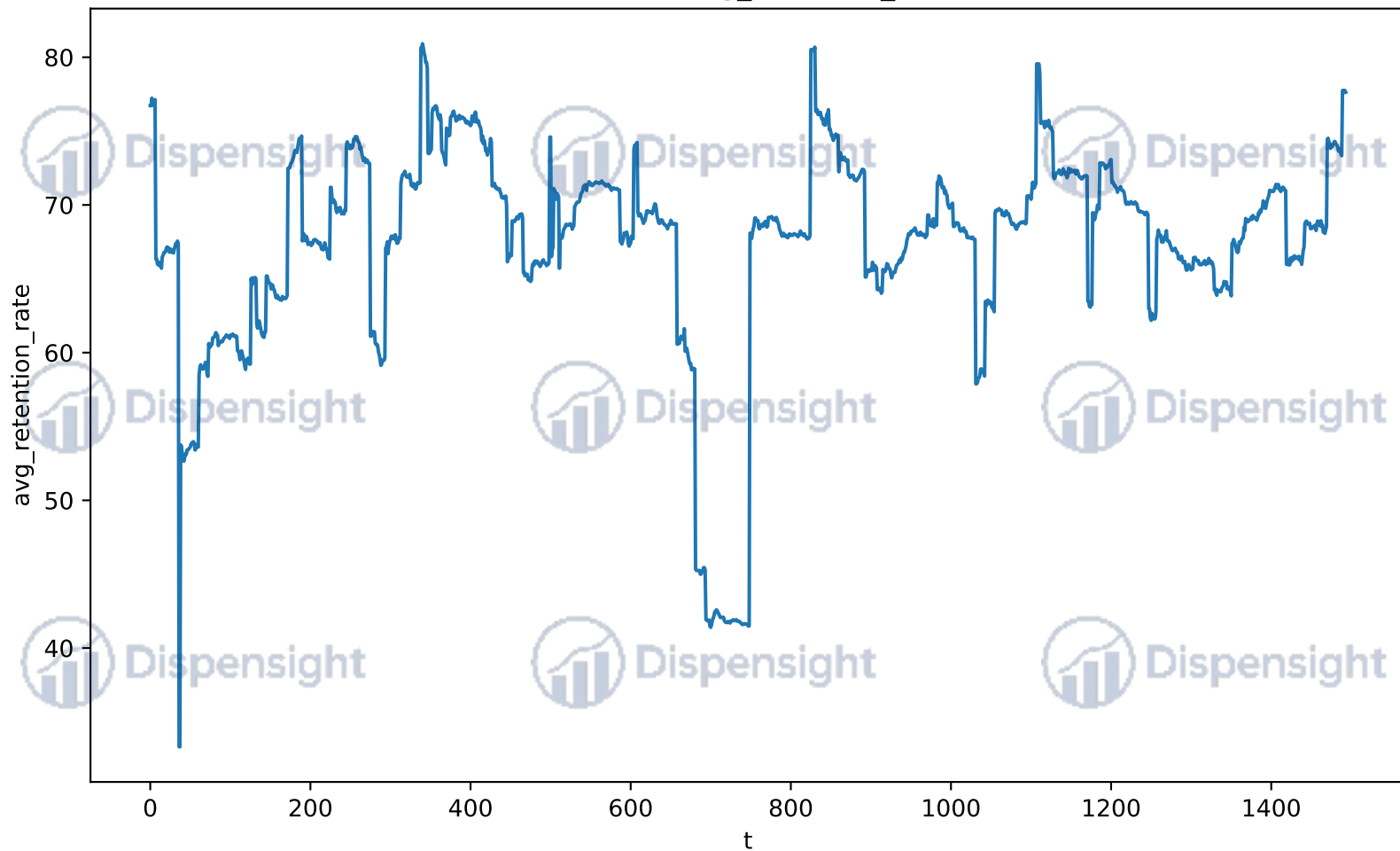
MH Accept Rate: 0.020

Metric	Value
total_sales	1,551.930
total_transactions	38.000
avg_retention_rate	77.630
avg_upt	1.645
avg_basket_size	41.785
avg_sales_per_hour	48.498
top_performer_sales	437.440
performance_variance	50.068
team_performance_score	44.844

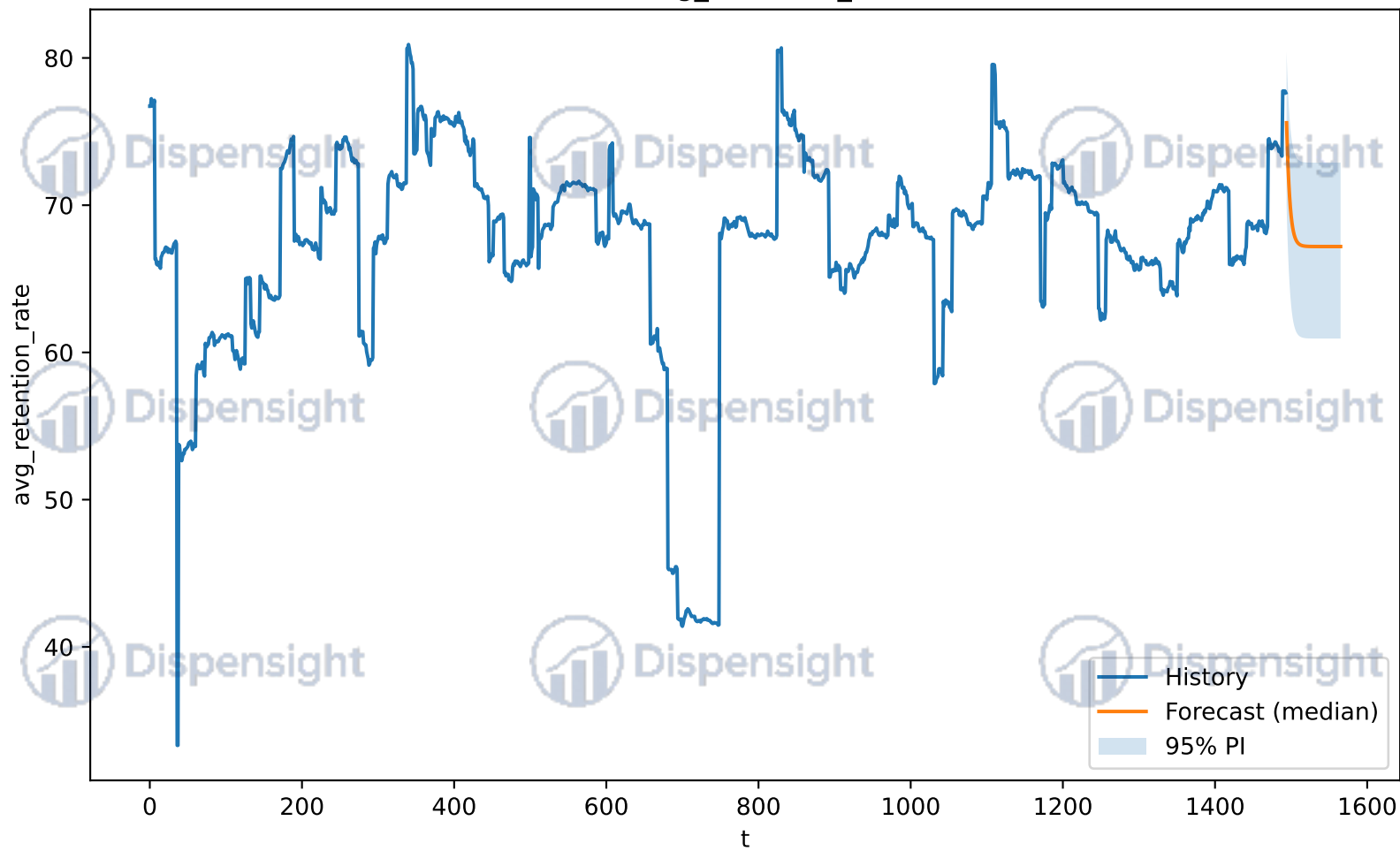
Model Summary (wrapped)

Store: testville_002 Target: avg_retention_rate Engine: MH (accept rate: 0.020) Enabled coefficients: transactions, sales, upt, avg_basket, retention, avg_sales_per_hour, top_performer_sales, performance_variance, team_performance_score Bayesian regression on transformed target: $y_t^* \sim \text{Intercept} + \phi \cdot y_{(t-1)}^* + \text{exogenous}$ Posterior means ($\pm 1\sigma$): Intercept: 0.1542 ± 0.0490 avg_retention_rate_lag (trans): 0.7848 ± 0.0681 log1p_tx (z): -0.2206 ± 0.0389 log_sales (z): 0.1287 ± 0.0683 avg_upt (z): -0.0291 ± 0.0184 avg_sales_per_hour_log (z): -0.1996 ± 0.0573 top_performer_sales_log (z): 0.2192 ± 0.0635 performance_variance_log1p (z): -0.0104 ± 0.0375 team_performance_score_logit (z): 0.0857 ± 0.0273 σ^2 (noise): 0.019141 Pairwise coefficient comparisons (top 5 by $|z|$): avg_retention_rate_lag (trans) vs avg_upt (z): $\Delta=0.8140$ (sd 0.0554), $z=14.686$, $p=0$, $P(i>j)=1.000$ avg_retention_rate_lag (trans) vs log1p_tx (z): $\Delta=1.0054$ (sd 0.0779), $z=12.906$, $p=0$, $P(i>j)=1.000$ avg_retention_rate_lag (trans) vs avg_sales_per_hour_log (z): $\Delta=0.9845$ (sd 0.0849), $z=11.590$, $p=0$, $P(i>j)=1.000$ avg_retention_rate_lag (trans) vs performance_variance_log1p (z): $\Delta=0.7953$ (sd 0.0836), $z=9.518$, $p=0$, $P(i>j)=1.000$ avg_retention_rate_lag (trans) vs team_performance_score_logit (z): $\Delta=0.6992$ (sd 0.0902), $z=7.755$, $p=8.88e-15$, $P(i>j)=1.000$ Fisher information (β) diag (approx): 78001.440, 50279.211, 78001.440, 78001.440, ... BvM approx: $\beta = \text{OLS}$, $\text{Var}(\beta) \approx \sigma^2 (X'X)^{-1}$; $\text{cond}(X'X) = 4221.19$ Anomaly detection (last 50 pts): flagged indices [1469, 1488, 1489, 1464, 1466] with $|z|$ scores [1.515, 0.775, 0.516, 0.433, 0.373]. Forecast horizon: 72 steps ahead (exogenous at baseline).

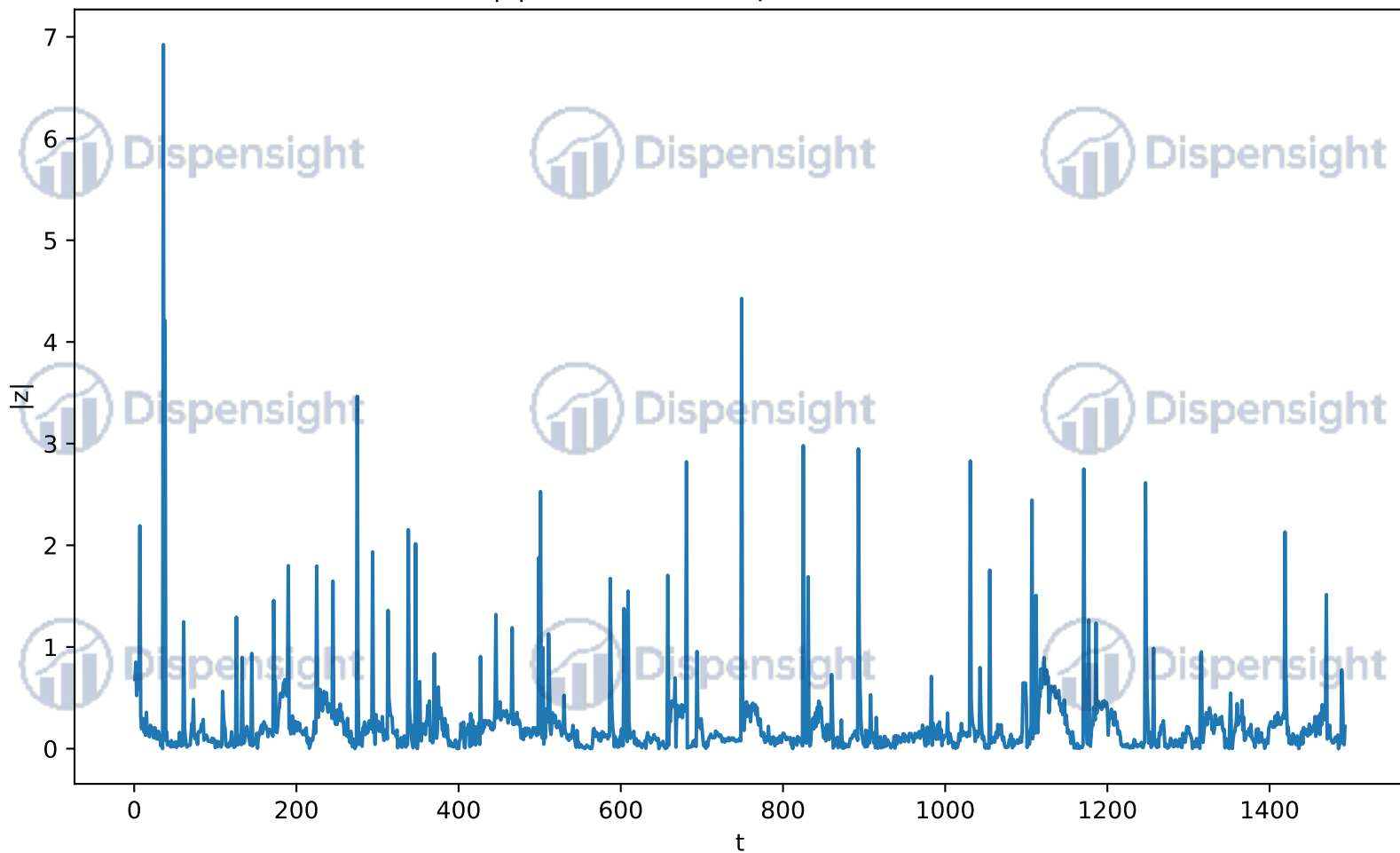
Historical avg_retention_rate



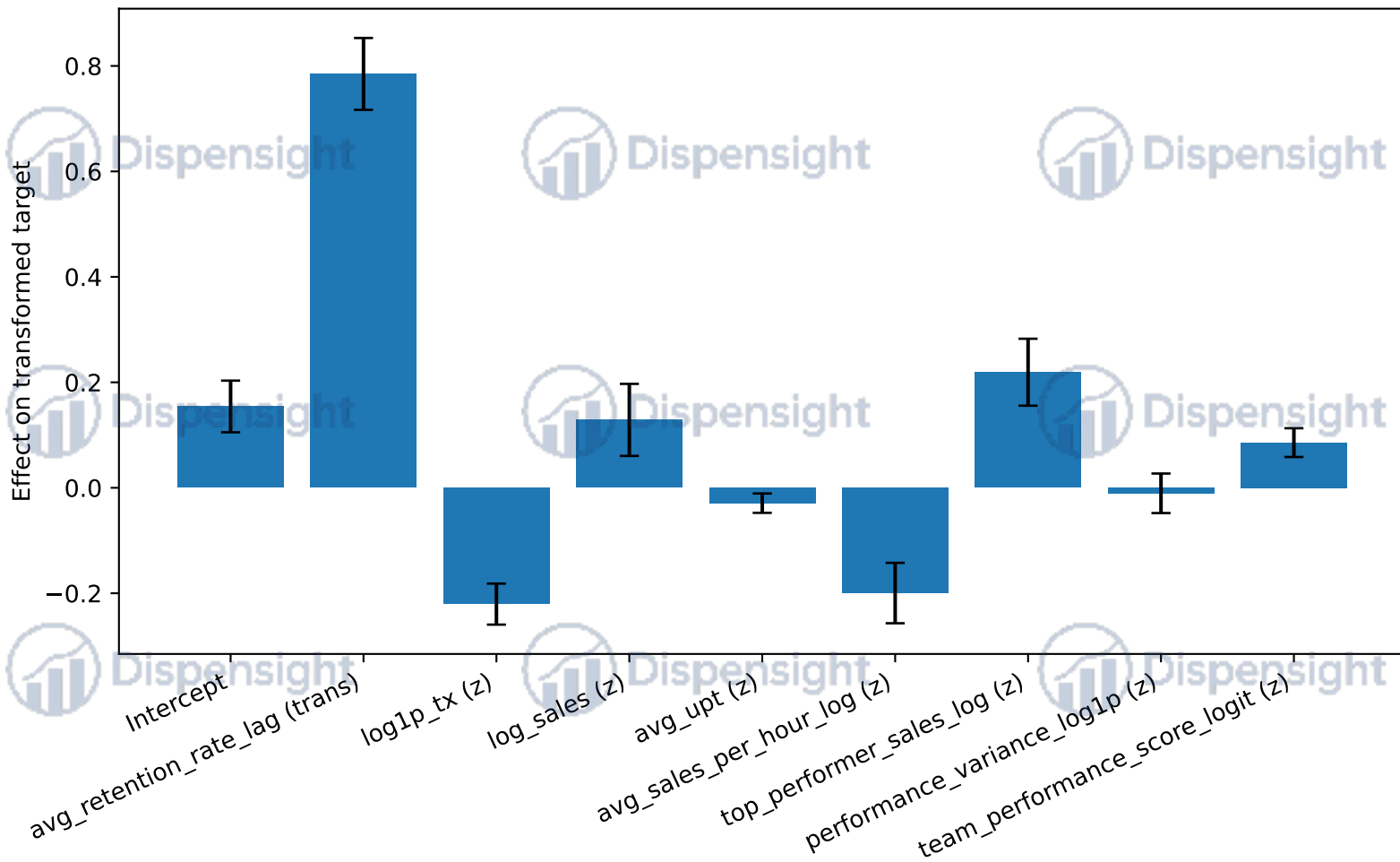
Forecast: avg_retention_rate (MH)

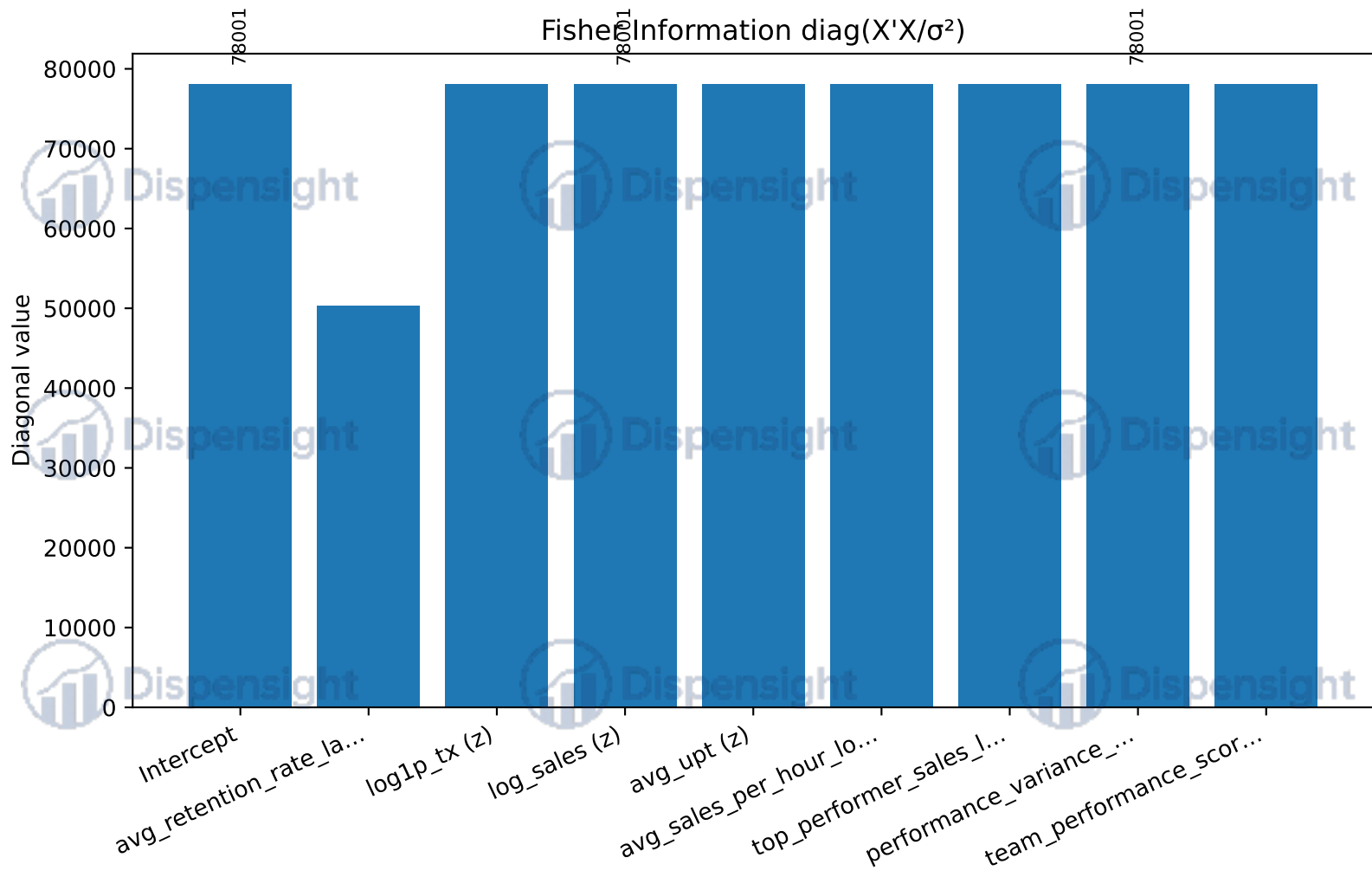


|z|-scores for 1-step residuals (MH)

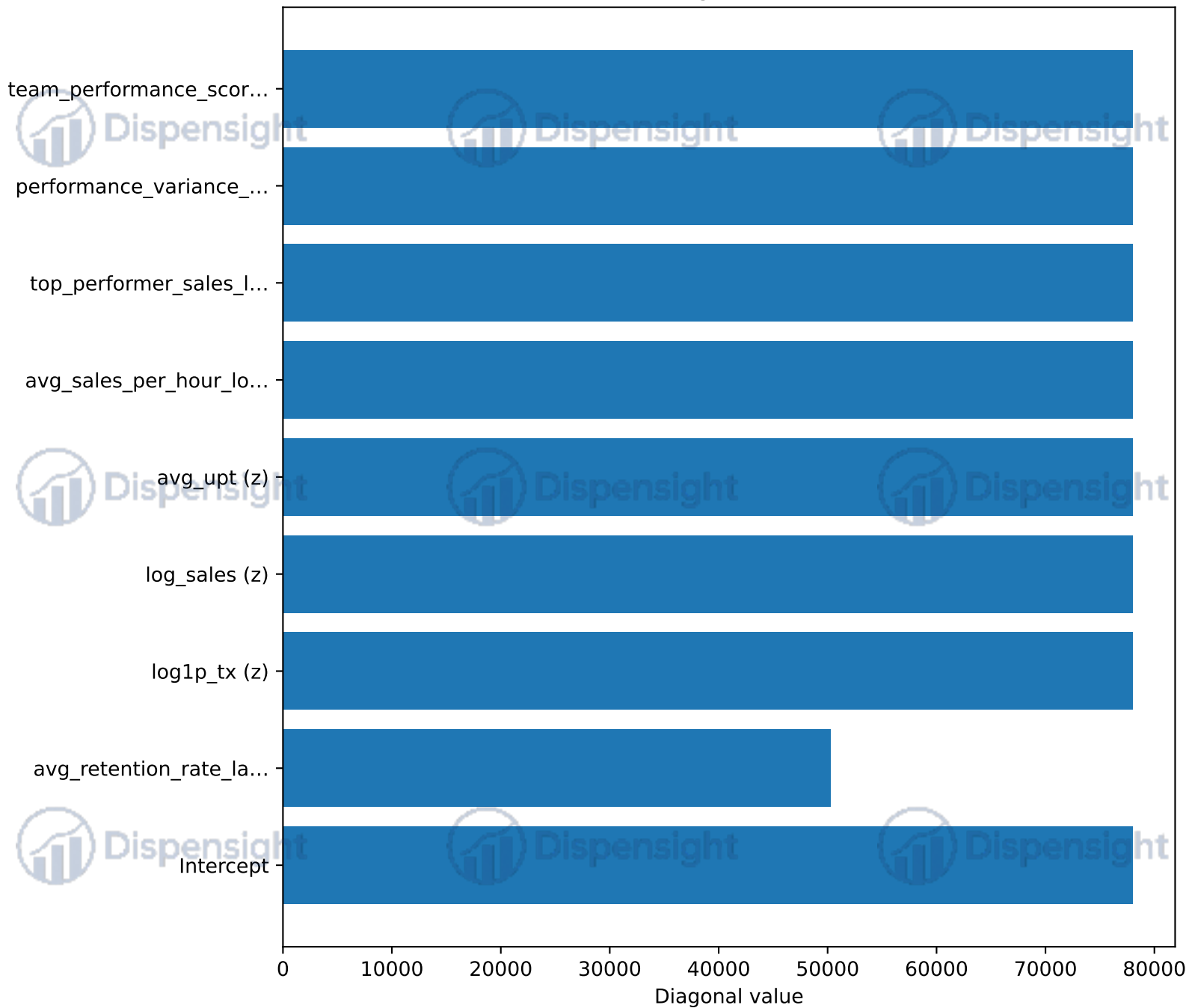


Posterior Coefficients (mean $\pm 1\sigma$) - MH





Fisher Information diag($X'X/\sigma^2$) — horizontal view



Abbreviated Coefficient Names

Used label	Full name
avg_retention_rate_la...	avg_retention_rate_lag (trans)
avg_sales_per_hour_lo...	avg_sales_per_hour_log (z)
top_performer_sales_l...	top_performer_sales_log (z)
performance_variance_...	performance_variance_log1p (z)
team_performance_scor...	team_performance_score_logit (z)

Dispensight

Largest diag entries

Coef	Fisher diag
Intercept	78001.440
performance_variance_log1p	78001.440
log_sales (z)	78001.440
log1p_tx (z)	78001.440
top_performer_sales_log (z)	78001.440

Dispensight

Smallest diag entries

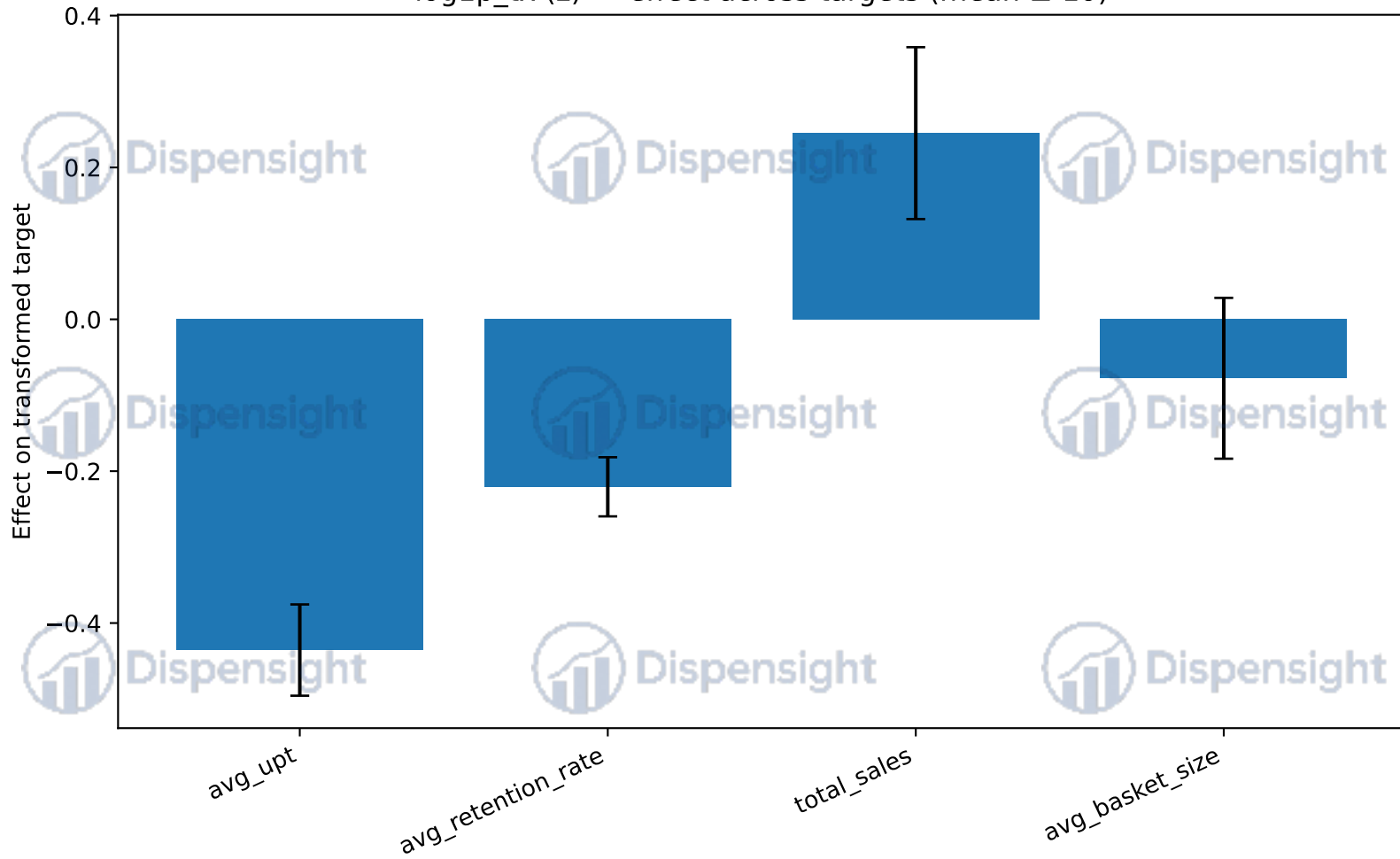
Coef	Fisher diag
avg_retention_rate_lag (trans)	50279.211
avg_upt (z)	78001.438
team_performance_score_logit	78001.439
avg_sales_per_hour_log (z)	78001.440



Pairwise Coefficient Comparisons (Normal/BvM approx)

#	i	j	Δ	sd	z	p	P(i>j)
1	avg_retention_rate	avg_upt (z)	0.8140	0.0554	14.686	0	1.000
2	avg_lag (trans)	loglp_tx (z)	1.0054	0.0779	12.906	0	1.000
3	avg_lag (trans)	avg_sales_per_head	0.9845	0.0849	11.590	0	1.000
4	avg_lag (trans)	performance_variance	0.7953	0.0836	9.518	0	1.000
5	avg_lag (trans)	team_performance	0.6992	0.0902	7.755	8.88e-15	1.000
6	avg_lag (trans)	core_logit (z)	0.6561	0.0871	7.531	5.04e-14	1.000
7	avg_lag (trans)	log_sales (z)	0.5657	0.0874	6.469	9.87e-11	1.000
8	loglp_tx (z)	team_performance	-0.3062	0.0490	-6.247	4.19e-10	0.000
9	Intercept	loglp_tx (z)	0.3748	0.0641	5.845	5.07e-09	1.000
10	Intercept	avg_retention_rate	-0.6306	0.1165	-5.415	6.13e-08	0.000
11	loglp_tx (z)	avg_upt (z)	-0.4397	0.0929	-4.732	2.23e-06	0.000
12	loglp_tx (z)	performance_variance	-0.2101	0.0453	-4.639	3.49e-06	0.000
13	Intercept	avg_sales_per_head	0.3539	0.0793	4.461	8.15e-06	1.000
14	avg_sales_per_head	team_performance	-0.2853	0.0643	-4.437	9.12e-06	0.000
15	loglp_tx (z)	core_logit (z)	-0.1914	0.0451	-4.246	2.17e-05	0.000
16	avg_sales_per_head	performance_variance	-0.1892	0.0481	-3.933	8.4e-05	0.000
17	avg_upt (z)	team_performance	-0.2483	0.0660	-3.762	0.000169	0.000
18	avg_sales_per_head	core_logit (z)	-0.4188	0.1140	-3.673	0.00024	0.000
19	loglp_tx (z)	log_sales (z)	-0.3493	0.1026	-3.406	0.000659	0.000
20	avg_upt (z)	team_performance	-0.1148	0.0380	-3.017	0.00255	0.001

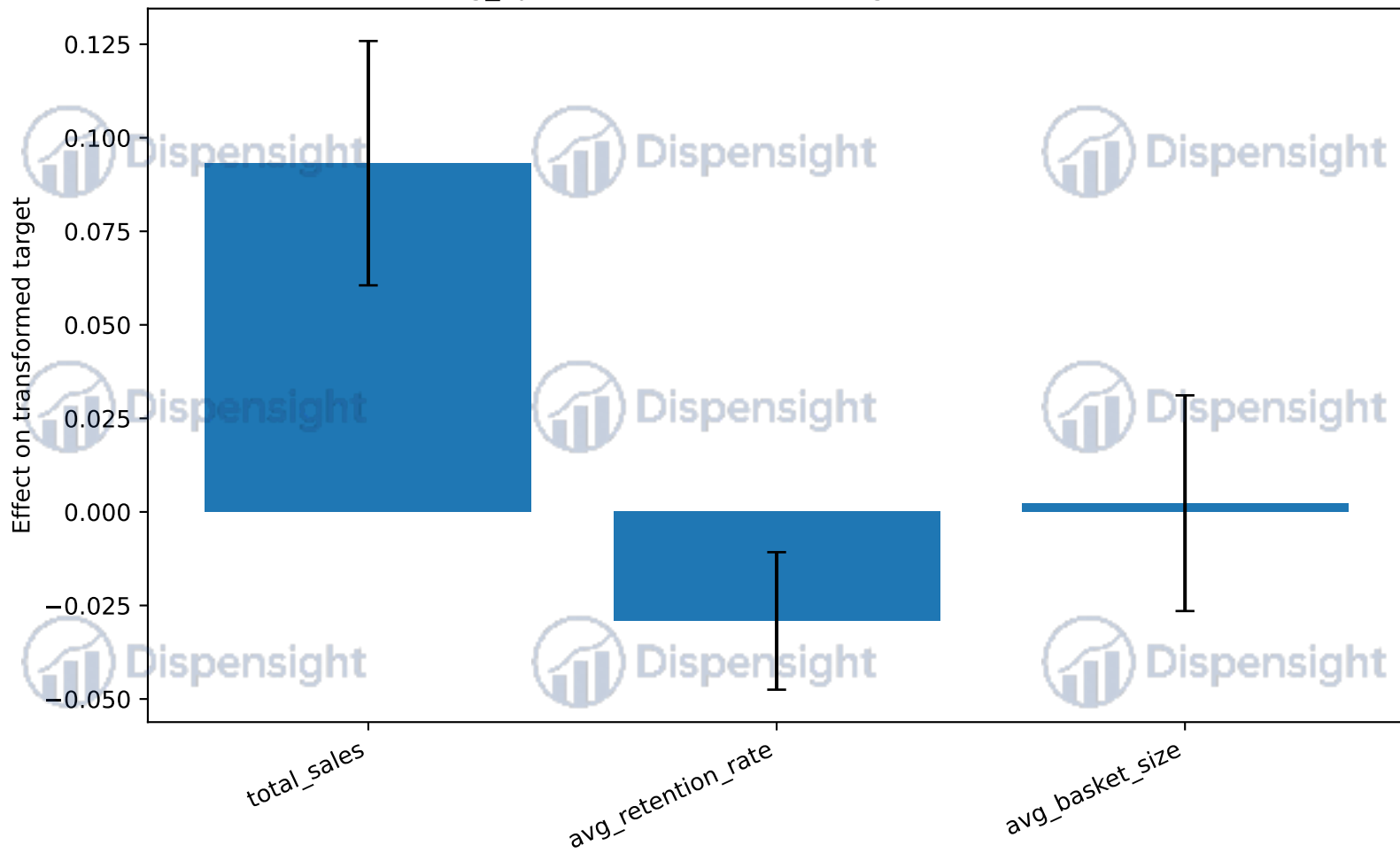
log1p_tx (z) — effect across targets (mean $\pm 1\sigma$)



Multi-Target Sweep — log1p tx (z)

Rank	Target	β	sd	z	p	$P(\beta > 0)$
1	avg_upt	-0.43559	0.06010	-7.247	4.25e-13	0.000
2	avg_retention_rate	-0.22058	0.03892	-5.667	1.46e-08	0.000
3	total_sales	+0.24519	0.11319	+2.166	0.0303	0.985
4	avg_basket_size	-0.07766	0.10590	-0.733	0.463	0.232

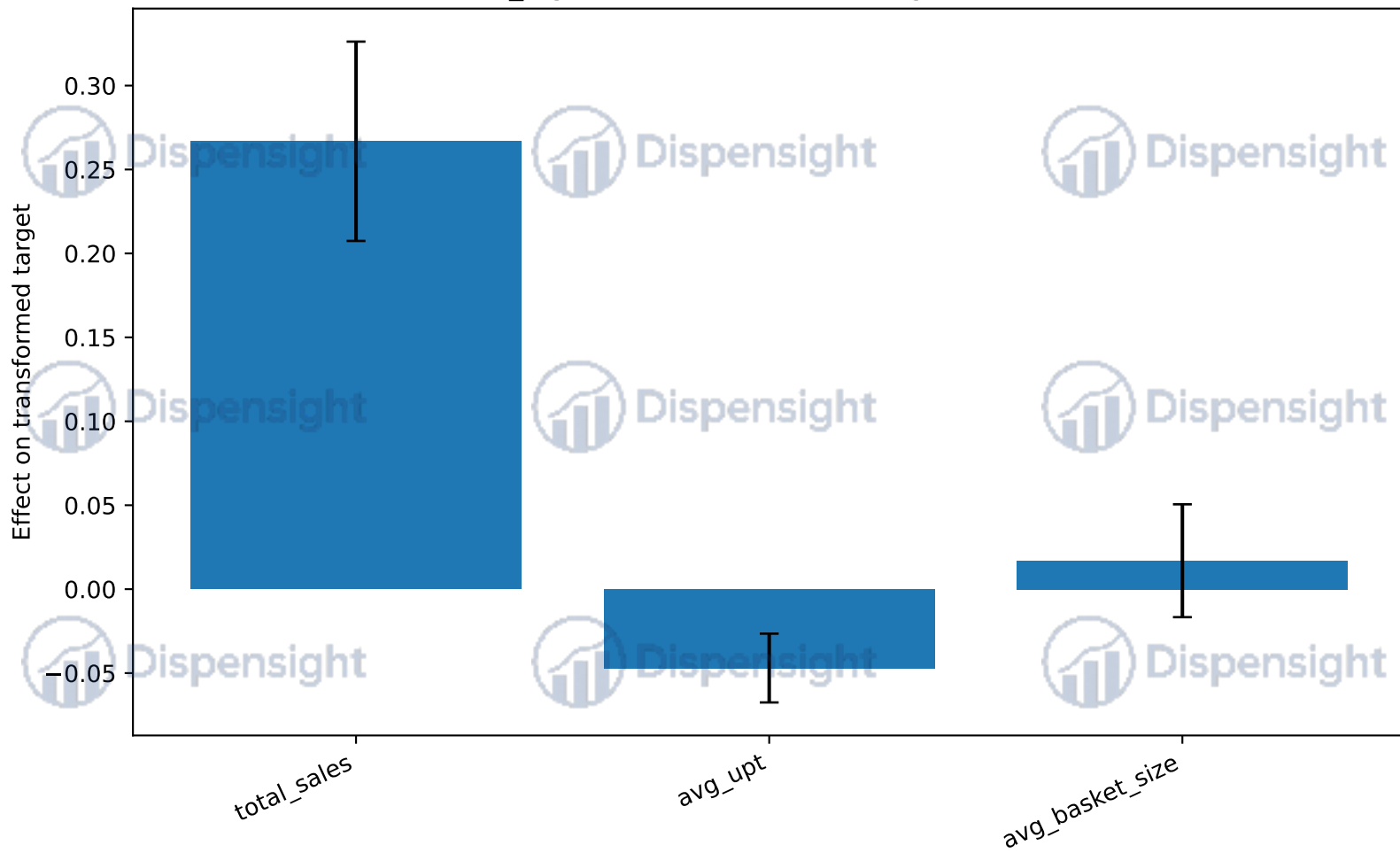
avg_upt (z) — effect across targets (mean $\pm 1\sigma$)



Multi-Target Sweep — avg_upt (z)

Rank	Target	β	sd	z	p	$P(\beta > 0)$
1	total_sales	+0.09321	0.03265	+2.855	0.00431	0.998
2	avg_retention_rate	-0.02913	0.01837	-1.586	0.113	0.056
3	avg_basket_size	+0.00233	0.02882	+0.081	0.935	0.532

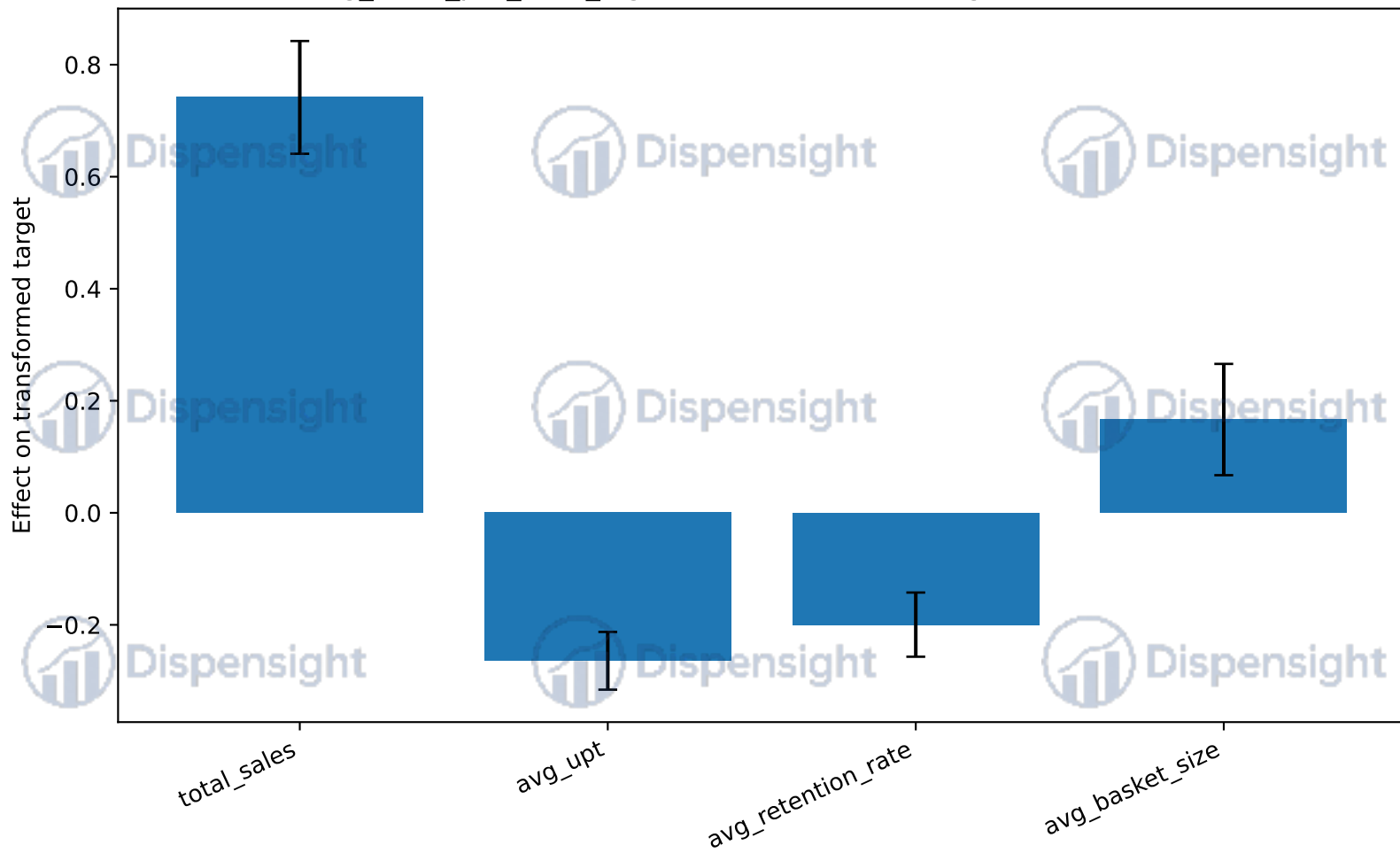
retention_logit (z) — effect across targets (mean $\pm 1\sigma$)



Multi-Target Sweep — retention_logit (z)

Rank	Target	β	sd	z	p	$P(\beta > 0)$
1	total_sales	+0.26682	0.05936	+4.495	6.97e-06	1.000
2	avg_upt	-0.04699	0.02050	-2.292	0.0219	0.011
3	avg_basket_size	+0.01693	0.03361	+0.504	0.615	0.693

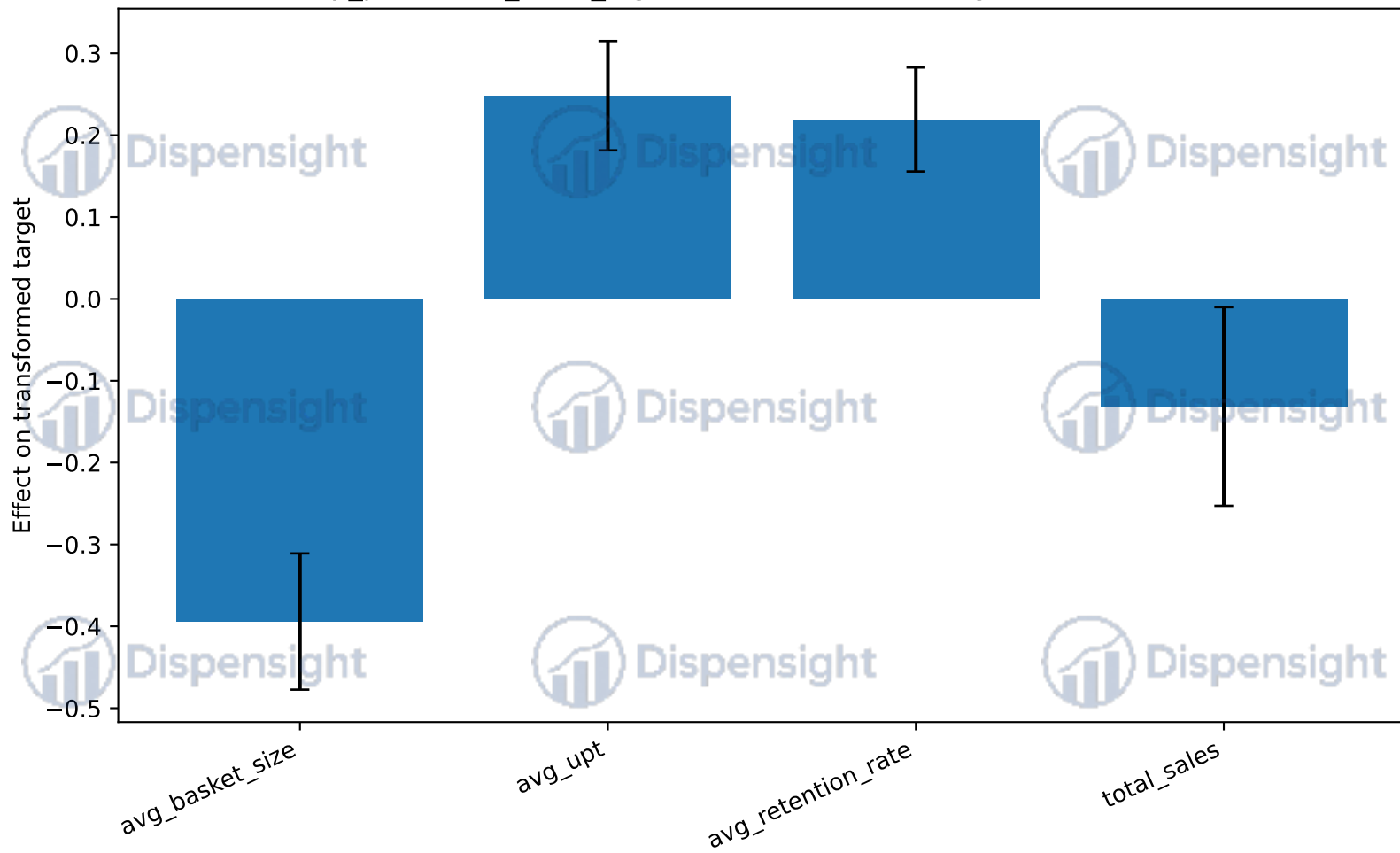
avg_sales_per_hour_log (z) — effect across targets (mean $\pm 1\sigma$)



Multi-Target Sweep — avg sales per hour log (z)

Rank	Target	β	sd	z	p	$P(\beta > 0)$
1	total_sales	+0.74163	0.10065	+7.368	1.73e-13	1.000
2	avg_upt	-0.26417	0.05154	-5.125	2.97e-07	0.000
3	avg_retention_rate	-0.19961	0.05730	-3.484	0.000494	0.000
4	avg_basket_size	+0.16650	0.09935	+1.676	0.0937	0.953

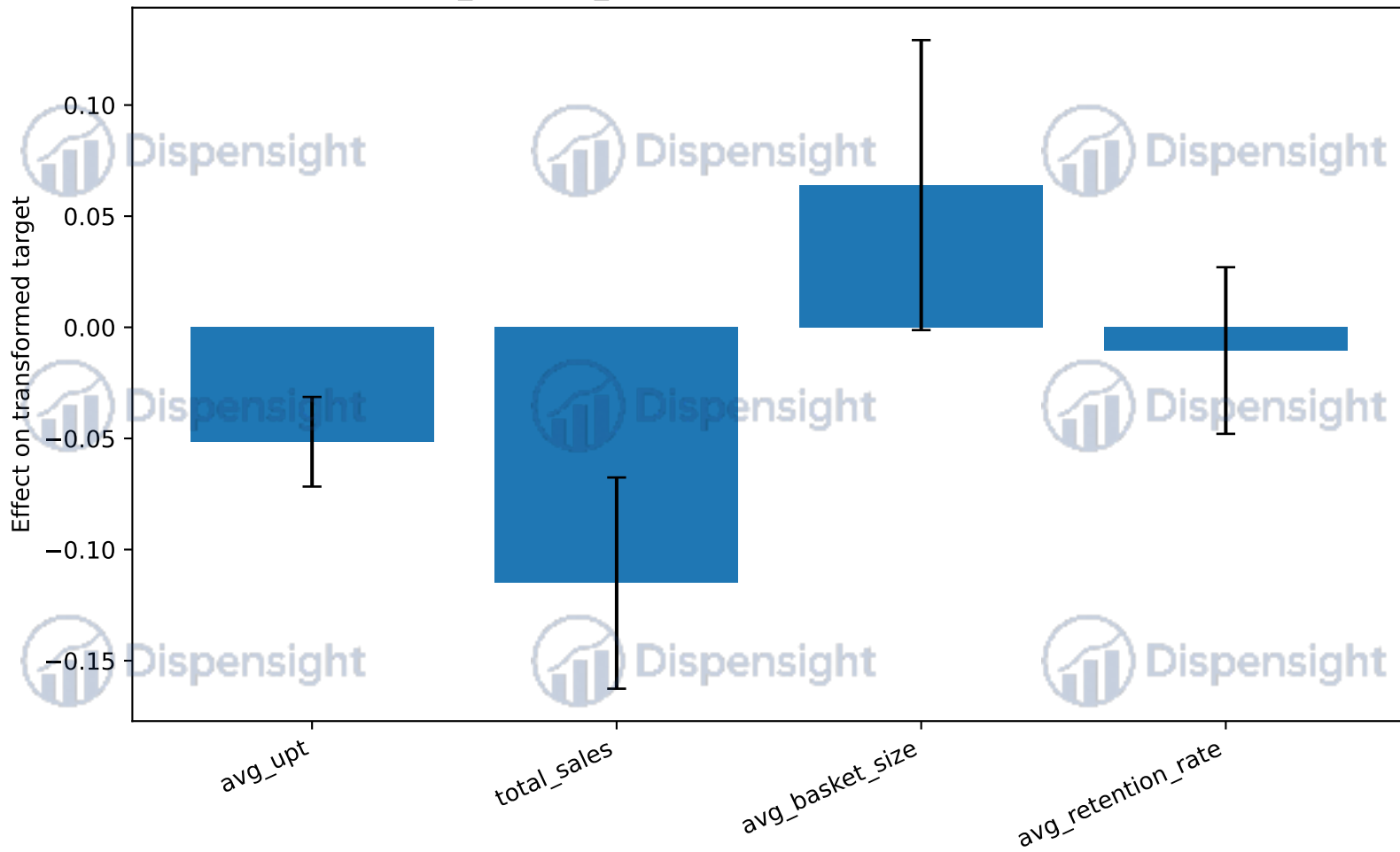
top_performer_sales_log (z) — effect across targets (mean $\pm 1\sigma$)



Multi-Target Sweep — top performer sales log (z)

Rank	Target	β	sd	z	p	$P(\beta > 0)$
1	avg_basket_size	-0.39420	0.08318	-4.739	2.14e-06	0.000
2	avg_upt	+0.24823	0.06679	+3.716	0.000202	1.000
3	avg_retention_rate	+0.21915	0.06354	+3.449	0.000563	1.000
4	total_sales	-0.13144	0.12130	-1.084	0.279	0.139

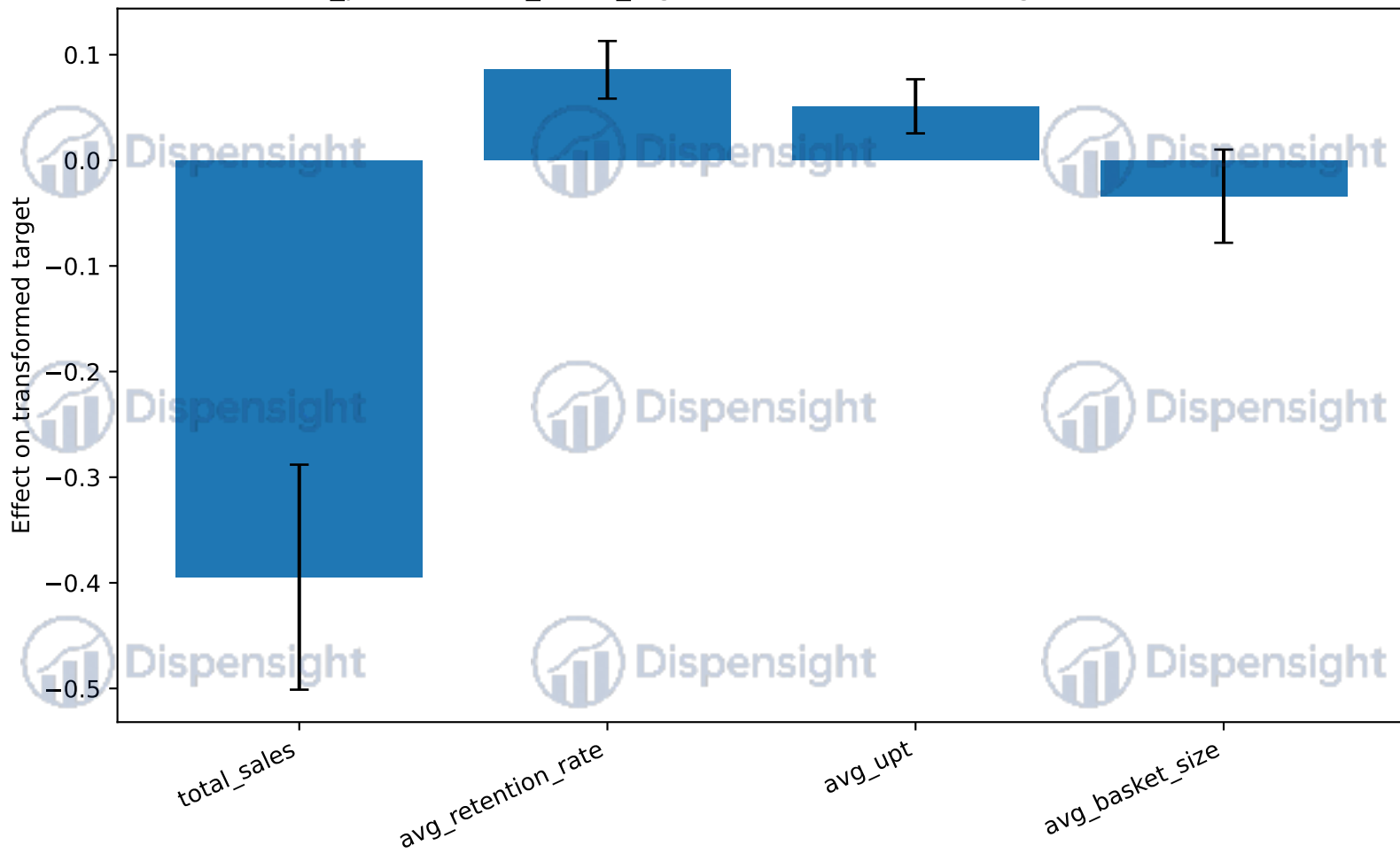
performance_variance_log1p (z) — effect across targets (mean $\pm 1\sigma$)



Multi-Target Sweep — performance variance log1p (z)

Rank	Target	β	sd	z	p	$P(\beta > 0)$
1	avg_upt	-0.05150	0.02017	-2.553	0.0107	0.005
2	total_sales	-0.11509	0.04752	-2.422	0.0154	0.008
3	avg_basket_size	+0.06398	0.06524	+0.981	0.327	0.837
4	avg_retention_rate	-0.01045	0.03749	-0.279	0.781	0.390

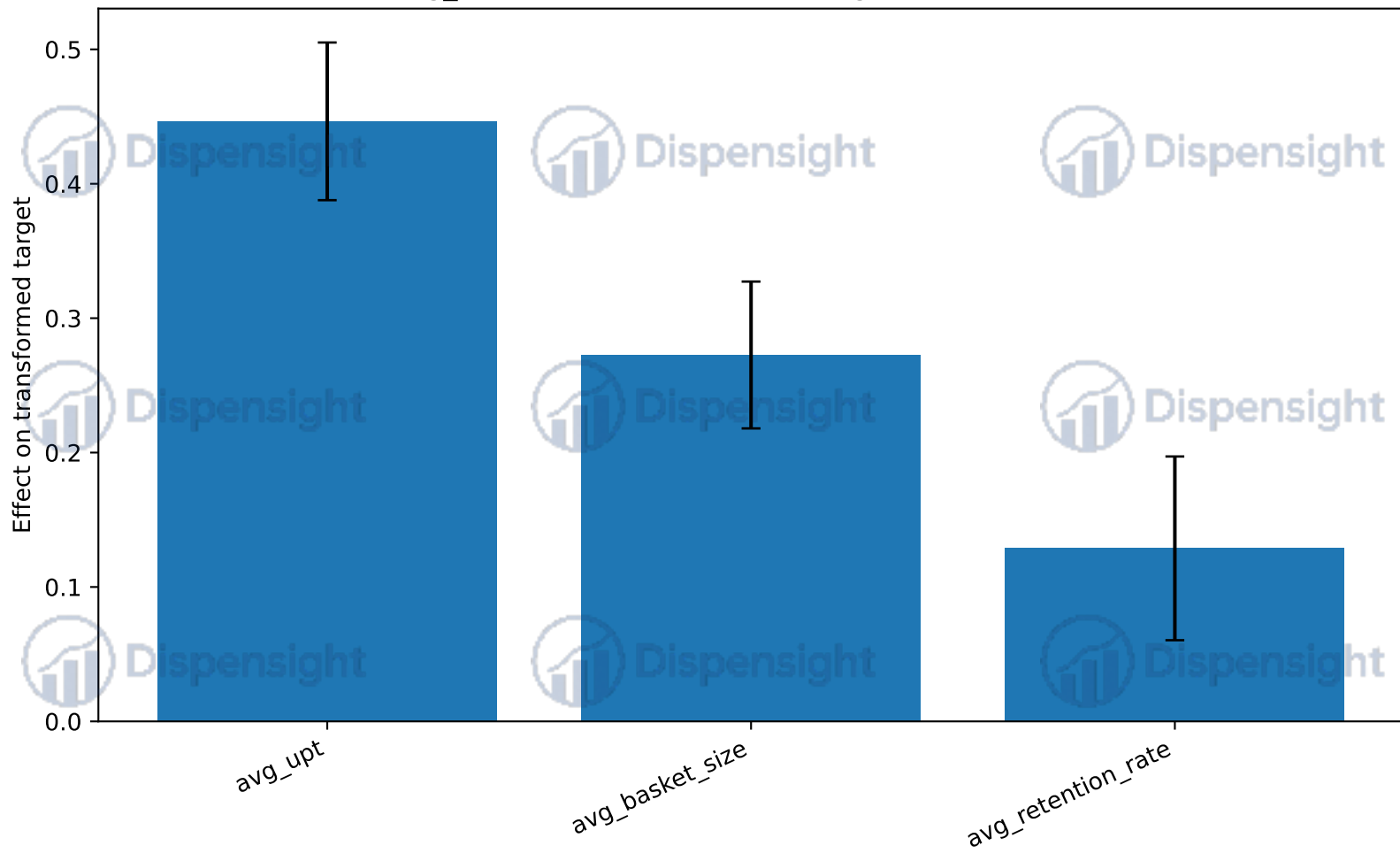
team_performance_score_logit (z) — effect across targets (mean $\pm 1\sigma$)



Multi-Target Sweep — team performance score logit (z)

Rank	Target	β	sd	z	p	$P(\beta > 0)$
1	total_sales	-0.39464	0.10651	-3.705	0.000211	0.000
2	avg_retention_rate	+0.08567	0.02727	+3.141	0.00168	0.999
3	avg_upt	+0.05113	0.02561	+1.996	0.0459	0.977
4	avg_basket_size	-0.03394	0.04412	-0.769	0.442	0.221

log_sales (z) — effect across targets (mean $\pm 1\sigma$)



Multi-Target Sweep — log_sales (z)

Rank	Target	β	sd	z	p	$P(\beta > 0)$
1	avg_upt	+0.44645	0.05866	+7.611	2.73e-14	1.000
2	avg_basket_size	+0.27261	0.05462	+4.991	6.02e-07	1.000
3	avg_retention_rate	+0.12874	0.06835	+1.884	0.0596	0.970