



What can we learn from Big Data?

Are valuers equipped for “deep diving” into massive data

Data overview

Municipality	Count	Average of Price_per_sqm	Average of Area_sqm	Max of Stories	Average of Registered_in_cadaster	
Beograd	5907	€	1,625.81	73.40	30.00	0.78
Zvezdara	890	€	1,394.31	64.57	28.00	0.73
Novi Beograd	743	€	1,709.84	71.11	30.00	0.89
Vracar	735	€	2,186.28	85.85	21.00	0.85
Vozdovac	709	€	1,375.65	74.21	25.00	0.79
Palilula	585	€	1,214.28	66.22	22.00	0.69
Stari grad	474	€	2,474.32	80.13	22.00	0.90
Zemun	447	€	1,196.02	67.52	22.00	0.71
Savski venac	445	€	2,504.87	90.45	30.00	0.65
Cukarica	431	€	1,265.02	73.32	15.00	0.77
Rakovica	401	€	994.55	65.05	19.00	0.78
Grocka	32	€	724.23	53.94	5.00	0.81
Barajevo	4	€	414.77	52.25	6.00	1.00
Surcin	4	€	893.94	63.25	4.00	0.75
Lazarevac	3	€	680.01	83.33	5.00	0.67
Obrenovac	2	€	738.09	90.50	4.00	1.00
Mladenovac	1	€	933.33	75.00	4.00	1.00
Sopot	1	€	679.25	53.00	3.00	1.00
Grand Total	5907	€	1,625.81	73.40	30.00	0.78

Null model

Price_per_sqm is a function of:
Location (Municipality/Neighbourhood/Street)

Factor	Variance	% of total variation
Street:(Neighbourhood:Municipality)	28769	4.87%
Neighbourhood:Municipality	97102	16.45%
Municipality	313038	53.04%
Residual	151326	25.64%
Total	590235	100.00%

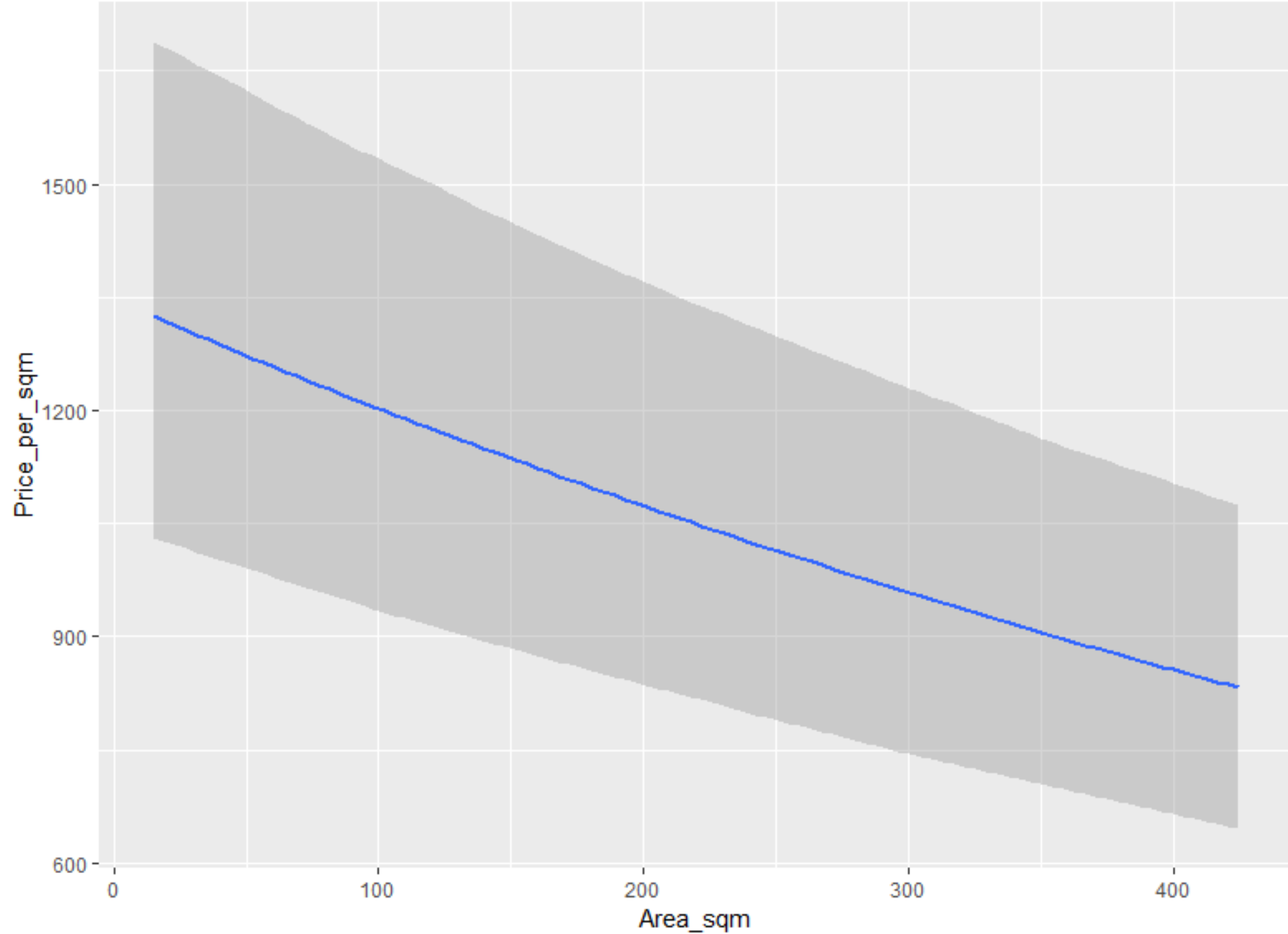
Around 75% of the total variation in price per meter squared can be explained by locations. The mantra *Location, location and location* seems to be supported by the data.

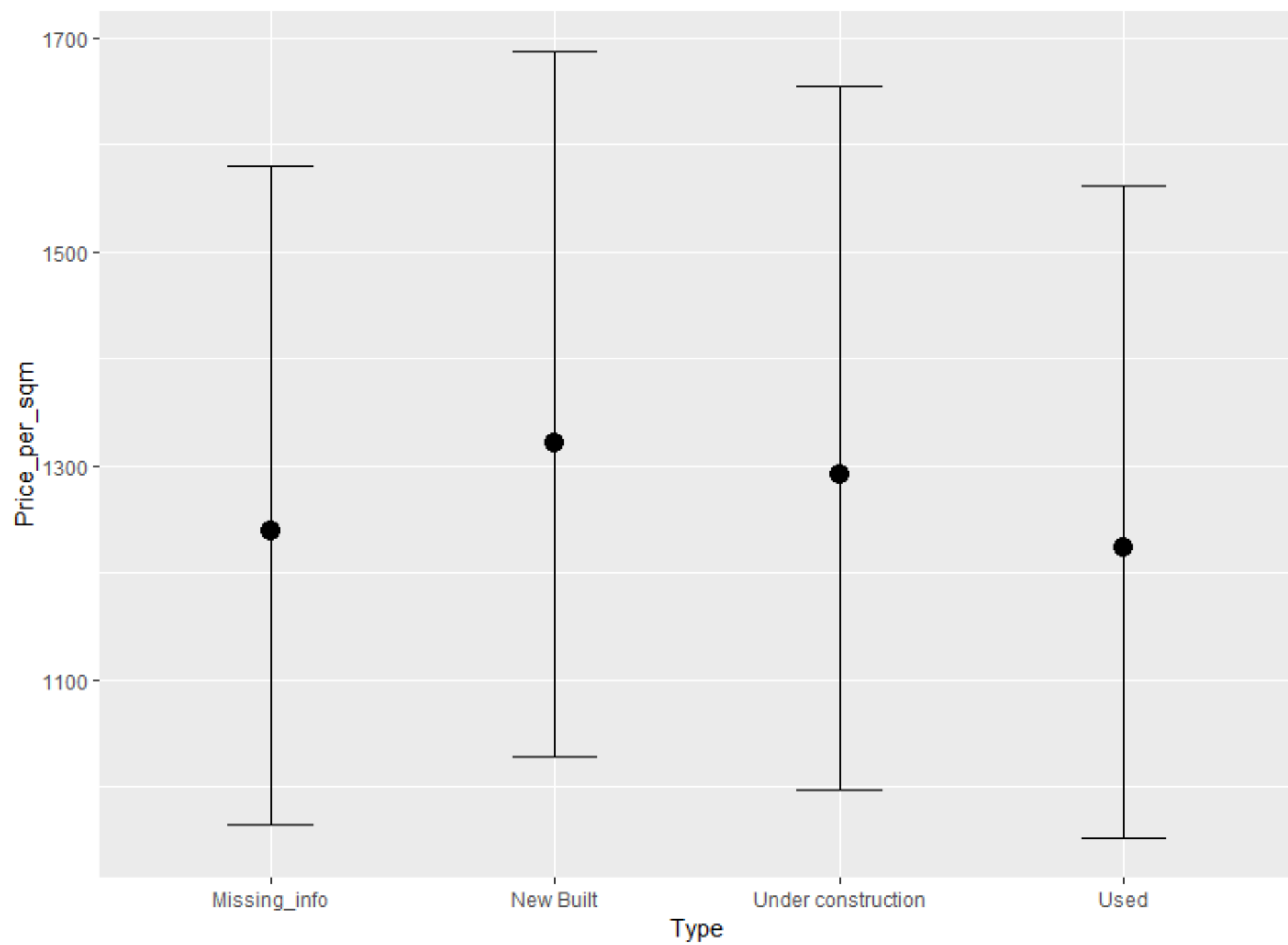
Full model (Hedonic regression model)

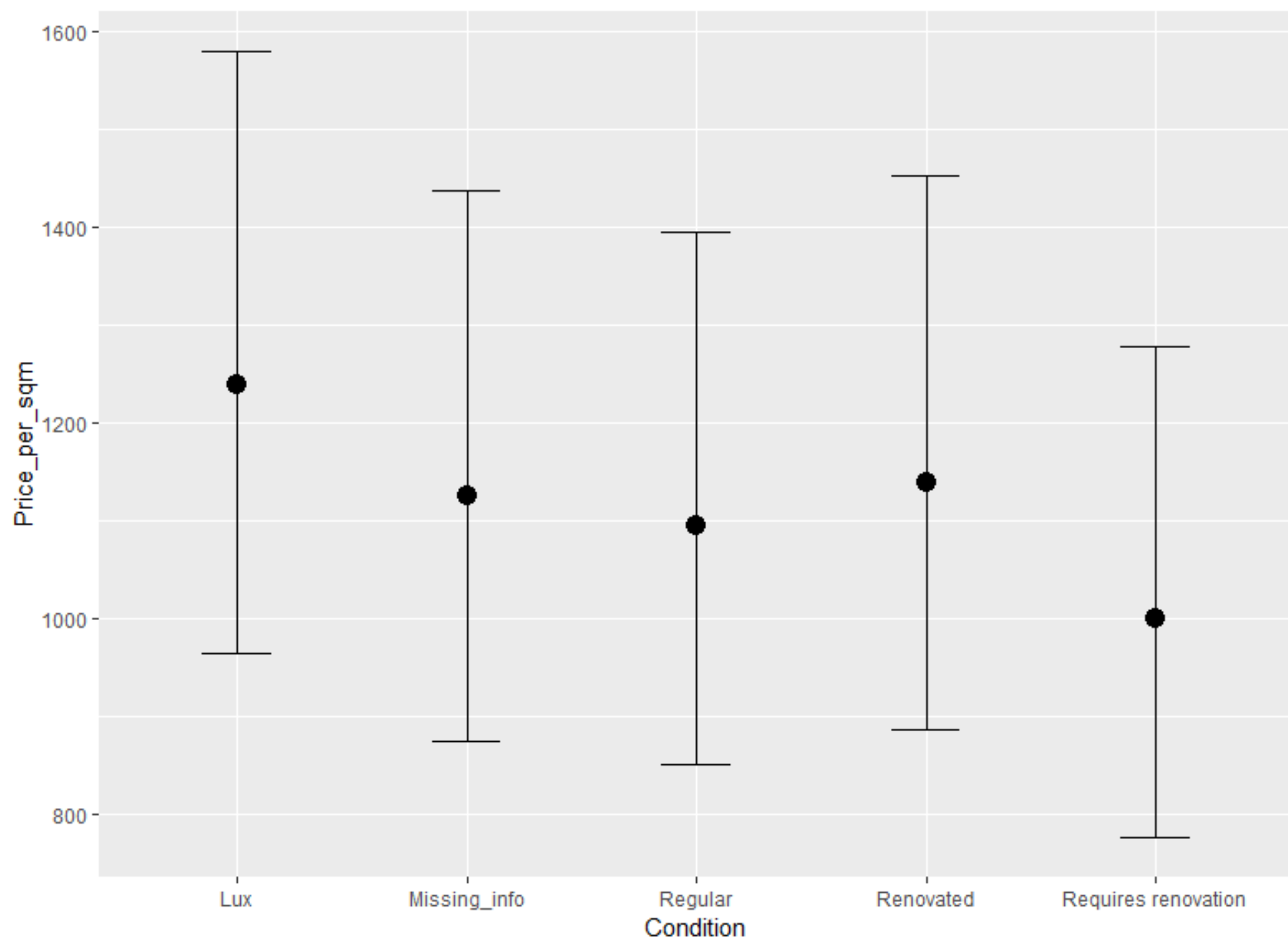
Price_per_sqm is a function of:

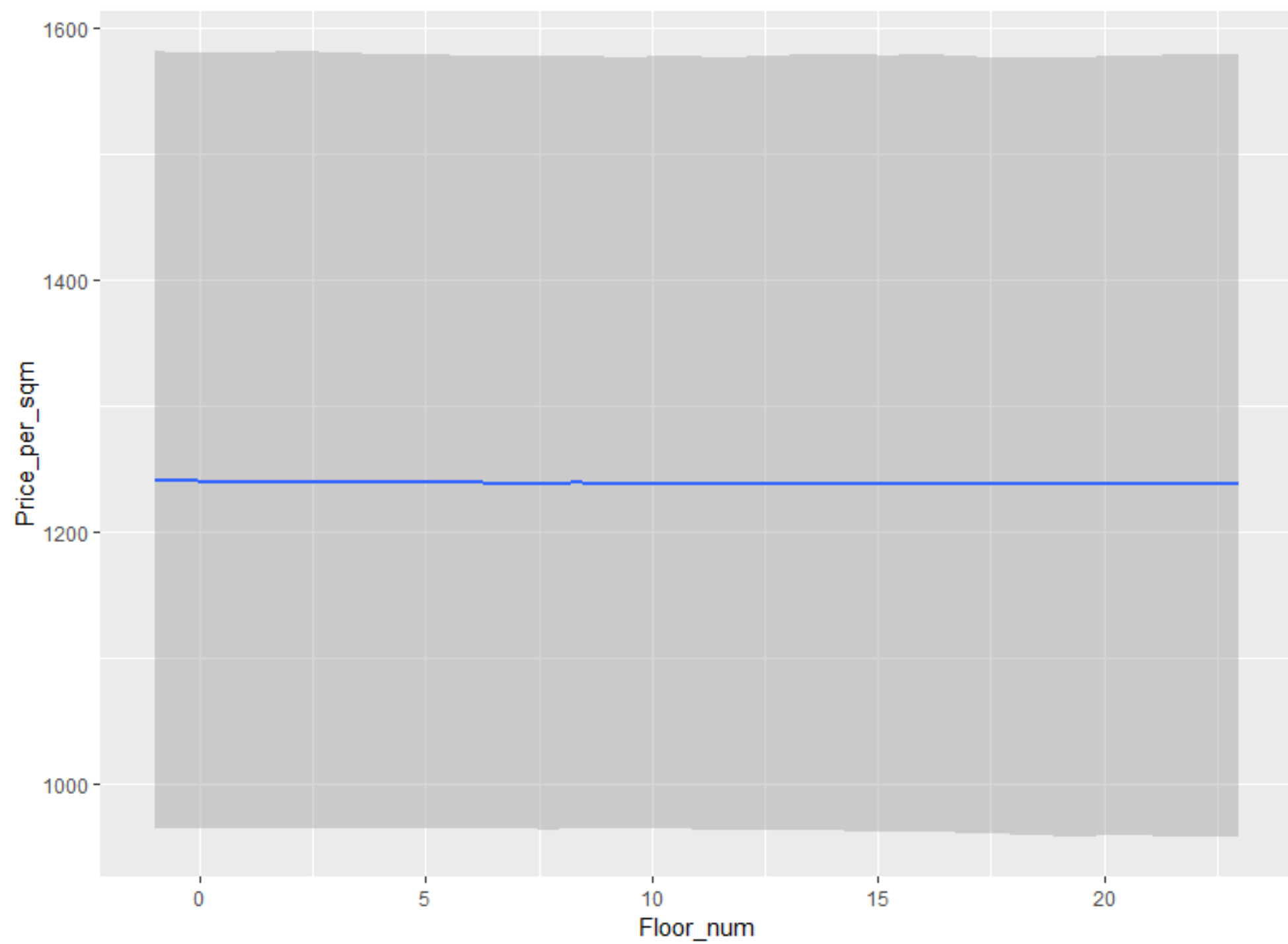
- *Location (Municipality/Neighbourhood/Street)*
- *Area_sqm (numerical value)*
- *Type (new built, used, under construction)*
- *Condition (regular, lux, renovated, requires renovation)*
- *Floor (basement, lower ground, ground, mezzanine, 1 ... n)*
- *Stories (numerical value)*
- *Not at the top floor (yes or no)*
- *Elevator (yes or no)*
- *Garage (yes or no)*
- *Basement storage (yes or no)*
- *Heating (Electric Thermal Storage, District Heating, Underfloor Heating, Central Heating, Norwegian Panel Heaters, Tiled Stove, Marble Heaters, Natural Gas)*
- *Registered in the cadaster (yes or no)*
- *Advertiser (agency, investor, owner)*

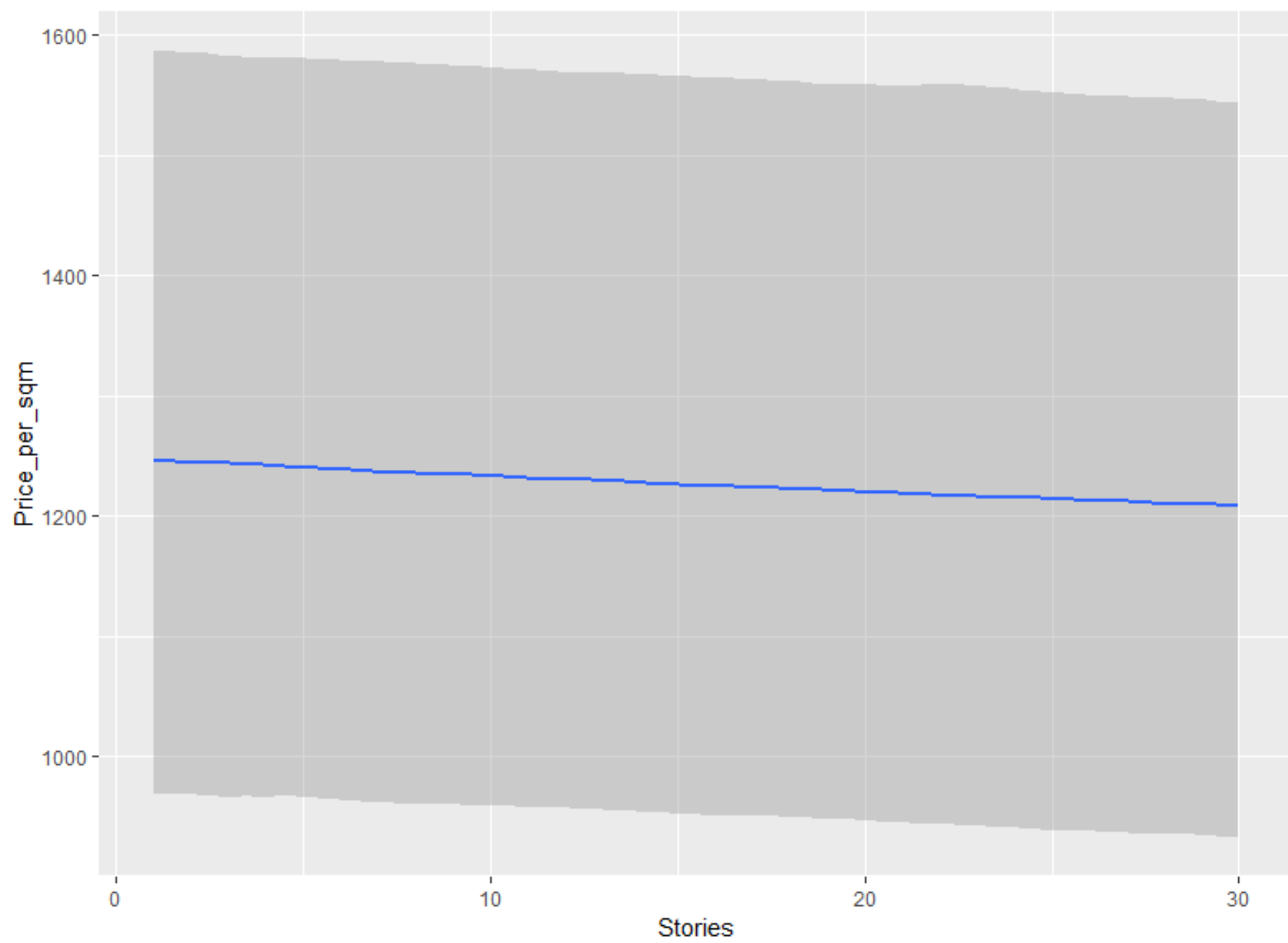
- The following slides show marginal (all remaining factors are held constant at their average/reference levels) effects for each factor.

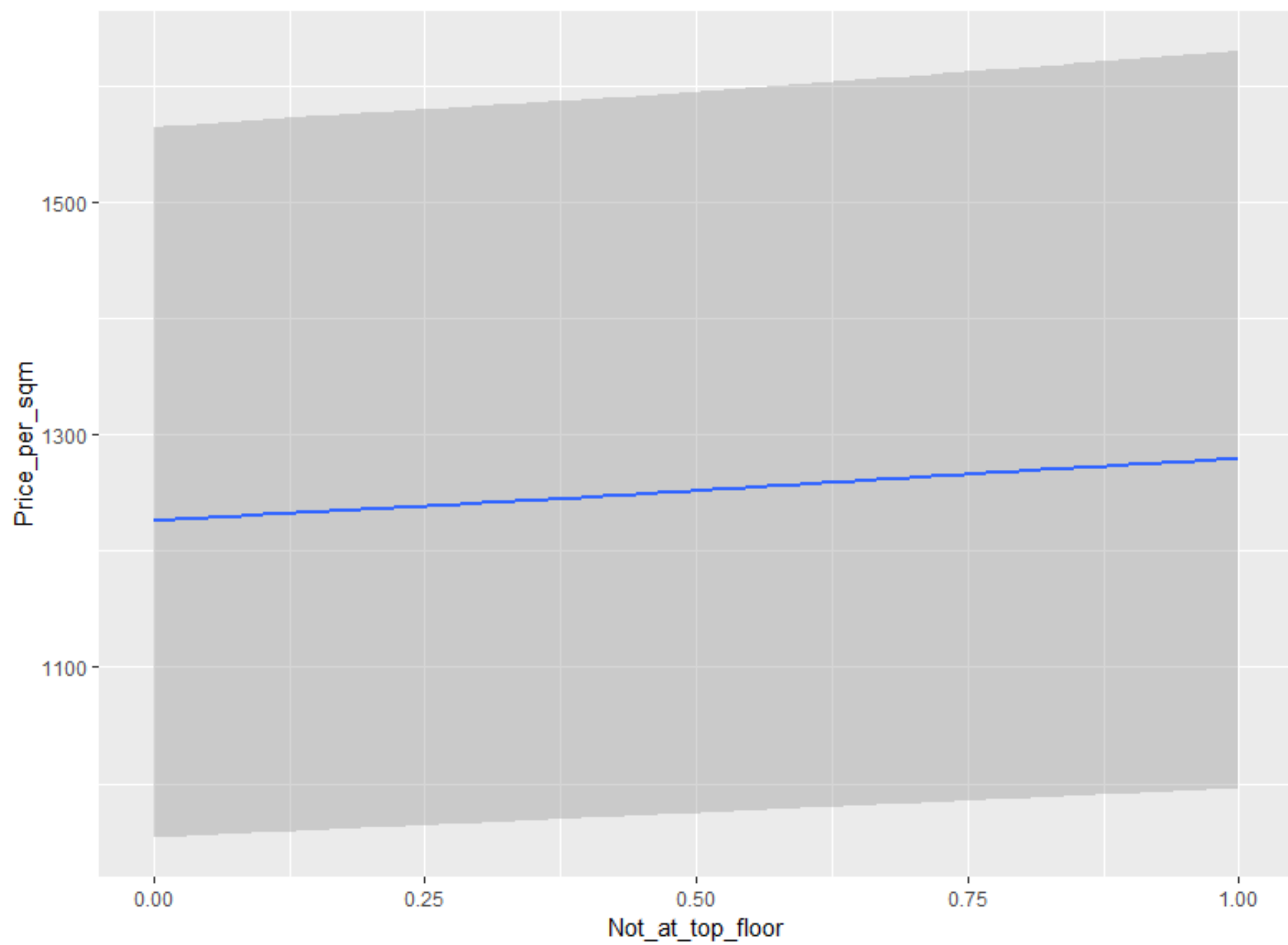


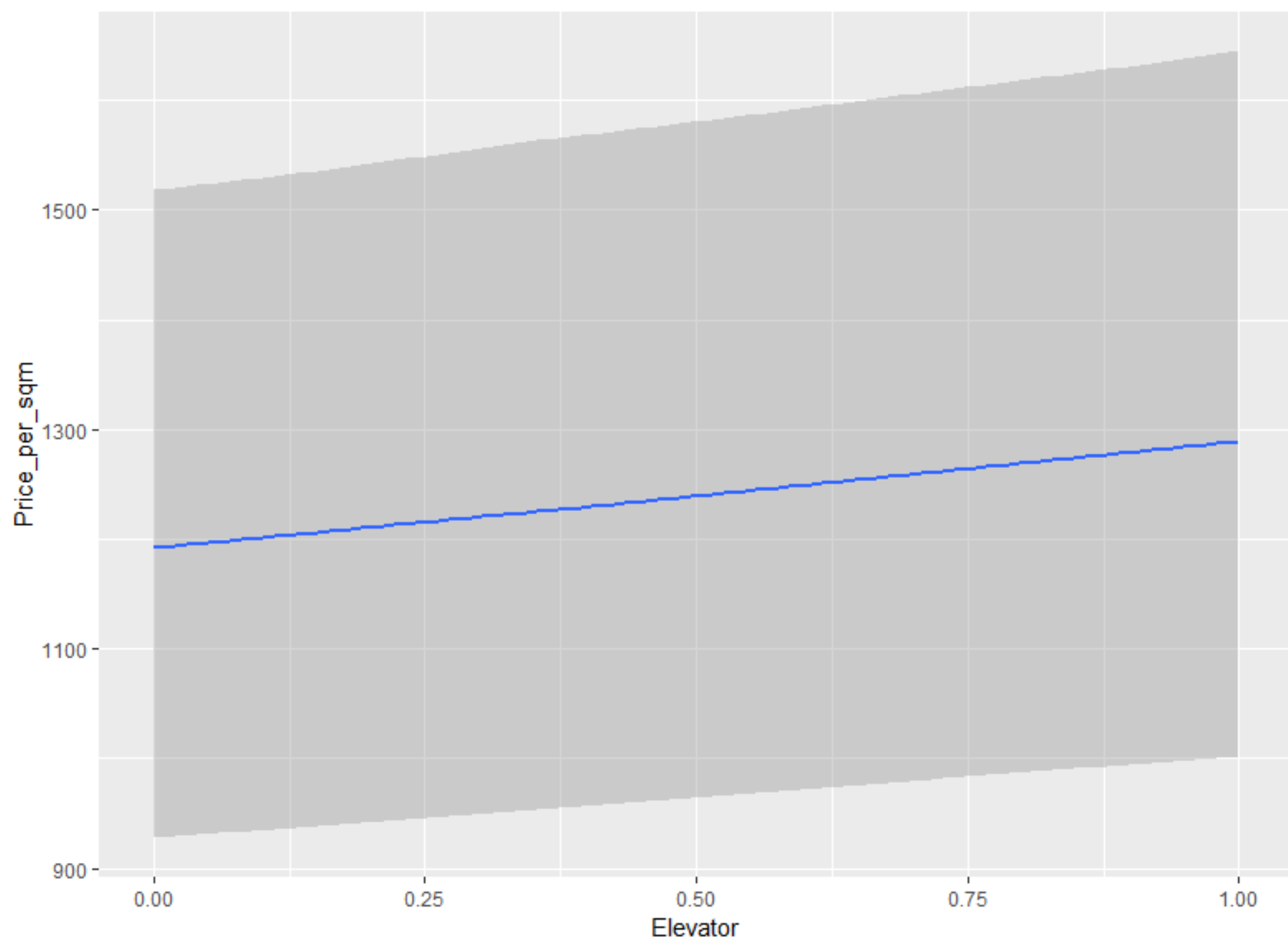


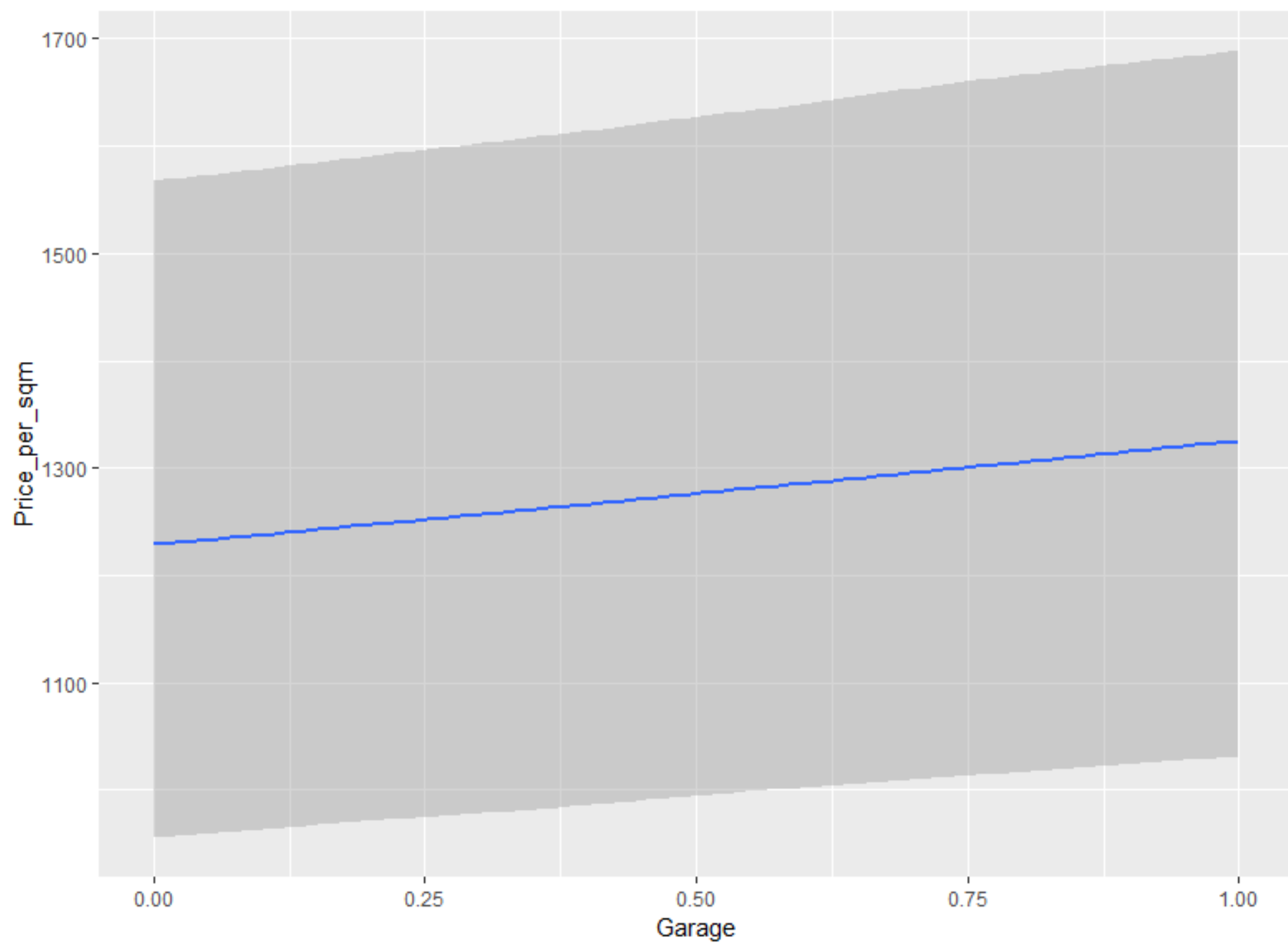


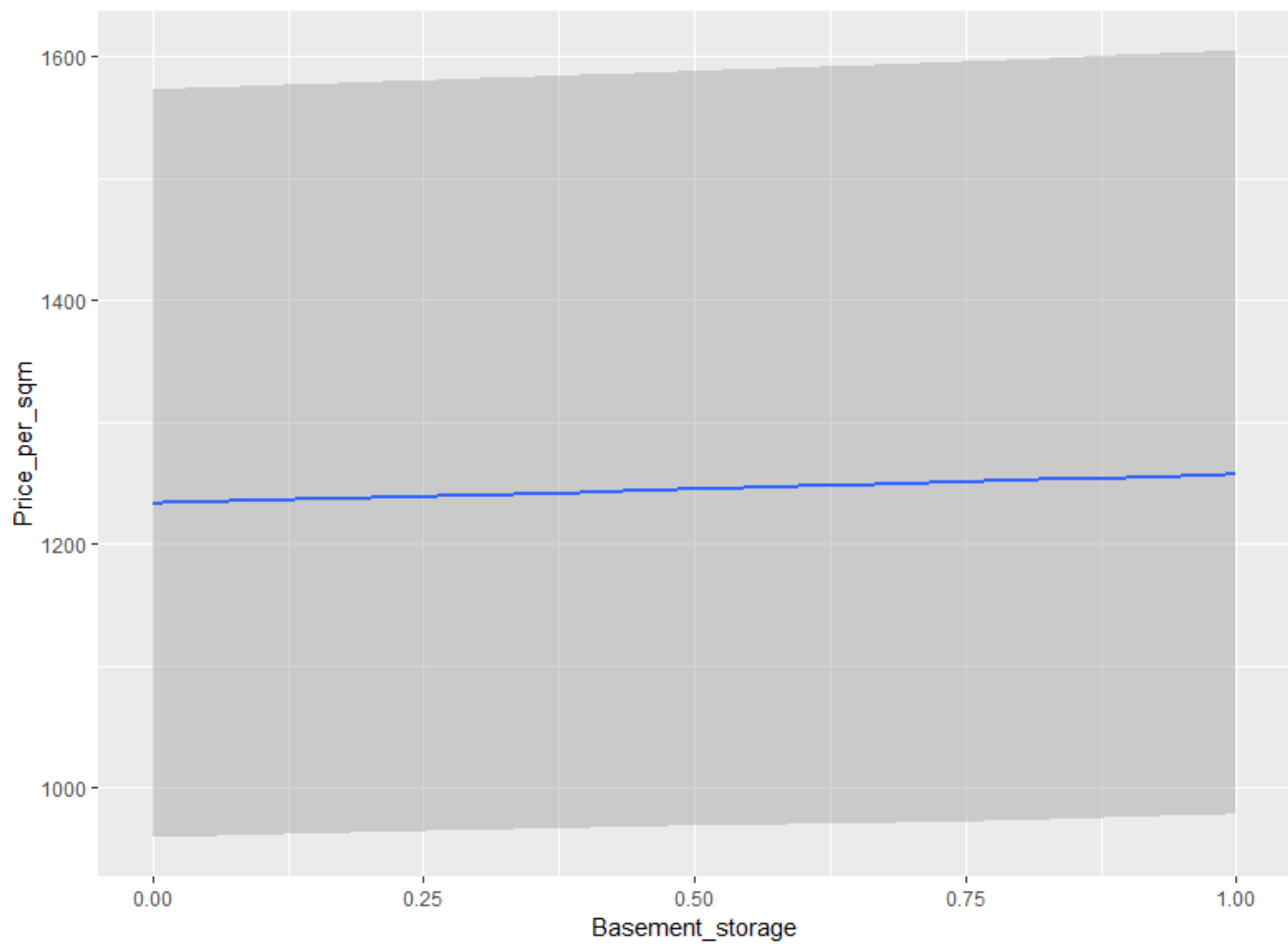


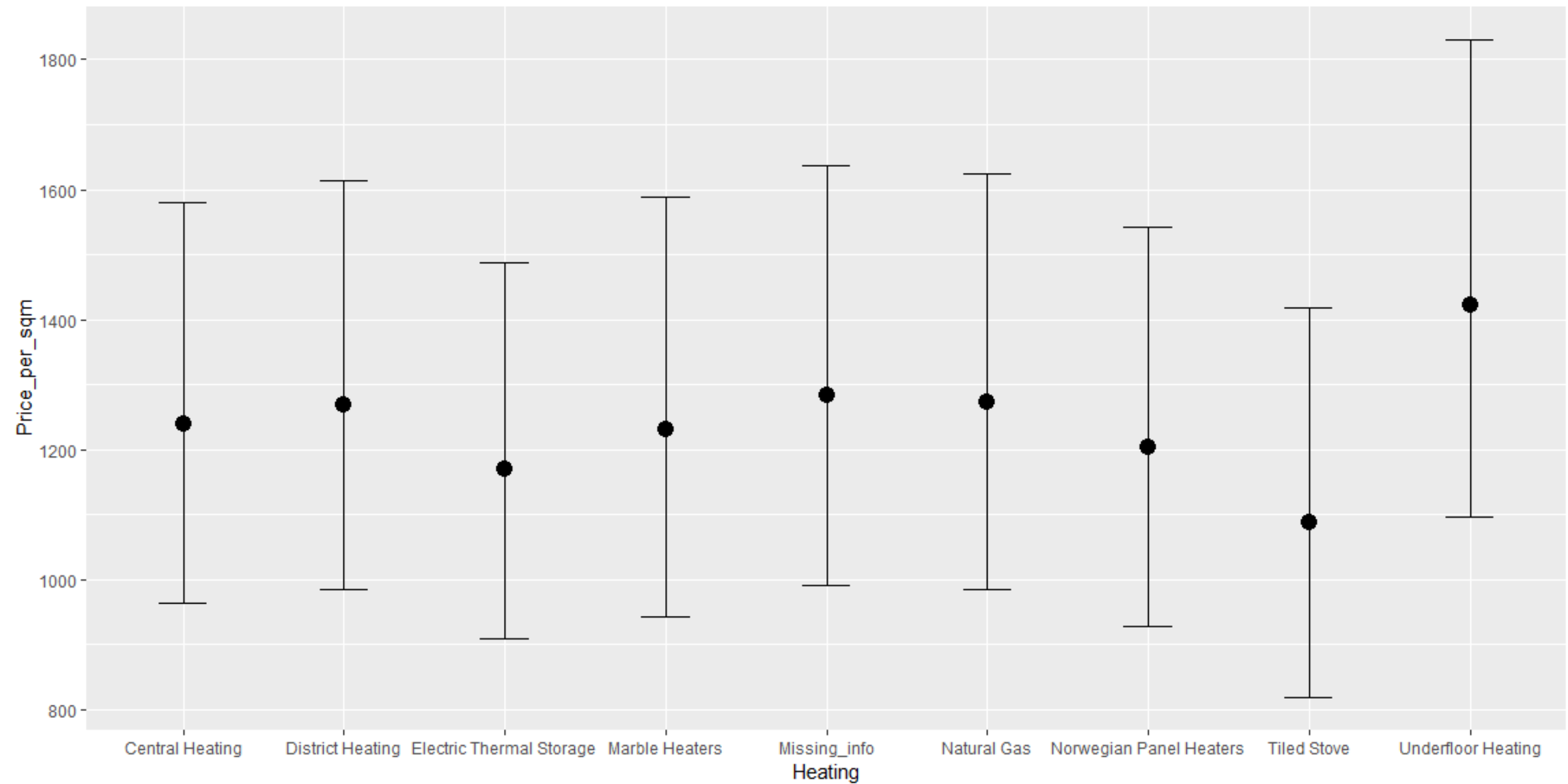


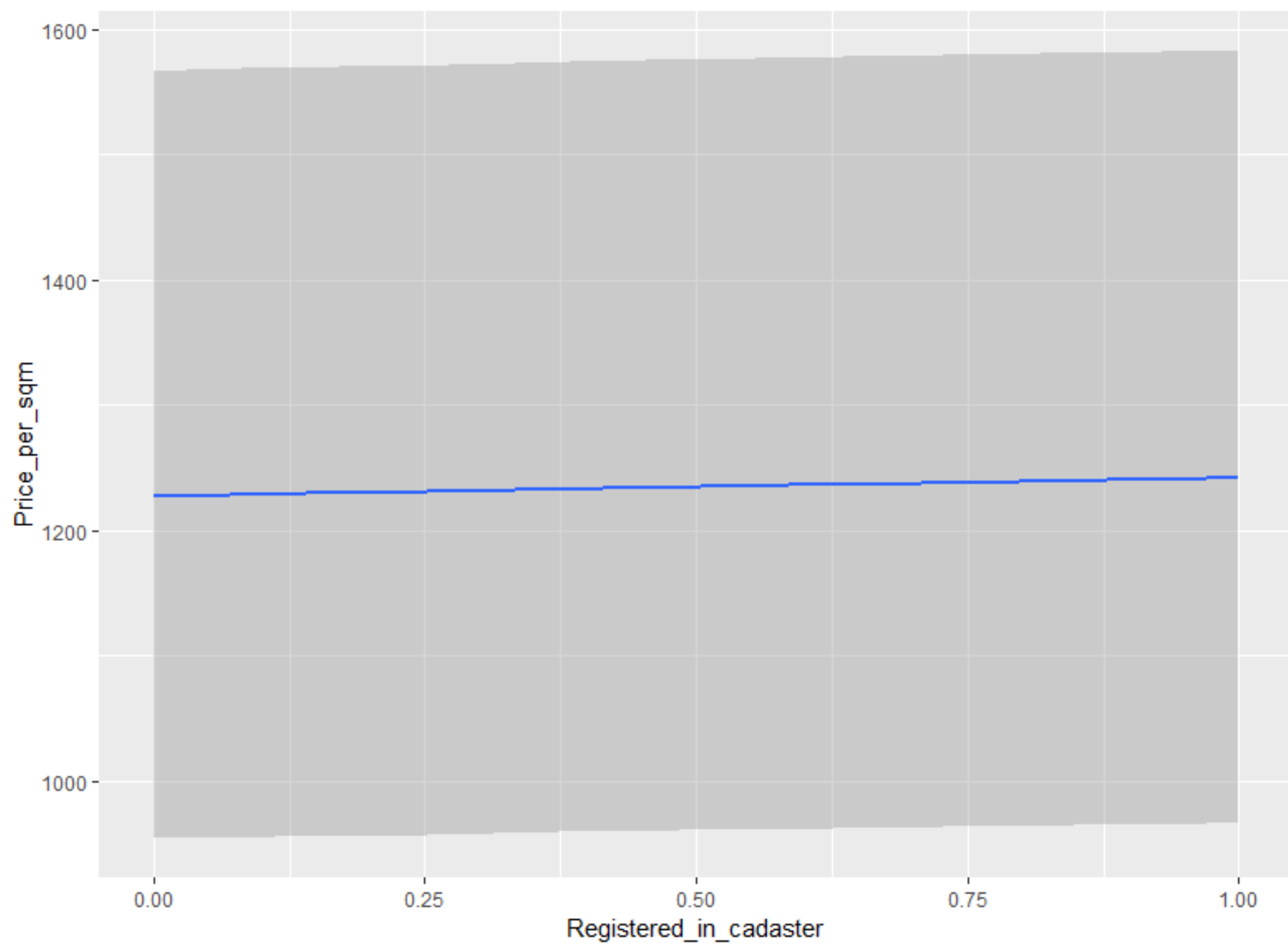


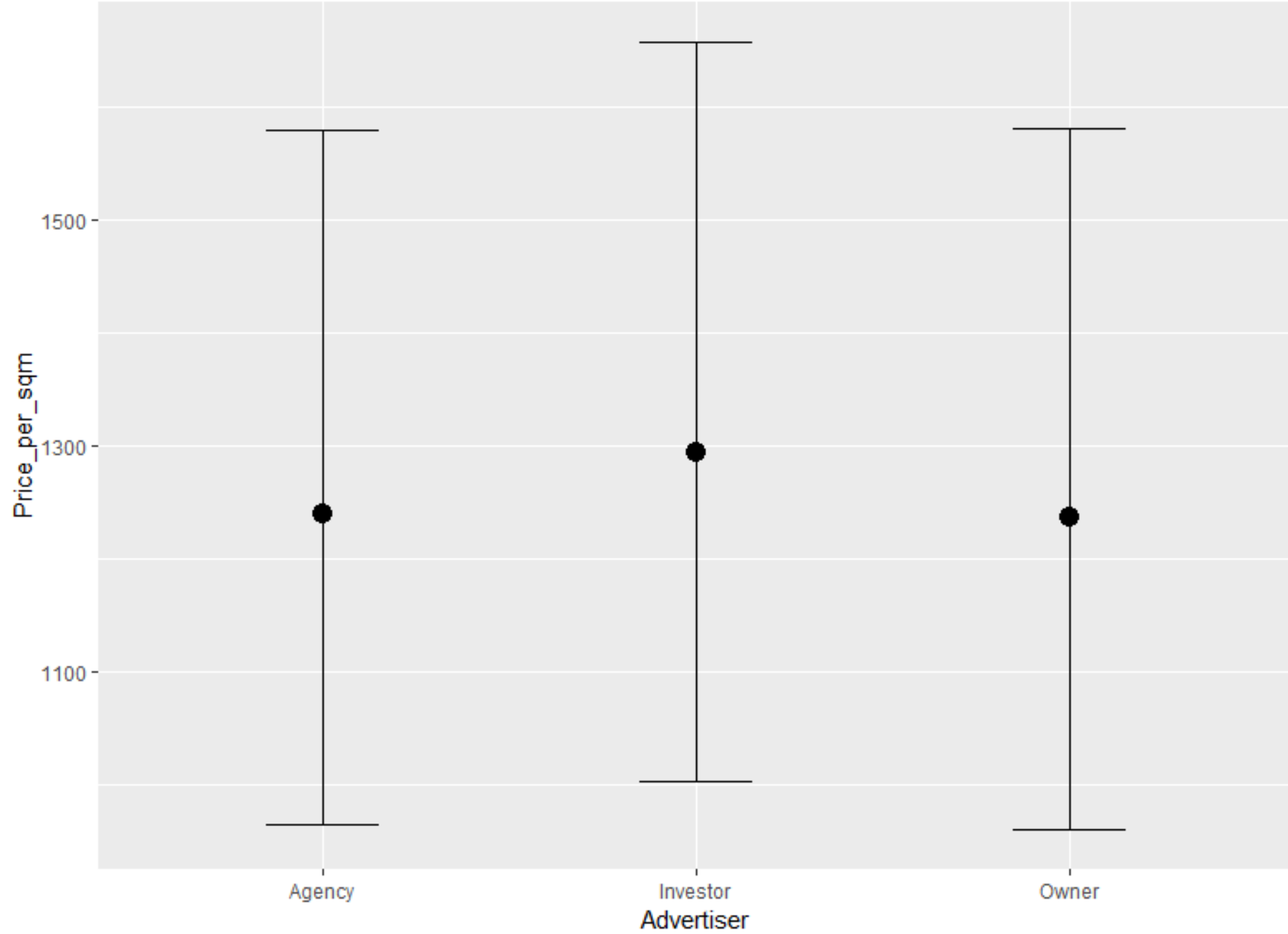












The most pricey municipalities/neighborhoods/streets

	Estimate.Intercept
Stari grad	0.767674194
Vracar	0.594548384
Savski venac	0.513409163
Novi Beograd	0.384770251
Zvezdara	0.159477013
Palilula	0.152703093
Vozdovac	0.143092180
Zemun	0.073937535
Cukarica	-0.003340912
Surcin	-0.057541566
Mladenovac	-0.075400077
Rakovica	-0.138726070
Sopot	-0.292523067
Lazarevac	-0.404737846
Obrenovac	-0.434908177
Grocka	-0.591752887
Barajevo	-0.822136729

	Estimate.Intercept
Novi Beograd_Blok 67a (A blok)	0.458071158
Cukarica_Golf	0.380818441
Palilula_Palilulska pijaca	0.366453839
Palilula_Tasmajdan	0.340273007
Palilula_Botanicka basta	0.323387689
Vozdovac_Bulevar oslobodjenja	0.302295133
Vozdovac_Jove Ilica	0.296429721
Palilula_27. marta	0.294291013
Palilula_Centar	0.282903963
Zemun_Retenzija	0.281323636
Novi Beograd_Blok 67 (Belvil)	0.276702059
Palilula_Masinski fakultet	0.274741377
Cukarica_Banovo brdo	0.274211966
Palilula_Dalmatinska	0.270166663
Zemun_Karadjordjev trg	0.269099728
Palilula_Postanska stedionica	0.267517882
Zvezdara_Vukov Spomenik	0.265131030
Savski venac_Nemanjina	0.259040245
Zemun_Kej	0.258200546
Savski venac_Beograd na vodi	0.255828831
Zemun_Centar	0.254165031

	Estimate.Intercept
Vracar_Neimar_Hadzi Melentijeva	0.26037456
Zvezdara_Uciteljsko naselje_Zivka Davidovica	0.25671718
Stari grad_Dorcol_Dobracina	0.23884803
Vozdovac_Centar_Koste Jovanovica	0.22303778
Savski venac_Senjak_Banjickih zrtava	0.21322828
Stari grad_Dorcol_Gospodar Jovanova	0.21085402
Vracar_Kalenic pijaca_Nevesinjska	0.20839722
Palilula_Karaburma_Vojvode Micka Krstica	0.20388108
Stari grad_Centar_Nusiceva	0.19802209
Stari grad_Terazije_Kralja Milana	0.19739311
Zvezdara_Vukov Spomenik_Bulevar kralja Aleksandra	0.19597157
Vracar_Kalenic pijaca_Njegoseva	0.19194373
Stari grad_Kosancicev venac_Kosancicev venac	0.19192392
Savski venac_Centar_Hercegovacka	0.19036074
Palilula_Bulevar despota Stefana_Jovana Avakumovica	0.17891401
Vracar_Kalenic pijaca_Hadzi Prodanova	0.17794136
Vozdovac_Autokomanda_Jove Ilica	0.17514009
Zvezdara_Mirijevo_Matice srpske	0.17486530

Findings

- The full model explains 81.43% of the total variation in advertised prices of apartments.
- The most important factors are: Location, Floor, Condition, Area, Heating system, Garage, Elevator.
- The remaining 18.57% of variation is a result of different pricing strategies, agency fees, different views, quality of construction, quality of furniture and installations, amenities, facilities, layout, construction timelines (for properties under construction), etc.

Prediction

- Besides using the regression model to help us understand what drives property prices, we can use it to make predictions and identify (potentially) underpriced properties. These are properties for which predicted prices are significantly higher than advertised prices. Some differences mainly reflect model errors (i.e. the difference can be justified by factors not included in the model), while some reflect pricing errors (fire sales, suboptimal pricing).
- The following slides present the most over/undervalued properties according to the model.

Potentially overpriced

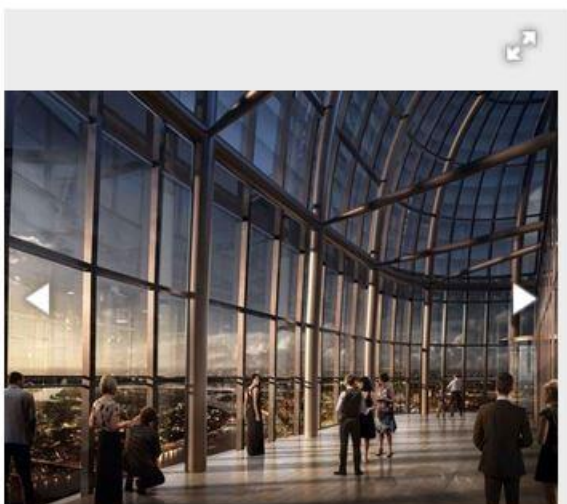
Price_per_sqm	Municipality	Neighbourhood	Street	Floor_num	Area_sqm	Stories	Garage	Basement_storage	Heating	Registered_in_cadaster	Elevator	Not_at_top_floor	Type	Condition	Advertiser	predicted	error
7942.34	Savski venac	Beograd na vodi	Hercegovačka	14.0	106	30	0		0 Missing_info		0	0	1 Under construction	Lux	Agency	2831.5231	-5110.8169
5166.67	Vracar	Neimar	Internacionalnih brigada	0.5	120	3	0		0 District Heating		0	1	1 New Built	Lux	Agency	2781.8526	-2384.8174
4838.71	Stari grad	Centar	Kralja Milana	2.0	155	5	0		1 District Heating		1	1	1 Used	Renovated	Agency	2861.5671	-1977.1429
4693.88	Savski venac	Beograd na vodi	Hercegovačka	15.0	245	20	1		0 District Heating		1	1	0 New Built	Lux	Agency	2794.5396	-1899.3404
4484.30	Savski venac	Dedinje	Missing_info	1.0	223	4	1		1 Natural Gas		1	1	0 New Built	Lux	Agency	2593.2607	-1891.0393
5472.22	Novi Beograd	Blok 67a (A blok)	Jurija Gagarina	12.0	180	12	1		0 District Heating		1	1	0 New Built	Lux	Agency	3603.1874	-1869.0326
4673.91	Savski venac	Beograd na vodi	Hercegovačka	8.0	92	20	0		0 District Heating		0	0	0 New Built	Lux	Agency	2822.2362	-1851.6738
4796.75	Savski venac	Beograd na vodi	Hercegovačka	15.0	123	20	0		0 District Heating		1	1	0 New Built	Lux	Agency	2976.0607	-1820.6893
5245.90	Savski venac	Beograd na vodi	Hercegovačka	8.0	61	20	1		0 District Heating		1	1	0 New Built	Lux	Agency	3449.1096	-1796.7904
4396.25	Vracar	Kalenic pijaca	Nevesinjska	6.0	293	6	1		0 District Heating		0	1	0 New Built	Lux	Agency	2747.5550	-1648.6950
3181.82	Zvezdara	Vukov Spomenik	Vojvode Brane	0.5	220	4	1		0 District Heating		1	0	1 Missing_info	Missing_info	Agency	1554.4727	-1627.3473
3579.17	Novi Beograd	Stari Merkator	Bulevar Mihajla Pupina	14.0	24	14	0		0 District Heating		1	1	0 Used	Missing_info	Agency	1952.4098	-1626.7602
4444.44	Stari grad	Dorcol	Dobracina	2.0	90	6	0		0 District Heating		1	1	0 Missing_info	Missing_info	Agency	2863.7935	-1580.6465
5245.90	Savski venac	Beograd na vodi	Hercegovačka	8.0	61	19	1		1 District Heating		1	1	1 New Built	Lux	Agency	3680.0028	-1565.8972
4758.06	Savski venac	Beograd na vodi	Hercegovačka	16.0	124	20	1		0 District Heating		1	1	0 New Built	Lux	Agency	3205.8428	-1552.2172
4836.07	Savski venac	Beograd na vodi	Hercegovačka	16.0	122	20	1		0 District Heating		1	1	1 New Built	Lux	Agency	3365.5089	-1470.5611
3673.47	Stari grad	Trg Republike	Brace Jugovica	2.0	98	6	0		0 District Heating		1	1	0 Missing_info	Missing_info	Agency	2294.4867	-1378.9833
4693.88	Savski venac	Beograd na vodi	Hercegovačka	16.0	245	19	1		1 Underfloor Heating		1	1	1 New Built	Lux	Owner	3328.6898	-1365.1902

Overpriced?

Bez provizije - Duplex u Kuli Beograd / St.Regis

Beograd - Opština Savski venac - Beograd na vodi

841.888 €



Tip nekretnine	Kvadratura	Broj soba
stan	106 m²	3.0

Oglašivač **Agencija**

Tip objekta **U izgradnji**

Stanje objekta **Lux**

Sprat **14**

Ukupna spratnost **30**



Potentially underpriced

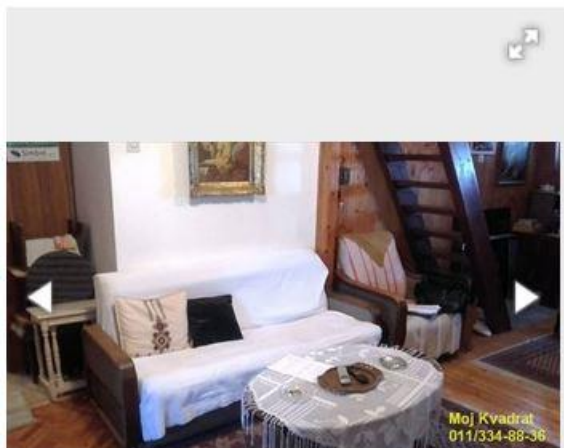
Price_per_sqm	Municipality	Neighbourhood	Street	Floor_num	Area_sqm	Stories	Garage	Basement_storage	Heating	Registered_in_cadaster	Elevator	Not_at_top_floor	Type	Condition	Advertiser	predicted	error
1723.19	Stari grad	Centar	Kralja Milana	7.0	69	7	0	1	District Heating	1	1	0	Used	Missing_info	Agency	2970.9548	1247.7648
2164.00	Savski venac	Beograd na vodi	Hercegovačka	1.0	42	17	1	0	District Heating	0	1	0	Under construction	Lux	Agency	3407.6580	1243.6580
937.50	Stari grad	Centar	Strahinjica Bana	-0.5	40	5	0	0	Electric Thermal Storage	1	0	0	Used	Missing_info	Agency	2034.4143	1096.9143
2296.29	Savski venac	Beograd na vodi	Hercegovačka	1.0	111	20	1	0	District Heating	0	1	1	New Built	Lux	Agency	3355.6730	1059.3830
1547.62	Vracar	Cvetni trg	Kralja Milana	0.5	84	1	0	0	District Heating	1	0	0	Missing_info	Renovated	Agency	2576.3033	1028.6833
906.25	Stari grad	Dorcol	Knez Miletina	-0.5	64	4	0	0	Missing_info	1	0	1	Used	Missing_info	Agency	1920.7569	1014.5069
1420.17	Vracar	Juzni bulevar	Maksima Gorkog	4.0	119	5	1	0	District Heating	1	1	1	New Built	Lux	Agency	2427.7432	1007.5732
1209.30	Stari grad	Centar	Hilandarska	-1.0	43	5	0	0	Electric Thermal Storage	1	0	0	Missing_info	Requires renovation	Agency	2216.6155	1007.3155
1818.18	Savski venac	Beograd na vodi	Hercegovačka	4.0	44	5	0	0	District Heating	1	1	0	Missing_info	Missing_info	Agency	2816.7963	998.6163
1000.00	Vracar	Krunska	Smijaniceva	-1.0	30	4	0	1	Electric Thermal Storage	1	0	0	Used	Regular	Agency	1966.4630	966.4630
2303.51	Savski venac	Beograd na vodi	Hercegovačka	2.0	82	17	1	0	District Heating	0	1	0	Under construction	Lux	Agency	3265.7701	962.2601
2052.63	Stari grad	Terazije	Balkanska	5.0	95	5	1	1	District Heating	1	1	0	Used	Regular	Agency	3009.0541	956.4241
1000.00	Stari grad	Dorcol	Herceg Stjepana	6.0	75	7	0	0	District Heating	0	1	1	Missing_info	Missing_info	Agency	1955.7609	955.7609
1151.28	Vracar	Kalenic pijaca	Koce Kapetana	-0.5	39	6	0	0	District Heating	1	0	0	Missing_info	Missing_info	Agency	2105.0413	953.7613
2343.75	Stari grad	Kalemegdan	Tadeusa Koscuska	3.0	64	5	0	0	District Heating	1	1	1	Missing_info	Lux	Agency	3286.5688	942.8188
1210.61	Vracar	Neimar	Internacionalnih brigada	0.0	66	6	0	0	District Heating	1	0	0	Used	Regular	Agency	2148.6609	938.0509
1800.00	Vracar	Cvetni trg	Svetozara Markovica	0.5	50	6	0	0	District Heating	1	1	0	Used	Missing_info	Agency	2715.8740	915.8740
857.14	Zvezdara	Vukov Spomenik	Vojvode Brane	-1.0	28	4	0	0	District Heating	0	1	0	Used	Regular	Agency	1756.0614	898.9214

Underpriced?

Stari grad, Centar - Kralja Milana

Beograd - Opština Stari grad - Centar - Kralja Milana

118.900 €



Tip nekretnine	Kvadratura	Broj soba
stan	69 m ²	3.0

Oglašivač **Agencija**

Tip objekta **Stara gradnja**

Grejanje **CG**

Sprat **7**

Ukupna spratnost **7**

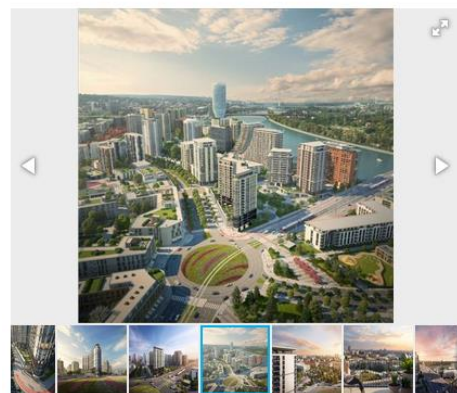


Underpriced?

Beograd na vodi, BEZ PROVIZIJE KUPCA, ID S12587

Beograd - Opština Savski venac - Beograd na vodi - Metropolitan

90.888 €



Tip nekretnine	Kvadratura	Broj soba
stan	42 m ²	1.0

Oglašivač	Agencija
Tip objekta	U izgradnji
Stanje objekta	Lux
Grejanje	CG
Sprat	1
Ukupna spratnost	17

Ostalo

- ✓ Terasa
- ✓ Telefon
- ✓ Interfon
- ✓ Parking
- ✓ Klima
- ✓ KATV
- ✓ Video nadzor
- ✓ Lift
- ✓ Internet
- ✓ Garaža

Dodatni opis

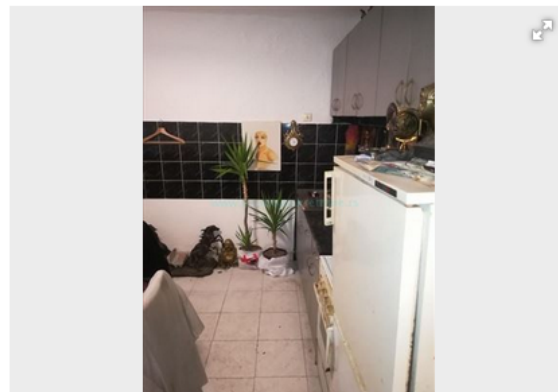
U ponudi je nova zgrada u Beogradu na vodi, Metropolitan, koja će se sastojati od podijuma i stambene zgrade. Zgrada će biti na odličnoj lokaciji, na ulasku u projekat BW, na samom početku glavnog bulevara. Odlikovaće se karakterističnim dizajnom i fasadom u kombinaciji čvrstih i prirodnih materijala, a akcenat je panoramskom pogledu. Stanovi će biti opremljeni kuhinjskim elementima visokog kvaliteta, nerđajućim sudoperama, ugradnim plakarima, sanitarnim elementima nove generacije, akrilnim kadama i tuš kabinama sa staklenim zidovima, podovi će biti pokriveni višeslojnim parketom i porculanskim pločicama, hlađenje će biti obezbeđeno multisplit klimatizacijom tako da svaka prostorija u stanu ima svoju jedinicu. Na prvom spratu će biti vrtić, a zgrada će imati i unutrašnje dvorište za stanare, recepciju i video nadzor 24/7. U ponudi su stanovi različitih kvadratura i struktura, sa pogledom na reku ili grad. Bilo za stanovanje ili investiciju, stanovi u Metropolitanu su IZUZETNA ponuda! Garažno mesto je obavezno i cena po mestu je 20.000€! Očekivani završetak radova je decembar 2021. godine!

Studio sa PRIVATNOM BAŠTOM (23.81m2 + bašra17.73m2), odličan! BEZ PROVIZIJE KUPCA! ID S12587

Stari grad, Centar, Strahinjića Bana, 1.0, 40m2

Beograd - Opština Stari grad - Centar - Strahinjića Bana

37.500 €



Tip nekretnine	Kvadratura	Broj soba
stan	40 m ²	1.0

Oglašivač	Agencija
Tip objekta	Stara gradnja
Grejanje	TA
Sprat	PSUT
Ukupna spratnost	5

Dodatno

- ✓ Uknjižen

Ostalo

- ✓ Parking

Dodatni opis

Agencijski ID: 18603, psut/5, uknjižen, za renoviranje, loš, stara gradnja, loša, parking, može zameniti (lokal ili veći stan u širem centru), pogodan za pp, dvorišna zgrada, uknjiženo samo 24m2,+12 m2 nadogradjeno, do pola ukopan, predratna zgrada. Reg.Br. 554. Više informacija na: www.beocitynekretnine.rs Agencijska provizija 2%. Aleksandra. Kontakt van radnog vremena: info@beocitynekretnine.rs

Underpriced?

3.0 Vracar , Maksima Gorkog , garaza ID#1261

Beograd - Opština Vračar - Južni bulevar - Maksima Gorkog

169.000 €



Tip nekretnine	Kvadratura	Broj soba
stan	119 m ²	3.0

Oglašivač	Agencija
Tip objekta	Novogradnja
Stanje objekta	Lux
Grejanje	CG
Sprat	4
Ukupna spratnost	5

Dodatno

- ✓ Uknjižen
- ✓ Nije poslednji sprat
- ✓ Duplex

Ostalo

- ✓ Terasa
- ✓ Klima
- ✓ Lift
- ✓ KATV
- ✓ Internet
- ✓ Interfon
- ✓ Garaža

Dodatni opis

3.0 Vracar , Maksima Gorkog , 119 m2 , IV + V sprat , cg , lift , odlican stan - duplex u kvalitetnoj , lepo održavanoj zgradi , gradnja 2012. godina , dvostrano orjentisan , svetao , uknjižen na 69m2

Postoji mogućnost kupovine dva garazna mesta - platforme 2 X 12m2

Struktura :

donji nivo- dnevna soba , kuhinja sa prostranom trpezarijom i izlazom na terasu , kupatilo.

gornji nivo - dve spavace sobe , kupatilo.

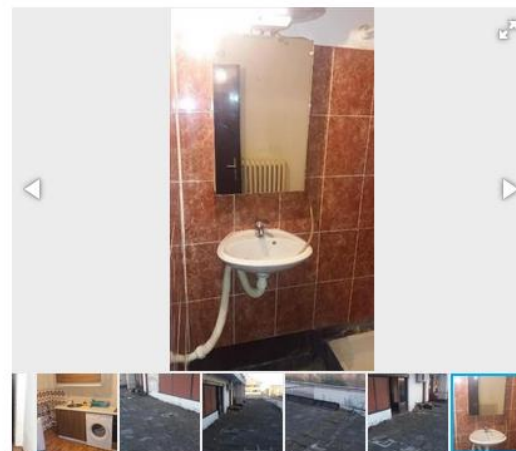
Stan se prodaje poluopremljen , sa ugradnim plakarima , plakarima u kupatilima i kompletnom ugradnom kuhinjom sa svim aparatima , tri klime ...

Agencijska provizija 2%

1.0 stan, Banovo brdo, Požeška

Beograd - Opština Čukarica - Banovo brdo - Požeška

58.500 €



Tip nekretnine	Kvadratura	Broj soba
stan	93 m ²	1.0

Oglašivač	Agencija
Stanje objekta	Renovirano
Grejanje	CG
Sprat	5
Ukupna spratnost	5

Dodatno

- ✓ Odmah useljiv
- ✓ Uknjižen

Ostalo

- ✓ Terasa
- ✓ Telefon
- ✓ Interfon

Dodatni opis

Izvorno jednosoban uknjižen stan površine 39m2, sa uknjiženom terasom površine 54m2. Ovaj stan ima mogućnost adaptacije terase u stambeni prostor. Stan ima prelep pogled na Košutnjak.

Agencijska provizija %