



Public transit networks are essential to the functioning of a city. When purchasing a property, some buyers will try to get as close as possible to a bus, train or subway station in order to minimize their walking distance to public transit. A property's proximity to public transit then becomes a characteristic that may have value for some buyers, just like a garage or an extra bedroom. We therefore sought to quantify the additional value that proximity to public transit brings when selling a property.

To determine the value associated with the different types of public transit, such as subway, bus or commuter train, we created a hedonic model to isolate the individual effect of several variables on a property's sale price. This type of statistical tool allows us to isolate the contribution of a single characteristic of a property by keeping all of the other characteristics constant, meaning that all other things are equal. For example, a hedonic model makes it possible to calculate the price difference between two identical homes with the exception that one of them has an additional bedroom. This method therefore allows us to isolate the influence, on average, of adding a bedroom to a property's sale price.

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In order to specifically focus on the effects of public transit, we calculated several models for single-family homes and condominiums in the province's two most densely populated census metropolitan areas (CMAs): Montréal and Québec City. For the Montréal CMA, we analyzed the effect of proximity to a subway station or a commuter train station on the sale price of properties. For the Québec City CMA, we performed the same analysis, but regarding proximity to one of the two main Métrobus stations, 800 or 801.

To find out more about our methodology, please see the Annex.

Montréal

Subway

To calculate the effect of proximity to a subway station on the sale price of a property, we relied on a realistic walking distance between the property and the subway station, meaning 1.5 kilometres. This distance takes approximately 15 to 20 minutes at an average walking speed. Beyond this distance, many people will use another means of transportation to get around or to get to the subway station. After testing the results beyond the 1.5 kilometre radius, the effect of proximity to a subway station on the sale price of a property drops significantly, but can still be beneficial to some extent.

For single-family homes, the model allows us to estimate that a home located within a 1.5-kilometre radius of a subway station sells, on average, for 38.9% more than a home with the same characteristics that is located outside of this radius. As for condominiums, this impact is also beneficial, but is approximately half as beneficial when compared to the single-family segment. Thus, a condominium located within a 1.5 kilometre radius of a subway station sells, on average, for 19.1% more than a condominium with the same characteristics that is located outside of this radius.

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Table 1: The effect of proximity to a subway station on the sale price of a property

Single-family		Condominium	
0-1,500 metres	38.9%	0-1,500 metres	19.1%
0-500 metres	38.9%	0-500 metres	22.0%
500-1,000 metres	41.0%	500-1,000 metres	19.6%
1,000-1,500 metres	37.1%	1,000-1,500 metres	15.3%

Source: QFREB by the Centris® system

However, this effect is not linear, meaning that the contribution is not the same for the first metre and for the 1,500th metre. We therefore separated the distance to the nearest subway station into 500-metre slices in order to observe the distinctive effects. For single-family homes, those located at a distance of 500 to 1,000 metres from a subway station benefit from the highest contribution (+41.0%), while those that are between 1,000 and 1,500 metres receive the lowest contribution (+37.5%). For condominiums, those between 0 and 500 metres have the highest contribution (+22.0%) and those between 1,000 and 1,500 metres have the lowest contribution (+15.3%).

For single-family homes, those located at a distance of 500 to 1,000 metres from a subway station benefit from the highest contribution (+41.0%).

Table 3: The effect of proximity to a commuter train station on the sale price of a property

Single-family		Condominium	
0-1,500 metres	2.8%	0-1,500 metres	4.9%
0-500 metres	**	0-500 metres	4.6%
500-1,000 metres	4.4%	500-1,000 metres	7.0%
1,000-1,500 metres	2.3%	1,000-1,500 metres	2.2%

Source: QFREB by the Centris® system

**Variable is not significant or lack of observation

Québec City

Métrobus

To calculate the effect of proximity to Métrobus stations 800 and 801 on the sale price of a property, we used a radius of 1 kilometre, because with a walking distance of more than 15 minutes, coupled with the waiting time to take the Métrobus, it is often more advantageous for users to use another regular or express bus route. When testing beyond this radius, the effect on property prices drops drastically. In addition, we did not incorporate Métrobus routes 802, 803 and 807, as several of these routes did not exist during some of our observations.

For single-family homes, a property located within the 1-kilometre radius of a Métrobus station sells for 8.7% more, on average, than a property with the same characteristics that is located outside of this radius. This effect is slightly weaker for condominiums, as a condo located within the 1-kilometre radius sells for a price that is 8.1% higher than an identical condo located outside of this radius.

When separated into increments of 500 metres, we obtain linear results for single-family homes but not for condominiums. Thus, for condominiums, the contribution of proximity to a Métrobus station within a radius of 0 to 500 metres is stronger than the average contribution of being 0 to 1,000 metres away.

For single-family homes, a property located within the 1-kilometre radius of a Métrobus station sells for 8.7% more, on average, than a property with the same characteristics that is located outside of this radius.

Table 4: The effect of proximity to a Métrobus station on the sale price of a property

Single-family		Condominium	
0-1,000 metres	8.7%	0-1,000 metres	8.1%
0-500 metres	8.6%	0-500 metres	11.2%
500-1,000 metres	8.7%	500-1,000 metres	**

Source: QFREB by the Centris® system

**Variable is not significant or lack of observation

Caution

Despite the fact that the method and variables used to obtain our results enable us to explain in large part (64% to 80%³) the characteristics that influence the sale price of a property, some variables not included in the model also affect our results. The absence of these variables therefore has the impact of slightly overestimating the effect of proximity to public transit on the sale price of properties.

First, although we largely isolated the effect of proximity to services with the Walk Score® index⁴, it is possible that part of this effect is absorbed by the variables of proximity to public transit. The way this index is constructed, it measures access to services within walking distance from a property. However, a property may be close to many services, but they may be difficult to reach on foot. Since the Walk Score® variable does not capture the total effect of proximity to services, this residual impact is redistributed to other variables.

Second, the assumption of linearity imposed by the calculation method assumes that the effect of the variables is equally distributed over all observations. For example, linearity assumes that a property in a disadvantaged neighbourhood near a public transit station benefits from the same effect on its sale price as a property in a more affluent neighbourhood. Despite the fact that we added variables to isolate certain socio-economic effects on property prices, other variables such as the crime rate or noise pollution level could have been added to refine the model. However, because of data accessibility issues, it was impossible to include them.

In addition, other variables such as the architecture and materials used in the construction of the properties, the exterior cladding or flooring, the kitchen cabinets and counters, and the roof would have allowed us to refine our calculation method and explain the price differences between two properties with similar characteristics but located in more or less favoured neighborhoods. Although this data is available in the Centris® database, it is entered in the text fields, which makes it difficult to use.

To learn more about the methodology, please consult the Annex.

³ Estimate based on the R-squared method in the presence of heteroskedasticity.

⁴ The Walk Score® measures the walkability of an address based on walking distances to several amenities that are divided into 13 categories, including supermarkets and food stores, coffee shops, movie theaters, parks, book stores, pharmacies, restaurants, bars, schools, libraries, gyms, hardware stores, as well as clothing and music stores.

Conclusion

Generally speaking, a property located within walking distance of public transit infrastructure does actually sell for more than an identical property outside this radius. For the subway in Montréal and the Métrobus in Québec City, the effect on sale price is greater on single-family homes, while for the suburban commuter train, the effect is greater on condominiums. In addition, the contribution of proximity to public transit differs depending on the distance within the radius, with the exception of the effect of the Métrobus on the sale price of single-family homes. The distance where the contribution is more or less strong differs depending on the mode of transportation and the type of property. We also noticed that the effect of proximity to public transit on property prices drops drastically when the public transit infrastructure is no longer within walking distance. A beneficial effect may still be felt beyond this distance, but much less.

The development of the public transit system has a significant upward impact on the value of properties, in addition to other benefits.

Whether it's the Service rapide par bus (SRB) in Québec City, the light rail project proposed by the Caisse de dépôt et placement or an extension to the current subway system in Montréal, the development of the public transit system has a significant upward impact on the value of properties, in addition to other benefits. It will be interesting to carry out the same exercise after the completion of these major projects.

ANNEX

Data

The observations used correspond to all single-family homes and condominiums sold between January 1, 2013, and September 9, 2016, through the real estate brokers' Centris® system. After cleaning the data, the Montréal Census Metropolitan Area (CMA) included 53,481 observations for single-family homes and 27,162 observations for condominiums. In the Québec City CMA, single-family homes comprised 10,392 observations and condominiums comprised 3,022 observations.

Methodology

The basic hedonic model can be represented as follows:

$$p_j = h(x_1^j, \dots, x_k^j, \partial_j) = \beta_0 + \sum_{i=1}^N \beta_i x_i^j + \partial_j$$

where:

p_j = Price of a property that has a hedonic price as a function

K = True number of property characteristics

j = One property ($j=1, \dots, N$)

x_i^j = Value of the characteristic i of the property j

∂_j = Measurement error due to the omission of characteristics

N = Number of properties

Because it is not possible to collect data for each of the characteristics of the properties and only a fraction of it is available, it is only possible to produce an approximation of the hedonic model $h(\cdot)$.

$$p_j = \hat{h}(x_1^j, \dots, x_C^j, \varepsilon_j)$$

where :

C = Number of characteristics retained and collected for empirical estimates

ε_j = Measurement error due to the omission of certain characteristics

The different hedonic models were estimated using the ordinary linear least squares regression method, corrected for the presence of heteroskedasticity. After various Box-Cox specification tests, the models were estimated as log-level, meaning that the explained variable is the logarithm of the sale price and the explanatory variables are level. This way of expressing the model allows us to interpret the coefficients β as being the percentage change in the sale price when the variation of a unit of the associated explanatory variable x changes. All the coefficients β in the document are significant at a threshold of 5%.

Several different regressions were estimated in order to arrive at our results. In the case of Montréal and Québec City, a first regression for each CMA was made using variables of proximity to subway stations, commuter train stations and the Métrobus within a radius of 1.5 kilometres. Subsequently, a second regression was performed for each CMA by separating the public transit variables into 500 metre increments. For the Montréal CMA, the first two regressions were carried out again, but this time by separating the subway stations into their respective lines.

Variables

In addition to variables on proximity to public transit, here is the list of the other explanatory variables⁵:

Statistics relating to properties	Single-family	Condominium
Two or more storey (0/1)	✓	
One-and-a-half storey (0/1)	✓	
Split-level (0/1)	✓	
Loft and studio (0/1)		✓
Townhouse (0/1)		✓
Semi-detached or attached corner unit (0/1)	✓	
Quadrex or attached (0/1)	✓	
Age of the property at time of sale	✓	✓
Number of rooms	✓	✓
Number of bedrooms	✓	✓
Number of bathrooms (including powder rooms)	✓	✓
Living area in square feet		✓
Lot area in square feet	✓	
New construction (0/1)	✓	✓
Walk Score®	✓	✓
Repossession (0/1)	✓	✓
Without legal warranty only (excluding repossessions) (0/1)	✓	✓
View (water, city, mountain, panoramic, other) (0/1)	✓	✓
Property with finished basement (0/1)	✓	
Above-ground pool (0/1)	✓	✓
In-ground pool (0/1)	✓	✓
Number of parking spaces in a garage	✓	
Condominium with at least one parking space (0/1)		✓
Statistics relating to the neighbourhood	Single-family	Condominium
Distance to downtown (km)	✓	✓
University attainment rate in the municipality	✓	✓

Source: QFREB by the Centris® system

⁵ The variables identified (0/1) are binary variables that have the value of 1 if they meet the characteristic. For example, the variable new construction equals 0 if the property is used and equals 1 if it is new.

The reference group⁶ for single-family homes is made up of homes that are single-storey, detached, used, with legal warranty and not a repossession, without a view of an attraction, with unfinished basement and without a swimming pool.

For condominiums, the reference group is composed of apartment-type condominiums that are used, with legal warranty and not a repossession, without a view of an attraction, without a parking space and without a swimming pool.

⁶ The reference group represents the characteristics of the property when all of the binary variables are equal to 0.