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Appendix

1 Limitations of the "Location Choice" Strategy

- Agent Definition and Heterogeneity: Accurately representing the developer population at a regional scale is often not feasible due to data limitations. Consequently, many models use a single "omniscient" agent to simulate development decisions for the entire region. This approach raises a fundamental theoretical concern: if the system is driven by a single decision-maker, it resembles a top-down allocation rather than a true bottom-up microsimulation. While introducing multiple developer agents can resolve this, it introduces the challenge of configuration. Determining the appropriate number of representative developers involves a difficult trade-off between model realism and computational burden.
- Intra-Sector Competition (Land Tenure): Even if the number of developers is established, assigning land ownership (tenure) presents a significant hurdle. In the absence of high-quality empirical data, the allocation of land to specific developers depends heavily on assumptions. This weakens the model's validity and makes it difficult to simulate real competition between developers (intra-competition).
- Inter-Sector Competition: Finally, the model must address competition between different land use types. When a site is zoned for mixed potential, i.e., allowing residential, retail, office, or industrial use, representing the competition between these uses is complex. Standard location choice models are often inadequate for such simultaneous multi-sector decisions, requiring more advanced multiple-choice structures. Implementing these increases the algorithmic complexity significantly, which may be unmanageable for large-scale studies facing data constraints.

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2 Multicollinearity Diagnostic Results

Table A1. VIF test scores for the underlying numeric explanatory variables used in the final model[1]

Variable Name	VIF Score
# Projects Developed 1 Year Ago	1.0937
Rent Price	1.3350
Change of Sale Price	2.5947
Change of Cap Rate	2.6255
Change in # Leasing Deals	1.0274
# Sales Listed	1.4854
Parcel Size	1.2160
Commercial Supply Mix	1.4822
# Business Establishments	3.2391
# Residential Addresses	8.1289
# Buildings of All Types (100m Buffer)	1.6681
Density of Open Space	1.2347
Density of Developed Lands	4.3546
Density of Major Local Roads	6.1985
Density of Railways	1.6045
Density of Railways (100m Buffer)	1.2867
Auto Accessibility to Retail Cluster	5.7476
Auto Accessibility to Industry Cluster	3.5958
Auto Accessibility to Office Cluster	6.6381
Distance to the Nearest Bus Stop	1.5683
Distance to the Nearest Metro Station	1.7356
Distance to the Nearest Airport	2.1648
Distance to Open Space	1.6985

3 Attribute Downscaling Approach

The complete list of market variables is presented in Table A2. Because the commercial data provider restricts access to fine-resolution market data, only meso-level data aggregated over multiple smaller regions in the GTHA (Figure A1) can be obtained. To integrate these coarser data into the parcel-level model, this paper assumes that developers anywhere in the GTHA are aware of market conditions in all other regions.

[1]The VIF test covers the underlying numeric explanatory variables only and does not include the expanded alternative-specific interaction terms reported in Tables 3, 4, and A3.

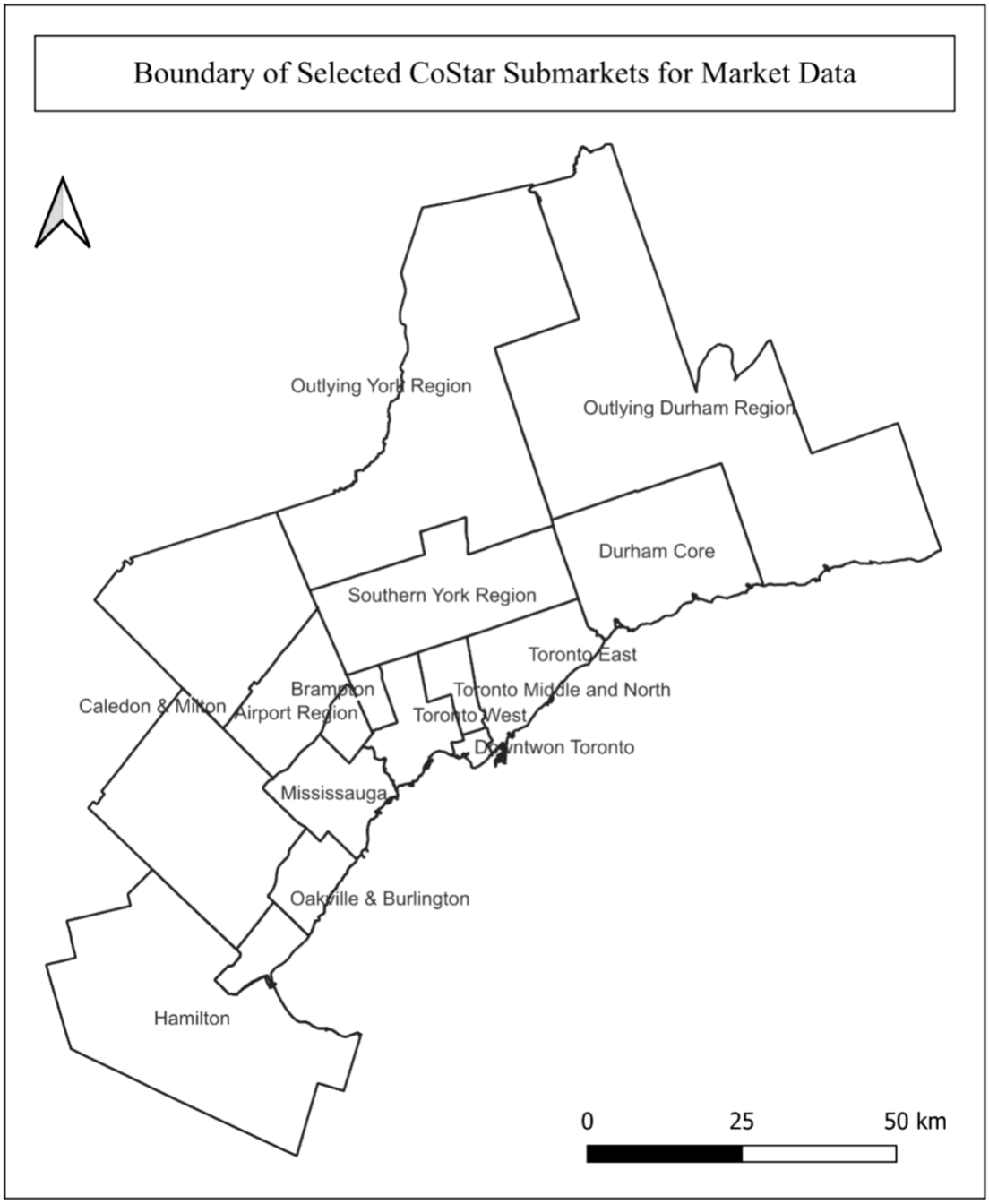


Figure A1. Map of submarkets based on CoStar Group's data

In practice, this means that each parcel i will compare its own market attribute to those of every other parcel k, with a spatial interaction weighting that decays with distance. Hence, a relative value RM_{ij}^{t-1} at parcel i was calculated as:

$$RM_{ij}^{t-1} = \frac{\sum_{k \neq i} w_{ik} M_{kj}^{t-1}}{\sum_{k \neq i} w_{ik}} \quad \text{(A1)}$$

where M_{kj}^{t-1} is the observed value of the selected market variable for development type j associated with parcel k in the previous year, w_{ik} is the distance-decay weight between parcel i and parcel k, and $k \neq i$ indicates that self-comparison is excluded. Each component of RM_{ij}^{t-1} represents the distance-weighted average of the selected market variable over all other projects of type j. These downscaled relative market variables enter the model in place of the meso-level observations.

In the primary specification, the distance-decay weight was defined using an inverse-squared function:

$$w_{ik}^{SQ} = \frac{1}{l_{ik}^2} \tag{A2}$$

where l_{ik} is the Euclidean distance between parcel i and parcel k.

To examine whether the model results are sensitive to this distance-decay specification, two alternative forms were tested while keeping all other model structural design. The first alternative uses an inverse-linear distance-decay function:

$$w_{ik}^{LIN} = \frac{1}{l_{ik}} \tag{A3}$$

Compared with the inverse-squared specification, the inverse-linear specification applies a slower rate of distance decay. It therefore assigns relatively greater influence to market observations farther away from parcel i.

The second alternative uses an exponential distance-decay function. The exponential weight was defined as:

$$w_{ik}^{EXP(h)} = e^{-\lambda_h l_{ik}} \tag{A4}$$

where λ_h is the exponential decay parameter associated with half-life distance h. To make the exponential specification interpretable, the decay parameter was defined as:

$$\lambda_h = \frac{\ln(2)}{h} \tag{A5}$$

According to Östh et al. (2018), h is interpreted as the distance at which the weight assigned to another market observation falls to one half. The main exponential test used half-life distances of 1 km, 5km, 10 km, 25 km, and 50 km. These alternatives represent different assumptions about the speed at which the influence of market observations declines with distance.

Based on these methods, Table A2 reports the sensitivity test results. The estimated effects of the market-signal variables are generally robust across alternative distance-decay specifications, and the coefficients remain broadly consistent in direction. This provides a basis for retaining the inverse-squared specification as the baseline. The baseline estimates are nearly identical to those under the exponential kernel with a 1 km half-life, which indicates that the baseline weighting is effectively local. All market signals remain significant at the 5% level under every kernel, although the z-values of some variables, such as “Change of Sale Price”, decrease as the kernel widens. Overall, the results suggest that the main conclusions do not depend strongly on the specific

functional form used to construct the parcel-level market variables, although some individual effects may still be sensitive to the assumed spatial-decay structure. Future research could examine other spatial-weighting specifications and data contexts to better understand this sensitivity.

Table A2. Sensitivity of market-signal coefficients to alternative distance-decay specifications

Variable	Statistic	Squared	Linear	Exponential h = 1 km	Exponential h = 5 km	Exponential h = 10 km	Exponential h = 25 km	Exponential h = 50 km
# Projects Developed 1 Year Ago	Estimate	0.2143	0.2171	0.2153	0.2157	0.2164	0.2167	0.2165
	Std. Error	0.0286	0.0285	0.0285	0.0285	0.0285	0.0285	0.0285
	z-value	7.4890	7.6144	7.5451	7.5715	7.6051	7.6153	7.6090
	Sig.	***	***	***	***	***	***	***
Rent Price	Estimate	0.0644	0.0825	0.0650	0.0809	0.0808	0.0866	0.0879
	Std. Error	0.0149	0.0182	0.0150	0.0172	0.0185	0.0204	0.0211
	z-value	4.3347	4.5304	4.3402	4.6967	4.3581	4.2364	4.1719
	Sig.	***	***	***	***	***	***	***
Change of Sale Price	Estimate	0.0358	0.0278	0.0356	0.0296	0.0282	0.0251	0.0246
	Std. Error	0.0090	0.0098	0.0090	0.0095	0.0099	0.0105	0.0107
	z-value	3.9754	2.8260	3.9684	3.1277	2.8355	2.3792	2.3068
	Sig.	***	***	***	***	***	**	**
Change of Cap Rate	Estimate	1.3962	1.1886	1.3944	1.2423	1.2046	1.1261	1.1209
	Std. Error	0.3066	0.3276	0.3056	0.3169	0.3291	0.3444	0.3475
	z-value	4.5538	3.6285	4.5629	3.9207	3.6599	3.2697	3.2251
	Sig.	***	***	***	***	***	***	***
Change in # Leasing Deals	Estimate	0.0024	0.0025	0.0024	0.0025	0.0026	0.0026	0.0026
	Std. Error	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
	z-value	2.9114	3.0289	2.8965	3.0087	3.0708	3.0766	3.0805
	Sig.	***	***	***	***	***	***	***
# Sales Listed	Estimate	0.0052	0.0059	0.0052	0.0059	0.0061	0.0062	0.0061
	Std. Error	0.0013	0.0013	0.0013	0.0013	0.0013	0.0014	0.0014
	z-value	3.9085	4.4090	3.9567	4.4137	4.5021	4.5544	4.5337
	Sig.	***	***	***	***	***	***	***

*Note: *** p < 0.01; ** p < 0.05; * p < 0.10. Squared = inverse-squared distance decay (baseline, Table 3); Linear = inverse-linear; h = half-life distance of the exponential kernel. All columns use the final model specification.*

4 Prediction-Success Index (PSI)

Following McFadden (1977, Eq. 63), the PSI of alternative i is defined as:

$$\mathrm{PSI}_i = \frac{N_{ii}}{N_{\cdot i}} - \frac{N_{i\cdot}}{N_{\cdot\cdot}} \tag{A6}$$

Because the maximum attainable PSI is $1 - N_{i\cdot}/N_{\cdot\cdot}$, which varies with the base rate of each alternative, PSI is also reported in normalized form:

$$\mathrm{PSI}_i^* = \frac{\mathrm{PSI}_i}{1 - N_{i\cdot}/N_{\cdot\cdot}} \quad \text{(A7)}$$

Where:

- N_{ii} is the summed predicted probability of alternative i over the choice occasions on which i was observed
- $N_{\cdot i}$ is the column total, i.e., the summed predicted probability of alternative i over all choice occasions
- $N_{i\cdot}$ is the row total, i.e., the number of choice occasions on which alternative i was observed
- $N_{\cdot\cdot}$ is the total number of choice occasions

5 Full model results

Table A3. Full summary of the "1-Year Lag, 2015 to 2023" model

Variables	Estimate	Standard Error	Z Value	P Value
(Intercept):Industrial	-4.1478	0.6164	-6.7288	0.0000
(Intercept):Mixed	-5.2165	1.7919	-2.9112	0.0036
(Intercept):Office	-3.4062	1.0069	-3.3830	0.0007
(Intercept):Retail	-3.8256	0.5544	-6.9005	0.0000
# Projects Developed (1-Year Lag)	0.2143	0.0286	7.4890	0.0000
Rent Price	0.0644	0.0149	4.3347	0.0000
Change of Sale Price	0.0358	0.0090	3.9754	0.0001
S.D. of Change of Sale Price	0.0279	0.0104	2.6754	0.0075
Change of Cap Rate	1.3962	0.3066	4.5538	0.0000
Change in # Leasing Deals	0.0024	0.0008	2.9114	0.0036
# Sales Listed	0.0052	0.0013	3.9085	0.0001
Parcel Size:Industrial	3.0647	0.5753	5.3269	0.0000
Parcel Size:Mixed	3.0535	2.9098	1.0494	0.2940
Parcel Size:Office	-2.3030	1.7687	-1.3021	0.1929
Parcel Size:Retail	1.0872	0.5693	1.9096	0.0562
Commercial Supply Mix:Industrial	0.5097	0.3566	1.4294	0.1529
Commercial Supply Mix:Mixed	0.5045	1.0738	0.4698	0.6385
Commercial Supply Mix:Office	0.9912	0.4450	2.2276	0.0259
Commercial Supply Mix:Retail	-0.3472	0.2338	-1.4851	0.1375
# Business Establishments:Industrial	-0.5174	0.1926	-2.6857	0.0072
# Business Establishments:Mixed	-0.0735	0.0832	-0.8836	0.3769
# Business Establishments:Office	-0.0608	0.0282	-2.1556	0.0311
# Business Establishments:Retail	-0.0288	0.0276	-1.0442	0.2964
# Residential Addresses:Industrial	1.9811	0.8125	2.4382	0.0148
# Residential Addresses:Mixed	-3.2175	1.6588	-1.9396	0.0524
# Residential Addresses:Office	-0.5796	0.4832	-1.1994	0.2304
# Residential Addresses:Retail	-0.1283	0.3643	-0.3521	0.7247
# Buildings of All Type (100m Buffer):Industrial	0.0042	0.0034	1.2492	0.2116

Variables	Estimate	Standard Error	Z Value	P Value
# Buildings of All Type (100m Buffer):Mixed	-0.0068	0.0104	-0.6510	0.5150
# Buildings of All Type (100m Buffer):Office	0.0011	0.0037	0.2956	0.7675
# Buildings of All Type (100m Buffer):Retail	0.0028	0.0012	2.3183	0.0204
Density of Developed Lands:Industrial	0.0039	0.0033	1.1820	0.2372
Density of Developed Lands:Mixed	-0.0086	0.0125	-0.6852	0.4932
Density of Developed Lands:Office	0.0187	0.0061	3.0836	0.0020
Density of Developed Lands:Retail	0.0040	0.0036	1.1116	0.2663
Density of Open Space:Industrial	-0.3531	0.1452	-2.4324	0.0150
Density of Open Space:Mixed	-0.0637	0.6882	-0.0925	0.9263
Density of Open Space:Office	-0.1892	0.2713	-0.6974	0.4856
Density of Open Space:Retail	-0.0701	0.1167	-0.6006	0.5481
Density of Major Local Roads:Industrial	-0.0398	0.0133	-2.9936	0.0028
Density of Major Local Roads:Mixed	-0.0005	0.0476	-0.0112	0.9910
Density of Major Local Roads:Office	-0.0088	0.0169	-0.5225	0.6013
Density of Major Local Roads:Retail	-0.0116	0.0088	-1.3190	0.1872
Density of Railways:Industrial	-0.0134	0.0083	-1.6194	0.1054
Density of Railways:Mixed	0.0116	0.0300	0.3857	0.6998
Density of Railways:Office	0.0072	0.0083	0.8710	0.3838
Density of Railways:Retail	-0.0239	0.0078	-3.0532	0.0023
Density of Railways (100m Buffer):Industrial	0.0679	0.0939	0.7232	0.4695
Density of Railways (100m Buffer):Mixed	0.2335	0.3224	0.7241	0.4690
Density of Railways (100m Buffer):Office	-0.3428	0.1587	-2.1606	0.0307
Density of Railways (100m Buffer):Retail	-0.1386	0.1394	-0.9941	0.3202
Auto Accessibility to Retail Cluster:Industrial	8.4793	14.3754	0.5898	0.5553
Auto Accessibility to Retail Cluster:Mixed	5.0382	38.9300	0.1294	0.8970
Auto Accessibility to Retail Cluster:Office	-56.3533	18.1137	-3.1111	0.0019
Auto Accessibility to Retail Cluster:Retail	8.5777	10.0606	0.8526	0.3939
Auto Accessibility to Industry Cluster:Industrial	2.5430	5.8280	0.4363	0.6626
Auto Accessibility to Industry Cluster:Mixed	-4.9684	17.9220	-0.2772	0.7816
Auto Accessibility to Industry Cluster:Office	-27.8171	9.9018	-2.8093	0.0050
Auto Accessibility to Industry Cluster:Retail	-14.3330	5.8381	-2.4551	0.0141
Auto Accessibility to Office Cluster:Industrial	-10.7733	5.2083	-2.0685	0.0386
Auto Accessibility to Office Cluster:Mixed	13.3163	8.2211	1.6198	0.1053
Auto Accessibility to Office Cluster:Office	4.3602	2.9128	1.4969	0.1344
Auto Accessibility to Office Cluster:Retail	-0.5678	2.0966	-0.2708	0.7865
Distance to the Nearest Bus Stop:Industrial	-0.0552	0.1394	-0.3961	0.6920
Distance to the Nearest Bus Stop:Mixed	-0.1578	0.3890	-0.4058	0.6849
Distance to the Nearest Bus Stop:Office	-0.1436	0.1674	-0.8583	0.3907
Distance to the Nearest Bus Stop:Retail	-0.2179	0.0735	-2.9630	0.0030
Distance to the Nearest Metro Station:Industrial	-0.0539	0.0415	-1.2981	0.1942
Distance to the Nearest Metro Station:Mixed	-0.1379	0.1492	-0.9241	0.3555

Variables	Estimate	Standard Error	Z Value	P Value
Distance to the Nearest Metro Station:Office	-0.0790	0.0634	-1.2468	0.2125
Distance to the Nearest Metro Station:Retail	-0.0627	0.0264	-2.3795	0.0173
Distance to the Nearest Airport:Industrial	-0.0172	0.0123	-1.3985	0.1620
Distance to the Nearest Airport:Mixed	-0.0024	0.0360	-0.0677	0.9460
Distance to the Nearest Airport:Office	-0.0467	0.0190	-2.4505	0.0143
Distance to the Nearest Airport:Retail	0.0005	0.0099	0.0466	0.9629
Distance to Open Space:Industrial	0.1184	0.1151	1.0285	0.3037
Distance to Open Space:Mixed	-0.1935	0.6039	-0.3204	0.7486
Distance to Open Space:Office	-0.3900	0.3782	-1.0310	0.3026
Distance to Open Space:Retail	-0.4751	0.1709	-2.7797	0.0054
Commercial Zone:Industrial	0.5085	0.3079	1.6515	0.0986
Commercial Zone:Mixed	1.5248	0.6283	2.4271	0.0152
Commercial Zone:Office	1.3599	0.2424	5.6095	0.0000
Commercial Zone:Retail	0.9576	0.2225	4.3030	0.0000
Industrial Zone:Industrial	1.2471	0.1495	8.3446	0.0000
Industrial Zone:Mixed	0.9945	0.5022	1.9802	0.0477
Industrial Zone:Office	0.4944	0.2360	2.0947	0.0362
Industrial Zone:Retail	-0.1531	0.2090	-0.7325	0.4639
Retail Zone:Industrial	-0.2604	0.4277	-0.6088	0.5427
Retail Zone:Mixed	0.7695	0.4586	1.6778	0.0934
Retail Zone:Office	0.4060	0.2739	1.4822	0.1383
Retail Zone:Retail	1.6892	0.1214	13.9121	0.0000
Residential Zone:Industrial	0.7002	0.4553	1.5378	0.1241
Residential Zone:Mixed	0.3660	1.4332	0.2554	0.7984
Residential Zone:Office	1.0379	0.2609	3.9779	0.0001
Residential Zone:Retail	1.1612	0.1509	7.6952	0.0000
Toronto Downtown and Midtown:Industrial	0.0732	0.7490	0.0978	0.9221
Toronto Downtown and Midtown:Mixed	0.5804	1.7406	0.3334	0.7388
Toronto Downtown and Midtown:Office	1.7474	0.6568	2.6605	0.0078
Toronto Downtown and Midtown:Retail	-0.2604	0.4009	-0.6496	0.5160
Toronto East:Industrial	0.4390	0.4339	1.0117	0.3117
Toronto East:Mixed	-1.4566	1.0277	-1.4174	0.1564
Toronto East:Office	0.1204	0.6806	0.1769	0.8596
Toronto East:Retail	-0.6662	0.3172	-2.1001	0.0357
Toronto West:Industrial	0.1305	0.4834	0.2699	0.7872
Toronto West:Mixed	-1.2978	1.2388	-1.0476	0.2948
Toronto West:Office	1.0787	0.6412	1.6822	0.0925
Toronto West:Retail	-0.5393	0.3449	-1.5636	0.1179
York South:Industrial	0.2146	0.3549	0.6047	0.5454
York South:Mixed	-0.6747	0.9254	-0.7291	0.4660
York South:Office	1.2431	0.6288	1.9770	0.0480

Variables	Estimate	Standard Error	Z Value	P Value
York South:Retail	-1.2853	0.3487	-3.6860	0.0002
York North:Industrial	0.7760	0.4874	1.5921	0.1114
York North:Mixed	0.0778	1.1453	0.0679	0.9459
York North:Office	0.7615	0.7428	1.0252	0.3053
York North:Retail	0.0558	0.3936	0.1417	0.8873
Mississauga:Industrial	-0.0252	0.3493	-0.0721	0.9425
Mississauga:Mixed	-1.9842	1.0481	-1.8931	0.0583
Mississauga:Office	-0.0393	0.5840	-0.0673	0.9463
Mississauga:Retail	-0.1483	0.3020	-0.4909	0.6235
Brampton:Industrial	0.1410	0.3504	0.4025	0.6873
Brampton:Mixed	0.2540	1.0323	0.2460	0.8057
Brampton:Office	0.7902	0.5852	1.3503	0.1769
Brampton:Retail	0.1196	0.2563	0.4668	0.6406
Caledon and Milton:Industrial	-0.0084	0.3501	-0.0239	0.9809
Caledon and Milton:Mixed	-1.0789	1.0536	-1.0240	0.3059
Caledon and Milton:Office	0.0232	0.6756	0.0344	0.9726
Caledon and Milton:Retail	-0.3787	0.3048	-1.2426	0.2140
Oakville and Burlington:Industrial	0.1016	0.3996	0.2543	0.7993
Oakville and Burlington:Mixed	-1.0230	0.8823	-1.1595	0.2463
Oakville and Burlington:Office	0.8699	0.5170	1.6827	0.0924
Oakville and Burlington:Retail	-0.4899	0.2971	-1.6492	0.0991
Airport:Industrial	0.2624	0.4650	0.5642	0.5726
Airport:Mixed	-1.5153	1.1885	-1.2749	0.2023
Airport:Office	0.7987	0.6575	1.2148	0.2244
Airport:Retail	0.0922	0.4368	0.2111	0.8328
Durham South:Industrial	0.0802	0.5544	0.1448	0.8849
Durham South:Mixed	-1.4621	1.4672	-0.9965	0.3190
Durham South:Office	0.7604	0.8785	0.8655	0.3868
Durham South:Retail	-0.2084	0.4282	-0.4868	0.6264
Durham North:Industrial	1.2938	0.6617	1.9552	0.0506
Durham North:Mixed	-0.9076	2.0650	-0.4395	0.6603
Durham North:Office	0.8897	1.5499	0.5740	0.5660
Durham North:Retail	-0.1041	0.5700	-0.1827	0.8551

Notes: Log-Likelihood: -4,913.07. McFadden's ρ^2: 0.1941. Choice occasions: 13,469; Parcels: 2,059. Change of Sale Price is the only random parameter (normally distributed; 200 Halton draws). NO is the reference alternative and Hamilton is the baseline region.

Table A4. Full summary of the "1-Year Lag, 2018 to 2023" model (for lag comparison)

Variables	Estimate	Standard Error	Z Value	P Value
(Intercept):Industrial	-3.7960	0.8032	-4.7260	0.0000
(Intercept):Mixed	-5.3813	2.8304	-1.9013	0.0573
(Intercept):Office	-2.2728	1.2679	-1.7926	0.0730

Variables	Estimate	Standard Error	Z Value	P Value
(Intercept):Retail	-2.7661	0.7711	-3.5873	0.0003
# Projects Developed (1-Year Lag)	0.1965	0.0432	4.5474	0.0000
Rent Price	0.0482	0.0210	2.2992	0.0215
Change of Sale Price	0.0663	0.0177	3.7490	0.0002
S.D. of Change of Sale Price	0.0287	0.0150	1.9131	0.0557
Change of Cap Rate	2.9615	0.5571	5.3160	0.0000
Change in # Leasing Deals	0.0044	0.0012	3.7380	0.0002
# Sales Listed	0.0026	0.0034	0.7528	0.4516
Parcel Size:Industrial	3.8927	0.7504	5.1877	0.0000
Parcel Size:Mixed	2.9976	3.6516	0.8209	0.4117
Parcel Size:Office	-1.5201	1.8943	-0.8025	0.4223
Parcel Size:Retail	2.2017	0.6843	3.2174	0.0013
Commercial Supply Mix:Industrial	0.4067	0.4402	0.9239	0.3556
Commercial Supply Mix:Mixed	1.1083	1.5264	0.7261	0.4678
Commercial Supply Mix:Office	0.7458	0.5675	1.3142	0.1888
Commercial Supply Mix:Retail	-0.3125	0.3243	-0.9637	0.3352
# Business Establishments:Industrial	-0.5747	0.2256	-2.5479	0.0108
# Business Establishments:Mixed	-0.2652	0.6922	-0.3831	0.7016
# Business Establishments:Office	-0.0564	0.0345	-1.6323	0.1026
# Business Establishments:Retail	-0.0457	0.0345	-1.3225	0.1860
# Residential Addresses:Industrial	1.3874	1.0593	1.3097	0.1903
# Residential Addresses:Mixed	-2.8468	3.3593	-0.8474	0.3968
# Residential Addresses:Office	-0.4813	0.6280	-0.7663	0.4435
# Residential Addresses:Retail	0.2374	0.5084	0.4671	0.6404
# Buildings of All Type (100m Buffer):Industrial	0.0093	0.0041	2.2551	0.0241
# Buildings of All Type (100m Buffer):Mixed	-0.0008	0.0131	-0.0608	0.9515
# Buildings of All Type (100m Buffer):Office	0.0007	0.0047	0.1413	0.8876
# Buildings of All Type (100m Buffer):Retail	0.0033	0.0020	1.6327	0.1025
Density of Developed Lands:Industrial	0.0027	0.0040	0.6561	0.5118
Density of Developed Lands:Mixed	-0.0105	0.0169	-0.6195	0.5356
Density of Developed Lands:Office	0.0202	0.0079	2.5595	0.0105
Density of Developed Lands:Retail	0.0021	0.0044	0.4819	0.6299
Density of Open Space:Industrial	-0.6382	0.1969	-3.2405	0.0012
Density of Open Space:Mixed	-0.2580	0.9497	-0.2717	0.7859
Density of Open Space:Office	-0.1203	0.3193	-0.3767	0.7064
Density of Open Space:Retail	-0.1696	0.1677	-1.0111	0.3120
Density of Major Local Roads:Industrial	-0.0396	0.0168	-2.3525	0.0186
Density of Major Local Roads:Mixed	-0.0032	0.0782	-0.0416	0.9669
Density of Major Local Roads:Office	-0.0105	0.0204	-0.5147	0.6068
Density of Major Local Roads:Retail	-0.0268	0.0118	-2.2657	0.0235
Density of Railways:Industrial	-0.0144	0.0112	-1.2863	0.1983
Density of Railways:Mixed	0.0074	0.0392	0.1881	0.8508

Variables	Estimate	Standard Error	Z Value	P Value
Density of Railways:Office	0.0098	0.0093	1.0494	0.2940
Density of Railways:Retail	-0.0360	0.0134	-2.6802	0.0074
Density of Railways (100m Buffer):Industrial	0.0494	0.1129	0.4378	0.6615
Density of Railways (100m Buffer):Mixed	0.1209	0.4653	0.2598	0.7951
Density of Railways (100m Buffer):Office	-0.3460	0.1739	-1.9899	0.0466
Density of Railways (100m Buffer):Retail	-0.3388	0.2046	-1.6558	0.0978
Auto Accessibility to Retail Cluster:Industrial	8.7937	18.3160	0.4801	0.6312
Auto Accessibility to Retail Cluster:Mixed	0.7933	55.8611	0.0142	0.9887
Auto Accessibility to Retail Cluster:Office	-77.1405	24.6337	-3.1315	0.0017
Auto Accessibility to Retail Cluster:Retail	13.3287	13.2660	1.0047	0.3150
Auto Accessibility to Industry Cluster:Industrial	3.8490	7.3052	0.5269	0.5983
Auto Accessibility to Industry Cluster:Mixed	4.7148	24.6276	0.1914	0.8482
Auto Accessibility to Industry Cluster:Office	-23.7795	12.8024	-1.8574	0.0633
Auto Accessibility to Industry Cluster:Retail	-22.1081	7.8229	-2.8261	0.0047
Auto Accessibility to Office Cluster:Industrial	-17.1074	6.7951	-2.5176	0.0118
Auto Accessibility to Office Cluster:Mixed	14.7759	18.5450	0.7968	0.4256
Auto Accessibility to Office Cluster:Office	6.5136	3.4169	1.9063	0.0566
Auto Accessibility to Office Cluster:Retail	1.4945	2.9219	0.5115	0.6090
Distance to the Nearest Bus Stop:Industrial	-0.0879	0.1732	-0.5076	0.6117
Distance to the Nearest Bus Stop:Mixed	-0.2233	0.6132	-0.3642	0.7157
Distance to the Nearest Bus Stop:Office	-0.0097	0.1854	-0.0524	0.9582
Distance to the Nearest Bus Stop:Retail	-0.1611	0.0929	-1.7341	0.0829
Distance to the Nearest Metro Station:Industrial	-0.0255	0.0527	-0.4843	0.6282
Distance to the Nearest Metro Station:Mixed	-0.0822	0.2280	-0.3605	0.7185
Distance to the Nearest Metro Station:Office	-0.1245	0.0770	-1.6176	0.1057
Distance to the Nearest Metro Station:Retail	-0.0989	0.0386	-2.5649	0.0103
Distance to the Nearest Airport:Industrial	-0.0081	0.0156	-0.5214	0.6021
Distance to the Nearest Airport:Mixed	0.0150	0.0590	0.2552	0.7986
Distance to the Nearest Airport:Office	-0.0458	0.0231	-1.9846	0.0472
Distance to the Nearest Airport:Retail	-0.0002	0.0138	-0.0110	0.9913
Distance to Open Space:Industrial	0.1265	0.1335	0.9476	0.3433
Distance to Open Space:Mixed	-0.1926	0.8168	-0.2358	0.8136
Distance to Open Space:Office	-0.5654	0.4945	-1.1434	0.2529
Distance to Open Space:Retail	-0.6027	0.2343	-2.5726	0.0101
Commercial Zone:Industrial	0.2281	0.3857	0.5914	0.5543
Commercial Zone:Mixed	0.7557	0.9245	0.8175	0.4137
Commercial Zone:Office	0.8648	0.3624	2.3863	0.0170
Commercial Zone:Retail	0.9494	0.2910	3.2625	0.0011
Industrial Zone:Industrial	0.8652	0.1699	5.0918	0.0000
Industrial Zone:Mixed	0.7007	0.6267	1.1182	0.2635
Industrial Zone:Office	0.6039	0.2871	2.1036	0.0354
Industrial Zone:Retail	-0.0239	0.2625	-0.0909	0.9276

Variables	Estimate	Standard Error	Z Value	P Value
Retail Zone:Industrial	-0.9885	0.6356	-1.5551	0.1199
Retail Zone:Mixed	0.0541	0.6914	0.0782	0.9377
Retail Zone:Office	0.4288	0.3572	1.2006	0.2299
Retail Zone:Retail	1.2904	0.1567	8.2365	0.0000
Residential Zone:Industrial	0.4175	0.5380	0.7760	0.4377
Residential Zone:Mixed	0.5078	1.7097	0.2970	0.7664
Residential Zone:Office	1.1859	0.3523	3.3663	0.0008
Residential Zone:Retail	1.2783	0.1939	6.5926	0.0000
Toronto Downtown and Midtown:Industrial	-0.5528	1.1519	-0.4799	0.6313
Toronto Downtown and Midtown:Mixed	1.0124	2.0971	0.4828	0.6293
Toronto Downtown and Midtown:Office	2.1564	0.8873	2.4303	0.0151
Toronto Downtown and Midtown:Retail	-0.3352	0.6179	-0.5425	0.5875
Toronto East:Industrial	0.2857	0.5522	0.5173	0.6049
Toronto East:Mixed	-0.9264	1.4026	-0.6605	0.5089
Toronto East:Office	0.2778	0.9448	0.2940	0.7688
Toronto East:Retail	-0.1723	0.4477	-0.3849	0.7003
Toronto West:Industrial	0.6169	0.5855	1.0535	0.2921
Toronto West:Mixed	-1.6547	1.8896	-0.8757	0.3812
Toronto West:Office	1.5871	0.8273	1.9184	0.0551
Toronto West:Retail	-0.0819	0.4979	-0.1644	0.8694
York South:Industrial	0.2191	0.4473	0.4899	0.6242
York South:Mixed	-0.9763	1.3735	-0.7108	0.4772
York South:Office	1.3619	0.8098	1.6817	0.0926
York South:Retail	-0.6799	0.4700	-1.4467	0.1480
York North:Industrial	-0.4996	0.6695	-0.7463	0.4555
York North:Mixed	-0.9540	1.7408	-0.5480	0.5837
York North:Office	0.9535	0.9495	1.0042	0.3153
York North:Retail	-0.1667	0.5437	-0.3066	0.7591
Mississauga:Industrial	0.2070	0.4375	0.4731	0.6362
Mississauga:Mixed	-2.2718	1.4168	-1.6035	0.1088
Mississauga:Office	-0.7917	0.8771	-0.9027	0.3667
Mississauga:Retail	0.1746	0.4265	0.4094	0.6822
Brampton:Industrial	-0.0141	0.4404	-0.0320	0.9745
Brampton:Mixed	0.4508	1.3975	0.3226	0.7470
Brampton:Office	0.5909	0.7832	0.7544	0.4506
Brampton:Retail	0.4291	0.3780	1.1350	0.2564
Caledon and Milton:Industrial	-0.4568	0.4583	-0.9967	0.3189
Caledon and Milton:Mixed	-2.0217	1.7051	-1.1857	0.2357
Caledon and Milton:Office	-0.2960	0.8579	-0.3450	0.7301
Caledon and Milton:Retail	-0.5824	0.4302	-1.3537	0.1758
Oakville and Burlington:Industrial	0.1355	0.4862	0.2788	0.7804
Oakville and Burlington:Mixed	-1.2035	1.3377	-0.8997	0.3683

Variables	Estimate	Standard Error	Z Value	P Value
Oakville and Burlington:Office	1.0333	0.6894	1.4988	0.1339
Oakville and Burlington:Retail	-0.8625	0.4325	-1.9944	0.0461
Airport:Industrial	0.5995	0.5867	1.0218	0.3069
Airport:Mixed	-1.8950	1.7116	-1.1072	0.2682
Airport:Office	0.9588	0.8168	1.1738	0.2405
Airport:Retail	0.2924	0.6336	0.4615	0.6444
Durham South:Industrial	-0.2003	0.7009	-0.2857	0.7751
Durham South:Mixed	-1.5856	2.1215	-0.7474	0.4548
Durham South:Office	0.7395	1.0241	0.7220	0.4703
Durham South:Retail	-0.2692	0.6055	-0.4445	0.6567
Durham North:Industrial	0.3535	0.8596	0.4112	0.6809
Durham North:Mixed	-1.7593	2.8814	-0.6106	0.5415
Durham North:Office	1.2293	1.7521	0.7016	0.4829
Durham North:Retail	-0.0991	0.7690	-0.1289	0.8974

Notes: Log-Likelihood: -2,996.62. McFadden's ρ^2: 0.1941. Choice occasions: 7,739; Parcels: 1,551. Change of Sale Price is the only random parameter (normally distributed; 200 Halton draws). NO is the reference alternative and Hamilton is the baseline region.

Table A5. Full summary of the "3-Year Lag, 2018 to 2023" model (for lag comparison)

Variables	Estimate	Standard Error	Z Value	P Value
(Intercept):Industrial	-3.7845	0.8104	-4.6701	0.0000
(Intercept):Mixed	-5.4008	2.8297	-1.9086	0.0563
(Intercept):Office	-2.2676	1.2706	-1.7846	0.0743
(Intercept):Retail	-2.7527	0.7700	-3.5751	0.0004
# Projects Developed (3-Year Lag)	0.0407	0.0233	1.7463	0.0808
Rent Price	0.0510	0.0209	2.4350	0.0149
Change of Sale Price	0.0621	0.0177	3.5044	0.0005
S.D. of Change of Sale Price	0.0339	0.0134	2.5217	0.0117
Change of Cap Rate	3.0949	0.5603	5.5236	0.0000
Change in # Leasing Deals	0.0045	0.0012	3.8538	0.0001
# Sales Listed	0.0022	0.0034	0.6353	0.5252
Parcel Size:Industrial	4.0056	0.7610	5.2637	0.0000
Parcel Size:Mixed	3.0223	3.6581	0.8262	0.4087
Parcel Size:Office	-1.5280	1.8961	-0.8059	0.4203
Parcel Size:Retail	2.1975	0.6801	3.2312	0.0012
Commercial Supply Mix:Industrial	0.4419	0.4447	0.9936	0.3204
Commercial Supply Mix:Mixed	1.1051	1.5258	0.7243	0.4689
Commercial Supply Mix:Office	0.7335	0.5692	1.2886	0.1975
Commercial Supply Mix:Retail	-0.2931	0.3242	-0.9040	0.3660
# Business Establishments:Industrial	-0.6211	0.2279	-2.7249	0.0064
# Business Establishments:Mixed	-0.2683	0.6918	-0.3879	0.6981
# Business Establishments:Office	-0.0537	0.0343	-1.5667	0.1172

Variables	Estimate	Standard Error	Z Value	P Value
# Business Establishments:Retail	-0.0463	0.0347	-1.3359	0.1816
# Residential Addresses:Industrial	1.5137	1.0644	1.4221	0.1550
# Residential Addresses:Mixed	-2.8371	3.3554	-0.8455	0.3978
# Residential Addresses:Office	-0.4977	0.6272	-0.7936	0.4274
# Residential Addresses:Retail	0.2124	0.5104	0.4161	0.6773
# Buildings of All Type (100m Buffer):Industrial	0.0092	0.0041	2.2408	0.0250
# Buildings of All Type (100m Buffer):Mixed	-0.0008	0.0131	-0.0613	0.9511
# Buildings of All Type (100m Buffer):Office	0.0007	0.0047	0.1583	0.8743
# Buildings of All Type (100m Buffer):Retail	0.0034	0.0020	1.6678	0.0954
Density of Developed Lands:Industrial	0.0027	0.0041	0.6525	0.5141
Density of Developed Lands:Mixed	-0.0106	0.0169	-0.6289	0.5294
Density of Developed Lands:Office	0.0205	0.0079	2.5974	0.0094
Density of Developed Lands:Retail	0.0023	0.0044	0.5228	0.6011
Density of Open Space:Industrial	-0.6576	0.1990	-3.3051	0.0009
Density of Open Space:Mixed	-0.2585	0.9493	-0.2723	0.7854
Density of Open Space:Office	-0.1279	0.3188	-0.4012	0.6882
Density of Open Space:Retail	-0.1652	0.1677	-0.9850	0.3246
Density of Major Local Roads:Industrial	-0.0414	0.0170	-2.4316	0.0150
Density of Major Local Roads:Mixed	-0.0034	0.0782	-0.0436	0.9652
Density of Major Local Roads:Office	-0.0108	0.0204	-0.5283	0.5973
Density of Major Local Roads:Retail	-0.0273	0.0118	-2.3200	0.0203
Density of Railways:Industrial	-0.0156	0.0113	-1.3763	0.1687
Density of Railways:Mixed	0.0071	0.0392	0.1818	0.8558
Density of Railways:Office	0.0101	0.0093	1.0865	0.2773
Density of Railways:Retail	-0.0375	0.0135	-2.7866	0.0053
Density of Railways (100m Buffer):Industrial	0.0483	0.1139	0.4238	0.6717
Density of Railways (100m Buffer):Mixed	0.1260	0.4649	0.2710	0.7864
Density of Railways (100m Buffer):Office	-0.3520	0.1752	-2.0090	0.0445
Density of Railways (100m Buffer):Retail	-0.3320	0.2043	-1.6249	0.1042
Auto Accessibility to Retail Cluster:Industrial	9.2571	18.4316	0.5022	0.6155
Auto Accessibility to Retail Cluster:Mixed	0.9722	55.8359	0.0174	0.9861
Auto Accessibility to Retail Cluster:Office	-78.3520	24.6046	-3.1844	0.0015
Auto Accessibility to Retail Cluster:Retail	14.0443	13.2950	1.0564	0.2908
Auto Accessibility to Industry Cluster:Industrial	6.5576	7.3794	0.8886	0.3742
Auto Accessibility to Industry Cluster:Mixed	5.2167	24.6250	0.2118	0.8322
Auto Accessibility to Industry Cluster:Office	-24.1894	12.8458	-1.8831	0.0597
Auto Accessibility to Industry Cluster:Retail	-22.3651	7.8371	-2.8537	0.0043
Auto Accessibility to Office Cluster:Industrial	-17.9090	6.8244	-2.6242	0.0087
Auto Accessibility to Office Cluster:Mixed	14.7762	18.5177	0.7979	0.4249
Auto Accessibility to Office Cluster:Office	7.0690	3.4212	2.0662	0.0388
Auto Accessibility to Office Cluster:Retail	1.9225	2.9281	0.6566	0.5115
Distance to the Nearest Bus Stop:Industrial	-0.0874	0.1742	-0.5018	0.6158

Variables	Estimate	Standard Error	Z Value	P Value
Distance to the Nearest Bus Stop:Mixed	-0.2223	0.6137	-0.3622	0.7172
Distance to the Nearest Bus Stop:Office	-0.0036	0.1857	-0.0195	0.9845
Distance to the Nearest Bus Stop:Retail	-0.1661	0.0929	-1.7887	0.0737
Distance to the Nearest Metro Station:Industrial	-0.0237	0.0531	-0.4455	0.6559
Distance to the Nearest Metro Station:Mixed	-0.0818	0.2279	-0.3588	0.7197
Distance to the Nearest Metro Station:Office	-0.1261	0.0770	-1.6386	0.1013
Distance to the Nearest Metro Station:Retail	-0.0998	0.0384	-2.5967	0.0094
Distance to the Nearest Airport:Industrial	-0.0093	0.0157	-0.5884	0.5563
Distance to the Nearest Airport:Mixed	0.0152	0.0589	0.2573	0.7970
Distance to the Nearest Airport:Office	-0.0471	0.0231	-2.0362	0.0417
Distance to the Nearest Airport:Retail	0.0005	0.0138	0.0332	0.9735
Distance to Open Space:Industrial	0.1241	0.1344	0.9235	0.3558
Distance to Open Space:Mixed	-0.1906	0.8174	-0.2332	0.8156
Distance to Open Space:Office	-0.5769	0.4953	-1.1648	0.2441
Distance to Open Space:Retail	-0.6137	0.2339	-2.6233	0.0087
Commercial Zone:Industrial	0.1947	0.3891	0.5005	0.6168
Commercial Zone:Mixed	0.7627	0.9247	0.8248	0.4095
Commercial Zone:Office	0.8759	0.3634	2.4103	0.0159
Commercial Zone:Retail	0.9638	0.2899	3.3247	0.0009
Industrial Zone:Industrial	0.8871	0.1725	5.1423	0.0000
Industrial Zone:Mixed	0.7102	0.6267	1.1331	0.2572
Industrial Zone:Office	0.5999	0.2875	2.0866	0.0369
Industrial Zone:Retail	-0.0257	0.2625	-0.0978	0.9221
Retail Zone:Industrial	-0.9783	0.6402	-1.5283	0.1265
Retail Zone:Mixed	0.0538	0.6918	0.0778	0.9380
Retail Zone:Office	0.4228	0.3569	1.1844	0.2362
Retail Zone:Retail	1.2967	0.1569	8.2624	0.0000
Residential Zone:Industrial	0.4482	0.5334	0.8402	0.4008
Residential Zone:Mixed	0.5086	1.7088	0.2977	0.7660
Residential Zone:Office	1.1727	0.3538	3.3141	0.0009
Residential Zone:Retail	1.2784	0.1941	6.5849	0.0000
Toronto Downtown and Midtown:Industrial	-0.6513	1.1470	-0.5678	0.5701
Toronto Downtown and Midtown:Mixed	0.9943	2.0965	0.4742	0.6353
Toronto Downtown and Midtown:Office	2.1627	0.8895	2.4313	0.0150
Toronto Downtown and Midtown:Retail	-0.4045	0.6227	-0.6495	0.5160
Toronto East:Industrial	0.3072	0.5541	0.5544	0.5793
Toronto East:Mixed	-0.9196	1.4008	-0.6565	0.5115
Toronto East:Office	0.2732	0.9458	0.2888	0.7727
Toronto East:Retail	-0.2326	0.4529	-0.5135	0.6076
Toronto West:Industrial	0.5694	0.5892	0.9663	0.3339
Toronto West:Mixed	-1.6590	1.8883	-0.8786	0.3796
Toronto West:Office	1.5691	0.8283	1.8942	0.0582

Variables	Estimate	Standard Error	Z Value	P Value
Toronto West:Retail	-0.1277	0.5016	-0.2547	0.7990
York South:Industrial	0.2455	0.4496	0.5460	0.5851
York South:Mixed	-0.9660	1.3720	-0.7041	0.4814
York South:Office	1.3897	0.8114	1.7128	0.0868
York South:Retail	-0.7309	0.4758	-1.5360	0.1245
York North:Industrial	-0.4972	0.6728	-0.7391	0.4599
York North:Mixed	-0.9680	1.7393	-0.5565	0.5779
York North:Office	0.9838	0.9515	1.0338	0.3012
York North:Retail	-0.2315	0.5453	-0.4246	0.6712
Mississauga:Industrial	0.1826	0.4400	0.4150	0.6781
Mississauga:Mixed	-2.2797	1.4155	-1.6105	0.1073
Mississauga:Office	-0.7961	0.8800	-0.9047	0.3656
Mississauga:Retail	0.1517	0.4292	0.3534	0.7238
Brampton:Industrial	-0.1019	0.4418	-0.2306	0.8176
Brampton:Mixed	0.4479	1.3965	0.3207	0.7484
Brampton:Office	0.6007	0.7845	0.7656	0.4439
Brampton:Retail	0.4172	0.3787	1.1017	0.2706
Caledon and Milton:Industrial	-0.4861	0.4595	-1.0578	0.2901
Caledon and Milton:Mixed	-2.0414	1.7031	-1.1986	0.2307
Caledon and Milton:Office	-0.2778	0.8592	-0.3233	0.7465
Caledon and Milton:Retail	-0.6377	0.4312	-1.4791	0.1391
Oakville and Burlington:Industrial	0.1455	0.4876	0.2984	0.7654
Oakville and Burlington:Mixed	-1.1962	1.3360	-0.8953	0.3706
Oakville and Burlington:Office	1.0899	0.6928	1.5731	0.1157
Oakville and Burlington:Retail	-0.9161	0.4328	-2.1164	0.0343
Airport:Industrial	0.4620	0.5940	0.7778	0.4367
Airport:Mixed	-1.9239	1.7098	-1.1252	0.2605
Airport:Office	0.9427	0.8187	1.1515	0.2495
Airport:Retail	0.2084	0.6352	0.3280	0.7429
Durham South:Industrial	-0.1769	0.7052	-0.2508	0.8019
Durham South:Mixed	-1.5864	2.1195	-0.7485	0.4542
Durham South:Office	0.7842	1.0253	0.7648	0.4444
Durham South:Retail	-0.3122	0.6088	-0.5128	0.6081
Durham North:Industrial	0.4033	0.8666	0.4654	0.6416
Durham North:Mixed	-1.7493	2.8789	-0.6076	0.5434
Durham North:Office	1.2983	1.7546	0.7399	0.4593
Durham North:Retail	-0.1250	0.7717	-0.1620	0.8713

Notes: Log-Likelihood: -3,004.78. McFadden's ρ^2: 0.1919. Choice occasions: 7,739; Parcels: 1,551. Change of Sale Price is the only random parameter (normally distributed; 200 Halton draws). NO is the reference alternative and Hamilton is the baseline region.

Table A6. Full summary of the "5-Year Lag, 2018 to 2023" model (for lag comparison)

Variables	Estimate	Standard Error	Z Value	P Value
(Intercept):Industrial	-3.7825	0.8146	-4.6435	0.0000
(Intercept):Mixed	-5.3992	2.8290	-1.9085	0.0563
(Intercept):Office	-2.2145	1.2707	-1.7427	0.0814
(Intercept):Retail	-2.7455	0.7701	-3.5650	0.0004
# Projects Developed (5-Year Lag)	0.0066	0.0162	0.4106	0.6814
Rent Price	0.0498	0.0210	2.3784	0.0174
Change of Sale Price	0.0624	0.0177	3.5177	0.0004
S.D. of Change of Sale Price	0.0360	0.0130	2.7702	0.0056
Change of Cap Rate	3.1654	0.5607	5.6452	0.0000
Change in # Leasing Deals	0.0046	0.0012	3.8418	0.0001
# Sales Listed	0.0022	0.0034	0.6519	0.5145
Parcel Size:Industrial	4.0692	0.7668	5.3069	0.0000
Parcel Size:Mixed	3.0420	3.6616	0.8308	0.4061
Parcel Size:Office	-1.5218	1.8963	-0.8025	0.4223
Parcel Size:Retail	2.2266	0.6813	3.2679	0.0011
Commercial Supply Mix:Industrial	0.4682	0.4465	1.0486	0.2944
Commercial Supply Mix:Mixed	1.0997	1.5259	0.7207	0.4711
Commercial Supply Mix:Office	0.7395	0.5688	1.3000	0.1936
Commercial Supply Mix:Retail	-0.2947	0.3243	-0.9085	0.3636
# Business Establishments:Industrial	-0.6879	0.2284	-3.0117	0.0026
# Business Establishments:Mixed	-0.2699	0.6913	-0.3904	0.6963
# Business Establishments:Office	-0.0536	0.0342	-1.5657	0.1174
# Business Establishments:Retail	-0.0447	0.0351	-1.2735	0.2028
# Residential Addresses:Industrial	1.6360	1.0691	1.5303	0.1260
# Residential Addresses:Mixed	-2.8426	3.3537	-0.8476	0.3967
# Residential Addresses:Office	-0.5092	0.6275	-0.8115	0.4171
# Residential Addresses:Retail	0.2702	0.5141	0.5256	0.5991
# Buildings of All Type (100m Buffer):Industrial	0.0091	0.0041	2.2117	0.0270
# Buildings of All Type (100m Buffer):Mixed	-0.0008	0.0131	-0.0628	0.9499
# Buildings of All Type (100m Buffer):Office	0.0008	0.0047	0.1764	0.8600
# Buildings of All Type (100m Buffer):Retail	0.0033	0.0021	1.6278	0.1036
Density of Developed Lands:Industrial	0.0030	0.0041	0.7205	0.4712
Density of Developed Lands:Mixed	-0.0107	0.0169	-0.6350	0.5254
Density of Developed Lands:Office	0.0209	0.0079	2.6479	0.0081
Density of Developed Lands:Retail	0.0024	0.0044	0.5356	0.5922
Density of Open Space:Industrial	-0.6752	0.1998	-3.3788	0.0007
Density of Open Space:Mixed	-0.2577	0.9493	-0.2715	0.7860
Density of Open Space:Office	-0.1352	0.3189	-0.4239	0.6716
Density of Open Space:Retail	-0.1552	0.1673	-0.9275	0.3537
Density of Major Local Roads:Industrial	-0.0428	0.0171	-2.5003	0.0124

Variables	Estimate	Standard Error	Z Value	P Value
Density of Major Local Roads:Mixed	-0.0034	0.0781	-0.0431	0.9656
Density of Major Local Roads:Office	-0.0116	0.0204	-0.5701	0.5686
Density of Major Local Roads:Retail	-0.0281	0.0118	-2.3799	0.0173
Density of Railways:Industrial	-0.0165	0.0113	-1.4576	0.1450
Density of Railways:Mixed	0.0071	0.0392	0.1805	0.8568
Density of Railways:Office	0.0102	0.0093	1.0943	0.2738
Density of Railways:Retail	-0.0388	0.0135	-2.8805	0.0040
Density of Railways (100m Buffer):Industrial	0.0479	0.1142	0.4193	0.6750
Density of Railways (100m Buffer):Mixed	0.1302	0.4645	0.2803	0.7792
Density of Railways (100m Buffer):Office	-0.3573	0.1757	-2.0332	0.0420
Density of Railways (100m Buffer):Retail	-0.3300	0.2041	-1.6169	0.1059
Auto Accessibility to Retail Cluster:Industrial	8.9938	18.4782	0.4867	0.6265
Auto Accessibility to Retail Cluster:Mixed	1.3049	55.8280	0.0234	0.9814
Auto Accessibility to Retail Cluster:Office	-78.2549	24.6083	-3.1800	0.0015
Auto Accessibility to Retail Cluster:Retail	15.9166	13.3410	1.1931	0.2328
Auto Accessibility to Industry Cluster:Industrial	8.8121	7.4229	1.1872	0.2352
Auto Accessibility to Industry Cluster:Mixed	5.4928	24.6196	0.2231	0.8235
Auto Accessibility to Industry Cluster:Office	-24.7990	12.8461	-1.9305	0.0535
Auto Accessibility to Industry Cluster:Retail	-22.1918	7.8362	-2.8320	0.0046
Auto Accessibility to Office Cluster:Industrial	-18.3430	6.8311	-2.6852	0.0072
Auto Accessibility to Office Cluster:Mixed	14.8630	18.4952	0.8036	0.4216
Auto Accessibility to Office Cluster:Office	7.4456	3.4313	2.1699	0.0300
Auto Accessibility to Office Cluster:Retail	1.9702	2.9221	0.6742	0.5002
Distance to the Nearest Bus Stop:Industrial	-0.0933	0.1753	-0.5322	0.5946
Distance to the Nearest Bus Stop:Mixed	-0.2192	0.6131	-0.3575	0.7207
Distance to the Nearest Bus Stop:Office	0.0012	0.1858	0.0064	0.9949
Distance to the Nearest Bus Stop:Retail	-0.1687	0.0930	-1.8145	0.0696
Distance to the Nearest Metro Station:Industrial	-0.0244	0.0534	-0.4580	0.6470
Distance to the Nearest Metro Station:Mixed	-0.0820	0.2278	-0.3601	0.7188
Distance to the Nearest Metro Station:Office	-0.1277	0.0770	-1.6590	0.0971
Distance to the Nearest Metro Station:Retail	-0.0990	0.0384	-2.5768	0.0100
Distance to the Nearest Airport:Industrial	-0.0109	0.0159	-0.6852	0.4932
Distance to the Nearest Airport:Mixed	0.0152	0.0589	0.2586	0.7959
Distance to the Nearest Airport:Office	-0.0486	0.0231	-2.1012	0.0356
Distance to the Nearest Airport:Retail	0.0007	0.0138	0.0535	0.9574
Distance to Open Space:Industrial	0.1328	0.1350	0.9837	0.3252
Distance to Open Space:Mixed	-0.1899	0.8175	-0.2323	0.8163
Distance to Open Space:Office	-0.5831	0.4953	-1.1773	0.2391
Distance to Open Space:Retail	-0.6122	0.2340	-2.6167	0.0089
Commercial Zone:Industrial	0.1715	0.3902	0.4395	0.6603
Commercial Zone:Mixed	0.7680	0.9252	0.8301	0.4065
Commercial Zone:Office	0.8868	0.3631	2.4424	0.0146

Variables	Estimate	Standard Error	Z Value	P Value
Commercial Zone:Retail	0.9723	0.2895	3.3586	0.0008
Industrial Zone:Industrial	0.8957	0.1739	5.1502	0.0000
Industrial Zone:Mixed	0.7129	0.6267	1.1375	0.2553
Industrial Zone:Office	0.5976	0.2874	2.0796	0.0376
Industrial Zone:Retail	-0.0200	0.2627	-0.0762	0.9393
Retail Zone:Industrial	-0.9837	0.6431	-1.5296	0.1261
Retail Zone:Mixed	0.0549	0.6918	0.0794	0.9367
Retail Zone:Office	0.4223	0.3568	1.1835	0.2366
Retail Zone:Retail	1.3187	0.1574	8.3774	0.0000
Residential Zone:Industrial	0.4631	0.5321	0.8702	0.3842
Residential Zone:Mixed	0.5088	1.7079	0.2979	0.7658
Residential Zone:Office	1.1692	0.3538	3.3050	0.0009
Residential Zone:Retail	1.2859	0.1938	6.6339	0.0000
Toronto Downtown and Midtown:Industrial	-0.6165	1.1501	-0.5361	0.5919
Toronto Downtown and Midtown:Mixed	0.9988	2.0960	0.4765	0.6337
Toronto Downtown and Midtown:Office	2.2026	0.8904	2.4738	0.0134
Toronto Downtown and Midtown:Retail	-0.4735	0.6256	-0.7570	0.4491
Toronto East:Industrial	0.3375	0.5560	0.6071	0.5438
Toronto East:Mixed	-0.9089	1.4010	-0.6487	0.5165
Toronto East:Office	0.2905	0.9458	0.3071	0.7588
Toronto East:Retail	-0.3022	0.4541	-0.6654	0.5058
Toronto West:Industrial	0.5222	0.5914	0.8831	0.3772
Toronto West:Mixed	-1.6533	1.8888	-0.8753	0.3814
Toronto West:Office	1.5892	0.8282	1.9189	0.0550
Toronto West:Retail	-0.1961	0.5029	-0.3900	0.6965
York South:Industrial	0.2898	0.4517	0.6416	0.5211
York South:Mixed	-0.9545	1.3716	-0.6959	0.4865
York South:Office	1.4355	0.8113	1.7693	0.0768
York South:Retail	-0.8090	0.4760	-1.6995	0.0892
York North:Industrial	-0.4518	0.6764	-0.6679	0.5042
York North:Mixed	-0.9652	1.7387	-0.5551	0.5788
York North:Office	1.0399	0.9511	1.0933	0.2743
York North:Retail	-0.2724	0.5465	-0.4984	0.6182
Mississauga:Industrial	0.1493	0.4411	0.3384	0.7351
Mississauga:Mixed	-2.2869	1.4152	-1.6159	0.1061
Mississauga:Office	-0.7762	0.8795	-0.8826	0.3775
Mississauga:Retail	0.1008	0.4310	0.2338	0.8151
Brampton:Industrial	-0.1763	0.4431	-0.3978	0.6908
Brampton:Mixed	0.4493	1.3964	0.3217	0.7476
Brampton:Office	0.6261	0.7843	0.7983	0.4247
Brampton:Retail	0.4003	0.3798	1.0539	0.2919
Caledon and Milton:Industrial	-0.4985	0.4607	-1.0821	0.2792

Variables	Estimate	Standard Error	Z Value	P Value
Caledon and Milton:Mixed	-2.0441	1.7027	-1.2005	0.2299
Caledon and Milton:Office	-0.2412	0.8582	-0.2811	0.7787
Caledon and Milton:Retail	-0.6650	0.4313	-1.5419	0.1231
Oakville and Burlington:Industrial	0.1409	0.4887	0.2884	0.7731
Oakville and Burlington:Mixed	-1.1902	1.3355	-0.8912	0.3728
Oakville and Burlington:Office	1.1534	0.6927	1.6651	0.0959
Oakville and Burlington:Retail	-0.9249	0.4343	-2.1296	0.0332
Airport:Industrial	0.3352	0.5959	0.5625	0.5738
Airport:Mixed	-1.9339	1.7094	-1.1313	0.2579
Airport:Office	0.9553	0.8183	1.1674	0.2430
Airport:Retail	0.1359	0.6356	0.2138	0.8307
Durham South:Industrial	-0.1386	0.7084	-0.1956	0.8449
Durham South:Mixed	-1.5913	2.1187	-0.7511	0.4526
Durham South:Office	0.8310	1.0254	0.8104	0.4177
Durham South:Retail	-0.3681	0.6106	-0.6028	0.5467
Durham North:Industrial	0.4943	0.8725	0.5666	0.5710
Durham North:Mixed	-1.7427	2.8780	-0.6055	0.5448
Durham North:Office	1.3849	1.7548	0.7892	0.4300
Durham North:Retail	-0.1663	0.7730	-0.2152	0.8296

Notes: Log-Likelihood: -3,006.43. McFadden's ρ^2: 0.1915. Choice occasions: 7,739; Parcels: 1,551. Change of Sale Price is the only random parameter (normally distributed; 200 Halton draws). NO is the reference alternative and Hamilton is the baseline region.

6 Digital Zoning By-Law Data Availability by Municipality in the GTHA

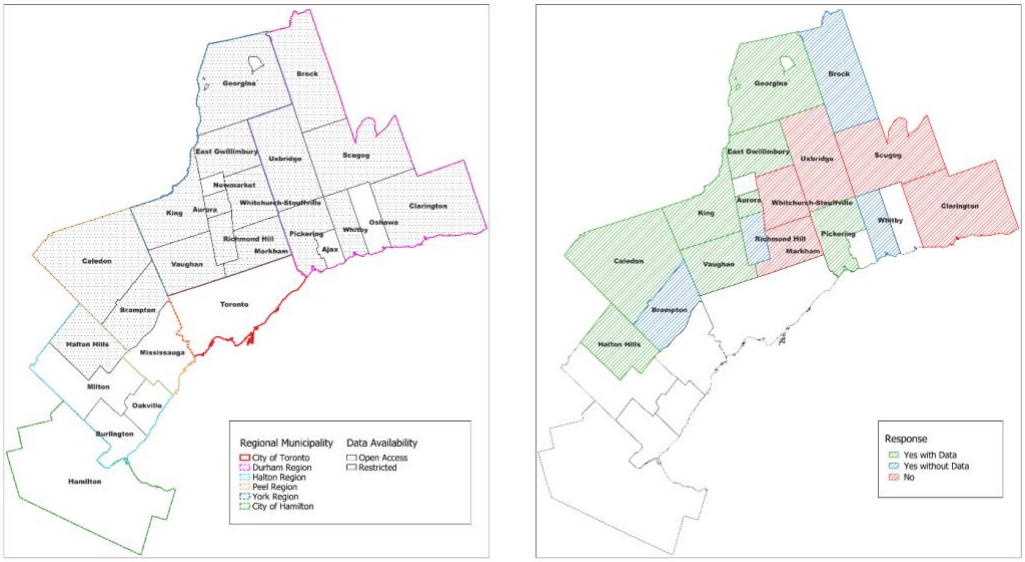


Figure A2. Digital zoning by-law data availability and response summary (Zhang, 2026)

References

McFadden, D. (1977). Quantitative methods for analyzing travel behaviour of individuals: Some recent developments (Cowles Foundation Discussion Paper No. 474). Cowles Foundation for Research in Economics, Yale University. https://elischolar.library.yale.edu/cowles-discussion-paper-series/707

Östh, J., Reggiani, A., & Nijkamp, P. (2018). Resilience and accessibility of Swedish and Dutch municipalities. *Transportation (Dordrecht)*, *45*(4), 1051–1073. https://doi.org/10.1007/s11116-017-9854-3

Zhang, J. (2026). Decoding urban evolution: A parcel-level blueprint for the ILUTE 2.0 land use module [Doctoral dissertation, University of Toronto]. University of Toronto TSpace. https://hdl.handle.net/1807/153905