The Effects of Environmental Disamenities on House Prices

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Abstract

The market price of a property is a function of its physical characteristics, location, neighbourhood, and real estate environment. Impact of environmental disamenities, especially water and noise pollution, on property value had continued to receive attention in the property market. The objective of the study is to examine the effects of water and noise pollutions on house prices, besides, other factors. The study areas chosen comprised residential neighbourhoods nearby sources of such pollutions. Digital maps were used to identify parcels of residential properties that were presumably affected by such pollutions, using GIS' overlay and buffering functions, after integrating the digital cadastre and house transaction data of the study areas. Using the overlay and buffering functions, two proxy environmental variables were included in the regression models to capture pollution effects on house prices. The analysis disclosed that houses affected by water and noise pollutions were sold at lower prices compared to those unaffected by such pollutions. The evidence shows that house buyers regard environmental quality as an important factor in real estate transaction. In particular, environmental disamenities resulting from water and noise pollution could have been negatively capitalised into house prices.

Key words: environmental disamenities, water and noise pollution, house prices.

1.0 INTRODUCTION

The effects of environmental pollution on property values have not been so apparently reflected in the Malaysian property market. For this reason, it is rather difficult to practically ascertain whether environmental pollution affects buyer's utility and, thus, is reflected in real estate transactions.

Some segments of the society tend to disregard pollution problems in their neighbourhoods. Part of the explanation is that they are not being deterred by these problems rather they are more influenced by some pulling factors such as public amenities, proximity to city centre, and neighbourhood conditions. Nevertheless, this is not a general situation. Property values can be sensitive environmental conditions if the society expressly so regards the phenomena and people react to them in a certain way. For instance, environmental pollution may affect property values if it affects their life. In this case, environmental pollution may lower the values of real estate ().

Where environmental pollution negatively affects the community, it is taken into account in real estate transactions. The effects of environmental pollution may then be capitalised into property values negatively as a result of buyer's disutility. Consequently, properties affected by pollution demonstrate a lower price level compared to those unaffected.

Therefore, pollution problem is a factor that needs a particular consideration in real estate valuation besides other value factors such as location, transaction date, property type, lot position, etc.

With a total of 128 formal complaints about environmental pollution in 2002, Johor Bahru can be considered as the most polluted district in the state of Johor (DoEM, 2005).

This study has two objectives. First, to identify environmental elements, particularly water and noise pollution, and micro factors that could have influenced house prices in the study area. Second, to model and estimate the effects of environmental disamenities and other factors on house prices within the study areas.

The second part presents a brief literature on the topic. Next, data and analysis procedures are discussed in the third part. The fourth part discusses the findings of this study. Conclusion and recommendations for further studies are discussed in the last part of this paper.

2.0 THEORETICAL FRAMEWORK

2.1. Factors Affecting House Price

There are a number of factors that influence house prices. For example, house prices are determined by a multitude of factors associated with accessibility, neighbourhood, physical characteristics, social, and environment (Kauko, 2003).

Land value is negatively related to distance (Byroom, 1979) where the best location with higher value is in the town centre (Nelson, 1958). It is the centre of economic, market, and social activities. It has high land use competition (Khan, 1977). Land and/floor size is positively related to value (Lexington, 1971). A corner lot or an end lot, for example, has a higher value due to its larger size compared to an intermediate lot. Differences in the right of interest will also influence land value differently (Lean and Goodall, 1966).

In the environmental context, negative externalities such as water, noise, and air pollution and visual obstruction can influence land value (Miller, 1982; Segerson, 2001). Some research discovered that externalities associated with industrial land use cause land value to drop (Lentz dan Wang, 1982).

The surrounding development refers to nearby activities that can positively or negatively affect a land parcel. For example, a housing area located nearby an industrial area may create noise, congestion, and other types of environmental pollution, making the area less attractive to buyers (Zulkifli, 1995). Neighbourhood factors also influence house prices in terms of environmental conditions and population characteristics.

2.2. The Environment and House Prices

Environmental disamenities affecting residential properties can emerge in various forms such as flood (Lamond et al., 2007), hazardous waste (Gayer, 2000; McCluskey and Rausser, 2003), soil pollution (Zavadskas et al., 2007), water pollution (), air pollution (Jaksch, 1970; Anderson and Crocker, 1971); Murdoch and Thayer, 1988; Smith and Huang, J. C., 1993; 1995), noise pollution (Palmquist, 1982; Hughes and Sirmans, 1992), etc.

Polluted rivers are a from water pollution that occur in various parts of the world (). Infrastructural projects such as the expansion of airport and construction of high-speed railways cause various kinds of unavoidable nuisance such as noise (Theebe, 2004).

Past studies have demonstrated the significant physical, psychological, economic, or market effects of environmental disamenities on property prices such as aircraft noise (Collins and Evans, 1994; Stansfeld *et al.*, 2005; von Praag and Baarsma, 2005; Diaz-Serrano, 2006;); traffic externalities (Hughes and Sirmans, 1992); air pollution (Anderson and Crocker, 1971; Murdoch and Thayer 1988; Brucato et al., 1990; Smith and Huang, 1995); and water quality (Epp and Al-Ani, 1979; Young and Teti, 1984). In general, these studies discovered negative effects of bad environmental quality and positive effects of good environmental quality on property prices, although there were also some anomalies (Malone and Barrows, 1990; Smith and Huang, 1993).

2.3. Measuring the Effects of Water and Noise Pollution of House Prices

The general approach to measuring the effects of these environmental disamenities is by estimating consumer's willingness to pay (WTP) with respect to different levels of pollution. Theoretically, consumer's WTP for a particular differentiated good can be represented by its market price (Rosen, 1974, Freeman, 1974). It follows that, in optimum, consumer's marginal WTP equals his marginal rate of substitution between the price of the good and any of its attributes and, thus, the slope of the price function may be used to determine consumer's marginal WTP (Andersson et al., 2008).

Based on the above principle, the general approach to measuring the effects of environmental disamenities such as pollution is by estimating percentage or dollar reduction in house prices with respect to the levels of pollution involved or with respect to the possibility of being affected by pollution. In our study, we choose the second option, whereby we use proximity of a particular parcel to water or noise pollution sites as a proxy for the possibility of that parcel being affected by the pollution in question (Figure 1).

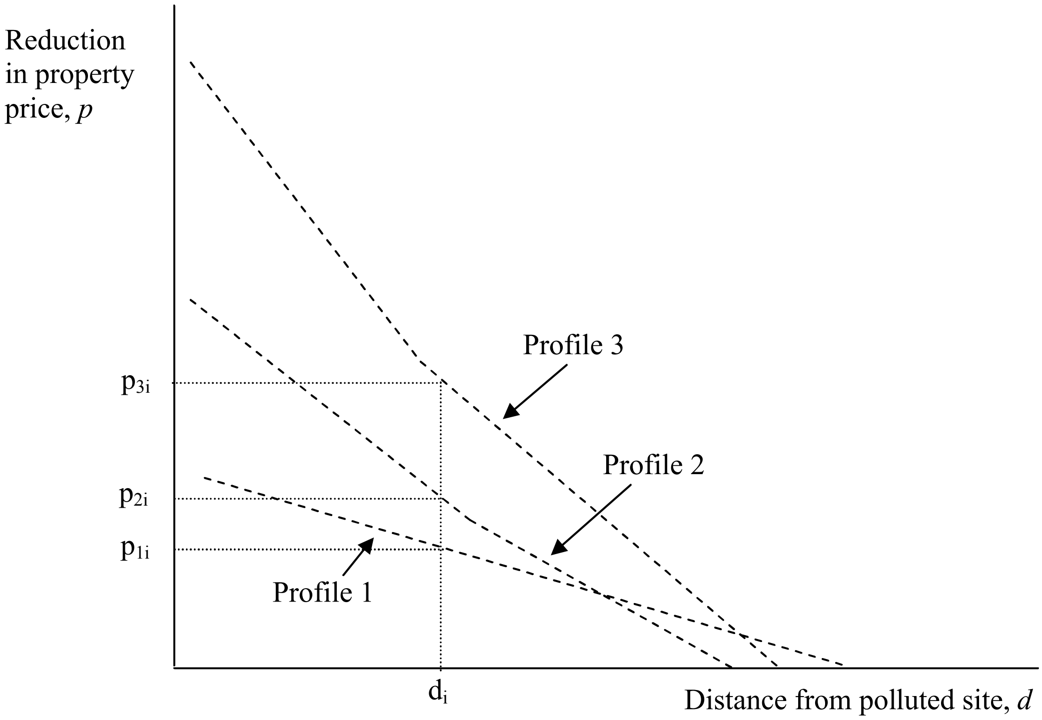

Figure 1: Proximity to polluted site and house price (Authors' concept)

The relationship between property price reduction and proximity to a polluted site is defined by certain profiles that may represent some discriminating elements such as sub-market area or type of pollution. Thus, different profiles will exhibit different effects of environmental disamenities on property prices, given a certain level of attribute, say property distance from a polluted site. In Figure 1, let's assume that the profiles represent different types of pollution; noise (profile 1), water (profile 2), and air (profile 3). Assume that these types of pollution occur within the same market area among some cluster of properties. Given a certain level of attribute, say d_i - which is proximity - the respective effects of different types of pollution on property prices differ; p_{1i} for profile 1, p_{2i} for profile 2, and p_{3i} for profile 3.

Let say, we have a simple property price model as follows

$$P_i = \alpha + \beta X_i + u_i \quad (1)$$

where P_i is the ith. observation of property price and X_i is the i^{th}. observation of property attribute; α is regression intercept, β is regression slope, and u is error term.

In our study, we assume a situation where the regression intercepts, not the slope, are different between the two discriminating groups, water and noise pollutions, in this case. This is because we only investigate a dichotomous situation of "existence" or "non-existence" (and not the "levels") of water or noise pollution among the sampled properties so that only differentiation of the intercept dummies is required to measure pollution effects on house prices.

For capturing such effects, statistical analysis is usually applied for analysing property prices against environmental disamenities (Palmquist, 1982). The theoretical foundation of measuring environmental deprivation such as water, air, and noise pollution dated back in the 1970s, whereby property data were used in the hedonic modelling of residential property values. The verdict of this method is that, all else equal, if similar homes sell for less the closer they are to the source of disamenity, the conditional difference in price is interpreted as the market discount attributed to that problem.

We introduce dichotomous variables for the pollution factor such that D = m-1, where D is the number of dichotomous variables to be included in a model and m is the number of groups with respect to a discriminating factor under question, namely water or noise pollution.[1] The regression intercepts tell how much pollution "affected" and "unaffected" properties relatively differ from each other, which can be specified as

$$P_i = \alpha + \beta X_i + \lambda D + u_i \quad (2)$$

The expected regression function of pollution "unaffected" properties is given in equation (3) while that of pollution "affected" properties in equation (4)

$$E(P_i \mid D = 0, X_i) = \alpha + \beta X_i \quad (3)$$

$$E(P_i \mid D = 1, X_i) = (\alpha + \lambda) + \beta X_i \quad (4)$$

Equations (3) and (4) assume that the slope of regression equation of a given profile, β, is the same as that of other profiles. The differential effect of pollution on house prices between "affected" and "unaffected" properties is obtained by subtracting equation (3) from equation (4). Thus,

$$\delta P_i/\delta D = (\alpha + \lambda) + \beta X_i - \alpha + \beta X_i$$

$$= \lambda$$

This quantity is exactly the value of dichotomous variable's slope in equation (2). Note that since one of the two groups is made the control group, λ should be interpreted as the amount of differential effect of pollution on house prices between the "included" and "control" groups.

2.4. Previous Studies

Environmental disamenities resulting from water, air, or noise pollution have long been

[1] The general rule for specifying dummy variables is discussed in many econometrics textbooks. See for example, Gujerati (1979, pp. 209-291).

researched with a focus on examining their effects on house prices. Noise pollution has been more frequently investigated, followed by water and air pollutions. Most studies have disclosed the negative impacts of all the three types of pollution on house prices (Table 1).

Table 1: Use of hedonic models in investigating environmental disamenities

Author	Focus of study	Data used for the dependent variable	Findings
Walters (1975)	Relationship between house prices and proximity to noise sources.	Market data for estimating shadow price of noise.	Properties closer to source of noise have lower sale prices.
Palmquist (1982)	Effect of highway noise on property values	Repeat sales on houses.	Properties closer to source of noise have lower sale prices.
Malone and Barrows (1990)	Effect of nitrate pollution of groundwater on residential property prices.	Residential property prices.	Nitrate pollution of groundwater had no statistically significant effect on the price of residential property
Hughes and Sirmans (1992)	Effects of traffic intensity on property values.	Single-family housing transactions data.	Substantial negative price effect of traffic externalities on house prices. The magnitude of the effect was shown to be location specific.
Smith and Huang (1993)	Meta analysis on the effects of air pollution on house prices in thirty-seven previous studies.	House prices.	Negative and statistically significant relationships between housing prices and air pollution measures.
Collins and Evans (1994)	Effect of aircraft noise on residential property values.	Market prices of residential properties.	There have been varying effects of noise on different property types and neighbourhoods.
Levesque (1994)	Effect of airport noise on property prices.	Sale prices of residential properties	
Eugenio *et al.* (1996)	Effect of air pollution on property prices.	House prices.	Negative effects of air pollution on house prices
Hite (1998)	Role of information on disamenities residential real estate prices.	House prices.	Among other things, informed buyers about disamenities (in this case landfills), bid down house prices.
Deaton and Hoehn (2004)	Impacts of landfills sited among grouped environmental hazards located in industrial zones on property values.	House prices.	Residential property values are reduced by increased proximity to hazardous waste sites.
Espey, M. (2000)	Airport noise and proximity on residential property values.	Sale prices of residential properties.	Property values closer to airport were registered lower than those farther away from it.

Gayer (2000)	Relationship between housing prices and environmental risks from pollution.	House prices.	Among other things, neighbourhoods with low-priced houses were associated with greater environmental risks.
Leggett and Bockstael (2000)	Potential benefits from water quality improvement, by calculating an upper bound to the benefits from a more widespread improvement.	Sales data of waterfront properties.	More polluted water (higher levels of fecal coliform) significantly depressed property values.
McCluskey and Rausser (2003)	Causal relationship between housing appreciation rates and house location in relation to a hazardous waste site.	Resale data from individual sales transactions.	Residential property owners in close proximity to the hazardous waste site experienced lower housing appreciation rates.
Theebe (2004)	Non-linear impact of traffic noise on property prices through using spatial autocorrelation techniques to overcome the regular problems of traditional NIMBY-analysis performed by hedonic regression		Impact of traffic noise ranged to 12%, with an average of about 5%. The discount varied across sub-markets and was a non-linear function of the noise level.
Zavadskas et al. (2007)	Effects of air or noise pollution on property values.	Property sales data.	Property prices differed depending on property location from the source of pollution, whereby it exerts a rather sizeable influence on property prices.
Cohen and Coughlin (2008)	Effects of airport noise and proximity on housing prices.	House prices	Houses located in noisy areas (70-75 dB) sold for 20.8% less than houses located in less noisy areas (<65 dB)
Andersson et al. (2008)	Eeffect of road and railway noise on property prices	House prices	Road noise has a larger negative impact on the property prices than railway noise.

Most studies use hedonic regression for examining price-pollution relationship in linear, intrinsically linear, or non-linear forms. The first two functional forms are more frequently applied in the majority of studies.

In our study, we apply linear regression to capture the effects of water and noise pollution on house prices. The reason for this linear specification is that we only use dichotomous variables through buffering of distance of houses from the sources of environmental disamenities, within a short distance. Furthermore, each of the study areas covered only a small geographic span. Therefore, we do not expect a non-linear relationship between house prices and environmental disamenities.

3.0 DATA AND ANALYSIS PROCEDURE

Two independent geographic areas with different scenarios of environmental pollution were conducted. The first was an area within the Central Johor Bahru Municipality comprising some residential neighbourhoods in the vicinity of polluted rivers of Sg. Melayu, Sg. Danga, and Sg. Skudai. The sampled parcels were located within Taman Perling, Taman Sutera and Taman Baiduri. The second was an area within the Senai-Kulai jurisdiction comprising residential neighbourhoods within airport, road/highway, and/or industrial noise-disturbed Taman Perindu, Taman Perindustrian Murni Senai, Taman Senai Utama, and Taman Seri Senai.

Location/site plans of both geographic areas were obtained from Kulai Municipality (MPKu) and Central Johor Bahru Municipality (MBJB), respectively, while digitised maps of the areas were obtained from Department of Surveying and Mapping Malaysia (JUPEM). Data on environmental quality (water, air, and noise) for both geographic areas were obtained from Department of Environment Malaysia's (DoEM). Information on the sources and impacts of pollution on the society, especially health, was obtained from secondary publication as well as unstructured interviews with the environmental officers in charge of both areas. Overall, this study has discovered that air and noise pollution in Johor Bahru is under control whereas water pollution is generally alarming. Property and sales data were obtained from Department of Valuation and Property Services, Johor Bahru.

Arc View 3.3 and MapInfo were used for parcel-based mapping of the first and second geographic areas, respectively, in order to spatially identify each sampled transacted property. Then, buffer and overly operations were performed to select "river pollution" affected parcels of residential properties along three rivers in the study area, namely Sg. Skudai, Sg. Danga, and Sg. Melayu. Based on environmental quality index (EQI) developed by DoEM, these rivers have been classified by DoEM as polluted rivers (Figures 1 and 2).

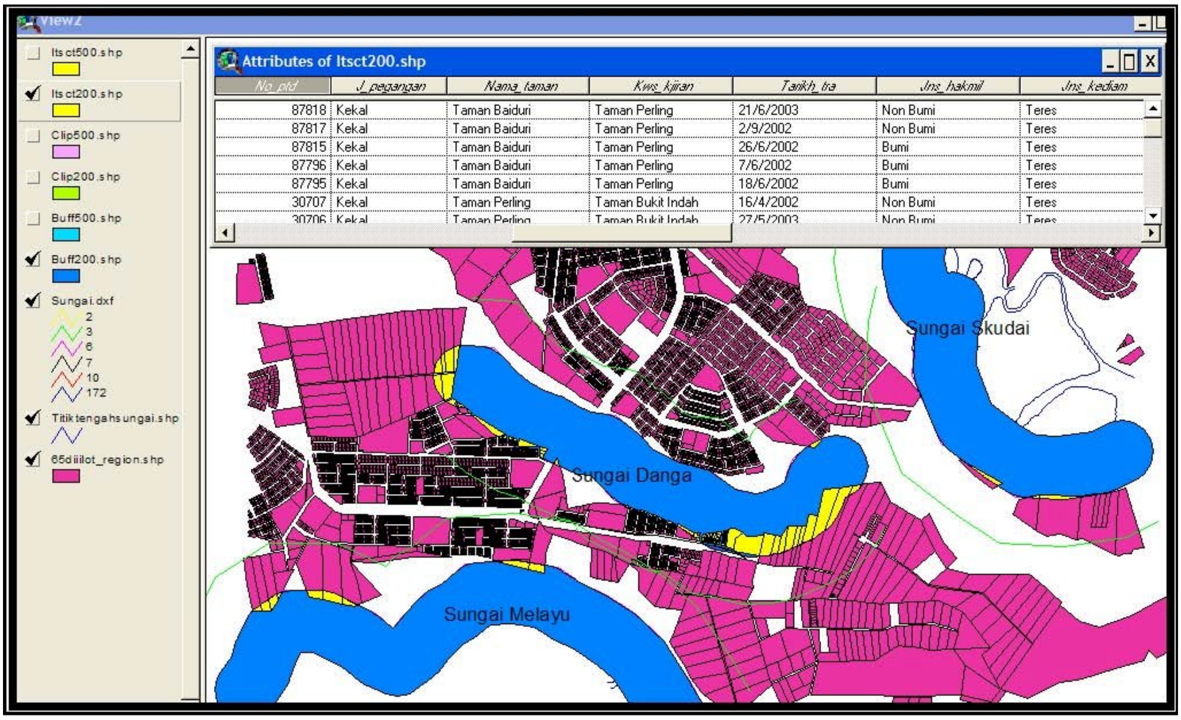

Figure 1: Parcels of residential properties located at a distance less than 200 meters from polluted rivers.

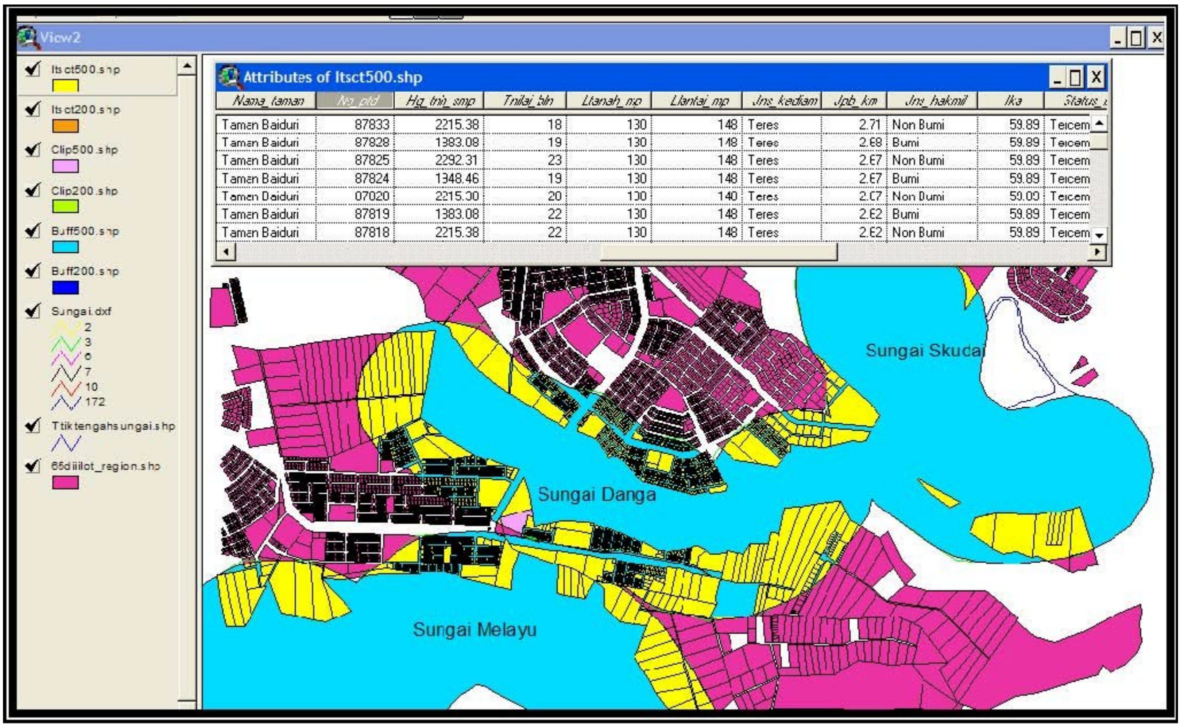

Figure 2: Parcels of residential properties located between 200 and 500 meters (inclusive) from polluted rivers.

Similar operations were also performed to select "noise disturbance" affected parcels of residential properties within the Senai-Kulai area, using a GIS base map (Figure 3). The sources of noise disturbance were Sultan Ismail International Airport (60-75 dBA) for Taman Perindu, railway lines (60-65 dBA) for Taman Senai Utama, road traffic (60-65 dBA) for Taman Seri Senai, and factories (60-70 dBA) for Taman Perindustrian Murni Senai (DoEM, 2005).

The buffering and overlay operations have resulted in as many as 298 parcels of sampled residential properties, in the first geographic area, and 230 parcels of sampled residential properties in the second geographic area.

The conventional regression model was specified to capture the effects of property's physical attributes (lot and floor size, house type, lot position); neighbourhood and location; market conditions (transaction date), legal characteristics (freehold, leasehold, and ownership type), and environmental elements, in particular water and noise pollution (buffer 1, buffer 2). These variables are shown in Tables 2 and 3.

4.0 RESULTS AND DISCUSSION

4.1. Basic Results

The regression results for both geographic areas are shown in Tables 2 and 3. Based on F-values, overall, the models were significant in explaining the factors that influenced house prices in the study areas albeit a low level of R^2. This could have indicated possible exclusion of some relevant variables and/or model misspecification. However, addressing such a limitation is not intended in this study. On the basis of t-values, except for a few variables, all other variables can be considered to be significant determinants of house prices, including the variables representing water and noise pollutions.

Figure 3: Parcels of residential properties located between 200 meters (inclusive) from noise-emitting trunk road.

Table 2: Regression results for the first geographic area (Dep.: per sq. m. house prices)

R^2		0.412		
F-value		13.159		
Standard error of estimate		309.930		
Sample size		298		
		Coefficient	*t-value*	
Constant		928.216	3.212	**
Neighbourhood maturity	(1= more developed; 0=less developed)[a]	445.357	3.380	**
Date of transaction	(number of months from 1/12005)	-7.299	-1.506	*
Land area	(sq. m.)	-2.039	-5.607	**
Floor area	(sq. m.)	1.613	1.178	
House type:				
Terraced	(1=yes; 0=no)	-733.689	-3.762	**
Semi-detached	(1=yes; 0=no)	14.886	0.063	
Lot position				
Intermediate lot	(1=yes; 0=no)	139.973	1.153	
Corner lot	(1=yes; 0=no)	458.368	2.960	**
Ownership type	(1=Non-bumiputra; 0=bumiputra)	16.998	0.267	
Holding type	(1=freehold; 0=leasehold)	885.083	3.322	**
Perling	(1=yes; 0=otherwise)	509.486	2.785	**
Bukit Indah	(1=yes; 0=otherwise)	847.503	4.995	**
Jarak CBD	(km)	-0.293	-2.880	**
Water (river) pollution				
Within 200 m from source	(1=within the distance; 0=otherwise)	-305.068	-2.666	**
Within 200-500 m from source	(1=within the distance; 0=otherwise)	-174.377	-1.823	*

[a] Level of development is assessed from various aspects, including age of neighbourhood, local economic profile, and level of services provided in a particular area; b [b] Outside a 500 m range was used the control group. * Significant at α = 0.05; ** Significant at α = 0.01.

4.2. Disbenefits of Water and Noise Pollution on House Prices

The variables representing house distance from polluted Sg. Skudai, Sg. Melayu, and Sg. Danga were statistically significant. Houses sited within a buffer of less than 200 m from these rivers have shown a larger amount of drop in house prices compared to houses sited within a buffer of 200-500 m from them. Overall, based on the regression coefficients, the closer the distance of a house to a polluted river, within a distance of 0-500 m, the lower was its market price compared to a comparable house sited further away from it, whereby the margin of price reduction was in the range of RM 174-305/sq. m.

There was also some evidence that noise pollution has had a negative effect on house prices. The closer the distance of a house to the source of noise, within a distance of 0-500 m, the lower was its market price compared to a comparable house sited further away from it, whereby the margin of price reduction was in the range of RM 119-245/sq. m.

By comparing Tables 2 and 3, we can say that environmental disamenities resulting from water pollution could have been more impactful than that resulting from noise pollution. The differential disbenefits of water pollution compared to noise pollution on house prices is in the bracket of (305-245)/305 x 100 = 19.7% to (174-119)/174 x 100 = 31.6% more per sq. m. of land area.[2]

Table 3: Regression results for the second geographic area (Dep.: per sq. m. house prices)

R^2		0.40		
F-value		18.165		
Standard error of estimate		162.596		
Sample size (N)		230		
		Coefficient	*t-value*	
Constant		21,433.245	2.055	**
Date of transaction	(number of months from 1/1/2003)	0.0001	-3.982	**
House type	(1=single-storey; 0=other types)	-36,427	-1.786	*
Holding type	(1=freehold; 0=leasehold)	319.358	8.336	**
Lot position[a]				
Intermediate	(1=yes; 0=no)	36.498	1.086	
End	(1=yes; 0=no)	2.998	0.080	
Floor size	(sq. m.)	-2.244	-5.793	**
Noise pollution[b]				
Within 200 m from source	(1=yes; 0=no)	-245.242	-7.289	**
Within 200-500m from source	(1=yes; 0=no)	-118.690	-3.663	**

[a] Corner lot was used as the control group; [b] Outside a 500 m range was used the control group. * Significant at $\alpha = 0.05$; ** Significant at $\alpha = 0.01$.

Based on the above results, a simple simulated house price schedule for the study areas can be constructed to guide buyers and investors in property purchase decisions (Table 4). The effects of water and noise pollutions on house prices in the table are assumed to be exclusive of each other. As a matter of fact, there can be combined effects resulting from concurrent pollution of both types at a particular site or on a particular property parcel. However, this dimension of effects was not the focus of this study and, thus, it implies an opportunity for a further investigation in the future.

From Table 4, we can further analyse how much environmental disbenefits cost the community in terms of their wealth.

[2] A word of caution should be exercised in this comparison though, since both models have different specifications. Furthermore, the models represent two different sub-markets; the comparison is valid assuming that houses and property sub-markets in both geographic areas, are reasonably comparable. Additional analysis from the Property Market Report (2007-2009) disclosed that the average property price was quite comparable in both geographic areas, i.e. RM 150,000 per unit for single-storey and RM 245,000 per unit for double-storey terraced house.

Table 4: Price schedule of terraced houses 'with' and 'without' environmental pollution

Type of house	Average land area (sq. m.)	Average normal price 'without' pollution (RM/unit)	Average price 'with' pollution (RM/unit)			
			Water		Noise	
			< 200 m	200-500 m	< 200 m	200-500 m
Single-storey terraced	143	150,00	106,385	125,118	114,965	132,983
Double-storey terraced	143	245,00	201,385	220,118	209,965	227,983

From site inspection, the number of residential properties (single- and double-storey terraced) sited within 500 meters from polluted rivers in the study area was estimated to be 450 units. Taking an average price of RM 197,500 per unit, the total community's wealth 'without pollution' is 197,500 x 450 = RM 88,875,000. Taking an average price of RM 163,252 per unit 'with pollution' scenario, the total community's wealth is RM 73,463,288. Thus, wealth loss due to water pollution is estimated to be RM 15,411,712.

4.3. Study Implications: Environmental Disamenities and Sustainability

Sustainability is an endless issue and hundreds of social, economic and environmental indicators are being established (Zavadskas et al., 2007) to unravel its concept and application. In the context of our current study, property price behaviour is one of those indicators. In general, if property prices are favourable in the free market, sustainable property market can be justified, especially in terms of investment opportunities. This is because levels of property prices have a close relationship with investment opportunities, say investment returns. Where market can sustain (high) property prices, it will encourage property demand for ownership and/or investment. This will provide an opportunity for favourable investment returns to property owners. Environmental disamenities beset such an opportunity.

Negative capitalisation of property value as reflected in the drop in house prices is a signal of depriving effects of environmental disamenities on property market. Unfortunately, those who suffer from these disamenities remain uncompensated (Grundy, 1996). This will discourage a healthy property market. Therefore, such a signal must be relayed to the society as a means of urban management strategies, particularly, those related to sustainability.

So far, systems for sustainability evaluation have ignored market-based indicators (see for e.g. Zavadskas et al., 2007, Table 1). As a matter of fact, an approach should be developed to use market-based indicators for evaluating property market sustainability and, in turn, for evaluating urban sustainability. Using property price as a basis for measuring environmental disamenities on the society is an application on one side. Specifically, property price based spatial index of environmental disamenities can be constructed and used as an indicator of the level of urban sustainability. Neighbourhoods with large effects of environmental pollution on house price, for example, can be marked as unsustainable living areas.

On the other side, market prices of properties can also be used to estimate windfall gain by property owners as a result of environmental quality improvement (Leggett and Bockstael, 2000). One option is to reduce the level of water, air, and noise pollution and to assess how such reduction can improve property values. These values, in turn, can be used to gauge whether or not property market sustainability can be achieved through environmental improvement.

5.0 CONCLUSION

Our analysis has discovered that houses affected by water and noise pollutions have been sold at a lower price compared to those unaffected by them. This study has provided some evidence that house buyers could have considered environmental quality as an important factor in property transactions. In particular, environmental disamenities resulting from water and noise pollutions could have been negatively capitalised into house prices.

An indirect impact of environmental disamenities is unsustainable property market. Therefore, this study has made a point that market-based indicators be used to evaluate urban sustainability through measurement of environmental disamenities caused by pollution. Specifically, property price-based spatial index of environmental disamenities can be constructed and used as an indicator of the level of urban sustainability. Neighbourhoods with large effects of environmental pollution on house prices, for example, can be marked as unsustainable living areas.

If this index is accepted in the environmental management, it will become an important environmental indicator that relays a meaningful signal into the property market.

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