LAND TITLE SOLUTIONS

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Proximity To a Metro Station: What Is The Added Value On The Price Of Neighbouring Properties?

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HIGHLIGHTS:

- All other things being equal, condominiums within 500 metres of a subway station have, on average, a price 11.2% higher than those located 2,000 to 4,500 metres from the same station.
- The impact of proximity to a station on condominium prices drops significantly for properties that are located 1,000 to 2,000 metres from the station, as compared to properties within a one-kilometre radius.
- All other things being equal, single-family homes that are between 0 and 500 metres from a station have a price, on average, 7.1% higher than single-family homes in the control area (2,000–4,500 metres away).
- The difference in added value due to proximity to a station is not significantly different for single-family homes that are in any of the first four 500-metre perimeter increments around a subway station.

Several empirical studies, including Agostini and Palmucci (2008) and Dubé et al. (2013)[1], have found a positive and significant relationship between proximity to public transit (metro, commuter rail) and the price of neighbouring homes. For many buyers, proximity to various modes of public transportation can be a deciding factor when choosing a home. This study investigates the effect of proximity to a metro station in the Montreal area (see attached map) on property prices.

This analysis was conducted on dwellings sold between January 1, 2010, and September 30, 2018, that are located a maximum distance of 4.5 km from the nearest subway station. In order to measure the monetary gain attributable to the proximity to a station on the sale price of a property, residences within a two-kilometre radius of a metro station (radius of interest) are compared to households outside of this range (control area). The radius of interest, often used in the literature, is usually 1.5 km, which represents a walking distance of about 20 minutes to the target station[2]. However, an additional 500 metres was included in this study in order to examine whether the presence of a station could still influence prices beyond the 1.5-km radius, and indeed it did. This being, it is not surprising that a proximity effect is still reflected on house prices in this 500-metre section. The effect of distance likely gradually diminishes within this area, as the properties approach the 2000-metre limit .

The initial categories of buildings selected to analyze the average impact of proximity on house prices were single-family homes, condominiums, duplexes and triplexes. More specific analyses were then conducted on samples that included only single-family homes or only condominiums. To eliminate non-representative data, properties were required to meet several criteria related to selling price, living space, and the type of sale in order to be included in the sample. Numerous control variables were also added to the regressions to hold constant factors that impact price and that, if left out, could create an omission bias in estimating the effect of proximity on house prices. The methodology and the complete list of criteria used are detailed in the appendix.

Four zones were designed within the first 2,000 metres:

- Zone 1: 0 to 500-metre radius;
- Zone 2: 500 to 1,000-metre radius;
- Zone 3: 1000 to 1500-metre radius;
- Zone 4:1,500 to 2,000-metre radius;

The remaining 2.5 km (2,000–4,500 metres) represents the control area to which residences in the first four zones were compared. These five groups were used for the three analyses presented in this study.

GENERAL CASE

In this section, a variable specifying the category in which a property classifies was added to the regression (the statistical method used to analyze the impact of proximity on prices) in order to isolate the effect of the type of buildings on dwelling prices. All other things being equal, properties within 2,000 metres of a metro station have proximity added value that averaged between +9.0% for the closest homes and +2.2% for those between 1,500 and 2,000 metres.

Table 1: Table 1: Average Impact of Distance to Metro Station on Property Prices[3]

Zone	Radius	Average impact on price
1	0–500 metres;	+9.0%
2	500–1,000 metres;	+7.6%
3	1,000–1,500 metres;	+4.1%
4	1,500–2,000 metres;	+2.2%

All other things being equal, the added value associated with proximity to a subway station diminishes as distance increases. However, on average, the impact of proximity on price decreases more significantly between zones 2 and 3 (as compared to the difference between zones 1 and 2 or zones 3 and 4).

SINGLE-FAMILY HOMES

In this section, only single-family homes (individual, row and semi-detached homes) were included in the sample used to determine the added value associated with proximity to a metro station.

All other things being equal, homes between 0 and 500 metres from the nearest station have a price, on average, 7.1% higher than single-family homes in the zone that is furthest away (2,000–4,500 m). Contrary to the general case above, the added value associated with proximity to a station is, on average, almost identical between houses in zone 2 and in zone 3 (+6.0% and +6.1% respectively). Finally, households in zone 4 have, on average, a price 4.0% higher than comparable homes in the control zone.

Table 2: Average Impact of Distance to a Metro Station on the Price of Single-Family Homes[4]

Zone	Radius	Average impact on price
1	0–500 metres;	+7.1%
2	500–1,000 metres;	+6.0%
3	1,000–1,500 metres;	+6.1%
4	1,500–2,000 metres;	+4.0%

Although the proximity effect appears to be slightly more pronounced within the first three zones as compared to the fourth; however, this difference is not statistically significant. The confidence interval analysis for each estimator (radius) shows that the intervals all intersect. This simply means that the change in appreciation between two consecutive zones (and even non-consecutive ones) is not much different from one zone to the next.

CONDOMINIUMS

In this section, only condominiums were included in the sample study. The impact on price due to closeness to a metro is, on average, greater for condominiums in the first 1,000 metres of the station than for single-family homes within the same radius.

All other things being equal, the effect of proximity to a station on condominium prices is, on average, strictly decreasing within the two-kilometre radius. In relation to comparable properties in the control zone, prices range, on average, from +11.2% for condominiums located within 500 metres of the nearest subway station to +2.1% for those in zone 4. Beyond 1,000 metres from the station, the appreciation associated with proximity drops significantly compared to the first two zones.

Table 3: Average Impact of Distance to a Metro Station on the Price of Condominiums[5]

Zone	Radius	Average impact on price
1	0–500 metres;	+11.2%
2	500–1,000 metres;	+9.0%
3	1,000–1,500 metres;	+2.2%
4	1,500–2,000 metres;	+2.1%

In more central neighbourhoods (for example, the downtown core and surrounding boroughs) there are more condominiums near subway stations than there are single-family homes. As a result, it is interesting to analyze how the price of condominiums varies within the first 500-metre zone.

To proceed to this evaluation, the radius of zone 1 was divided into five 100-metre subsections. When taking a closer look at the average effect of proximity on prices within zone 1, it appears that the 100–200 metre and 200–300 metre subsections have the greatest impact on price (+6.7% and +5.1%, respectively) compared to the 400-500-metre zone.

CONCLUSION

Based on the results presented above, proximity to a subway station appears to have a positive and significant impact on the price of properties in the Montreal area. When four types of buildings (single-family homes, condominiums, duplexes and triplexes) are included in the regression, the impact of proximity on dwelling prices varies, on average, between +2.2% and +9.0% within the first two-kilometre radius.

When the sample includes only single-family homes or condominiums, the price gain associated with proximity to a station is much higher for single-family homes in zones 3 and 4 (1,000–1,500 m and 1,500–2,000 m) than it is for condominiums in the same areas. However, the impact of proximity on prices is greater for condominiums within the first two zones (0–500 m and 500–1,000 m) than for single-family homes in those same zones. For instance, within the first zone of 0 to 500 metres, condominiums have a proximity added value that is, on average, 4.1% higher than single-family homes in the same radius. The presence or absence of parking spots could be one of the factors that explains the difference in added value according to building types. It is rarer for condominiums to come with reserved parking spaces than single-family homes. Condominium buyers might then be less likely to own a vehicle than single-family home owners. Therefore, they depend more on public transit in their day-to-day lives. Thus, one might think that people buying condominiums (without any parking stall) place more value on being close to a metro station since they use underground transit more regularly. This may help explain the difference between the two types of dwellings in terms of added value due to proximity.

In general, single-family homes have a similar proximity effect through zone 1 to 4, while the difference in the proximity effect between these zones is more pronounced for condominiums. For the latter type of dwelling, the difference in the added value between the second and third zone is, on average, almost 7%.

In the coming years, Montreal's public transit system will improve with the arrival of the new Réseau express métropolitain (REM) automated light rail network. Unlike the commuter rail system operated by Exo (formerly the Réseau de transport métropolitain [RTM]), construction of the REM will have little impact on the metro service provided by the Société de transport de Montréal (STM). That being said, properties close to the Édouard-Montpetit, McGill and Bonaventure metro stations, which will host new REM stations, may experience further proximity effect once the REM is in function. Finally, the commercial spaces near the McGill and Bonaventure stations will also most likely benefit from additional proximity gain once the REM is operational. In fact, residents of Montreal's South Shore and North Shore will have direct and quick access to downtown, even on weekends, which may attract more people to the stores near these future stations.

BIBLIOGRAPHY

[1] Agostini C. and G. Palmucci (2008), "The Anticipated Capitalisation Effect of a New Metro Line on Housing Prices", *Fiscal Studies*, vol.29 No.2, pp. 233–256.

Dubé J. et al. (2013). Commuter rail accessibility and house values: The case of the Montreal South Shore, Canada, 1992–2009', *Transportation Research*, Part A, vol.54, www.elsevier.com/locate/tra

[2] The choice of this particular radius (1.5 km) is often justified by the assumption that, beyond a 20-minute walk, residents are more likely to use a mean of transportation other than walking to get to the station or to simply adopt another mode of transportation than the subway.

[3] Regression 1 in the appendix. All coefficients in Table 1 are significant at a threshold of 0.1%.

[4] Regression 2 in the appendix. All coefficients in Table 2 are significant at a threshold of 0.1%.

[5] Regression 3 in the appendix. All coefficients in Table 3 are significant at a threshold of 0.1%.

[6] As reported by Dubé et al. (2013), log-level specification is common in the literature and has proven to be the best choice in several situations.

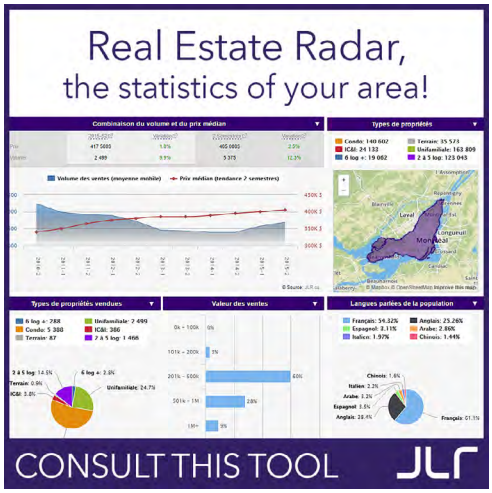
METHODOLOGICAL NOTE

The data used were compiled by JLR from records published in the Québec Land Register. To obtain statistics representative of the real estate market, some sales data are eliminated from the calculations. Thus, sales with a transaction value of less than $5,000, tied selling, foreclosure sales, undivided sales, and multiple sales are not included in the statistics contained in this study.

FOR MORE DETAILS

Check the Real Estate Radar for more information on sales, bad debts and the socio-demographic profile of your sector.

Consult JLR publications at this address: https://solutions.jlr.ca/publications/prime-studies



Appendix

Source: http://www.stm.info/fr/infos/reseaux/metro

METHODOLOGY

Hedonic Regression :

$$\log(prix) = \beta_0 + \beta_1 zone_1 + \beta_2 zone_2 + \beta_3 zone_3 + \beta_4 zone_4 + \beta X + \epsilon$$

βs represent coefficients, including a constant.

X represents the set of *N* observable physical and environmental characteristics that may influence price.

ε is an error term that accounts for unobservable characteristics (missing variables) that affect house prices.

The variables $zone_1$, $zone_2$, $zone_3$ and $zone_4$ are dummy variables that respectively represent the first four 500-metre zones in the radius of interest (2 km). The zone variable is equal to 1 if a property is within the 500-metre zone, and 0 otherwise.

The characteristics used were the number of floors, living area (m^2), the squared of the living area (the assumption being that the effect of surface area is not linear), an indicator of whether the property is a new build or not and the year of construction.

Control variables were also added for the type of building, the year the property was sold, the name of the nearest subway station and the borough in which the property is located. Cities and areas that are not actual boroughs (for example, Laval, Longueil and Montréal-Est) were still given borough markers in order to isolate for their effect as well.

The ordinary least squares method was used for this analysis. The models were estimated as log level, meaning that the dependent variable (price) was expressed in logarithmic form, while the independent variables (characteristics) were levels[6]. In practical terms, this implies that a one-unit change in the value of X_i changes the price by $(\widehat{\beta}_i * 100)\%$. All the regressions applied were corrected for the presence of heteroscedasticity (White method). Since the sample size is very large, if the variance of the estimators is sufficiently small (and it is in most cases or at least consistently for the estimators of interest), then they can still be precise.

DATA CLEANUP

The analyses in this document were based on sales statistics from the acts compiled by JLR based on the Quebec Land Register. The base sample included all properties (single-family homes, condominiums, duplexes and triplexes) that changed hands between January 1, 2010, and September 30, 2018, and that were not classified as tied selling, foreclosure, undivided, or multiple sales and located a maximum of 4.5 km from the nearest identified subway station (distance as the crow flies). Homes with sales prices below $80,000 or above $10,000,000, or with surface areas below 20 m^2 (215 sq. ft.) or above 700 m^2 (7,500 sq. ft.) were removed from the sample. Finally, only properties with a price-surface area ratio between $800/$m^2$ ($74/sq. ft.) and $20,000/$m^2$ ($1858/sq. ft.) were retained.

RESULTS OF THE REGRESSIONS

Dependent variable: log (price)

Independent Variables	General (1)	Single-Family Homes (2)	Condominiums (3)
Constant	1.1174e +01*** (3.6105e -02)	9.369e+00*** (6.1793e-01)	1.0941e+01*** (3.7364e -02)
Radius 1	8.9870e -02*** (2.5860e -03)	7.1262e -02*** (7.3099e -03)	1.1150e -02*** (3.4379e -03)
Radius 2	7.5995e -02*** (2.4350e -03)	5.9970e -02*** (6.0683e -03)	9.0110e -02*** (3.4288e -03)
Radius 3	4.1232e -02*** (2.5185e -03)	6.1337e -02*** (5.5447e -03)	2.2213e -02*** (3.6382e -03)
Radius 4	2.2198e -02*** (2.4287e -03)	4.0340e -02*** (4.8748e -03)	2.0647e -02*** (3.2978e -03)
f.building	[...]	NA	NA
f.station	[...]	[...]	[...]
f.borough	[...]	[...]	[...]
Year of Construction	2.1859e -04*** (1.6810e -05)	1.4422e -03*** (3.1972e -04)	1.7193-04*** (1.5171e -05)
Floor	-4.0485e -04 . (2.3889e -04)	-5.5372e-02*** (4.9276e-03)	-1.9802-04*** (4.7475e -05)
Surface area	1.0409e -02*** (8.1863e -05)	6.4409e -03*** (1.0833e -04)	1.4042-02*** (2.0817e -04)
(Surface area)^2	-1.2957e-05*** (2.2796e-07)	-5.1999e-06*** (2.2565e-07)	-2.1609e-05*** (9.0255e-07)
New	7.3076e -02*** (1.8490e -03)	8.7559e -02*** (1.2331e -02)	8.5099e -02*** (1.8466e -03)
f.year	[...]	[...]	[...]
Adjusted R^2	0.7749	0.8344	0.7396
# of observations	142,742	32,570	82,864

The coefficients with three asterisks are significant at a threshold of 0.1%. The coefficient for the floor variable in regression 1 is the only one that is significant at a 10% level. The variables beginning with f are categorical variables. They include all N-1 categories associated with a factor. For example, the variable ***f.station*** includes all metro stations in the network with the exception of one, which serves as a reference.

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