Chapter 3

What Determines Neighborhood Quality of Life?
Measuring Quality of Life in Six Latin American Cities

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1. Introduction

This Chapter presents a summary of the results of the individual country projects that then follow as country chapters across six Latin American nations. However, new material is also developed, particularly on the issue of segregation in Latin American cities. The analysis builds on the more theoretical discussion of the last chapter.

There is a growing literature on Quality of Life (QoL) in Latin America. For example, Amorin and Blanco (2003) employ census data for Rio de Janeiro to construct a Human Development Index (HDI) for 126 neighborhoods[1]. Also, for Rio de Janeiro, Cavallieri et al (2007) presents the estimation of a Social Development Index (SDI) covering 8045 sub-city areas defined by census radiuses. The SDI is an equally-weighted average of 11 socioeconomic variables normalized between 0 and 1[2]. For the case of Colombia, using the data provided by the National Survey on Quality of Life, Acosta et al (2003) construct a city level indicator based upon the methodology proposed by Cortes et al (1999) that includes sanitary and water services, garbage collection, schooling, overcrowding and the certain housing construction characteristics – the quality of floors and walls quality.

An issue with these analyses is that both the selection of the QoL indicators and the weights that they are given to construct an index tend to be arbitrary[3]. In the project that forms the basis for this book, QoL indices are constructed using two alternative

[1] The Human Development Index (HDI) is a welfare measures that combines three indicators: (a) longevity as measured by life expectancy at birth; (b) educational attainment, measured as a weighted average of (i) adult literacy rate with a two-third weight, and (ii) combined primary and secondary gross enrolment rates with a one-third weight; (c) standard of living as measured by income per capita.

[2] The 11 indicators are: access to a water network within the house, access to sewage services, proper waste disposal collection, average size of household, number of bathrooms per house, % of illiteracy within household members older than 15 years, % of head of households with less than 4 years of school, % of head of households with 15 or more years of schooling; average income of head of household (in terms if minimum wages), percentage of head of household with income up to 2 minimum wages, percentage of head of household with income of 10 or more minimum wages.

[3] An exception is Acosta et al (2003) as while they select the indicators arbitrarily they determine the weights across nine regions of Colombia using a principal component analysis.

methodologies. Both allow the data to determine which indicators should be included and what weights should be employed. These two approaches are referred to here as the hedonic and the life satisfaction approaches.

Hedonic pricing has a long tradition in the urban economic literature as a method to place monetary values on the welfare impact of various city amenities and public goods[4]. Families' location decisions implicitly reflect preferences about a set of characteristics regarding the house and the neighborhood that offer a given level of Quality of Life. In turn these preferences will affect the prices of land and houses. In other words, the value of amenities, public services, other goods and bads should all be priced in to the market valuations of houses. For example Roback (1982) and Blomquist et al (1988) use hedonic price methods to estimate implicit values of local QoL attributes which then can be used to construct price-weighted QoL indexes.

An alternative, complementary method is to ask people how satisfied (or happy) they are with their QoL. As already explained in chapter 2, there is a recent literature that has emphasized the utilization of subjective, satisfaction or happiness indicators for evaluating well-being (Winkelman and Wilkeman (1998), Di Tella et al (1998), Gardner and Oswald (2001)[5]. This literature has shown that standard income or consumption variables are only partially related to subjective levels of life satisfaction. In this regard, Cattaneo et al (2007) provides evidence that certain basic housing characteristics generate significant improvement in health and self-reported levels of QoL satisfaction even though they are poorly correlated with family income. In the same vein, the results obtained from the Colombian Quality of Life Survey shows that though real income has declined between 1997 and 2003, the access to some basic public services and the level of subjective satisfaction has increased during this period (Acosta et al (2005).

Hence it is of significant interest to consider whether housing characteristics and neighborhood or city amenities play a role in self-reported life satisfaction. As developed in the previous Chapter, under certain circumstances subjective satisfaction can be used as a

[4] Pioneering work using hedonic methods to evaluate, for example, the impact of air pollution can be found in Ridker (1967) and Ridker and Henning (1967). Chay and Greenstone (2004) provide a more updated treatment of the same issue taking into account identification problems. Another area were hedonic methods have been widely used is to estimate the value of school quality. Early work for US is presented in Kain and Quigley (1975) and Li and Brown (1980). See Black (1999), Clapp and Ross (2002) and Bayer et al (2003) for more recent estimations.

[5] Application to other economic issues like the costs of unemployment, the inflation-unemployment trade off , macro volatility and inequality see, respectively, Clark and Oswald (1994), Di Tella et al (2001), Wolfers (2002) and Alesina et al (2001).

direct measure of indirect utility. Using the estimated marginal utility of income, this method allows, similarly to hedonic estimation, to put an implicit price to different QoL attributes which in turn gives an obvious method to weight variables in an aggregate QoL index.

In this chapter we will to show applications of the above two theoretically-founded methods to evaluate the impact on QoL of housing and neighborhood characteristics for a sample of Latin American cities. These applications are developed in detail in the following chapters. Here we will summarize the main results and focus on cross city comparisons. The questions we want to address with this analysis are the following: Do we find important disparities in the measured QoL of urban neighborhoods both across and within cities? Are within city disparities associated with a strong spatial pattern (low and high QoL neighborhoods are mainly concentrated in certain areas: central districts vs periphery?) What are the main driving forces pushing down QoL in the different neighborhoods?

The rest of this chapter is organized as follows. In the next section a set of selected issues regarding monitoring quality of life in Latin America is discussed. In section 3, the results employing the life satisfaction approach are summarized and in section 4 the results using the hedonic pricing methodologies are discussed. In section 5 the issue of segregation in Latin America is analyzed and section 6 concludes.

2. Monitoring Quality of Life in Latin American Cities: A Discussion of Selected Issues

Are neighborhood amenities and city public goods important variables in determining the level of well being or quality of life of individuals? This is an important question because if the answer is that they do matter then local authorities and neighborhood organizations can play a significant role in improving living standards of the urban population. But to answer the above question we need to put a value on those amenities and local public goods. In general this is not an easy task as, by definition, direct markets for these goods do not exist and hence there is little reason for individuals to disclosure their true valuations and demand for them.

In this subsection, selected issues regarding how to measure Quality of Life in the cities included in this project are discussed. The cities are La Paz and Santa Cruz in Bolivia, Buenos Aires in Argentina, Bogotá and Medellín in Colombia, San José in Costa Rica, Lima in Peru and Montevideo in Uruguay. Although these cities cannot be considered a

representative sample of all Latin American cities, they are certainly diverse in terms of their history and socioeconomic characteristics. A key aspect that will differentiate this analysis, in relation to recent academic and policy work is the level of disaggregation. Here, the objective is to consider a within-city analysis. Thus many of the QoL indicators that we will analyze are computed at the neighborhood level. In some cases these sub-city areas represent districts or localities within large urban agglomerations; in other cases they refer to census tracts.

In several cases the urban spaces to be analyzed includes the capital of the respective country and its main neighboring districts. For many cities the formal political boundaries do not reflect the limits of the whole urban area. In such cases, and depending on the availability of information, it is convenient to adopt a metropolitan view where the urban agglomeration to be studied combines the central city and other surrounding localities that have a close association in terms of the relevant markets for locally produced goods (say, land, housing and labor). For example, in the case of Buenos Aires, the urban agglomeration includes the City of Buenos Aires and 24 surrounding municipalities (AMBA). For the case of Lima the analysis covers the 33 districts that forming the conurbation of Lima. In the case of San Jose, its metropolitan area covers 51 localities. The La Paz metropolitan area includes also the near by city of El Alto[6]. This metropolitan approach to the analyses of QoL implies that the urban population covered in the different cases is very significant representing a large proportion of total urban population in each of countries. For example, in the case of Argentina the 13 million people of AMBA represent almost a third of the total population of the country.

A further relevant issue is what indicators of quality of life to monitor. As discussed the project took a very open view of this question preferring to collect a wide variety of indicators and hence as possible allowing the data to determine which factors are important or not. Apart from general indicators including income, health and education, the teams in each country collected indicators pertaining particularly to urban quality of life. These can be divided into indicators related to housing characteristics and indicators related to neighborhood amenities; the particular indicators being dependent on relevance given the city in question. In each city a survey was conducted for at least 3 neighborhoods of each city.

Regarding housing characteristics, typical indicators refer to the size of the house (number of bedrooms, bathrooms) and the quality of the construction of the building (roof, walls and floor). In relation to neighborhood characteristics, one important focus is the access

[6] In the case of Bogota and Medellin the analysis refers only to the formal political borders of these two cities.

of the neighborhood to the city as a whole and to other areas. Hence the distance to a bus stop, to a metro if there is one plus the quality of public transport services, the quality of roads and traffic congestion are neighborhood characteristics that may affect quality of life. Also, neighborhood amenities such as parks, in the case of Monetevideo the proximity to the coast, and even the abundance of trees are relevant characteristics. Two other areas that turn our to be highly relevant for Quality of Life are the proximity of education institutions and indicators of safety such as the crime rate (murders per capita) and victimization rates (robbery).

The above indicators are largely objective in nature, but especially in the life satisfaction approach subjective measures may also be employed. Through surveys the satisfaction with housing quality, education quality or the perceptions regarding can also be employed in empirical work. The choice between objective and subjective measures is discussed further below.

3. The Life Satisfaction Approach to Measuring Quality of Life

As explained in detail in chapter 2 (see also Frey et al (2004)), Life Satisfaction (LS) is a relatively novel methodology that has been used to value public goods. This method corresponds more closely to a stated preference approach. Reported subjective well being can serve as an empirically adequate and valid approximation for individual utility. Hence it is an obvious and straightforward strategy to directly evaluate public goods in utility terms. By measuring the marginal utility of a public goods as well as the marginal utility of income, the trade off between income and public goods (the implicit price) can be calculated[7].

Life satisfaction has certain advantages with respect to the hedonic methods (to be analyzed in the next section). First as it is not based on observed behavior, the underlying assumptions are less restrictive and non-use values can to some extend be measured. Furthermore, individuals are not asked to value the public good directly, but to evaluate their general subjective satisfaction. This is presumably a less cognitively demanding task and also

[7] As indicated in Frey et al (2004) measures of self- reported subject well being passed a series of validation exercises in the sense that they reflect objective circumstances affecting individuals' well-being. Another critical assumption made by this approach that allows to identify the impact on welfare of public goods is that utility is cardinal and interpersonally comparable. This assumption, though problematic on theoretical grounds, proved not so much on empirical grounds. For example, Frey and Stutzer (2002) report very similar quantitative results in micro econometric estimations of happiness function using ordinal and cardinal measures of satisfaction.

prevents strategic behavior. These two issues have been critical problems affecting contingent valuation methods.

LS satisfaction methods have been successfully applied to value different public goods and policies. For example the trade-off between unemployment and inflation (Di Tella and McCulloch (2006), Kahneman and Krueger (2006)). This literature has shown that standard income or consumption variables are many times poorly related with subjective levels of QoL satisfaction. More closely associated with housing and neighborhoods variables, Cattaneo et al (2007) provides evidence that certain basic housing characteristics generate significant improvement in health and self-reported levels of QoL satisfaction which are very poorly correlated with family income. In the same vein the results obtained from the Colombian Quality of Life Survey shows that though real income has declined between 1997 and 2003, the access to some basic public services and the level of subjective satisfaction has increased during this period (Acosta et al (2005)). On the other hand the LS approach has been successfully applied to value environmental externalities. For example Van Praag and Baarsma (2004) analyze the noise nuisance in the area of the Amsterdam Airport.

In the basic empirical analysis of the LS approach, a micro-econometric happiness function is estimated in which individual's utility is approximated by self reported subjective well being. Explanatory variables are his/her income and a vector of socioeconomic variables. In addition, exposure to different neighborhood and city amenities (or dis-amenities) could also be included. The typical regression has the following form,

$$LS_{ij} = a + b\, y_{ij} + c\, age_{ij} + d\, age_{ij}^2 + e\, fs_{ij} + g\, H_{ij} + h\, Z_j + v_{ij} \qquad (1)$$

Where y, age and fs represent income, age and family size of individual i living in neighborhood j. H and Z are two vectors of housing and neighborhood characteristics, respectively. The error term $v_{ij}=n_i+z_j$ is, as in the hedonic regression, a composite error term which is a combination of a neighborhood-specific error component, zj and a house-specific error component, n_i.

The estimation of equation (1) is subject to potential omitted variables bias. In cross section applications of these regressions, which are the type of result we will summarize in section 4, estimation can be seriously biased if unobserved factors covariate with life satisfaction and the measured public good. A key issue is then to control for potentially co-

linear variables though the lack of the relevant indicators generally limits this procedure. Alternatively instruments for the public good variables could be used.

The results suggest that a set of housing and neighborhood characteristics are found to be important for each city. An overview of the results is illustrated in Table 1. The table indicates statistically significant coefficients in a regression of life satisfaction on a set of standard variables (age, sex, marital status etc) and then a set of house and neighborhood characteristics[8]. Several housing characteristics are found to be significant – consistent with the findings reported above. In poorer cities such as La Paz it is the basic quality of house construction (floors and walls) that is important, in richer cities such as Bogota and Medellin, the number of bathrooms and whether the house has a satellite dish come into play.

With respect to the neighborhood characteristics, security comes through as one of the most important issues in virtually all cases. For example, in the case of San José, the presence of gangs negatively affects life satisfaction. In the case of Bogotá, Lima and Montevideo safety is seen as an important neighborhood attribute. Access to basic services such as electricity, water and sewage, garbage collection and telephone also come through as important neighborhood characteristics. For Bogotá, inefficiencies in the provision of certain infrastructure services like energy, garbage collection and telephone services have a negative and significant impact on subjective well-being. In La Paz and Santa Cruz access to sewage and running water networks improves self-reported utility.

Several neighborhood characteristics that might be considered important a priori do not seem to influence individuals' satisfaction. One such set of variables is transit and congestion issues, which is consistent with the results from the Gallup polls reported in Chapter 1. It is possible however, that such issues, while very important for some cities with high levels of congestion in the region, are not as critical in the particular neighborhoods analyzed in this project, nor in all urban areas, as covered in the Gallup surveys. Interestingly, while traffic issues are generally found not to be significant, aspects of public transport are found to be important.

[8] It is somewhat artificial the distinction here between what is a house characteristic and what is considered a neighborhood characteristic, as the data is at the level of each household. In practice the distinction may be drawn given the relative variation across individual houses in a sub-neighborhood. For example in a (small) sub-neighborhood most houses will have or will not have access to water, hence this is considered as a neighborhood characteristic here.

Table 3.1 Overall Life Satisfaction Regressions: Summary of Results. Significant Factors

Bolivia (La Paz and Santa Cruz)	Colombia (Bogotá)	Colombia (Medellín)	Costa Rica (San José)	Peru (Lima)	Uruguay (Monteviedo)
Housing characteristics					
Condition of roof	Number of bathrooms	Number of bathrooms	Condition of floor	Condition walls	Condition of walls
Condition of of floors	Quality of floors	Satellite TV services		Dwelling characteristics	
		Quality of floors			
Neighborhood Characteristics					
	Quality of energy services	Distance to main/connector street	Safety (presence of gangs)	Safety (robbery)	Running water
Running water					
Sewage	Quality of garbage collection	Distance to places of cultural value		Condition street	Street lights
Paved street	Quality of telephone services	Presence of prisons		Green areas in good condition	Safety (vandalism in neighborhood)
Access to electricity network	Safety in the neighborhood			Trust in neighbors	
	Robbery				
	Drug dealing				
	Recreation/sports centers				
	Average education in the neighborhood				
Other controls					
Income	Income	Income	Income	Income	Income
Age	Age	Age	Age	Age	Age
Marital status	Marital status	Marital status	Marital status	Marital status	Marital status
Family size	Family size	Family size	Family size	Family size	Family size
	Health variables				

Source: Authors' compilation based on the IDB Latin American Research Network project on Quality of Life in Urban Neighborhoods in Latin America and the Caribbean, available at: http://www.iadb.org/res/network_study.cfm?st_id=91.

Apart from judging which housing and neighborhood characteristics are particularly important, the life satisfaction approach can also be used to place a value for living in a neighborhood or for a particular house or neighborhood characteristic.[9] As income influences life satisfaction along with certain characteristics (say the condition of sidewalks), the trade-off between greater income and better sidewalks can be used to estimate the value of improving sidewalks. At no point do interviewed people actually express how much they are willing to pay for these characteristics. The life satisfaction approach is then particularly useful as it can be used to value amenities that do not yet exist or where there is no market price available.

In order to illustrate the life satisfaction approach in action, the values for those neighborhood characteristics that turned about to be significant for three neighborhoods in Buenos Aires are presented in Table 2[10]. The approach can be used to place a value on a neighborhood as such, as well as the specific characteristics of those places. For instance, living in Caballito or Palermo has an implicit value when compared to living in Avellaneda. This value goes beyond the differences in the set of neighborhood characteristics considered – in other words this value is on top of any measured differences in neighborhood characteristics.

As discusses above some neighborhood characteristics are objective, in the sense that can be verified by an external observer, for instance the presence of garbage in the streets, or the availability of payphones (for this project the information on the variables classified as objective was reported by the interviewers). But many of the neighborhood characteristics that matter are subjective, in the sense that they come from peoples' own opinions. Among the subjective variables, good neighbors are found to be particularly valuable as well as the perceived condition of sidewalks and security. The perceived availability of green areas and their areas is also highly valued.

[9] Frey et al (2004) provides a description of the theory and applications of these techniques in practice.
[10] These valuations stem from a two stage technique where in a first step overall life satisfaction is regressed on income and a set of domains (including satisfaction with the neighborhood) and then in a second step, neighborhood satisfaction is regressed on a set of more objective neighborhood characteristics. The coefficient on income in the first regression and the coefficients on neighborhood satisfaction and the coefficients in the second step are then combined to find the tradeoff between income and say improving security during the day. This tradeoff implies how much someone would be willing to pay to obtain a little more security and hence can be interpreted as the price of additional security.

Table 2 Valuing Neighborhood Characteristics in Buenos Aires Using the Life-Satisfaction Approach *(monetary valuations in Argentine pesos)*

	Monetary valuatios in pesos
Neighborhood dummies	
Avellaneda	0.376
Caballito	1.404
Palermo	1.409
Housing characteristics	
Number of bedrooms	0.170
Garage	0.424
Neighborhood characteristics: Subjective	
Annoying noise during the day	-0.470
Sidewalk conditions when raining	0.492
Conditions of pavement/streets	0.550
Cultural and sports activities	0.300
Amount and quality of green areas	0.413
Traffic in neighborhood	0.315
Security during the day	0.405
Evaluation of neighbors	0.702
Neighborhood characteristics: Objective	
Garbage during the day	-0.279
Visual contamination	0.249
Payphones	0.553

Source: Cruces, Ham, and Tetaz (2008).

Note: Valuations based on the life-satisfaction approach make use of the implicit trade-off between income and each characteristic that is a derived from a regression analysis.

The valuation of public goods is a critical question for public policy. If public goods can be valued, this helps national government and local authorities make rational decisions as to what goods should be offered to try to improve quality of life as much as possible given the always-present budget constraints. The life satisfaction approach provides one promising route to do this and also to monitor valuations over time to see if they change depending on socio economic developments and as the characteristics of cities alter.

4. The Hedonic Approach to Value Neighborhood Amenities and its Impact on QoL.

An alternative method to estimate monetary values for local public goods and neighborhood amenities is hedonic pricing. This corresponds to a revealed preference method as it is based on actual behavior and utilize complementary and substitute relationship between public

goods and various market goods to infer the value attributed to public goods from market transaction in private goods.

The basic hedonic method uses land and housing markets to obtain implicit prices for various public goods affecting the quality of life (QoL). It can be shown that this methodology is derived from microeconomics fundamentals describing the localization decisions of families (and firms). Implicit prices for the various QoL attributes are obtained from a "spatial equilibrium" where a worker-resident, given equilibrium wages and price for housing services, is indifferent as to her city localization. For this equilibrium to be sustainable, differences in urban amenities between alternative locations must be compensated by differences in price of the local traded goods: housing prices and wages[11]. Thus the urban economic literature has usually assumed that city amenities affecting the QoL are capitalized not only in land or housing prices but also in wages. The key assumption here is that city borders could also place some limits to labor markets in the sense that the choice of residence affects also the access to job opportunities.

An application of this conceptual framework for the various cities where the focus is on within city variation in QoL would imply that most of the impact will be captured by housing prices and not so much in wages. This is because within city location will not limit labor opportunities if worker mobility is relatively high. To implement empirically this methodology complementary data on real estate prices is needed. Ideally, for each sub-city area j, information on housing prices and characteristics need to be collected for a representative sample of housing units. Thus the hedonic regression to be estimated would have the following form (Gyourko et al (1999)),

$$\text{Ln } p_{ij} = \text{constant} + \gamma_1 H_i + \gamma_2 Z_j + v_{ij} \quad , \quad v_{ij}=\delta_j + \eta_i \qquad (2)$$

Where p_{ij} is the rental price of house i localized in neighborhood j, H_i is a vector of individual house features (number of rooms, quality of construction, square meters, etc.), Z_j is a vector of neighborhood j amenities (crime rate, green space, etc.), and v_{ij} is the composite error term which is a combination of a neighborhood-specific error component, δ_j, and a house-specific error component, η_i . The city specific error component is common to all houses in the neighborhood, and represents systematic uncontrolled differences in amenity

[11] For a nice description of the microeconomic fundamentals behind hedonic pricing of quality of life indicators see Gyourko et al (1999).

characteristics across sub-city areas. But it also may capture systematic uncontrolled differences in *house quality* across neighborhoods. Any of these two factors would imply that the composite error term across houses within the same sub-city area will be correlated violating OLS independence assumption.[12]

The above brief discussion of the hedonic methodology already suggests the rather restrictive assumptions made by this theory. The presumption that the real state market is in equilibrium implies that households have a very high degree of information on buying-selling opportunities in the real estate market, that prices of houses and land adjust rapidly, that transaction and moving cost are low, and there are no other market restrictions (i.e. credit rationing). Only in this ideal scenario we could expect that the impact of public goods or bads will be fully capitalized in housing rents and prices.

Beyond the theoretical concerns regarding whether the application of hedonic pricing is justified or not, from the empirical point of view there is the already indicated problem of unobserved house and neighborhood characteristics and the consequent bias produced by omitted variables. This problem has made the estimation of the impact of different public goods and amenities to vary widely across different specifications or, occasionally, to have the wrong sign. We will discuss the practical relevance of this problem in the context of the estimation results we present in the next section.

There is considerable variation across the considered urban areas in terms of features that affect house prices – see Table 3 below. For example, in the San José metropolitan area (Costa Rica), the slope of the land in a neighborhood and the vulnerability to volcanoes negatively affects property values. On the other hand, in La Paz, the altitude of a neighborhood is found to be a positive factor. In Montevideo closeness to the coastal promenade (La Rambla) is an important feature of a neighborhood. In some cities, proximity to a main avenue or thoroughfare may be considered an asset, whereas in another context it may indicate congestion or pollution. Thus, while in Buenos Aires or in Medellín, closeness to a metro station contributes to higher house prices, in Bogotá distance to the "Transmilenio" transport system does not affect house prices.

[12] In particular it will imply a downwards bias to the OLS-based standard errors (Moulton (1986)). Thus the potential problem of the presence of groups effects needs to be addressed by correcting the standard error by clustering or running a RE estimation (assuming city fixed effects are not correlated with any of the Z variables). Of course this problem will be minimized the better the data on individual housing characteristics and also the more data we have for neighborhood-level QoL attributes.

In those cities where basic domiciliary services coverage is still deficient in some areas, its influence in house prices can be gauged. Results indicate that access to running water, access to sewage and access to piped gas are all associated with higher house prices.

Other neighborhood variables that proved to be important in several of the cities considered include proximity to schools, proximity to a park or a green space and security (Table 11 lists significant variables by city). Interestingly in a couple of cities it is also found that variable related to people spatial segregation by socioeconomic characteristics (including race) has also an impact in property prices. Thus for the case of Bogota and Medellin it is found that the proportion of people belonging to the highest socioeconomic stratum and the average level of education by census track has a significant positive impact in property values (even after controlling for housing and other neighborhood characteristics) . In fact these two variables explain around 20% of the variance of prices in Bogota and 30% in Medellin. For the case of La Paz the proportion of indigenous people is also an important determinant of property prices. On average prices decline almost 300% in a complete ethnic neighborhood (compare to one with no indigenous people). Now of course these quantitative estimates should be taken with caution as it is very plausible that identifications problems may bias the result. For one thing segregation is a an endogenous response of localization decisions to market prices so that causality could go from prices to the chosen indicator of segregation. At the same time this neighborhood level variables may be capturing other unobservable characteristics of houses and neighborhoods. Still at least qualitatively these results suggest that in fact spatial segregation could result a negative externality for poor/low educated families living in those city areas. We will come back to this issue in section 4 when we discuss policy implications.

Housing prices also depend strongly on the characteristics of the particular home in question. Location is definitely not everything when it comes to housing prices or equivalent rents. Here there is more homogeneity regarding the variables found to be significant. In particular, the number of rooms (total rooms or bedrooms), the number of bathrooms and the condition of walls, roof and floors were typically found to be significant. In Buenos Aires, the age of the house was found to be important (with a negative coefficient) and in some cities the presence of a garage and an exclusive kitchen were found to be important.

Table 3 House and Neighborhood Characteristics Revealed in House Prices

Argentina (Buenos Aires)	Bolivia (La Paz)	Bolivia (Santa Cruz)	Colombia (Bogotá)	Colombia (Medellín)	Costa Rica (San José)	Perú (Lima)	Uruguay (Montevideo)
Housing characteristics							
Number rooms	Number rooms	Number rooms	Number rooms	Number rooms	Number rooms	Number rooms	Number rooms
Garage	Number of Bathrooms	Number of Bathrooms	Garden	Number bathrooms	Number of Bathrooms	Number of Bathrooms	Number of Bathrooms
Condition walls	Condition walls	Condition walls	Garage	Fixed phone line	Condition walls	Condition walls	Condition walls
Lot size	Condition floor	Condition floor	Condition floor	Internet or satellite TV	Condition floor	Condition floor	Condition floor
Age	Condition roof	Condition roof	Size of house	Garage	Condition roof	Condition roof	Condition roof
Number of bathrooms	Exclusive Kitchen	Exclusive Kitchen	Size of plot	Condition floors	Exclusive kitchen	Exclusive kitchen	Exclusive kitchen
Parking place				Condition walls			
Neighborhood characteristics							
Distance avenue	Running water	Running water	Running water	Running water	Safety	Sidewalks in good conditions	Access running water
Distance freeway	Sewage	Sewage	Average education	Gas main	Slope		Access sewage
Distance metro	Paved street	Paved street	Distance restaurant	Average education	Eruption vulnerability		Access to gas
Distance train	Altitude	Proportion of indigenous people	Schools per capita	Restaurants per capita	Distance parks		Access to drainage

Distance green space	Proportion of indigenous people	Homicide rate	Environmental risks	Distance fire depts.	Condition street
Drug dealing		No bus/train terminal	Distance to metro	Neighborhood road	Condition sidewalk
		Education inequality	Distance to bus terminal	Primary road	Street lights
		Distance to Universities	Distance to main/connector street		Presence of trees
		Lower unemployment	Distance to places of cultural value		Air pollution
			Distance to University		Satisfaction with parks
					Satisfaction with sports facilities

Source: Authors' compilation based on the IDB Latin American Research Network project on Quality of Life in Urban Neighborhoods in Latin America and the Caribbean, available at: http://www.iadb.org/res/network_study.cfm?st_id=91.

Policymakers frequently need to know the relative importance of the different variables, as they must make decisions where to invest scarce resources. Should investments be made in the quality of housing construction or in providing neighborhood amenities? In the case of Bogotá, around 30% of the variance in housing prices is explained by identified neighborhood amenities while 51% of the price variation is explained by housing attributes. For Medellín the numbers are 37% and 25% respectively. In the Metropolitan Area of San José, neighborhood amenities explain 39% of the variation in rents. Neighborhood features, while not everything, are definitely significant. This last conclusion is very important from the point of view of urban planers and local authorities as it suggest that quality of life, as reflected in property values, can be significantly be improved by improving local public goods and neighborhood amenities.

Now the hedonic method provides a direct method to evaluate this type of interventions in monetary terms. Using the coefficients from the regressions an implicit price can be estimated (expressed in monthly terms) for different housing and neighborhood attributes. Table 4 presents an exercise considering San José, Costa Rica This price indicates how much the monthly rental of an average house would change with an additional unit of the amenity. These prices indicate that, for example, each degree of slope of land implies a lower housing cost of about 50 cents (0.5 US$) per month whereas an extra unit of safety (measured as reported crimes per week in the neighborhood, would imply a higher cost of housing of over US$20 per month[13].

Table 4 Hedonic Estimation of Implicit Prices for Housing and Neighborhood Amenities. Metropolitan Area of San Jose de Costa Rica

(Price of amenities measured at the mean prices in 2000 Dollars, 308 Colones=1US$ dollar)

Housing characteristics	Estimated coefficient[a]	Implicit price
Number of bedrooms	0.55***	30.84
Number of rooms (not-bedrooms)	0.33***	18.80
Floor in good condition	0.24***	13.63
Walls in good condition	0.44***	24.82
Walls of cinder blocks	0.82***	45.72
Roof in good condition	0.32***	18.23
Ceiling in good condition	0.43***	24.46
Water Source: communal organization	-0.36***	-20.24

[13] Housing costs refers to "equivalent rents", this is either the rent itself or a calculation of the opportunity cost of owning the house that depending on the value of the house and prevailing interest rates. Any differences between renters and owners in relation to their preferences are ignored in this analysis.

Water source: rain	-0.82**	-46.07
Water source: well	0.13	7.44
Water source: river	-0.89***	-49.63
Sewer (septic tank)	-0.10***	-6.03
Sewer (latrine)	-0.21*	-11.72
Sewer (other)	-0.33***	-18.60
No sewer	0.09	5.05
Exclusive bathroom for the household	0.48***	27.07
Electricity not supplied by Instituto Costarricense	-0.24***	-13.66
No electricity supplied	-0.70**	-39.15
Total housing characteristics contribution	60.84%	
Neighborhood characteristics		
Safety index	0.46***	25.82
Slope degrees	-0.01***	-0.57
Precipitation (mm3)	-0.12**	-6.99
Risk of eruption	-0.13**	-7.52
Distance to national parks (Km)	-1.25***	-70.09
Distance to clinics (Km)	0.01	0.57
Distance to secondary schools (Km)	0.02	1.18
Distance to primary schools (Km)	0.00	0.19
Distance to rivers (Km)	0.06***	3.42
Distance to fire departments (Km)	0.05**	3.14
Closeness to sabana park	-0.54***	-30.58
Distance to peace park	1.35***	75.56
Length of primary roads (Km)	-0.46***	-25.89
Length of secondary eoads (Km)	0.23***	13.31
Length of urban-neig. roads (Km)	0.57***	31.77
Neighborhood classified as poor	-0.35***	-19.91
Total neighborhood char. contribution	39.15%	

Coefficient is statically significant at the 10 percent level; ** at the 5 percent level; *** at the 1 percent level; no asterisk means the coefficient is not different from zero with statistical significance.

[a]To obtain these values, estimated prices were multiplied by quantities of the amenity c./ symbol of colones + The price was calculated following Bosquit et al 1988. Price = b*(Ybar)^(1-l) where b is the estimated coefficient from the best functional form and Ybar is the average of the dependent variable.

Using these implicit prices, an index of the overall value of neighborhood characteristics can be generated and combining this with the average value of housing characteristics, an overall neighborhood satisfaction index expressed in monetary terms can be calculated. Employing this technique, the average rental value of houses by district (including both housing and neighborhood characteristics across 51 districts) in San José ranges from $143 to $370 per month. Table 5 lists the top ten and the bottom ten neighborhoods in San Jose by this measure. The contribution to this rental value of the

neighborhood amenities and other characteristics ranges from -$67 to $27 ─ the contribution can take negative values as some neighborhood characteristics are "bads" rather than goods ─ the probability of a volcanic eruption being one example. The contribution of housing characteristics ranges from $183 to $343 reflecting the different quality of housing construction across districts in San José.

Table 5. Using Hedonic Prices to Construct a Quality of Life Index by Neighborhood, Metropolitan San José

(ranking of districts by housing and neighborhood characteristics)

		Housing and neighborhood characteristics		Neighborhood characteristics		Housing characteristics	
	District	Ranking	Value ($US)	Ranking	Value ($US)	Ranking	Value ($US)
Top 10	Sánchez	1	370	1	27	1	343
	San Rafael	2	285	2	9	8	275
	Mata Redonda	3	275	10	-23	2	299
	Carmen	4	264	11	-24	3	287
	San Vicente	5	258	8	-20	6	277
	Anselmo Llorente	6	254	13	-28	4	281
	San Isidro	7	245	3	-5	23	250
	San Pedro	8	238	20	-32	10	271
	San Juán	9	237	16	-30	11	267
	Sabanilla	10	237	35	-39	7	276
Bottom 10	Alajuelita	42	172	48	-59	34	230
	Hospital	43	169	40	-42	42	211
	San Jocesito	44	166	46	-54	38	220
	San Felipe	45	165	36	-40	46	205
	Cinco Esquinas	46	164	28	-37	48	200
	Patarrá	47	154	15	-29	51	183
	San Juán de Dios	48	148	50	-62	45	210
	Tirrases	49	144	51	-67	43	211
	Concepción	50	143	49	-61	47	204
	Aserri	51	143	47	-57	49	199

Source: Hall, Madrigal and Robalino (2008).

As expected, the wealthier districts such as Sánchez, San Rafael and San Isidro have relatively high rental values attributable to neighborhood variables while poorer areas such as Salitrillos, Patarrá and Concepción have lower values. Although this is not surprising, it illustrates how neighborhood characteristics may exacerbate income differentials in terms of the distribution of quality of life. These valuations also provide a guide to where scarce

resources might be concentrated to best improve that distribution. However, there are also some unexpected results. For example Mata Redonda ranks very high in housing characteristics (3rd) but rather poorly in neighborhood amenities (10th), while Escazú ranks poorly in housing characteristics (26th) but very high in neighborhood amenities (4th). This illustrates that there is indeed considerable space for action. Public policy has contributed to these results and may be used further to enhance the welfare of those living in districts where neighborhood valuations are currently at the lower end.

A similar exercise of calculating monetary values for neighborhood amenities is done for Buenos Aires. Table 6 ranks the top ten and the bottom ten neighborhoods. Neighborhood characteristics include the distance to different urban infrastructures like avenues, schools, parks, freeways, train stations and subways. The first column of the table represents the estimated value (in 2006 US dollars) of the neighborhood characteristic for the average house in the indicated city area. The second column indicates the percentage difference in price given by the considered amenities (0.05 means that property values prices rises 5%). As we see for some neighborhoods even the rather small number of amenities considered implied a significant increase in property values (18% for Chararita, 17% for Colegiales). On the other extreme, for some other areas lack of these amenities imply a significant reduction in property prices (Vila Real, -16%; Villa Riachuelo, -12.5%). Overall we see that wealthier neighborhoods (as judged by average price of property per square meter) such as the Recoleta and Palermo are included in the top ten, while poorer ones, such as Villa Lugano and Mataderos, in the south of the city are in the bottom ten. Interestingly, there are some relatively expensive neighborhoods at the bottom of Table 14 (San Telmo, Villa Devoto and Saavedra), and neighborhoods in the middle of the income distribution (such as Balvanera) are among the top ten. With respect to the 2006 average price per square meter of real estate in the city of about $1,041 dollars, the implicit price differences given by this index range from $219 to -$126, with an average of $72.5, or just under 7 percent of the average property value.

Table 6 Using Hedonic Prices to Construct a Quality of Life Index by Neighborhood, Buenos Aires City

	Neighborhood	Amenities index (value, $US dollars)	Amenities index (-1 to 1, scale)	Ranking by amenities index (quantity)	Average price per square meter (US$ dollars)	Ranking by price per square meter
Top 10	Chacarita	218.7	0.186	1	1,021	14
	Colegiales	214.0	0.166	2	1,174	7
	Puerto Madero	209.2	0.064	18	2,810	1
	San Nicolás	204.2	0.159	3	1,159	8
	Palermo	202.9	0.129	7	1,507	3
	Belgrano	184.7	0.136	5	1,269	5
	Villa Ortuzar	178.0	0.148	4	1,118	9
	Recoleta	158.2	0.105	10	1,453	4
	Retiro	154.3	0.091	14	1,721	2
	Villa Crespo	138.8	0.128	8	1,016	16
Bottom 10	Monte Castro	-42.8	-0.051	36	862	30
	Villa Devoto	-44.5	-0.056	38	960	22
	Villa Soldati	-44.9	-0.070	40	680	45
	Villa Lugano	-46.4	-0.081	43	605	47
	Mataderos	-60.4	-0.082	44	754	42
	Villa Luro	-63.1	-0.079	42	836	36
	Liniers	-63.6	-0.076	41	852	34
	Versalles	-89.0	-0.108	45	873	28
	Villa Riachuelo	-90.0	-0.124	46	760	41
	Villa Real	-126.6	-0.164	47	850	35

Source: Cruces, Ham and Tetaz (2008).

The correlation between the price per square meter and the index is positive but it is far from one. This reflects a significant but imperfect relationship between the index and property prices (the price/index correlation is 0.43, and the price/rank correlation is 0.71). This imperfect correlation again suggests that there are other factors that determine real-estate prices other than basic housing features and neighborhood characteristics; fashion would be one possible explanation. In the case of Buenos Aires, the ordering developed can also be used as a guide for public investment to improve the distribution of quality of life.

In the case of Bolivian cities the estimation of implicit prices for housing characteristics and neighborhood amenities also allowed the estimation of a QoL index in monetary terms by sub-city area. In La Paz and Santa Cruz it is found that housing features (size, quality and

services) explain about two thirds of the inequality in quality of life across neighborhoods while local public goods explain the remaining 1/3. For El Alto on the other hand the distribution is roughly 50% housing quality and 50% neighborhood amenities. Thus, again, the evidence for Bolivia shows that neighborhood characteristics matters for quality of life and that much that can be done on this account to improve standard of living of the urban population.

5. Is Segregation a Concern in Latin American Cities?

There is a small but highly relevant literature on the organization of cities, such as Tiebert (1956) and Vandell (1995), that yield interesting predictions for urban segregation and that relates to the Quality of Life in these large cities in Latin America. In Tiebert's classic paper, inhabitants organize themselves into different areas depending on their preferences over public goods. Different preferences imply an economic rationale for segregation as sub-city areas develop that are homogenous within their boundaries, but exacerbate segregation in the city level. This economic segregation is in contrast to ethnic or other motives for segregation.

A prediction of the Tiebert's model, borne out by evidence from the United States, is that the more segregated is the urban area, the more local governments may develop to service the needs of each homogeneous sub-city zone. The contribution by Vandell, in an extension of the same argument, is that the greater is the income inequality, the greater will be the segregation, as higher-income families will outbid lower-income ones for property with desirable characteristics.[14] The result is that richer areas will cluster close to desirable amenities. More generally, according to this view, market forces are likely to generate areas where residents have similar attributes, which may include neighborhood characteristics such as natural features or parks, but also the provision of higher-quality public services.

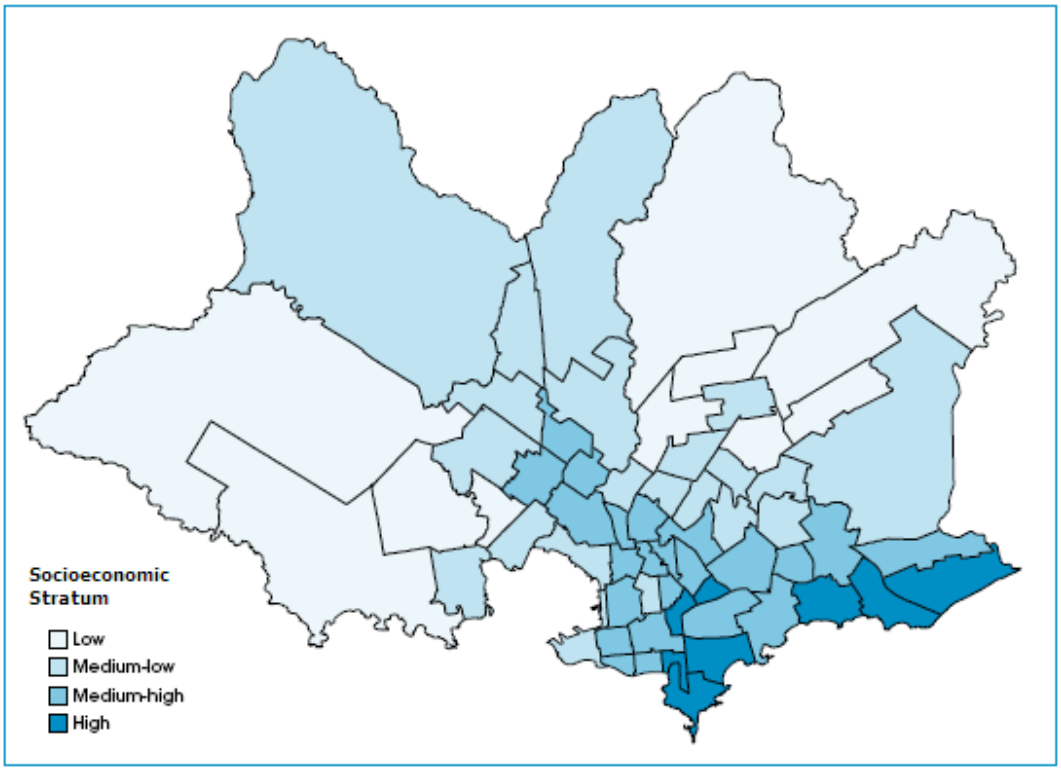
As is well known, Latin America's income inequality remains very high, and hence it should come as no surprise that large cities in the LAC region are also highly segregated.[15] Moreover, as reviewed in Chapter 1, these large cities have developed very rapidly over the last 50 years. These are precisely the conditions for segregation to flourish. The urban

[14] Vandell (1995) divides characteristics into four categories: (1) housing and lot characteristics, (2) neighborhood amenities, (3) accessibility characteristics, and (4) resident attributes—the last of these refers to attributes such as race, income, wealth, education, family composition, and occupation.
[15] Here we focus on economic rationales for segregation, but there may also be other rationales such as religious or racial, discussed in the literature.

economics literature also concludes that the rapid development of cities allows the demand for segregation to be more swiftly and more deeply realized (Watson, 2005).

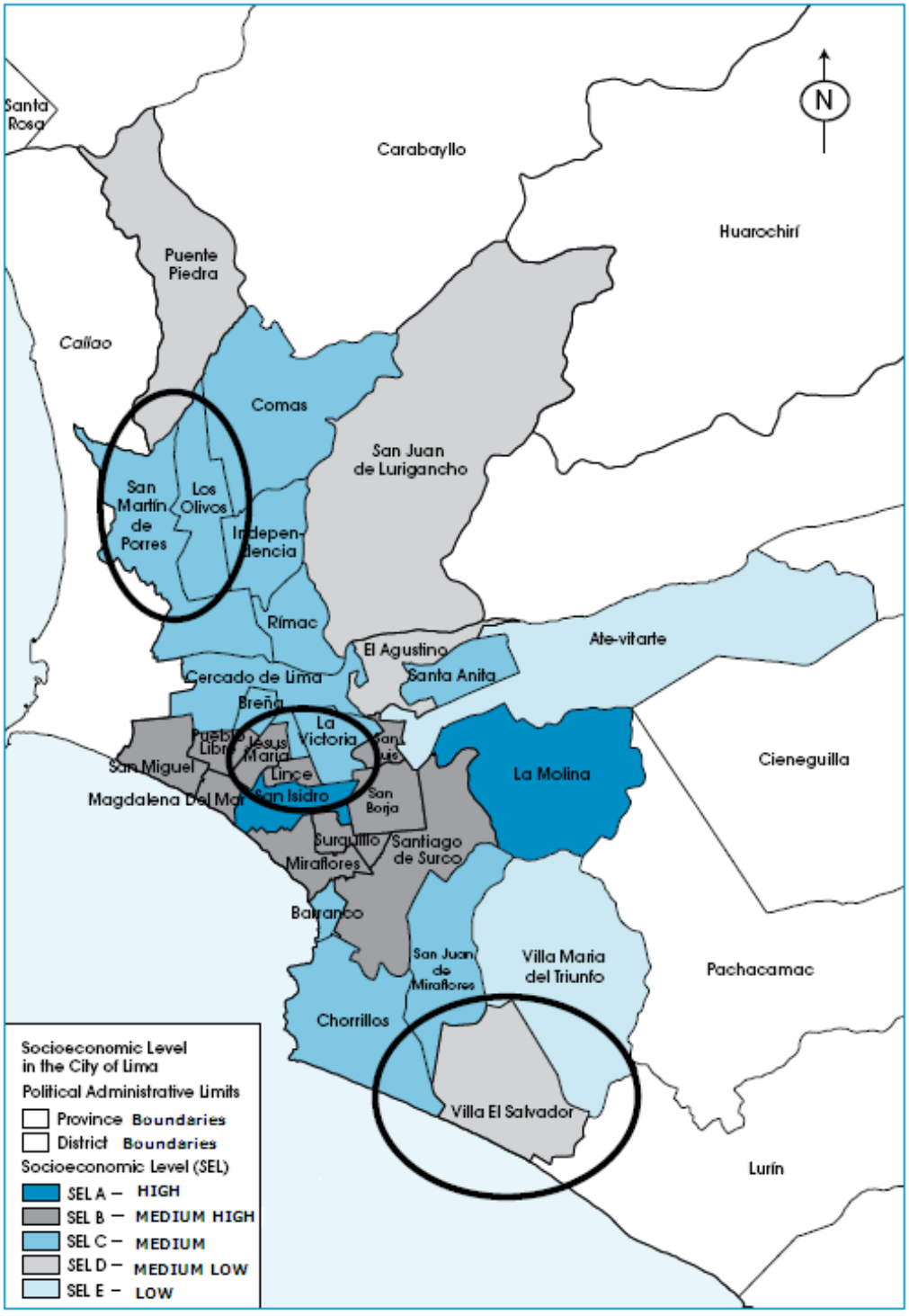
In the case of Montevideo (Figure 1), the high-income strata are spatially concentrated in very few neighborhoods. In two of these neighborhoods, Carrasco and Pocitos, more than 90 percent of the population belongs to the highest socioeconomic level. It is no coincidence that these areas are clustered closest to Montevideo's most famous natural feature; the *ramblas* or broad-walk by its beaches. In the case of Metropolitan Lima (see Figure 2), districts in the periphery of the city are poorer, and higher-income districts are located more towards the center of the metropolitan area.

Figure 1 Neighborhoods in Montevideo City according to Socioeconomic Strata



Source: Ferre, Gandelman, and Piani (2008).

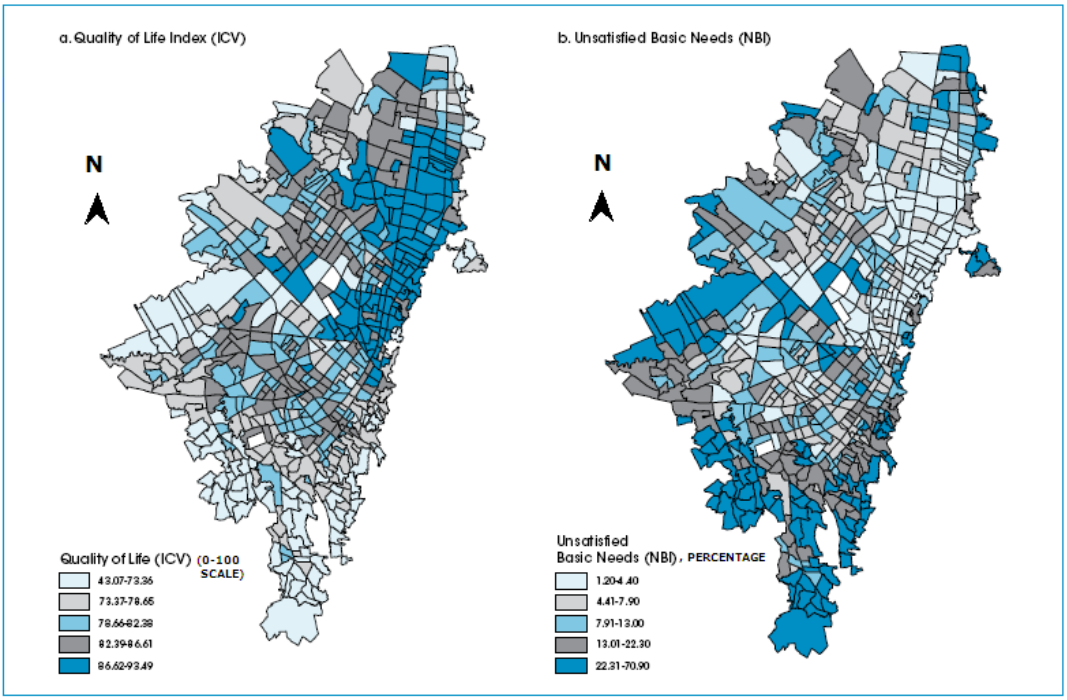
Figure 2 Distribution of Population by Socioeconomic Level, Metropolitan Lima



Given that house prices reflect neighborhood characteristics, and the tendency for neighborhoods to be segmented by income (socioeconomic strata), there is an implication that quality of life will also be highly segmented. In Bogotá, the spatial distribution of Índice de Calidad de Vida (ICV) (a quality of life index) and the Necesidades Básicas Insatisfecchas

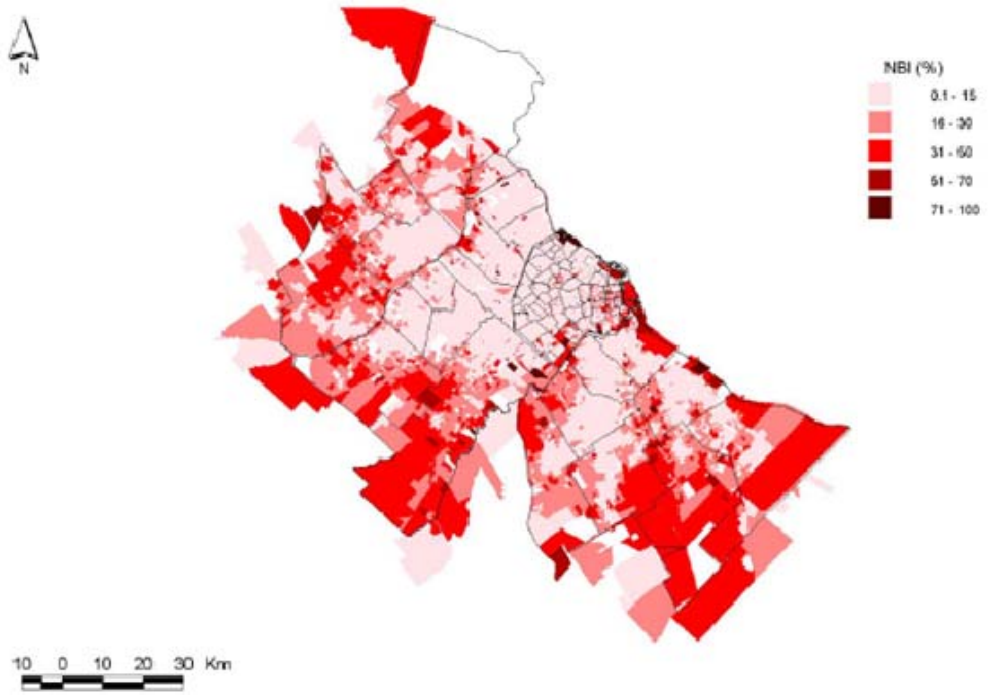
(NBI) (Unsatisffied Basic Needs) indicators (see Figure 3) demonstrate that the poorest families with the lowest quality of life indicators are consistently located in the southern and western census sectors of the city, and those better off are located in the northern and eastern sectors that match the highest socioeconomic strata.

Figure 3 Spatial socioeconomic stratification of population in Bogotá



Segregation is also apparent considering other characteristics: for example, educational attainment. In the case of Greater Buenos Aires, within a limited geographical space, there are areas with 25 to 50 percent of their populations holding a university degree adjacent to areas with significantly lower levels on the same indicator. Highly educated residents tend to concentrate in the northern half of the City of Buenos Aires and in the three municipalities north of it, which constitute the *corredor norte* (northern suburban corridor that follows the shore of the River Plate). The same pattern is apparent when the proportion of the population with at least one category of deficit in basic needs, a widely used measure of structural poverty captured with census data (Figure 4), is analyzed. In 2001, the outer area of Greater Buenos Aires had by far the highest concentration of population living under these conditions.

Figure 4 Percentage of the population with at least one category of basic needs deficit, by census radio. Greater Buenos Aires Area, 2001.



Greater Buenos Aires, although on average a wealthy city by Latin American standards, displays high levels of segregation of urban services.[16] Moreover, while access to the public network for water is relatively high for all residents (84 to 100 percent), there are still several pockets where more than 10 percent of households are not connected to this network,[17] specifically in the urban outskirts. Moreover, there are also some poorly covered areas within the City of Buenos Aires, corresponding to some of the city's poorer areas (or *villas miseria*). To underline the segregation patterns in the city, the higher socioeconomic status neighborhoods (such as Palermo and Caballito) have a significantly higher number of leisure-related and educational facilities, more trees, and more garbage bins per block than areas with a greater number of lower socioeconomic status inhabitants, such as Avellaneda and San Cristóbal.

[16] The presence of potential externality effects will be dealt with in the following sections when the impact of segregation on real estate prices and life satisfaction is evaluated.
[17] As 10 percent is very different from the average, this implies a high degree of segregation.

In the case of Montevideo, there is also significant variation of services across city areas. Dwellings in a neighborhood corresponding to a high-medium socioeconomic status have access on average to between 8 and 8.4 public services, while dwellings in a low-medium socioeconomic neighborhood have access to only between 5.6 and 7.1 services. In general, in Montevideo there is a positive correlation between the socioeconomic status of the inhabitants of a neighborhood and the number of basic services that are offered: the higher the socioeconomic status, the more services offered. In Metropolitan Lima the conclusion is a little more mixed. Neighborhoods such as La Victoria, which is considered a medium-low-income neighborhood, may be considered to be in the center of the urban area and have better access to public services (including transport, police officers and security, and hospitals and other health facilities), while neighborhoods such as Los Olivos, corresponding to a medium socioeconomic status, and Villa El Salvador, a low-income neighborhood, are located more in the city's periphery and access to public sources is more restricted.

For the cases of Bogotá and Medellín, the data show that the strong pattern of spatial segregation by socioeconomic level found for these cities is also observed when the allocation of some basic services is considered. For example, the distribution of piped gas is concentrated in a few neighborhoods within the city, and these areas coincide with the high-income neighborhoods. In summary, the evidence suggests that there are important disparities in access to local public services and urban amenities across neighborhoods in Latin American cities. The question then arises, what if anything should be done about it?

Returning to the economic theory, there is an argument that the type of Tiebert segregation described above may actually be a good thing. If segregation does indeed reflect different preferences, then the variation across areas allows inhabitants to choose the area that corresponds most to their desires. This implies that sub-city areas will be relatively homogeneous in their demands for public services, and voting mechanisms in the area would ensure less disappointment regarding taxation and service provision—as people would tend to vote for the same options given homogeneity. So if segregation produces a larger set of local governments offering different bundles of services according to inhabitants' tastes, then just as variety is important for consumers when shopping (for cars, for example), so segregation may also be desirable.

However, this positive side to segregation may be easily outweighed by a set of negatives, and indeed there are several reasons to be concerned about this strong pattern of

socioeconomic spatial segregation. First, as the distribution of socioeconomic indicators is also reflected in the allotment of basic urban public services and neighborhood amenities, cities are not working as a compensating mechanism to moderate differences in quality of life across the urban population. Indeed, segregation in services and amenities implies that inequality may be even deeper in quality of life than in income. There is also evidence that segregation extends racial divisions. For example, research in the United States suggests that blacks living in more highly segregated cities have significantly lower outcomes (education and future income) than blacks living in less-segregated areas, when current socioeconomic variables are controlled for (Cutler and Glaesser, 1997). Moreover, a highly segregated city population is less likely to be one that demands high-quality public services in general (Alesina, Baqir, and Easterly, 1999). The theory here is that a more-segregated population across a metropolitan area is one in which collective action is made more problematic and hence the inhabitants less likely to be able to effectively communicate demands.

Moreover, there are additional costs to creating separate areas of high and low income, particularly that crime and violence may flourish in the low-income areas and then spill over to all areas. Indeed, the efficiency of Tiebert-style sorting may turn negative if there are significant spillovers not contemplated in the original model. Given the major concerns with crime consistently discussed in this chapter, one view is that the high perceptions of serious crime in the LAC region are a fairly direct function of highly segregated cities, which by itself surely constitutes an important reason to be concerned about such high levels of segregation in the region.

While in theory, then, there may be some positive aspects to segregation, in practice many find disparities in income and access to basic services intolerable morally and untenable politically. The moral position and existence of externalities across areas justify policies to diminish segregation. In particular, basic services in poorer areas may be subsidized and richer areas may be taxed, although this is unlikely to alleviate all of the costs. Another approach is to encourage movement of people between areas to diminish segregation. However, this is not easy to accomplish, as richer areas may tax their citizens more and this would be a deterrent to lower-income families' moving into those areas. Again, schemes that allow mixing of social groups should be devised.[18]

[18] See Wassmer (2002) for an interesting discussion.

6. Concluding Remarks.

This Chapter summarizes the many and varied results found in the subsequent Chapters of this publication. Using life satisfaction and hedonic approaches, quantitative measures are obtained of the value people and markets implicitly assign to specific features of housing quality, to access to different services and to goods such as city amenities (such as parks) and to bads (such as crime).

Apart from housing quality and access to services the aspect that stands out as significantly affecting the quality of life in urban areas is that of safety. Interestingly, objective measures of crime do not always correlate with perceptions in this area. Creative policy thinking is required to reduce not only the actual incidence of crime but also to ensure that urban populations feel safe. Not one single country has been able to provide the perception of a safe environment for its urban population.

At a more local level, municipal governments should establish information systems for monitoring the various variables affecting quality of life in urban neighborhoods. There are already important and interesting experiences in setting up these monitoring systems including the City of London (London Sustainable Development commission, 2005), Canadian cities (Canadian Treasury Board, 2005) and the Urban Audit Program of the European Union (European Communities, 2000). In the Latin American and Caribbean Region, Bogotá and its "Bogotá, Como Vamos" scheme is another well known example.

What variables and what questions should be included in these initiatives? The lessons learned from the analysis presented in this chapter suggest that they should cover both quantitative and qualitative indicators. In particular, they must employ secondary sources (censuses and household surveys) to gather quantitative information at a very disaggregated, census-track level of basic socioeconomic and housing indicators. These secondary sources of information should be complemented with surveys, with sub-city representation, where in addition to some quantitative socioeconomic and housing variables, subjective questions regarding satisfaction with several dwelling and neighborhood characteristics (besides overall life satisfaction) are collected. One key objective of these subjective questions is to gauge the consistency between objective quality of life indicators and people's perceptions regarding these variables.

A second purpose of these subjective questions is to use them to extract an implicit value for certain public goods (or bads). In terms of this last objective, a third very important dataset to be recorded and monitored is housing prices and rents. This can be done through secondary sources (real estate quotations) and/or include rent and home value questions within the survey.

National statistical offices in some countries collect valuable information on many relevant variables. Typically, the focus, however, is at the national level with no regional or city level discrimination. Moreover, not all relevant variables are collected and rarely are subjective opinions sought (an exception is the quality of life survey- Encuesta de Calidad de Vida- in Bogotá). An effort is needed to link the valuable information already available at the national level with other information sources including subjective surveys and to provide results that are useful at different levels of government including regional, city and even at the level of municipalities.

But the purpose of these local quality of life monitoring systems is not only to gather the information in an integrated and consistent way. For this information to inform the policy process, the facts revealed by them must be part of the public debate and influence the policy agenda. This could be better achieved if there were public access to the information and the main results were presented to the public in a framework that assures a certain level of independence with respect to the authorities.

The monitoring of quality of life indicators at the city level can both reveal existing overall disparities in quality of life across neighborhoods as well as identify the main drivers or factors causing them. The question now arises of how this diagnosis should be used to guide policy interventions. In other words, which disparities should be given priority in terms of public investment and/or compensation schemes? The clearest case is when the survey reveals that determined areas of the city lack certain basic services (say, running water) or are subject to a particular negative amenity (say, pollution) and people's perceptions are consistent with these facts. This evidence could clearly support a public program to act against these problems.

But besides this obvious and clear-cut use of the information to support public policy, the analysis developed in this chapter also suggests other, less direct, ways to interpret the data and derive policy prescriptions. In particular, some interesting conclusions can be obtained from comparing the hedonic and the life satisfaction methods. In the hedonic

approach, if all relevant amenities or public goods are reflected in real estate prices, then the market works as a mechanism to set values on these intangibles. Thus, if people want to enjoy a positive amenity in a particular neighborhood, they will be paying for this. In the same vein, in the case of a public bad, people will be compensated by a lower rents and lower house prices in this area.

One easy way to check if markets work well in pricing these externalities is to perform the life satisfaction exercise. If real estate prices completely offset the impact of these amenities, self-reported life satisfaction would not be affected by the presence or absence of these features. In other words, utility as measured by self-reported satisfaction would not rise by a small increase in the provision of these public goods as people are already paying for it. Of course, in the opposite case where self-reported satisfaction does react to the presence of these externalities, then this means that markets do not entirely price these factors. Thus, differences in the results emanating from hedonic and life satisfaction methods can illuminate which amenities are already being taken care of by the markets and which are not. Governments should become involved the most in those cases where markets do not work correctly as a pricing mechanism.