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# A New Way of Monitoring the Quality of Urban Life

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**Abstract***

This paper proposes a methodology to resolve the problems that result from using a combination of objective and subjective information in evaluating urban quality of life. The paper further suggests techniques to identify and rank issues of potential importance for urban dwellers. In order to combine objective and subjective information in a coherent manner and focus on the most relevant dimensions of the quality of life in a city or neighborhood, the paper attempts to exploit the complementary nature of two approaches: the "hedonic" approach, which employs market prices for housing, and the "life satisfaction" approach, which addresses subjective well-being. Results using both approaches in selected Latin American cities are discussed and compared. The paper concludes with a discussion of potential uses of the two-pronged methodology for policy analysis.

**JEL Classifications:** D19, H41, H42, I31
**Keywords:** Quality of life, Urban quality of life, Latin America

**Acronyms**

| | |
|---|---|
| HDI | human development index |
| LS | life satisfaction |
| OLS | ordinary least squares |
| QoL | quality of life index |
| SDI | social development index |

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## 1. Introduction

Quality of life rankings across major cities frequently attract a great deal of global press. The oft-quoted Mercer (2010) rankings currently rate Geneva as the city with the highest quality of life, closely followed by Zurich, among the 221 cities covered. The stated intention of the Mercer ranking is to "help governments and major companies place employees on international assignments." However, the factors that are important for international executives are quite different from those of residents. In Europe, the Urban Audit system of Eurostats monitors the quality of life in 357 cities with more than 300 indicators more aligned to residents' likes and dislikes. This system has the explicit (and ambitious) intention of shedding light on "most aspects of quality of life, e.g., demography, housing, health, crime, labour market, income disparity, local administration, educational qualifications, environment, climate, travel patterns, information society and cultural infrastructure" (Feldman, 2008).

Efforts to monitor quality of life in other world regions tend to have less geographic coverage but are equally ambitious. The Quality of Life Report of New Zealand's Cities, which covers a dozen cities, encompasses 186 individual measures across 11 domain areas (Quality of Life Project, 2007). In the developing world, initiatives in several cities of Colombia and Brazil stand out. Though less structured than their counterparts in Europe and New Zealand, some of those monitoring systems have greater flexibility in exploring issues of immediate interest to citizens. In Bogota, Colombia, the *Cómo Vamos* system, for instance, is a veritable barometer of public opinion on the principal aspects of the city's conditions (Bogotá Cómo Vamos, 2009).

These systems to monitor residents' quality of life share two interesting but problematic traits. In contrast to the indices for executives or international businesses, which are based exclusively on objective data, systems of monitoring the quality of life of the population at large combine objective information with opinions, albeit in a variety of manners and with varying weights. While the Quality of Life Report of New Zealand's Cities attempts to strike a balance between objective and subjective indicators, *Bogotá Cómo Vamos* has gradually moved from its origin as an opinion survey in the late 1990s to a mix of subjective and objective indicators. A remarkable feature of both, however, is the

lack of interconnection between objective and subjective indicators. In the New Zealand system, for instance, the most comprehensive measures of subjective wellbeing are reported as part of the health indicators, with no attempt to understand their relationship with the objective indicators in that domain or others. The same concerns apply to other systems that mix objective and subjective indicators (Santons and Martins, 2007). It is hard to argue that urban quality of life can be satisfactorily monitored with the exclusive use of either objective or subjective indicators. Many important aspects of people's lives do not lend themselves to objective measure, such as the beauty (or lack thereof) of the urban environment, feelings of insecurity or the quality of the relations among neighbors. But subjective measures may be misleading, due to lack of public information, cultural biases, habituation or aspiration factors.

Partially for these reasons, international monitoring systems (including Eurostats' Urban Audit) avoid subjective variables as much as possible, since they limit international comparability. This limitation, though, amounts to throwing out the baby with the bathwater. An alternative solution is to understand the relationship between objective and subjective indicators and exploit it in a complementary manner so as to enrich the interpretation of both.

A second problematic feature is the inclusion of a large number of topics. Since the very essence of urban life is the meeting of diverse individuals who undertake a variety of activities, and possibly have greatly differing interests and tastes, it may seem necessary for a monitoring system to cover many dimensions of a city's services and amenities and of the way in which residents utilize and value them. While the European Urban Audit's more than 300 indicators address the interests of many different users, that very breadth may hinder rather than facilitate the policymaking process because it does not provide any ranking of needs or priorities. Moreover, the development of a universal set of indicators that would make national or even worldwide comparisons among cities is a futile undertaking: huge differences exist in geographical, economic and socio-cultural contexts, and many aspects of quality of life are qualitative in nature. For instance, while social ills such as inequality, exclusion or violence may be considered detrimental to quality of life, it is in no way obvious how they should be measured and weighted in the construction of a

quality of life index, taking into account that the impact of these problems on wellbeing may differ widely across cultures.[1] One possible solution is to use participatory approaches to elicit residents' degree of concern with different domains or their relative importance (Fahy, 2009). An alternative, which is explored in this paper, is to employ objective and subjective information jointly, using statistical methods to deduce which dimensions and aspects of urban conditions are important, and to what degree, according to two complementary criteria.

In this paper, we propose a methodology to attempt to resolve the problems resulting from the use of a combination of both objective and subjective information, and we suggest techniques to identify and rank the issues of potential importance for urban dwellers. In order to combine objective and subjective information in a coherent manner and focus on the most relevant dimensions of the quality of life in a city or neighborhood, we attempt to exploit the complementary nature of two approaches: the "hedonic" approach which employs market prices for housing and the "life satisfaction" approach which addresses subjective well-being.

Housing market prices (or rentals) reflect the market's recognition of the characteristics or traits of both the housing itself and the neighborhood where it is located. Housing prices offer a good summary gauge of the quality of urban life enjoyed by residents, assuming prices reflect all of the characteristics of cities that impact on people's wellbeing. This so-called "hedonic approach" has a long tradition in the urban economic literature as a method of placing monetary values on the welfare impact of city amenities and public goods, as will be discussed below. Implicit values estimated with this approach can then be used to construct price-weighted quality of life (QoL) indexes.

An alternative and complementary method is to ask people how satisfied (or happy) they are with their life, their city or their neighborhood.[2] A more recent literature, surveyed

[1] For instance, Alesina et al. (2004) have argued that Americans are more tolerant of inequality than Europeans because expectations of social mobility are higher among the former. Among Latin American countries, public concern with violence is highest in some of the countries with the lowest homicide rates, like Uruguay, and lowest in countries where street crime is more rampant and homicide rates higher, like some of the Central American countries (IDB, 2008, pp. 226-8).

[2] This question can also be applied to a specific dimension of life satisfaction such as how satisfied an individual is with their house.

below, has emphasized the utilization of subjective satisfaction or happiness indicators for evaluating wellbeing. As income is included as an explanatory variable in the standard life satisfaction regression, the marginal valuations of other significant variables included in the analysis may be computed. Under certain circumstances this allows for the calculation of an implicit price for various QoL attributes, which again may yield a scheme to weight variables to generate an aggregate QoL index.

As two methodologies can be used to derive a QoL index, it is imperative to understand the relation between them. Below it is argued that they are complementary. Indeed, under some circumstances the most appropriate valuation may be the sum of the prices from each (van Praag and Baarsma, 2005). However, comparing the two approaches may also yield interesting information regarding the functioning of housing and land markets.

There is small but growing literature on estimating other types of QoL indexes for Latin American cities. For example, Amorin and Blanco (2003) employ census data for Rio de Janeiro to construct a human development index (HDI) for 126 neighborhoods.[3] Also for Rio de Janeiro, Cavallieri and Lopes (2008) present the estimation of a social development index (SDI), an equally-weighted average of 11 socioeconomic variables normalized between 0 and 1, covering 8,045 sub-city areas defined by census radiuses.[4] For the case of Colombia, using the data provided by the National Survey on Quality of Life, Acosta, Guerra and Rivera (2005) construct a city-level indicator based on the methodology proposed by Cortés, Gamboa and González (1999) that includes sanitary and water services, garbage collection, schooling, overcrowding and certain housing construction characteristics (the quality of floors and of walls). A potential drawback of these analyses, however, is that both the selection of the QoL indicators and the weights employed to

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

[4] The 11 indicators are the following: 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; percentage of illiteracy among household members older than 15 years; percentage of heads of household with less than four years of school, percentage of heads of household with 15 or more years of schooling; average income of heads of household (in terms of minimum wages); percentage of heads of household with income up to two minimum wages; percentage of heads of household with income of 10 or more minimum wages.

construct an index tend to be arbitrary.[5] In the analyses in this paper, on the other hand, both the hedonic and the life satisfaction methodologies allow the data to determine which indicators should be included and what their weights should be in any QoL index.

The proposed two-pronged methodology has been applied in pilot studies conducted in several Latin American cities: Buenos Aires in Argentina, Bogota and Medellin in Colombia, San Jose in Costa Rica, Lima in Peru and Montevideo in Uruguay.[6] Although these cities cannot be considered a representative sample of all Latin American urban population centers, 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 are analyzed 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. This level of disaggregation allows us to gauge the extent to which QoL indicators vary across the city space and thus consider whether differences in this indicator across households display some spatial pattern.

The rest of this paper is organized as follows. In the second section the hedonic price approach is discussed and the results of its application to selected cities are summarized. In the third section, the results employing the life satisfaction approach are summarized. The fourth section discusses the relation between the two approaches. The paper concludes with a brief discussion of the potential uses of the two-pronged methodology for policy analysis.

[5] An exception is Acosta et al. (2005). While the authors select the indicators arbitrarily, they determine the weights across nine regions of Colombia using a principal component analysis.

[6] The project also included La Paz and Santa Cruz in Bolivia, but due to substantial methodological differences the results are not considered here.

## 2. The Hedonic Price Approach

A traditional method of estimating monetary values for local public goods and neighborhood amenities is hedonic pricing.[7] Families' location decisions implicitly reflect preferences regarding a set of characteristics pertaining to the house purchased or rented and the neighborhood where the house is located, as well as the amenities offered in that location. In turn, these preferences will affect property prices in the market for land. A better quality house in a location that offers a wider set of amenities and fewer "bads" will command a higher price. Given sufficient variation in the house and location combinations present in the market, and assuming that the market functions smoothly, house prices will fully reflect the value of the full set of relevant housing and neighborhood features and amenities. As examples of this approach, Roback (1982) and Blomquist, Berger, and Hoehn (1988) use hedonic price methods to estimate implicit values of local amenities. The valuations can be derived from microeconomic fundamentals considering households' and firms' location decisions as a function of the characteristics of neighborhoods and houses. Intuitively, implicit prices for various QoL attributes are obtained from a "spatial equilibrium" where a worker-resident receives an equilibrium wage and pays an equilibrium price for housing services. At this equilibrium, the worker-resident is just as happy living in that location as moving to a different one. For the equilibrium to be sustainable, differences in urban amenities between alternative locations must be compensated for by differences in prices of the local traded goods: housing prices and wages.[8]

The urban economics literature has usually assumed that city amenities affecting the QoL are reflected not only in land or housing prices but also in wages. The key assumption is that city borders also place limits on labor markets in the sense that choice of residence affects access to job opportunities. In contrast, the analysis presented in this paper focuses

[7] 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 (2005) provide a more updated treatment of the same issue taking into account identification problems. Another area where hedonic methods have been widely used is to estimate the value of school quality. Early work for the United States is presented in Kain and Quigley (1975) and Li and Brown (1980). See Black (1999), Clapp and Ross (2002) and Bayer, McMillan, and Ferreira (2003) for more recent estimations.

[8] For a description of the microeconomic fundamentals behind hedonic pricing of quality of life indicators, see Gyourko, Linneman and Wachter (1999).

is on within-city variations in QoL. As it is reasonable to assume that job opportunities do not differ greatly among workers within neighborhoods, valuations of amenities will be captured in house prices and not in wage differentials. Within-city location is not expected to limit labor opportunities if worker mobility is relatively high. To implement empirically this methodology complementary data on real estate prices are needed. Ideally, for each sub-city area *j*, information on housing prices and characteristics needs to be collected for a representative sample of housing units. Thus the hedonic regression to be estimated would have the following form from Gyourko, Linneman and Wachter (1999),

$$\text{Ln } p_{ij} = \text{constant} + \gamma_1 H_i + \gamma_2 Z_j + v_{ij} \text{ , } v_{ij}=\delta_j + \eta_i \qquad (1)$$

where $p_{ij}$ is the rental price of house *i* located 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, $\delta_j$, and a house-specific error component, $\eta_i$. The city-specific error component is common to all houses in the neighborhood and represents systematic uncontrolled differences in amenity characteristics across sub-city areas, but it may also capture systematic uncontrolled differences in *house quality* across neighborhoods. Either of these two factors would imply that the composite error term across houses within the same sub-city area will be correlated, violating the ordinary least squares (OLS) independence assumption.[9]

The above brief discussion of the hedonic methodology already suggests the rather restrictive assumptions made by this theory. The presumption that the real estate market is in equilibrium implies that households have a great deal of information on buying-selling opportunities in the real estate market, that prices of houses and land adjust rapidly, that transaction and moving costs are low, and that there are no other market restrictions (e.g., price controls). Only if these assumptions are met would we expect the impact of public goods or bads to be fully reflected in housing rents and prices.

[9] In particular, it will imply a downwards bias to OLS-based standard errors (Moulton, 1986). Thus the potential problem of the presence of group effects needs to be addressed by correcting the standard error by clustering or running a random effect E 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.

Beyond the theoretical concerns regarding whether the application of hedonic pricing is justified or not, from the empirical point of view there is the abovementioned problem of unobserved house and neighborhood characteristics and the consequent bias produced by omitted variables. In the literature this problem is manifested in results that vary across different regression specifications or, occasionally, in variables that even appear to have the wrong sign. The practical relevance of this problem is discussed in the context of the estimation results presented below.

Table 1 shows a summary overview of the results of the hedonic regressions. There is considerable variation across the considered urban areas in terms of features that affect house prices. For example, in the San Jose metropolitan area (Costa Rica), the slope of the land in a neighborhood and vulnerability to volcanic eruptions negatively affect property values. In Montevideo, proximity to the coastal promenade (La Rambla) is an important feature of a neighborhood and contributes to the values of the houses. 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 Medellin proximity to a subway station contributes to higher house prices, in Bogota distance to the "Transmilenio" transport system does not affect house prices. In those cities where basic domiciliary services coverage is still deficient in some areas, their influence on house prices can be gauged. The results indicate that access to running water, access to sewerage 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. Interestingly, in some cities variables that relate to segregation by socioeconomic characteristics also have impacts on property prices. In the case of Bogota and Medellin, it is observed that the proportion of people belonging to the highest socioeconomic stratum and the average level of education by census tract have a significant positive impact on property values (even after controlling for housing and other neighborhood characteristics). In fact, these two variables explain around 20 per cent of the variance of prices in Bogota and 30 per cent in Medellin.

These quantitative estimates should be considered with caution, as identification problems may produce biases in the results. Segregation is an endogenous response of location decisions to market prices so that causality could go from prices to the chosen indicator of segregation. At the same time, these 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 in a negative externality for poor/low-educated families living in those city areas. The issue is discussed below when addressing policy implications.

House prices also depend strongly on the characteristics of the particular home in question. 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 are typically found to be significant. In Buenos Aires, the age of the house is found to be important (with a negative coefficient), and in some cities the presence of a garage and an exclusive kitchen appear to be important.

In the case of Bogota, around 30 per cent of the variance in housing prices is explained by identified neighborhood amenities, while 51 per cent of price variation is explained by housing attributes. For Medellin the numbers are 37 per cent and 25 per cent, respectively. In the Metropolitan Area of San Jose, neighborhood amenities explain 39 per cent of the variation in rents. Neighborhood features, while not everything, are definitely significant.

**Table 1. Significant House and Neighborhood Characteristics Revealed in House Prices, Selected Cities**

| Argentina (Buenos Aires) | Colombia (Bogotá) | Colombia (Medellín) | Costa Rica (San José) | Uruguay (Montevideo) |
|---|---|---|---|---|
| | | **Housing characteristics** | | |
| | Number rooms | Number of rooms | Number of rooms | Number of rooms |
| Garage | Garden | Number of bathrooms | Number of Bathrooms | Number of Bathrooms |
| Quality of construction | Garage | Fixed phone line | Condition of walls | Condition of walls |
| | Condition of floor | Internet or satellite TV | Condition of floor | Condition of floor |
| | Size of house | Garage | Condition roof | Condition of roof |
| Number of bathrooms | Size of plot | Condition of floors | Exclusive Bathroom | Exclusive kitchen |
| | | Condition of walls | | |
| | | **Neighborhood characteristics** | | |
| Drug dealing | Homicide rate | Environmental risks | Safety | Access to running water |
| Public transportation stops | No bus/train terminal | Distance to subway | Slope | Access to sewerage |
| | Distance to restaurant | Distance to bus terminal | Eruption vulnerability | Access to gas |
| Distance to subway | Running water | Distance to main/connector street | Distance to fire departments | Condition of street |
| | Average education | Running water | Neighborhood road | Condition of sidewalk |
| Distance to green space | Education inequality | Pipe gas | Length of Primary road | Street lights |
| | Schools per capita | Average education | Length of Secondary road | Access to La Rambla (Ocean Promenade) |
| | Distance to Universities | Distance to University | Distance to parks | |
| | Lower unemployment | Distance to places of cultural value | | |

*Source:* Authors' compilation based on IDB (2007).

**Table 2. Hedonic Estimation of Implicit Prices for Housing and Neighborhood Characteristics. Metropolitan Area of San Jose, Costa Rica**

| Amenities / Disamenities | Estimated coefficient | Implicit price (2000 US$) |
|---|---|---|
| **Housing characteristics** | | |
| Number of bedrooms | 0.55*** | 30.84 |
| Number of rooms (not-bedrooms) | 0.33*** | 18.80 |
| Floor in good condition | 0.24*** | 13.63 |
| Walls in good condition | 0.44*** | 24.82 |
| Walls of cinder blocks | 0.82*** | 45.72 |
| Roof in good condition | 0.32*** | 18.23 |
| Ceiling in good condition | 0.43*** | 24.46 |
| Water Source: communal organization | -0.36*** | -20.24 |
| Water source: rain | -0.82** | -46.07 |
| Water source: well | 0.13 | 7.44 |
| Water source: river | -0.89*** | -49.63 |
| Sewer (septic tank) | -0.10*** | -6.03 |
| Sewer (latrine) | -0.21* | -11.72 |
| Sewer (other) | -0.33*** | -18.60 |
| No sewer | 0.09 | 5.05 |
| Exclusive bathroom for the household | 0.48*** | 27.07 |
| Electricity not supplied by Insituto Costarricense de Electricidad | -0.24*** | -13.66 |
| No electricity supplied | -0.70** | -39.15 |
| **Total contribution of housing characteristics (%)** | 60.84 | |
| **Neighborhood characteristics** | | |
| Safety index | 0.46*** | 25.82 |
| Degree of slope | -0.01*** | -0.57 |
| Precipitation ($mm^3$) | -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 roads (km) | 0.23*** | 13.31 |
| Length of urban-neighborhood roads (km) | 0.57*** | 31.77 |
| Neighborhood classified as poor | -0.35*** | -19.91 |
| **Total contribution of neighborhood characteristics (%)** | 39.15 | |

*Source*: Hall, Madrigal and Robalino (2008).

Note: Km=kilometers; mm3=cubic millimeters. The price of amenities is measured at mean prices in 2000 dollars(308 colones=1 dollar).
*Coefficient is statistically 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.

Using the coefficients from the regressions, an implicit price can be estimated (expressed in monthly terms) for different housing and neighborhood characteristics. These prices indicate that, for example, each degree of slope of land implies a lower housing cost of about 60 cents (US$0.6) 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.[10]

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 quality of life (QoL) index expressed in monetary terms can be calculated. Employing this technique, it is possible to obtain the average QoL index measured in terms of monthly rental value of houses by district (including both housing and neighborhood characteristics across 51 districts), which in San Jose ranges from US$143 to US$370 per month. Table 3 lists the top 10 and bottom 10 neighborhoods in San Jose by this measure. The contribution to this rental value of the neighborhood amenities and other characteristics ranges from −US$67 to US$27; the contribution can take negative values as some neighborhood characteristics, such as the probability of a volcanic eruption, are bads rather than goods. The contribution of housing characteristics ranges from US$183 to US$343, reflecting the differing quality of housing construction across districts in San Jose.

[10] Housing costs refers to "equivalent rents," which is either the rent itself or a calculation of the opportunity cost of inhabiting the self-owned house (as estimated, albeit somehow subjectively by the owner). Any differences between renters and owners in relation to their preferences are ignored in this analysis.

**Table 3. Ranking of Districts by Housing and Neighborhood Characteristics, Using Hedonic Prices, to Construct a QoL Index, Metropolitan San Jose, Costa Rica**

| | Neighborhoods | Neighborhood plus housing characteristics | | Neighborhood characteristics | | Housing characteristics | |
|---|---|---|---|---|---|---|---|
| | | 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 |
| | SanJocesito | 44 | 166 | 46 | -54 | 38 | 220 |
| | SanFelipe | 45 | 165 | 36 | -40 | 46 | 205 |
| | CincoEsquinas | 46 | 164 | 28 | -37 | 48 | 200 |
| | Patarrá | 47 | 154 | 15 | -29 | 51 | 183 |
| | SanJuándeDios | 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).

*Note:* Rounding errors may mean sums are not exact.

As expected, wealthier districts such as Sanchez, San Rafael and San Isidro have relatively high rental values attributable to neighborhood variables, while poorer areas such as Patarra, San Juan de Dios and Tirrases 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 Patarra ranks poorly in housing characteristics (47th) but relatively high in neighborhood amenities (15th). 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.

**Table 4. Using Hedonic Prices to Construct a QoL Index, by Neighborhood, City of Buenos Aires**

| | Neighborhood | Average index implicit price difference(value, 2006 US$) | Average amenities index (-1 to 1, scale) | Ranking by amenities index (of 47 neighborhoods) | Average price per square meter (US$ dollars) | Ranking by price per square meter (of 47 neighborhoods) |
|---|---|---|---|---|---|---|
| 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).

A similar exercise of calculating monetary values for neighborhood amenities using the hedonic method is presented here for Buenos Aires. Table 4 ranks the top 10 and the bottom 10 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 characteristics 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 rise 5 percent). As seen for some neighborhoods, even the rather small number of amenities considered implies a significant increase in property values (18 percent for Chacarita, 17 percent for Colegiales). At the other extreme, for some other areas the lack of these amenities implies a significant reduction in property prices (e.g., -16 per cent for Vila Real and -12.5 per cent for Villa Riachuelo). Overall, wealthier neighborhoods (as judged by average price of property per square meter) such as Recoleta and Palermo are included in the top 10, while poorer ones, such as Villa Lugano and Mataderos, in the south of the city, are in the bottom 10. However, there are some relatively

expensive neighborhoods at the bottom of the table (Villa Devoto), and neighborhoods in the middle of the income distribution (such as Chacarita and Villa Crespo) are among the top 10. With respect to the 2006 average price of real estate per square meter in the city of about US$1,041, the implicit price differences given by this index ranges from US$219 to −US$126, with an average of US$72.5, or just under 7 per cent of the average property value.

The correlation between the price per square meter and the index is positive, but it is far from one, reflecting 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.

## 3. The Life Satisfaction Approach

Life satisfaction (LS) is a relatively new approach to placing a value on public goods (Frey, Luechinger and Stutzer, 2004; van Praag and Baarsma, 2005). The approach is an important methodological by-product of the new "happiness science," a term first coined by Clark and Oswald (1994), with predecessors in van Praag (1971) and Easterlin (1974).[11] Happiness economics is diametrically opposed to mainstream neoclassical economics in that it does not assume that individuals make the right decisions based on observed prices to be able to maximize utility, which is assumed unobservable. Happiness economics posits that subjective wellbeing, as reported by individuals in surveys, can serve as an empirically adequate and valid approximation for individual utility. Subjective wellbeing information provides an obvious and straightforward strategy for directly evaluating public goods in utility terms. By measuring the marginal utility of a public good as well as the marginal utility of income, the tradeoff between income and public goods (the implicit price) can be calculated.[12]

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[11] Useful surveys include Layard (2005), Frey (2008), van Praag and Ferrer-i-Carbonell (2008), and Graham (2010).

[12] As indicated in Frey, Luechinger and Stutzer (2004), measures of self- reported subject wellbeing passed a series of validation exercises in the sense that they reflect objective circumstances affecting individuals' wellbeing. Another critical assumption made by this approach, which makes it possible identify the impact on welfare of public goods, is that utility is cardinal and interpersonally comparable. This assumption, though

Examples of this approach include Frey, Luechinger, and Stutzer (2004), Winkelman and Winkelman (1998), Di Tella and MacCulloch (1998), and Gardner and Oswald (2001).[13] A recent Inter-American Development Bank report (IDB, 2008) that considers many aspects of this approach is devoted to the analysis of life satisfaction in general in Latin America and the Caribbean.

Life satisfaction has certain advantages with respect to hedonic methods. First, as this method is not based on observed behavior, the underlying assumptions are less restrictive and non-use values can be measured to some extent. Furthermore, individuals are not asked to value the public good directly, but to evaluate their general subjective satisfaction. Arguably, this is a less cognitively demanding task and also one that does not allow for strategic behavior—two issues that have been critical problems affecting contingent valuation methods.

LS methods have been successfully applied to value different public goods and policies. For example, the approach has been successfully applied to value environmental externalities. For example, van Praag and Baarsma (2005) analyze the noise nuisance in the area of the Amsterdam Airport. For the case of housing and neighborhood amenities, Cattaneo et al. (2007) provide 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 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 wellbeing. 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,

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

problematic on theoretical grounds, proved to be less problematic empirically. 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.

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

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 a composite error term which is a combination of a neighborhood-specific error component, *zj* and a house-specific error component, $n_i$. Equation (2) is the typical LS regression with the addition of housing and neighborhood features. In this regard it is important to mention that empirical applications of this approach have consistently found that income has a positive effect on LS and that age has a negative but decreasing impact (*b* negative and *d* positive).

The estimation of Equation (2) is subject to potential omitted variables bias. In cross-section applications of these regressions, which will be summarized in a later section, 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.

Table 5 presents an overview of the results. A set of housing and neighborhood characteristics are found to be important for each city, with reasonable homogeneity across different urban areas. The table indicates statistically significant coefficients in a regression of life satisfaction on a set of standard variables (income, age, sex, marital status, etc.) and then a set of house and neighborhood characteristics.[14]

At least one indicator of the quality of house construction appears as significant in all cases.[15] The particular proxy varies between the quality of floors and the quality of walls, but at least one appears in each case. In the case of the two Colombian cities (Bogota and Medellin), the number of rooms also appears as significant, although this is not the case in the other cities.

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[14] Here, the distinction is somewhat artificial between what a house characteristic is and what is considered a neighborhood characteristic, as the data are 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 or will not have access to water, hence this is considered a neighborhood characteristic here.

[15] The Argentina study adopted a slightly different methodology where housing satisfaction was included in the regression and so individual housing characteristics were not included. However, a second-stage regression was performed to explain housing satisfaction, and here too the quality of house construction was found to be a significant variable.

With respect to neighborhood characteristics, security appears as perhaps *the* most important and consistent issue in Latin American cities, which is consistent with the cross-country findings on city satisfaction reported by Lora et al. (2010, Chapter 1). For example, in the case of San Jose, the presence of gangs negatively affects life satisfaction. In the case of Bogota, 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 appear as important neighborhood characteristics. For Bogota, inefficiencies in the provision of certain infrastructure services like energy, garbage collection and telephone services have a negative and significant impact on subjective wellbeing.

Note that some neighborhood characteristics are objective, in the sense that they can be verified by an external observer, such as the presence of garbage in the streets, or the availability of payphones (in general the information on the objective variables was reported by interviewers in this project). But several subjective neighborhood characteristics were also included that were based on residents' own opinions. Among the subjective variables, good neighbors are found to be particularly valuable in Argentina and in Peru, as is the perceived condition of streets in Peru.

Several neighborhood characteristics that might be considered important *a priori* do not seem to influence individuals' satisfaction. Perhaps surprisingly, traffic (or congestion) was only significant in the case of Buenos Aires. This is also consistent with the cross-country results reported in Lora et al. (2010, Chapter 1), where traffic problems did not affect city satisfaction. However, one view is that traffic problems are a dis-amenity that people become used to—and over time even become unaware of—and hence they do not consider it one of the most important when asked.

Apart from judging which housing and neighborhood characteristics are particularly important, the life satisfaction approach can also be used to place a value on living in a neighborhood or on a particular house or neighborhood characteristic.[16] As income influences life satisfaction along with certain characteristics (say, the condition of streets), the tradeoff between greater income and better streets can be used to estimate the value of

[16] Lora et al. (2010, Chapter 3) provide a description of the theory and applications of these techniques in practice. See also Frey, Luechinger and Stutzer (2004) and van Praag and Ferrer-i-Carbonell (2008).

improving streets. 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.

**Table 5. Overall Life Satisfaction Regressions for the Six Case Cities: Summary of Results and Significant Factors**

| Argentina (Buenos Aires) | Colombia (Bogotá) | Colombia (Medellín) | Costa Rica (San Jose) | Peru (Lima) | Uruguay (Montevideo) |
|---|---|---|---|---|---|
| **Housing characteristics** | | | | | |
| Not included (because a two-stage technique was used) | Number of rooms<br>Quality of floors | Number of rooms<br>Satellite TV services<br>Quality of floors | Quality of floors | Condition of walls | Quality of walls |
| **Neighborhood Characteristics** | | | | | |
| Security during the day<br>Sidewalk condition when raining<br>Noise during the day<br>Cultural and sports activities<br>Amount and quality of green areas<br>Traffic<br>Evaluation of neighbours | Safety in the neighborhood<br>Robbery<br>Drug dealing<br>Recreation/sports centers<br>Quality of energy services<br>Quality of garbage collection<br>Quality of telephone services<br>Average education in the neighborhood | Presence of prisons<br>Distance to places of cultural value<br>Distance to main/connector street | Safety (presence of gangs) | Safety (robbery)<br>Condition of street<br>Trust in neighbors | Safety (vandalism in neighborhood)<br>Running water<br>Street lights |
| **Other controls** | | | | | |
| Income<br>Age<br>Marital status<br>Household size<br>Education | Income<br>Age<br>Marital status<br>Family size<br>Health variables | Income<br>Age<br>Marital status<br>Family size | Income<br>Age<br>Marital status<br>Family size | Income<br>Age<br>Marital status<br>Family size | Income<br>Age<br>Marital status<br>Family size |

*Source:* Authors' compilation based on IDB (2007).

**Table 6. Values of Neighborhood Characteristics in Selected Buenos Aires Neighborhoods**

| Monthly income compensation | | |
|---|---|---|
| **Neighborhood Characteristics** | (%) | (US$) |
| **Neighborhood dummies** | | |
| Avellaneda | 0 | 0 |
| Caballito | -1.47 | -11.66 |
| Palermo | -1.28 | -10.15 |
| **Neighborhood characteristics** | | |
| Annoying noise during the day | 0.38 | 3.01 |
| Good sidewalk conditions when raining | -0.38 | -2.99 |
| Good conditions of pavement-streets | -0.40 | -3.13 |
| Cultural and sports activities | -0.22 | -1.75 |
| Amount and quality of green areas | -0.32 | -2.51 |
| Low Traffic in neighborhood | -0.23 | -1.86 |
| Security during the day | -0.45 | -3.59 |
| Evaluation of neighbors | -0.64 | -5.10 |
| Payphones | -0.35 | -2.78 |

| Change from average to own neighborhood (Income Variations) | | |
|---|---|---|
| **Neighborhood** | Neighborhood QoL Index (US$) | Average monthly income (US$) |
| Avellaneda | -319 | 763 |
| Caballito | 463 | 807 |
| Palermo | 455 | 866 |
| San Cristobal | -558 | 704 |

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

In order to illustrate how the life satisfaction approach can be used to price or value neighborhood amenities, Table 6 shows the values for those neighborhood characteristics that turned out to be significant for three neighborhoods in Buenos Aires.[17] The table not only presents the valuation of individual neighborhood characteristics and amenities but also how they are combined into a QoL index. Thus 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, good condition of paved streets has an estimated value of a monthly payment of

[17] These valuations stem from a two-stage technique (developed by van Praag et al., 2003) where in a first step overall life satisfaction is regressed on income and a set of domains (including satisfaction with the neighborhood), and 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, improved 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.

US$3. In the same way, living near green areas and parks commands a monthly payment of around US$2.5. The significant value for the neighborhood dummies suggest that differences in value goes beyond the differences in the set of characteristics considered. In other words, this value is in addition to the measured differences in neighborhood characteristics as reflected in the regression results. Overall the combinations of all these characteristics (those that are observable and those captured by the dummies) imply that people living in Caballito and Palermo enjoy a quality of life that is equivalent to a monthly payment of aroundUS$450 per month compared to that of people living in a neighborhood with the average supply of local public services and amenities.

The life satisfaction approach thus provides one possible route for ascertaining which amenities are actually considered to be valuable, as well for placing values on those characteristics and monitoring these valuations over time to see if they change depending on socioeconomic developments and as the characteristics of cities change.

## 4. The Relationship between Both Approaches

As discussed above, the hedonic and life satisfaction approaches can be viewed as complementary. To understand their relation, consider an extreme case where markets function perfectly and where there is ample variation in the housing stock so that there are houses with different characteristics and that display a wide variation of neighborhood amenities and dis-amenities. Under these circumstances house prices may reflect all the valuations of the relevant neighborhood and housing characteristics, and hence suitably specified regressions with house prices as the dependent variable may reveal those valuations.

In the extreme case where markets function perfectly, those same characteristics may not be at all significant in the life satisfaction regressions. The reason is that income is already included as one explanatory variable, and as the various characteristics are priced correctly, individuals may already buy them through their market-based housing decisions. This then implies that there is no extra effect to be found by regressing life satisfaction on individual house or neighborhood characteristics. In essence the importance of, say, a neighborhood amenity is already priced and paid for through the value of the house. The

interpretation is, then, not that these factors are unimportant, but rather that markets work well and are in equilibrium.

This implies that using the results of the hedonic regressions to calculate prices and using those as the weights to develop a QoL index is appropriate. In this case the life satisfaction approach would not be expected to reveal very much. As income is included in the regression and markets are in equilibrium, no additional welfare is obtained from the relevant good (or reduction in welfare from a bad). These factors are therefore already reflected in prices and affect welfare through the income variable.

A more realistic case, however, is that housing markets are not perfect. Information problems and transaction costs may be significant, suggesting that disequilibria may persist in housing markets for a considerable period of time.[18] In this case, it is possible that both the life satisfaction and the hedonic regression approach will find significant effects for a particular characteristic. Moreover some characteristics change quite quickly over time; for example, bus routes change, patterns of crime may shift and some neighborhoods become "gentrified." Other characteristics, though, are much more permanent. A river or coastal area, for instance, is a fixture, the slope of the land cannot be changed easily and parks rarely move (although they may be improved). These more structural features (again assuming there is enough variation in the housing stock) may be priced in the cross-section of house prices at a given time, whereas characteristics that shift over time may not be priced appropriately in the snapshot of house prices typically available. This implies that hedonic regressions may reveal some valuations but not others depending on the nature of the characteristic in question. And where hedonic regressions do reveal values, they may only reveal those valuations imperfectly as the market may be slowly moving towards equilibrium.

Moreover, there may be insufficient variation in a particular characteristic across the housing stock for that characteristic to be priced. For example, if all houses have exactly the same type of roof, then the quality of roofing will not be reflected in house prices. Likewise, if the crime level is constant across neighborhoods this dis-amenity will not be

[18] Because, for example, of imperfect information with respect to certain features like crime, which cannot be associated easily with a specific location due to its transitory nature.

priced. In these cases, prices will not reflect the full marginal effect of these characteristics on welfare. In this case hedonic regressions may not find the characteristic significant, whereas these factors may well be picked up by the life satisfaction approach.

These issues are discussed further in van Praag and Baarsma (2005) where it is suggested that the hedonic and the life satisfaction approaches are complements. Indeed, it is shown that, if certain conditions are met, the correct valuation is actually the sum of the coefficients from the two approaches. However, this is only feasible if the same sample and the same variable are included in both analyses, and in general this is not the case. Moreover, it is also of interest to compare the two approaches and to understand what the combination of results implies for how housing markets operate in the region.

Any neighborhood characteristic (ranging from the quality of sidewalks, safety condition, or proximity to public transportation routes) can be classified as one of four options, according to their effect or lack of effect on housing costs and to their effect or lack of effect on subjective wellbeing or life satisfaction *beyond what is paid for it.*

As mentioned, the simplest case is that of characteristics affecting housing costs, which do not have an additional effect on life satisfaction. A typical example is access to types of transportation. The housing units that are closest to a subway station or public transportation routes often are worth more than those that are located at a greater distance. That people pay more for the former units implies that proximity to transportation has an impact on people's quality of life. But it does not *additionally* influence life satisfaction, which suggests its value is its price.

If a city spends more on the delivery of goods and services that influence housing costs, it makes an implicit transfer of wealth to owners of certain homes and not to others. This has two important implications. One is the type of goods or services that can, or perhaps should, be financed through real estate taxes. The other is that, unless goods and services are delivered equally across the board, the poorest residents of beneficiary neighborhoods will become displaced by those more fortunate people who are willing to pay higher prices for their housing. Thus, these types of goods can be a major cause of urban economic segregation, a problem that in itself is quite severe in many cities of Latin America.

For the reasons mentioned, not all goods and services that people care about are reflected in housing prices. Some contribute to life satisfaction without having any impact through the housing market. Typical examples are recreational centers and places of cultural interest. Those who have easy access to these places may enjoy a more relaxing lifestyle and lead more satisfactory lives, perhaps because sports and culture contribute to health, intellectual enrichment, and socialization. Since they do not contribute to inflating the prices of nearby housing it is not feasible or desirable to finance them with property taxes. But at the same time it should be noted that they do not exacerbate urban social segregation. On the contrary, the areas around these facilities may attract people of diverse socioeconomic backgrounds who appreciate health and culture, contributing to the diversity and vitality of the beneficiary zones. Since people appreciate investments of this type but do not pay for them, it is hardly surprising that they are an effective instrument for the politicians seeking to increase their popularity and garner votes.

Some neighborhood characteristics are reflected partially in housing costs and partially in life satisfaction. Quite common is the case of safety, as already seen. The implication of improving safety or security conditions is that although some residents may be pushed out, the effect is quite limited, given that the benefit in subjective perceptions will be far greater than the costs for the increase in security.

Finally, it is important to bear in mind that there are goods and services which, even though they may be potentially important factors in the quality of life, are not reflected in the costs of housing or in life satisfaction, as reported by individual survey respondents. This can occur for purely statistical reasons (for example, because the data on housing costs and life satisfaction are not sufficiently precise to take account of their impact, or because the problem is common to every city or group of neighborhoods under consideration, such that the effect tends to be the same on the vast majority of homes and persons, as for example with the issue of air quality).[19] But this may also occur with problems which people are largely unaware of or to which they are excessively accustomed. A potential example is poor citizen culture, where there is a pervasive absence of respect for norms and

[19] Another possible statistical reason is that a neighborhood characteristic, such as safety, is so closely correlated to a separate trait, such as the condition of public zones, that it is not statistically possible to disaggregate the two effects.

standards (zones where parking is permitted, respect for pedestrians, facilities for persons with disabilities, cleanliness of public areas, etc.). Another example is that of moderate traffic problems. It is important to know which of these are characteristic of neighborhoods or cities, because their solution will not be easily financed nor will it reflect recognition for local government efforts, unless a campaign is first carried out to raise awareness of the problem and its implications.

## 5. The Monitoring System and Public Decisions

The monitoring system described here facilitates public decision-making in many ways. It allows public officials to know what city attributes individuals value the most and which problems are most urgently in need of action. Ultimately it provides a methodology for officials to place a monetary value on city characteristics. Combined with cost information, this facilitates planning and investment decisions. These characteristics may range from physical amenities to issues such as pollution or crime. The methodology can be used to develop a weighting system which can then be employed to calculate overall quality of life indices for different neighborhoods or other city areas. These indices then allow for a comparison of neighborhoods or population groups and may then reveal where interventions to improve wellbeing are most urgently required.

Regular surveys can see how certain interventions affect life satisfaction over time and gauge how city officials are responding to demands revealed by published survey results. Moreover, monitoring systems across neighborhoods can generate a type of yardstick competition among officials to increase wellbeing within their neighborhood or municipality. A further interesting aspect of the monitoring methodology proposed here is that it can be used to promote dialogue between public officials and the city public and enhance participation in decision making. Frequently, the process of decision-making and ensuring adequate consultation is as important as the final decision itself. A well-functioning monitoring system can be used to request opinions on particular issues faced by communities and to enhance participation in critical decisions.

The methodology proposed here may also allow officials to assess how investments to improve city wellbeing may be appropriately financed. Investments to improve

characteristics that are fully valued through house prices (and are not found to be significant in life satisfaction regressions) may be recouped through property taxes of those houses on which prices will rise as a result. Other improvements to city wellbeing that are not revealed through enhanced house prices would in general have to be financed through more general taxation.

For local authorities and for citizens, an attractive trait of the proposed system of monitoring is that it can be employed on a regular basis to gauge the progress of the city and its neighborhoods. Over time, this monitoring system makes clear whether enhancements in aspects of the city are important to people. It also helps to reveal which efforts by builders, on the one hand, and by local authorities, on the other, are concentrated more in some neighborhoods than in others or among certain socioeconomic groups. If subjective information is collected on people's satisfaction with specific aspects of their cities, it will be possible to assess people's perceptions of the severity of problems in accordance with objective indicators, and whether the gaps between perceptions and reality differ in different zones of the city, especially between high-income and low-income areas. Since valuations are based on regressions by city, the method does not permit comparison of the quality of life of different cities nor, consequently, can it provide city rankings.

A book recently published by the World Bank and the Inter-American Development Bank,[20] in which the application of this methodology is presented in greater detail, discusses additional aspects of how this type of inquiry should be carried out, and how a system to monitor the quality of urban life—one that is easy to operate at a reasonable cost on the basis of solid conceptual foundations—can be carried out in practice. This is the ideal of many scholars and observers of urban issues, and its application in reality may not be too far off in the future. A good monitoring system should enable local governments, analysts of urban problems, and local communities to engage in informed debate on the problems of cities and their possible solutions.

[20] Lora et al. (2010).

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